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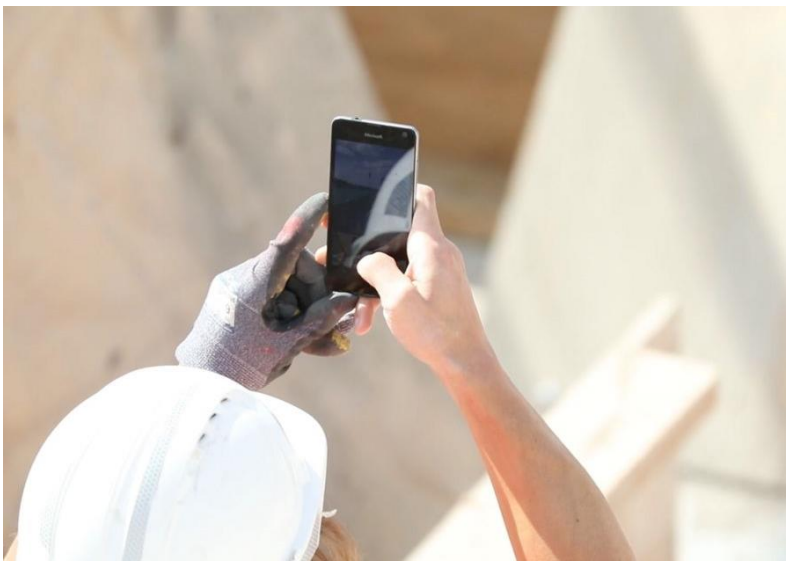
CITB ANALYSIS

Construction demand and skills analysis for Hertfordshire LEP



An analysis of the opportunities presented by the construction landscape in the Hertfordshire LEP with consideration of smart construction

March 2020

EXECUTIVE SUMMARY

Hertfordshire can expect sustained spending on new construction projects of almost £1.1 billion per year for the foreseeable future. To meet this anticipated demand a peak construction workforce of around 45,880 people is required in 2019 increasing to around 46,350 in 2023.

Although it appears that the total construction workforce available is sufficient to meet Hertfordshire's needs (current workforce approx. 52,000) this belies a number of factors that are critical in understanding Hertfordshire's circumstances and the risks the construction landscape is facing. There is huge construction demand from London as well as other areas close by, that will apply a significant draw on Hertfordshire's workforce. With an aging workforce it is likely that workers will move into less strenuous roles or retire, diminishing the skills available. There are also some occupations where the workforce will not be sufficient, creating risk for individual trades.

Across the area, new housing accounts for a very significant proportion of spend on new projects at 35%. Infrastructure accounts for 26% of anticipated spend on new projects in 2019; with private commercial developments accounting for 22%.

Hertfordshire LEP's opportunity

Hertfordshire LEP is presented with the continuing opportunities to: support growing businesses; develop a more appropriately skilled and flexible workforce; drive higher level skills, match skills and the local economy and encourage job creation. This will, in turn, support the delivery of new housing that will enable further development and ensure that the area is prepared to exploit opportunities as they emerge and deliver the new housing that is needed.

Construction on its own makes up a huge part of the UK economy representing more than 7% of GDP and around 10% of employment. But crucially it is also an enabler. It has the potential to enhance the environment and create better public spaces and put in place the facilities and infrastructure that open up growth opportunities and the sites for new technologies and manufacturing. Construction opens up opportunities for major social and economic gains.

> *"The Hertfordshire LEP area will have a huge range of opportunities in construction trades and professions over the coming years. With well-paid and highly skilled job opportunities in a wide range of trades and professions, the construction industry, schools, colleges, influencers and parents should be working together to encourage young people and career changers to look at construction as a career of choice with excellent prospects. A skilled workforce will help the area's growth aspirations and leave a legacy for future generations; CITB is working with employers to inspire, attract and train this new talent for these valuable and rewarding careers."* Andy Barron, CITB Partnership Manager

High demand occupations (2019- 2023)

The trades for which there will be the highest volumetric demand in the Hertfordshire area are[1]:

- Non-construction professional, technical, IT, and other office–based staff (excl. managers)
- Wood trades and interior fit-out
- Other construction process managers
- Electrical trades and installation
- Senior, executive, and business process managers
- Plumbing and HVAC[2] trades
- Other construction professionals and technical staff
- Labourers nec[3]
- Painters and decorators

At risk occupations (2019- 2023)

The occupations at highest risk of a shortfall in numbers (where demand exceeds supply) are:

[1] From CITB's Construction Skills Network Occupational Groups

[2] Heating, Ventilation, and Air Conditioning

[3] nec: not elsewhere classified

- Civil engineering operatives
- Electrical trades & installation
- Painters & decorators
- Specialist building operatives
- Non –construction operatives

Priority occupations (2019- 2023)

There are two occupations for which there is a high volumetric demand AND a high risk of a shortfall in numbers:

- Painters and decorators
- Electrical trades and installation

Occupations in context – the challenge

This report sets out a challenge to the Hertfordshire LEP, local authorities, FE colleges, universities, training providers, construction employers and other stakeholders – namely to attract, train, recruit and maintain a high skilled construction workforce that meets anticipated demand.

Construction offers a range of well-paid high skilled jobs for which there is demonstrable demand. The opportunity is to achieve social and economic gains by encouraging people from the area into these roles, providing the associated support and career pathways.

This challenge is set against the backdrop of: concerns about the future availability of skilled workers and demand from other UK regions and major infrastructure projects.

Hertfordshire's geography

Hertfordshire's risks of shortages appear less pronounced than for some areas and for fewer occupations; this though needs to be considered in the context of Hertfordshire's geography. London is likely to exert a very significant pull on the area's construction workforce. Similarly, CITB has seen significant demand from parts of Cambridgeshire that could also draw of workers, exacerbating shortages in Hertfordshire.

The professions

There appears to be low to moderate demand for several professional roles - jobs which require a significant length of training before candidates become qualified – in the Hertfordshire area. Architects, surveyors and civil engineers require higher level qualifications plus professional accreditation, so the effect of action now will only be felt in five to ten years' time. These are jobs in demand the world over. However, these roles do not need to be permanently on-site so it is likely that some demand may be met by those working outside the region.

There are also opportunities to modernise construction and for Hertfordshire to start to encourage and adopt new technologies and new practices like off-site and modular construction to help meet demand.

Training and education

Around 90 training providers have delivered construction related training (including apprenticeships) over the last five years. A core network of nine providers have delivered around 88% of that.

Construction training starts increased by 12% between 2012/13 and 2016/17, much greater than the decline of 5% experienced by the whole of the East of England region. However over the same period, apprenticeship starts within Hertfordshire increased by 29%, just below the East of England's 34%.

Competence qualifications are considered important and for many occupations achievements fair positively compared with the region. Of these, 62% have been at level 2; Level 3 make up 37% but only 1% are at level 4 and above.

Smart construction & future skills

Evidence suggests that smart/ digital construction will not sweep the industry at once – particularly when considering the vast differences between occupations and the technology itself. But it is coming; to prepare for it, the industry must upskill not only technically, but with a flexible mind-set. CITB Research suggests that Future curricula should consider the opportunities to support or develop employees so that they can:

- *Think creatively about problems and their solutions: be able to articulate clearly exactly what problem needs solving and thinking beyond what they have to hand about solving it.*
- *Understand how to use digital tools: have awareness and some knowledge about a wide range of digital platforms and hardware.*

- *Assess which tools to use in which circumstances: be able to assess a wide range of options to find a resolution and identify when the right tool isn't available.*
- *Manage the data that flows to and from the use of these tools: have an understanding of different types of data and what can be collected, how to share this and what implications it has.*

Action to address future skills needs should be incremental and take into consideration the delivery of training that supports construction industry needs – i.e. establish site ready proficient workers. Emphasis should be on ensuring that initial training leads individuals into more advanced and competency based training and high quality sustainable apprenticeships.

For many candidates consideration should be given to enhancing competencies such as: interpersonal skills, time management; curiosity; communication; problem solving; confidence; creativity; initiative; organisation; resilience; teamwork. Many of these competencies are considered essential within what is considered *Future Skills.* However many of these competencies are just as relevant in the workplace now.

In the longer term there may also be opportunities for the Employment and Skills Board to work with those colleges that offer Higher Education qualifications and Universities to consider how they can attract, train and retain the higher level, advanced and 'future' skills for which there appears to be demand and inadequate provision (across the UK). For example that may be in high demand for the many significant projects that are expected to proceed in the Hertfordshire LEP and further afield and that will increasingly need to utilise developing technology e.g. Building Information Modelling (BIM).

Recommendations

The report proposes recommendations that include:

1. Strengthen existing, and develop new, collaborative partnerships. With a view to building holistic action plans and encouraging local stakeholders to work together and input to, and take ownership of, the construction skills actions.
2. Review the Hertfordshire area construction skills strategy and action plan, identifying new collective actions and solutions that may be required in and across the area.
3. Develop skills and training pathways for current needs and develop future skills. Ensure training is appropriate for local needs and businesses. Develop Hertfordshire area construction training so that it is appropriate for the needs of the construction industry and local circumstances, addressing risks of supply shortfalls.
4. Outreach. Build a more positive image of construction locally with young people. Increase recruitment through new entrance points, career changes and reskilling. Emphasise that construction offers high value rewarding careers for all.
5. Use procurement as a lever to enable positive action. Develop smarter approaches to procurement to encourage wider contract award inclusivity of small and medium sized employers. With those tendering for construction and infrastructure contracts or those funding developments to be mandated to include provision for recruitment, training, apprenticeships and outreach.

CONTENTS

APPENDIX CONTENTS

LIST OF FIGURES

LIST OF TABLES

1. INTRODUCTION

1.1. THE SCOPE OF THIS REPORT

Figure 1 shows the area covered by the Hertfordshire LEP, and Table 1 shows the local authorities involved.

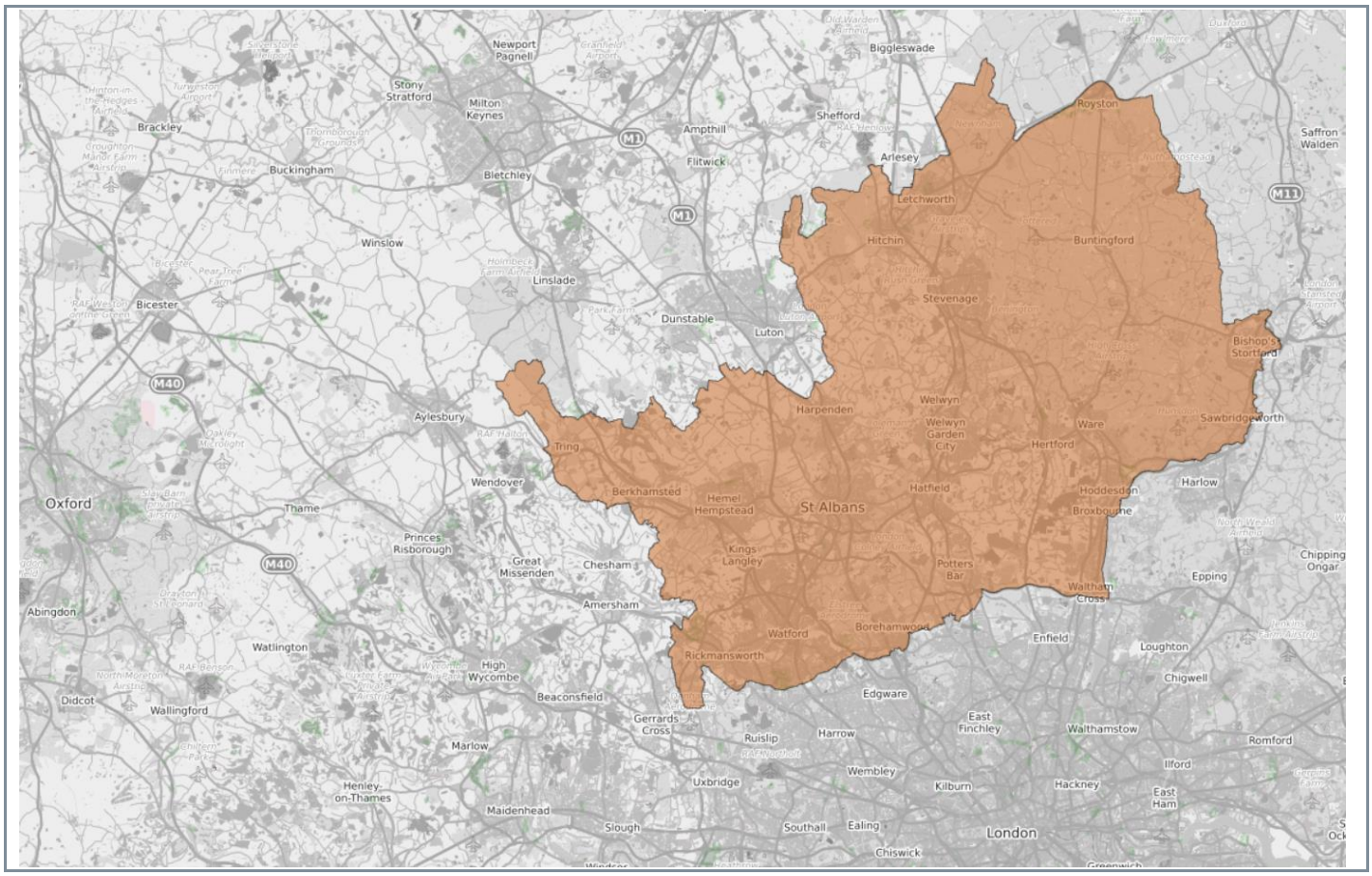


Figure 1: Hertfordshire and surrounding areas

Table 1: Local authorities analysed

Hertfordshire
Broxbourne
Dacorum
East Hertfordshire
Hertfordshire County Council
Hertsmere
North Hertfordshire
St Albans
Stevenage
Three Rivers
Watford
Welwyn Hatfield

1. LABOUR DEMAND IN THE HERTFORDSHIRE LEP

The following sections provide an estimate of the labour demand predicted by our Labour Forecasting Tool that construction investment will create across the LEP over the period 2019 - 2023. The tool and method of analysis are described in Appendix A.

SUMMARY OF DEMAND

- Our estimate of the labour demand in the Hertfordshire is around 45,880 people in 2019. The projected growth between 2019 and 2023 suggest that the labour demand in 2023 will be around 46,350 people.
- Around 58% of the workforce is employed in Skilled trades & operatives, the other 42% are in Managerial, professional & office based staff.
- During 2019 the most labour-intensive occupation group is “Non-construction professional, technical, IT, and other office–based staff (excl. managers)” with an annual demand of 6,240 people.
- The skilled trade & operative occupations in greatest demand are:
  - Wood trades and interior fit-out with a requirement for 4,700 people;
  - Electrical trades and installation follow with 3,510 people.
  - Plumbing and heating, ventilation, and air conditioning trades rank third, with a demand of 2,830 people

1.1. PIPELINE OF KNOWN PROJECTS

1.1.1. Glenigan pipeline analysis

We have considered projects in the Glenigan database[4] and the National Infrastructure and Construction Pipeline (NICP)[5]. These comprise what are referred to as the known projects.

An initial review of the Glenigan database identified 466 projects in the Hertfordshire LEP. Of the Glenigan projects, 61 were removed due to missing dates. Also excluded were three projects which were clearly identified as consultancy projects. Four projects were removed because they were duplicates. A full set of the projects which were omitted from the analysis is provided in Appendix C. The spend in projects which were removed because of missing dates is around 4.8% of the total pipeline value. It is possible that this work will take place at some point in the future but as dates are unknown it is most likely that this will be later in the forecast period. Since dates are not known it is not possible to pinpoint when the labour will be required. However, an assessment of the labour demand from potential additional projects is included in the estimates of other work as outlined in Appendix A.

The Mean Value Theorem was applied to the remainder of the pipeline to identify the significant projects. The process identified 107 significant projects accounting for 83% of the total construction spend in the area. This allowed a detailed analysis of a large proportion of all the projects and a comprehensive consideration of the project types to which they were assigned.

Appendix D provides a full breakdown of the Glenigan significant projects and their construction values. The peak year for the Glenigan spend profile is 2019. The location of the significant projects within the Hertfordshire can be seen in Figure 2. The values of the projects are proportional to the sizes of the coloured dots.

[4] The Glenigan database allows contractors to identify leads and to carry out construction market analysis. It is updated every quarter to provide details of planning applications from local authorities supplemented with additional project-specific data. For the purposes of this analysis with have used the 2019/Q2 cut of data.

[5] The Infrastructure and Projects Authority (formerly Infrastructure UK and Major Projects Authority) compile annually a pipeline of UK infrastructure and construction projects and the associated annual public and private investment. For this report we have used the 2018 versionwhich includes details of around 700 projects valued over£610bn.

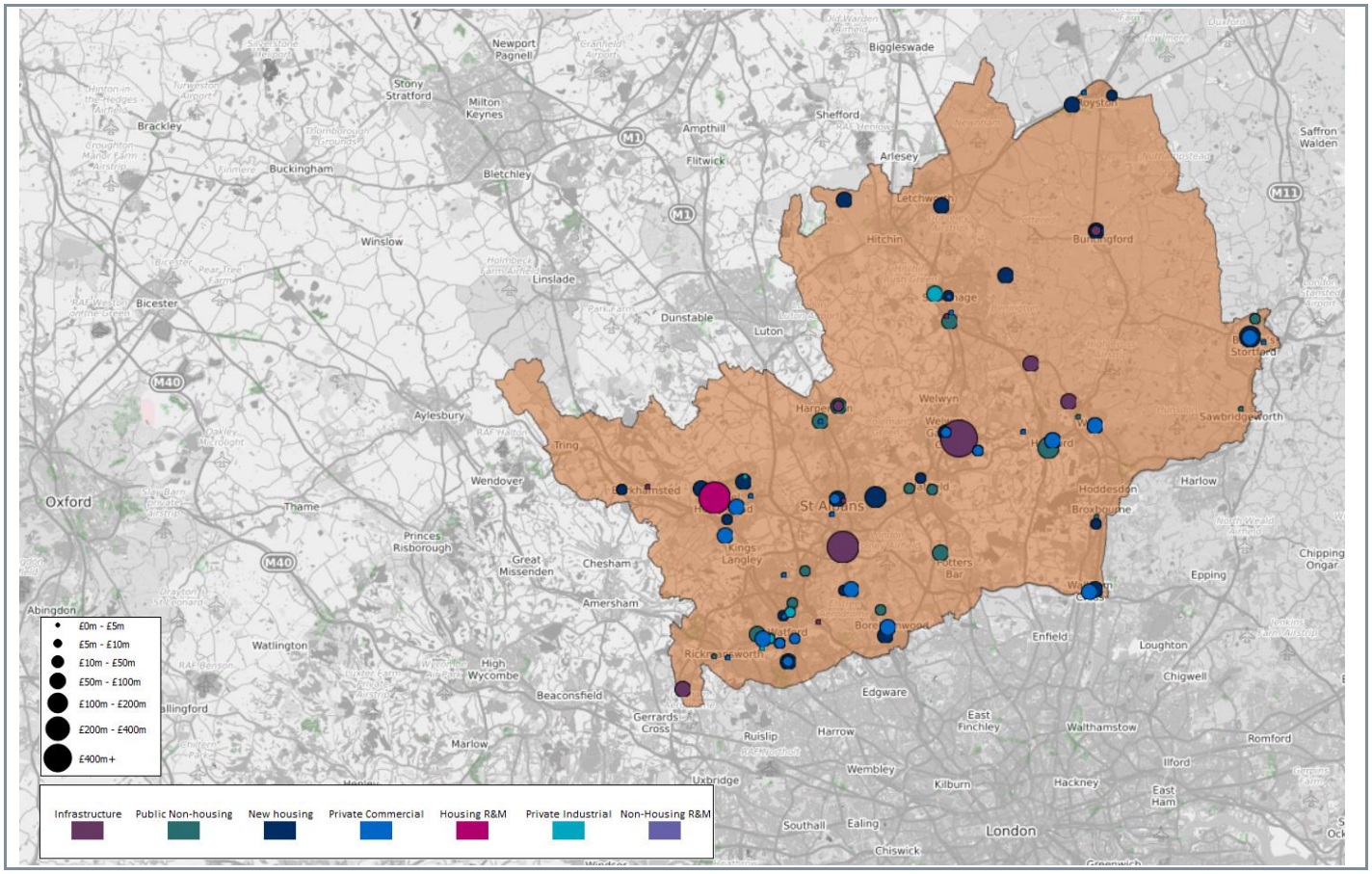


Figure 2: Location of significant Glenigan projects included in the analysis

1.1.2. Glenigan & NICP spend analysis

Implementing the methodology outlined in Appendix A leads to the following findings for the peak year for known projects of 2019. The peak year is used because the tail off in the known projects is more likely to be due to a lack of future planning rather than an actual tail off in workload.

Table 2 shows the distribution by project type of new build spend for the total pipeline of known projects.

Table 2: New-build construction spend by project type in 2019 (total known projects)

Project type	Construction spend in 2019 (2019 values - £m)	% of total
New housing	383	35%
Infrastructure	283	26%
Private commercial	238	22%
Public non-housing	155	14%
Private industrial	36	3%
Total	1,095	100%

Table 3 shows the infrastructure construction spend from the known projects in 2019 by infrastructure sub-type. 0 provides a full breakdown of the NICP and LEP projects and their construction values.

Table 3: Construction spend per infrastructure sub-type in 2019 (total known projects)

Project type	Construction spend in 2019 (2019 values - £m)	% of total
Transport	151	53%
Water	82	29%
General infrastructure	26	9%
Energy	14	5%
Flooding	10	4%
Communications	2	1%
Total	285	100%

1.2. ESTIMATE OF FUTURE TOTAL LABOUR DEMAND

The known project pipeline may not include smaller projects or repair and maintenance work. Figure 3 shows the outcomes of the analysis of future labour demand with the forecast regional employment growth rate applied. The solid purple area shows the labour demand arising from the new build Glenigan and NICP projects. This is projected forward from the peak as shown in green. The repair and maintenance (R&M) (including any in Glenigan or the NICP) is also shown along with the likely total labour demand arising from estimates of other work. The method for calculating these is provided in Appendix A. The total construction labour demand is around 45,880 people in 2019. The projected growth between 2019 and 2023 suggest that the labour demand in 2023 will be around 46,350.

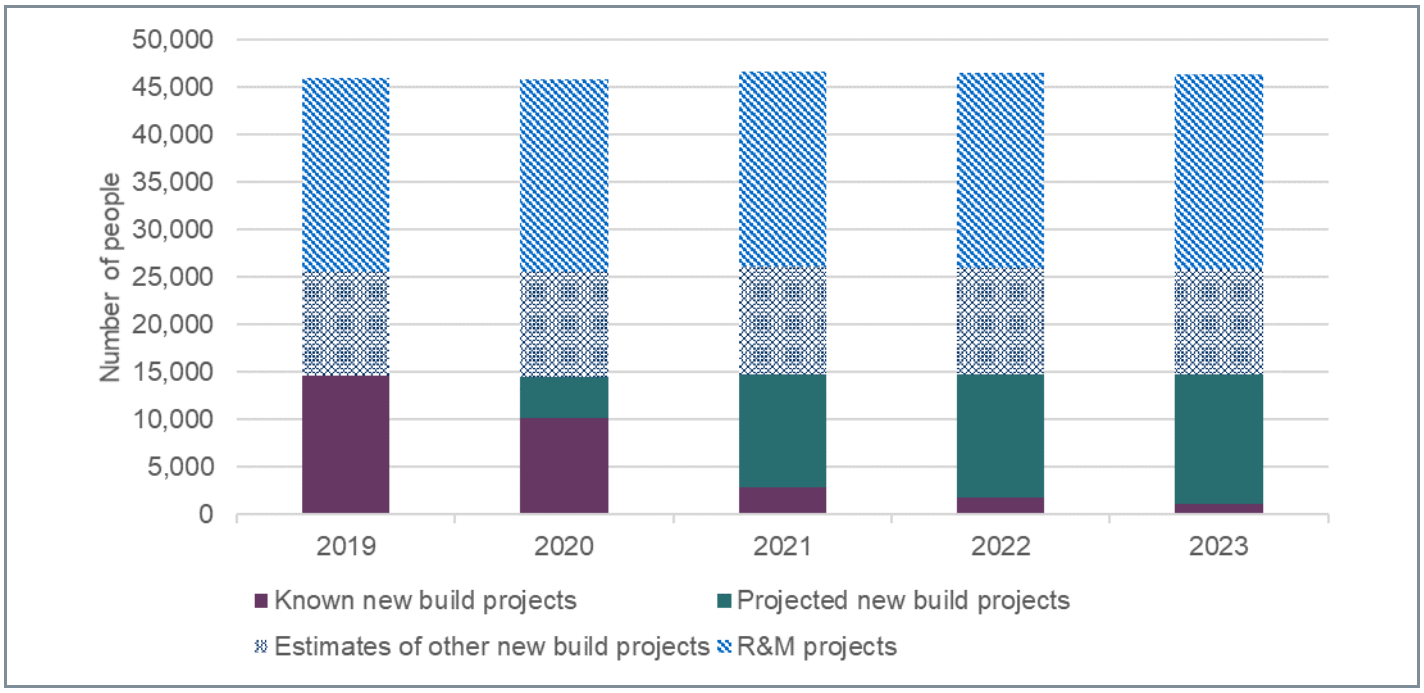


Figure 3: Total construction labour demand for 2019 including estimates for both repair and maintenance (R&M) and estimates of other work

1.2.1. Breakdown of labour demand by occupation

Figure 4 presents the breakdown of labour for skilled trades & operatives and managerial, professional & office based staff from the NICP and Glenigan data. Around 58% of the workforce is in skilled trades & operative occupations.

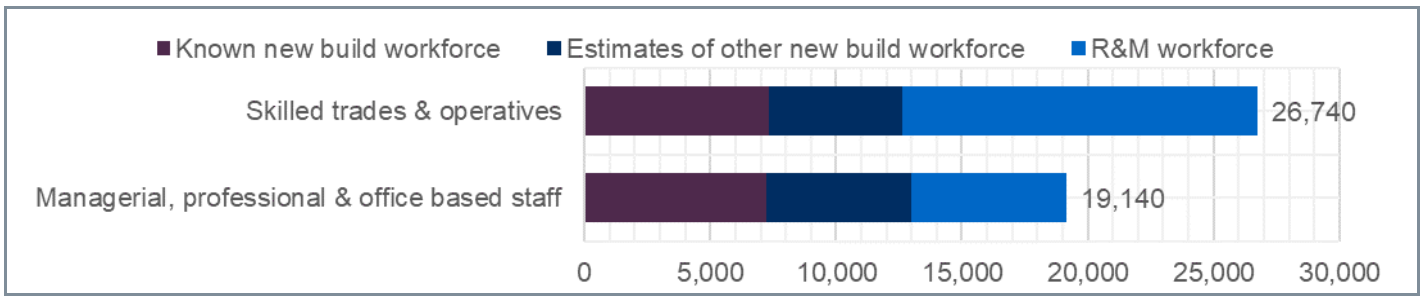


Figure 4: Total construction labour demand for 2019 by broad occupational group

For the peak year in Glenigan of 2019, Figure 5 shows the detailed breakdown for the 20 skilled trade & operative occupational groups for the pipeline of known projects, the estimates of other new-build work and the R&M work. These occupations will be predominately based at or near the location of the work.

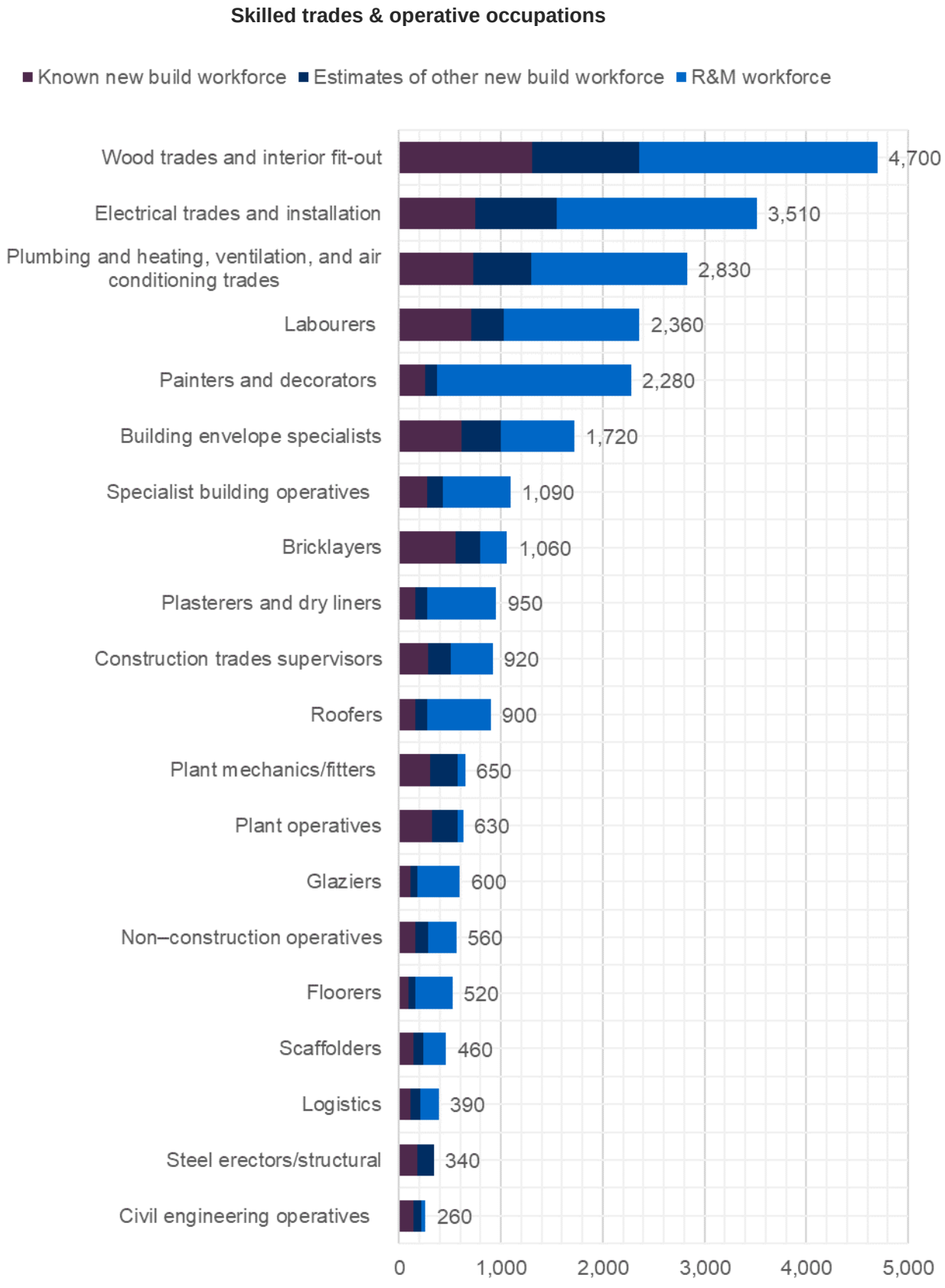


Figure 5: Construction labour demand for 2019 for skilled trades & operative occupations in the peak year

Figure 6 shows a breakdown of the managerial, professional & office based occupations. Since it is possible for many of these people to work remotely from the site, they will not necessarily generate a local demand.

Figure 6: Construction labour demand for 2019 for managerial, professional & office based occupations in the peak year

1.2.2. Breakdown of labour demand by project type

Table 4 shows the labour demand generated by the known projects and the estimates of other work in 2019 broken down by project type.

Table 4: Labour demand by project type in 2019

Project type	Known pipeline labour demand in 2019 (people)	Estimates of other work labour demand in 2019 (people)	Total labour demand in 2019 (people)	% of total in 2019
Non-housing repair and maintenance (R&M)	-	14,460	14,460	32%
Private commercial	4,320	10,140	14,460	32%
Housing repair and maintenance (R&M)	970	4,810	5,780	13%
New housing	3,870	-	3,870	8%
Infrastructure	2,850	910	3,760	8%
Public non-housing	2,880	-	2,880	6%
Private industrial	660	-	660	1%
Total	15,550	30,320	45,870	100%

2. CONSTRUCTION LABOUR SUPPLY IN THE HERTS AREA

When looking at the supply of workers there are two main elements to consider: the size of the current workforce and the existing training provision.

The first element is to take a view on construction employment in the Hertfordshire area and how this relates to employment across the East region and the UK. Where applicable, the UK data from CITB's Construction Skills Network (CSN) is used along with official Government sources. Employment and employers are considered together as they are intrinsically linked, particularly as a large proportion of construction workers are employed within micro businesses or are self-employed, where the business location is also the home location.

For the second element, whilst training occurs at Further Education (FE) and Higher Education (HE) levels, the main focus of this report is on the FE that takes place. FE tends to be sourced and delivered in a closer proximity to the home and workplace, whereas the length of study time and specialisms for Universities for HE typically give rise to much greater degrees of mobility. Nevertheless, Higher Education in the region is also analysed, but should be considered in the context of the greater mobility levels of the learners at this level.

Finally, the demand forecasts are compared against employment, training and workforce mobility to give an indication of possible gaps and/or occupational pinch points.

2.1. MAIN POINTS

- Current construction workforce within the Hertfordshire area is estimated at around 52,000 workers.
- The local authority areas in Hertfordshire with the largest share of the construction workforce are Dacorum, Broxbourne, North Hertfordshire and Watford accounting for 53% of the total.
- The Hertfordshire area currently accounts for nearly 21% of construction employment in East region as a whole
- Since 2012, the number of construction businesses in Hertfordshire has increased by 32% to around 8,700.
- Over the last five years over 90 training providers have delivered construction related training within the Hertfordshire area, with nine providers delivering 88% of provision.

2.2. EXISTING WORKFORCE

- The construction workforce in Hertfordshire has increased in size over the last four years to nearly 28% above 2013/14 level.
- 95.2% of Hertfordshire's construction businesses are micro sized (0-9 employees), similar to the East region as whole.

An analysis of the Annual Population Survey shows that the Hertfordshire area currently accounts for nearly 21% of construction employment in East region as a whole. Table 5 applies this percentage share across the CSN occupational breakdown for the East region as a whole to give an estimate of total employment at occupational and industry level in the Hertfordshire area. For comparison, the wider East region has been included.

Error! Reference source not found. below shows that the construction workforce in Hertfordshire has grown quite strongly from 2014-15, outperforming the region as a whole. At a current level of around 52,000 workers, construction employment in Hertfordshire is nearly 28% above its recent low level in 2013/14 of 40,700.

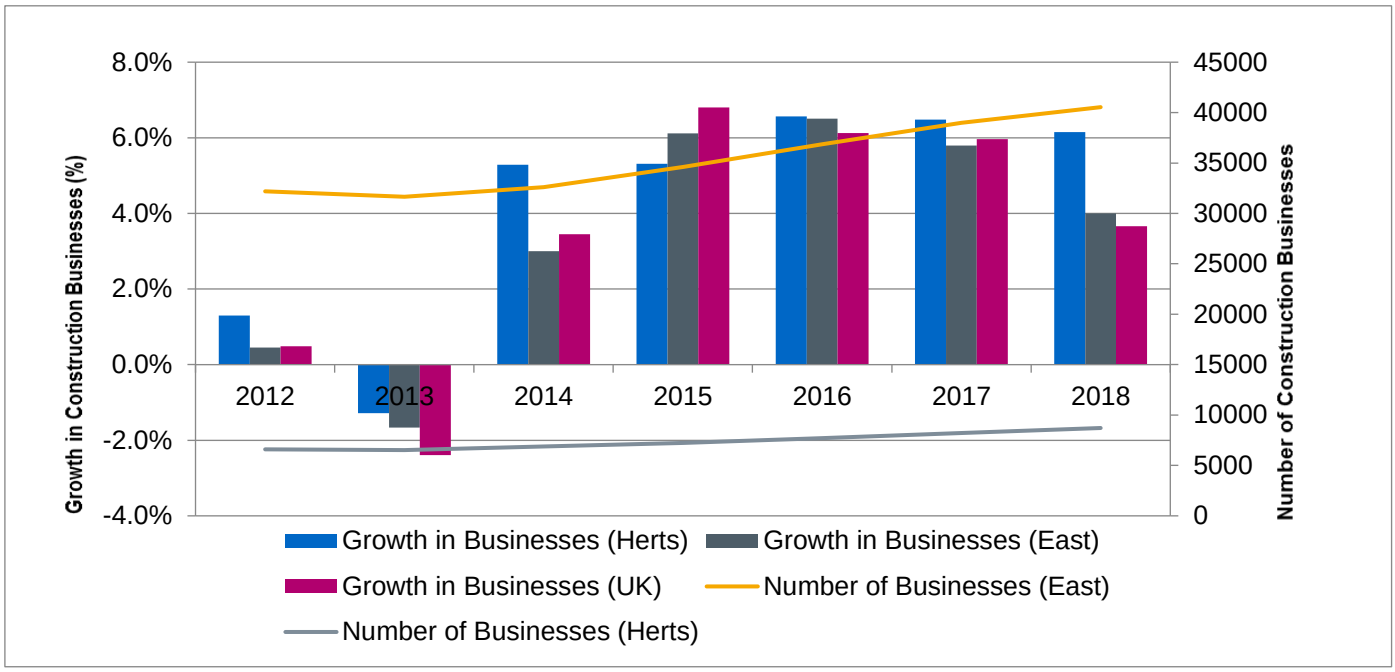


Figure 7: Year on year change in Construction Employment (Experian/CITB & NOMIS 2018)

Figure 8 below shows that growth in the number of construction businesses within Hertfordshire has been positive since 2014, sometimes outpacing growth in the wider East region and the UK as a whole. Since 2012, the number of construction businesses in Hertfordshire has increased by 32% to around 8,700. Overall, Hertfordshire has slightly increased its share of regional construction businesses from 20.5% to 21.5% between 2012 and 2018.

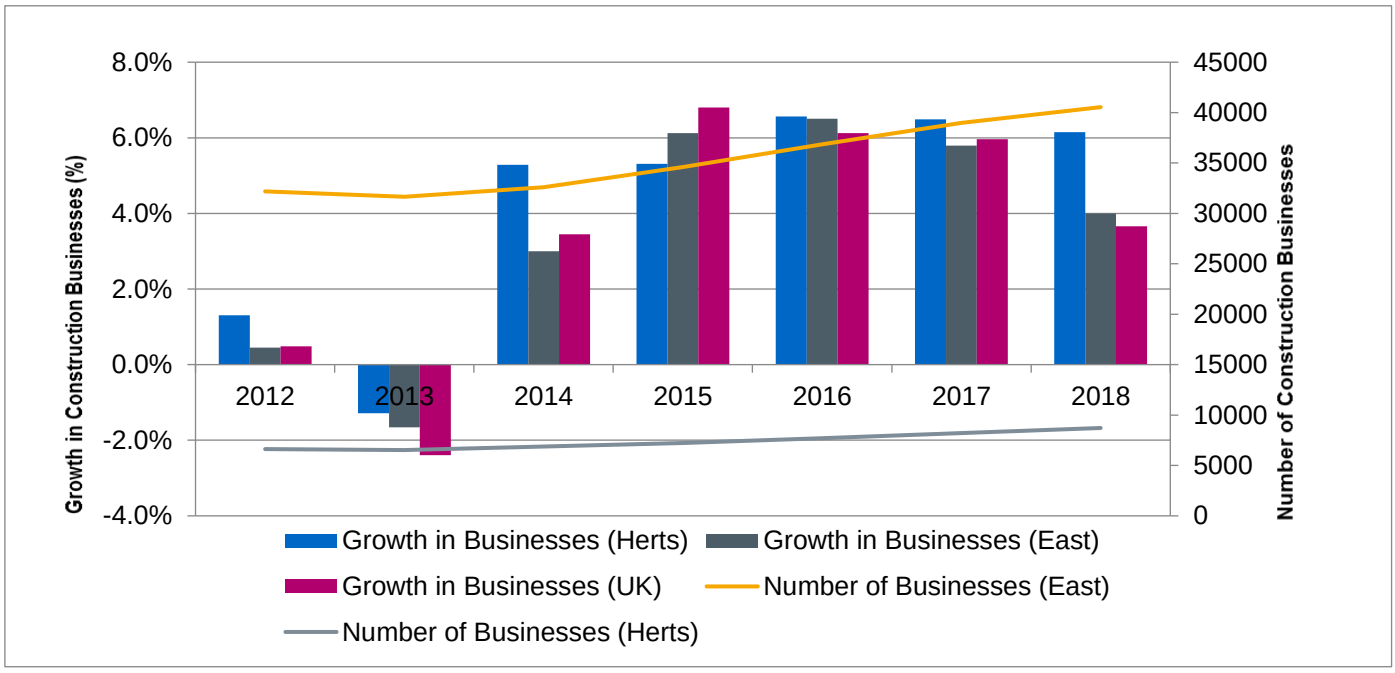


Figure 8: Year on year change in Construction Businesses (UK Business Count, NOMIS 2018)

Figure 9 shows the distribution of construction businesses within Hertfordshire and shows the distribution of the construction workforce.

There are some differences between the two distributions: Whilst four local authorities (East Hertfordshire, Dacorum, Hertsmere and Broxbourne) account for 50% of local construction businesses, only two of these (Dacorum and Broxbourne) also contribute largest shares of the construction workforce: North Hertfordshire and Watford are added instead to create a combined contribution of 53% of the local construction workforce.

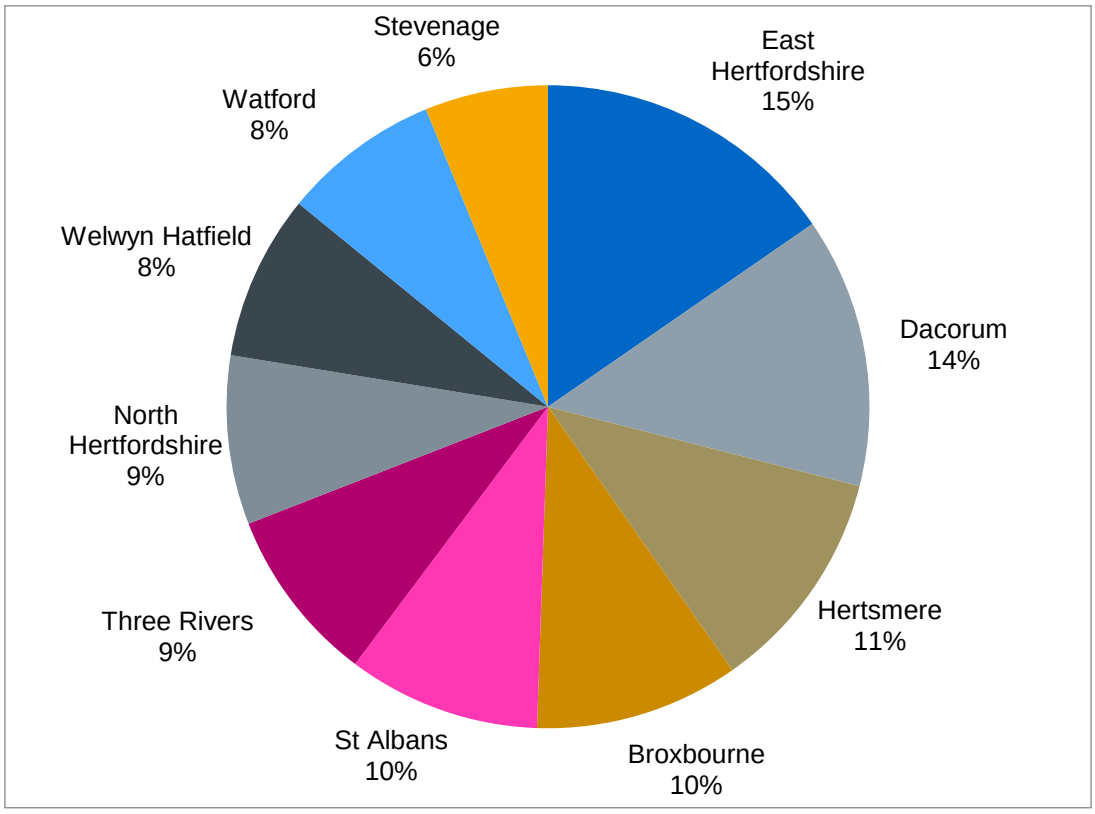


Figure 9: Distribution of construction businesses within Hertfordshire (UK Business Count, NOMIS 2018)

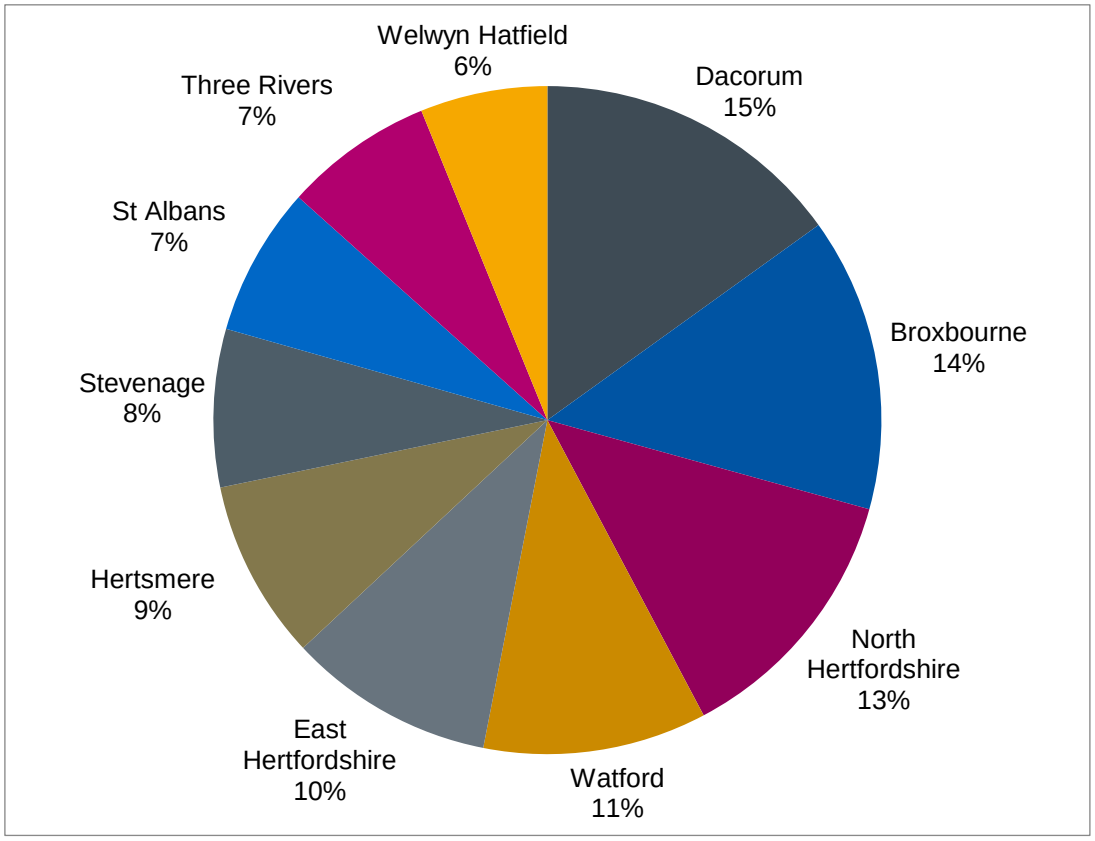


Figure 10: Construction employment by area within Hertfordshire (2018, NOMIS)

When assessing the patterns between workforce and number of businesses it is important to note two main factors when looking at the construction sector:

- Direct employment vs self-employment

- Size of business.

The construction sector has high levels of self-employment with around 40% of the UK construction workforce being self-employed. Local proportions are higher: 45% in the East; 48% in Hertfordshire.

When looking at business size,

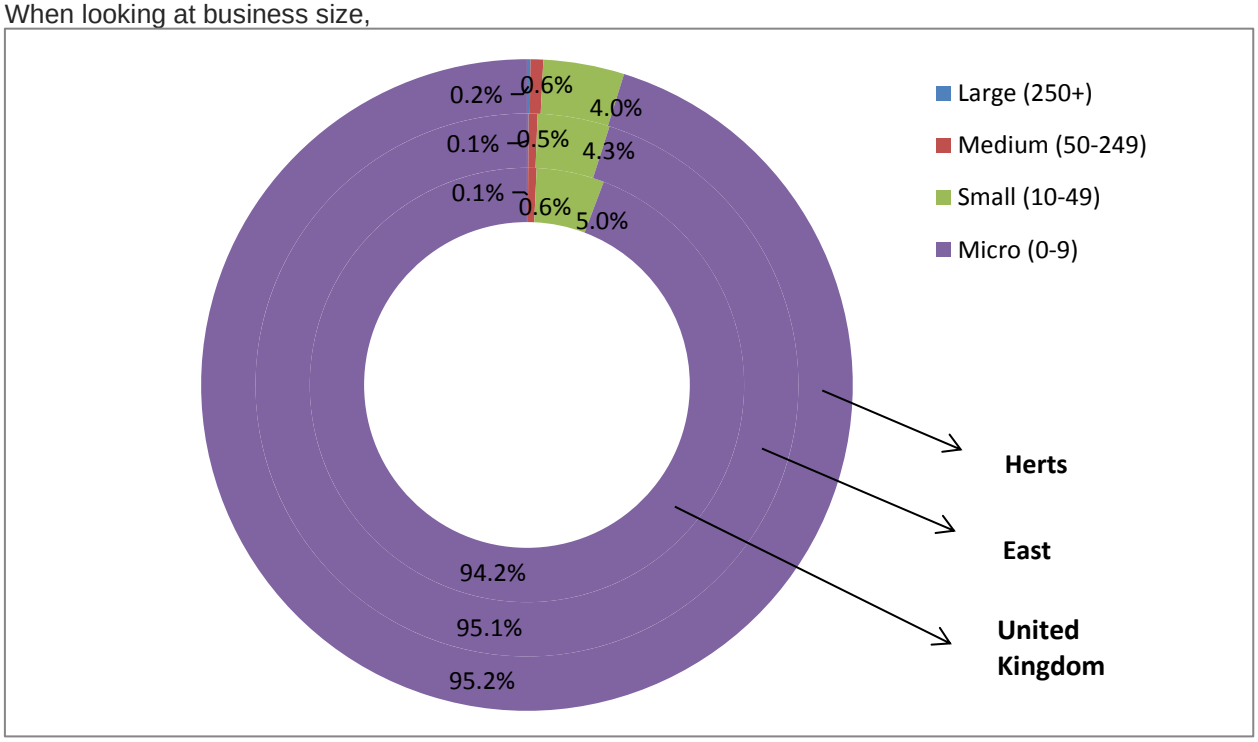


Figure 12: Construction Businesses by Employee Size (UK Business Count, NOMIS 2018)

below shows that the distribution of companies across the Hertfordshire area is on the whole similar to the East, with the majority of companies being micro-sized, (around 95% respectively). In fact, the local distributions are not dissimilar to the United Kingdom, although the local proportion of micro-sized businesses is slightly higher.

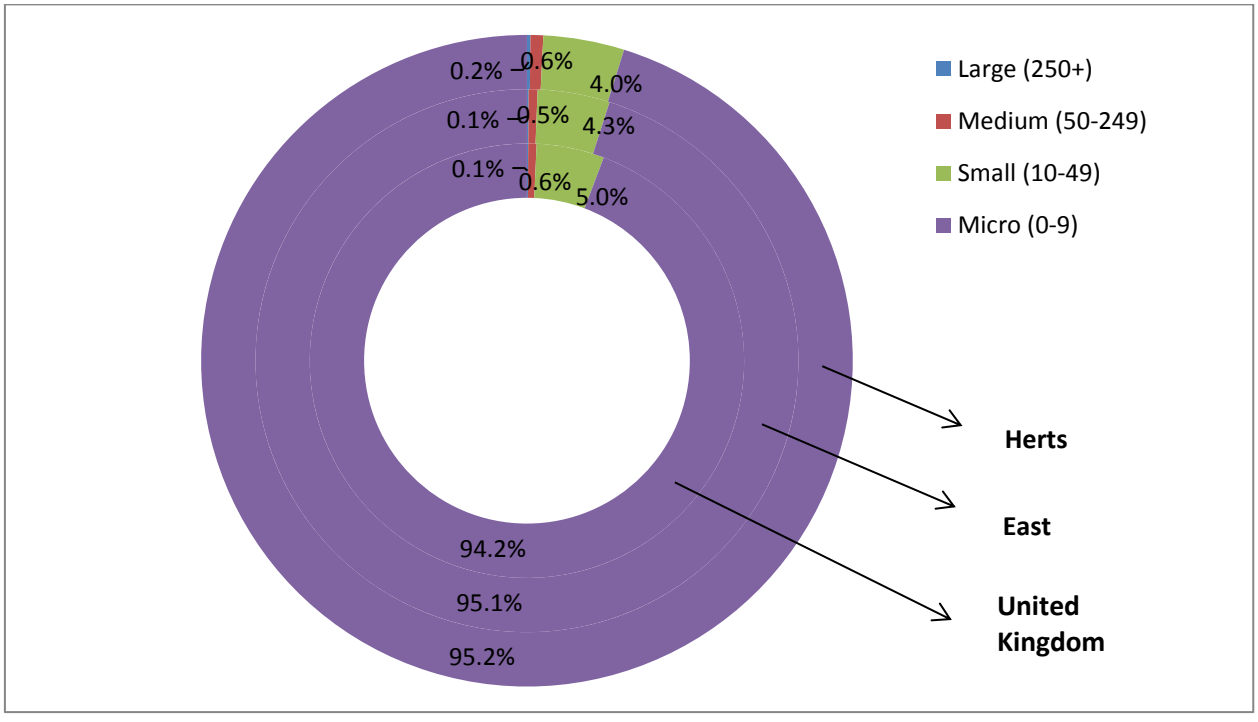


Figure 12: Construction Businesses by Employee Size (UK Business Count, NOMIS 2018)

Table 5: Construction workforce – occupational breakdown, 2017 (Source Experian & CITB)

	Hertfordshire	East region
MANAGERIAL, PROFESSIONAL AND OFFICE BASED ROLES		
Other construction professionals and technical staff	3,190	15,220
Other construction process managers	3,720	17,760
Senior, executive, and business process managers	3,620	17,290
Surveyors	1,010	4,840
Construction Project Managers	900	4,280
Civil engineers	1,500	7,160
Construction Trades Supervisors	930	4,420
Architects	900	4,280
Non-construction professional, technical, IT, and other office-based staff	7,460	35,620
Non–construction operatives	440	2,100
SKILLED TRADES		
Wood trades and interior fit-out	5,270	25,150
Electrical trades and installation	3,130	14,930
Plumbing and HVAC Trades	3,330	15,900
Labourers nec*	2,830	13,490
Building envelope specialists	2,200	10,510
Painters and decorators	2,090	9,970
Specialist building operatives nec*	1,020	4,880
Bricklayers	1,610	7,690
Roofers	990	4,740
Plasterers	1,300	6,230
Plant mechanics/fitters	660	3,150
Plant operatives	720	3,460
Glaziers	600	2,860
Floorers	790	3,790
Logistics	620	2,960
Steel erectors/structural fabrication	470	2,250
Scaffolders	520	2,490
Civil engineering operatives nec*	210	980
Total	**52,010**	**248,380**

Note: nec: not elsewhere classified; HVAC: Heating, ventilation and air-conditioning.*

3. TRAINING PROVISION

3.1. MAIN POINTS – TRAINING PROVISION

- Over the last five years over 90 training providers have delivered construction related training within the Hertfordshire area, with nine providers delivering 88% of provision.
- The volumes of construction training in the Hertfordshire are increasing, with numbers of apprenticeship starts also increasing overall.
- Good levels of competence qualifications achievements are found within the following occupations; plumbing trades, electrical trades, wood trades, specialist building operatives, plant operatives civil engineering operatives, building envelope specialists, scaffolders, construction trade supervisors and other construction professionals

CITB analysis of Education and Skills Funding Agency (ESFA) Individualised Leaner Records from 2012/13 through to 2016/17 academic years for construction learners shows that:

- Hertfordshire accounts for 20% of identified construction related training across the East region;
- Hertfordshire has experienced an increase in the number of construction learner starts of 12% between 2012/13 and 2016/17, whilst the wider East region experienced a decline of -5% over the same period;
- Apprenticeship starts within Hertfordshire have increased over the period from 2012/13 to 2016/17 by 29%, somewhat below the 34% increase for the East region.
- When looking at other Education and Training construction learner starts (i.e. non-Apprenticeship construction qualifications) there have been reductions in both Hertfordshire and in the East, each of around 12%.
- Five areas within Hertfordshire have witnessed positive growth in starters comparing 2012/13 to 2016/17, with East Hertfordshire seeing the most marked increase (113%)

“Knowledge” based qualifications describe those qualifications that typically have a theoretical basis so are more likely to be ‘classroom based’. “Competence” based qualifications, in the main, achieve a recognised NVQ and so a link can be made between the qualification title and the likely occupation that an individual will have. For example someone starting or achieving a Bricklaying qualification is highly likely to be working as a Bricklayer as competence based qualifications are based on an assessment of work based skills.

Table 6 shows qualification achievements over the last five years for the identified competence based qualifications, comparing achievement volumes against the overall pattern for the East as a whole. From this analysis there appear to be patterns for particular occupations.

Achievements referred to in Table 6 are at:

- Level 2 (62%),
- Level 3 (37%)
- Level 4 and above (1%).

The share of these achievements are relatively similar to those seen across England.

The percentage comparison with the East region as a whole is used to demonstrate how the provision of training in Hertfordshire by occupation is relatively high or low against the regional context.

The first group of occupations to be identified for the main training volumes, which are broadly similar with the overall training pattern seen in the East region. These are:

- Plumbing and HVAC Trades
- Electrical trades and installation
- Wood trades and interior fit-out
- Specialist building operatives (not elsewhere classified)
- Plant operatives
- Civil Engineering Operatives ((not elsewhere classified)

Local qualification achievements for four of these trades represent a higher proportion than the overall share of training being achieved in the East (20%); for two, wood trades and plant operatives, the proportion is lower. For

occupations such as wood trades, the volume of training will be related to their share of employment, while for others such as plant operators, training will be more related to the need to demonstrate competence for these roles through card scheme monitoring (for example the CPCS Card scheme for Plant Operatives).

Table 6: Competence qualification achievements in Hertfordshire as a % of total competence qualification achievements in East region as a whole (Source: CITB/ESFA)

Construction Occupations	2012 /13	2013 /14	2014 /15	2015 /16	2016 /17	Total number of achievements	Total % of achievements	Change (2012/13-2016/17)
Main Occupations								
Plumbing and HVAC Trades	16%	30%	18%	34%	26%	960	27%	↑
Electrical trades and installation	17%	26%	20%	19%	25%	660	22%	↑
Wood trades and interior fit-out	14%	18%	27%	12%	22%	580	19%	↑
Specialist building operatives nec*	34%	21%	39%	12%	23%	370	27%	↓
Plant operatives	14%	9%	23%	13%	60%	340	14%	↑
Civil engineering operatives nec*	49%	15%	38%	15%	47%	320	34%	↓
Occupations with good provision								
Building envelope specialists	25%	20%	28%	28%	52%	150	27%	↑
Scaffolders	17%	19%	16%	34%	24%	100	21%	↑
Construction Trades Supervisors	30%	30%	63%	0%	13%	80	34%	↓
Other construction professionals and technical staff	71%	19%	38%	22%	33%	60	32%	↓
Occupations to Monitor								
Bricklayers	15%	11%	16%	11%	8%	130	12%	↓
Painters and decorators	17%	13%	26%	13%	10%	80	16%	↓
Floorers	14%	11%	13%	4%	2%	80	9%	↓
Glaziers	8%	4%	10%	7%	4%	70	8%	↓
Low Overall Learner Volumes								
Plasterers	12%	6%	19%	13%	11%	30	11%	↓
Plant mechanics/fitters	3%	9%	9%	13%	14%	20	9%	↑
Logistics	100%	43%	63%	0%	0%	10	54%	↓
Roofers	5%	18%	3%	0%	6%	10	6%	↑
Construction Managers	29%	0%	0%	0%	0%	<10	17%	↓
Steel erectors/structural	0%	25%	0%	0%	0%	<10	25%	-
Grand Total	**19%**	**18%**	**23%**	**20%**	**22%**	**4,070**	**20%**	↑

*not elsewhere classified

There is a second group of occupations with good provision: Local proportional provision for occupations such as building envelope specialists, scaffolders, construction trade supervisors and other construction professionals, is at, or above, the overall level relative to the East region.

The third group – occupations to monitor: identifies a small number of occupations where we would expect higher levels of training, again linked to either the occupational size and/or demonstrating competence. This cluster includes bricklayers, painters and decorators, floorers and glaziers: Training happening within Hertfordshire is somewhat lower than would be expected. It is possible that individuals within the local area may be travelling outside for this type of training.

Lastly there is a group of occupations where the low level of learner volumes makes it difficult to judge patterns across the years. Whilst the training provider network can adjust to cover changes in demand, there will be a requirement for a certain volume of training to make it viable for a provider to deliver it. These occupations could suffer from this intermittent demand or learners could be travelling further afield to more specialist training providers.

In the Hertfordshire area between 2012/13 and 2016/17, 93 different providers have been delivering training. The majority of training (88%) is being delivered by nine main providers, as shown in Table 7 below.

Table 7: Top nine training providers delivering training to the Hertfordshire area by number of starts – excluding apprenticeships (Source: CITB/ESFA)

Provider	2012/13	2013/14	2014/15	2015/16	2016/17	Total (Learner Aims)	% share of Total Quals	% Quals Ofqual Regulated
Oaklands College	870	890	980	920	790	4440	23%	97%
West Herts College	830	760	680	580	530	3370	18%	97%
Hertford Regional College	760	940	730	530	380	3340	17%	100%
North Hertfordshire College	640	690	600	530	410	2860	15%	91%
A4E ltd	40	<10	210	350	220	830	4%	95%
Examplas Holdings ltd	-	400	270	-	-	670	3%	100%
Harlow College	-	-	-	90	360	450	2%	100%
Seetec Business Technology Centre ltd	-	-	-	-	450	450	2%	91%
Amersham and Wycombe College	-	160	<10	210	-	380	2%	100%

Not all of the providers are in Hertfordshire. Providers that are outside the area include: A4E Ltd (based in Sheffield), Seetec and Harlow College (based in the Hertfordshire LEP). The vast majority of colleges serving the Hertfordshire area provide a high percentage of Ofqual registered qualifications, with provision averaging nearly 94%.

This profile is typical of many areas, where a relatively small group of FE colleges deliver the majority of construction training. A smaller proportion of additional training is then delivered by a larger number of other providers. Sometimes these smaller specialist providers can operate far from the normal base of those for whom they provide training. In total this training covers the majority of the main occupations involved in the construction workforce.

Table 8: Unique Learner starts by area, construction subjects, all levels (Source: CITB/ESFA)

Local Authority	2012/13	2013/14	2014/15	2015/16	2016/17	% Net change	% Quals at Level 2+
East Hertfordshire	80	110	100	80	170	113%	94%
Welwyn Hatfield	200	150	180	150	250	25%	95%
Stevenage	510	770	530	510	620	22%	64%
Watford	140	70	60	310	170	21%	89%
St Albans	820	920	880	880	840	2%	74%
Three Rivers	620	570	570	630	600	-3%	92%
Hertsmere	160	150	270	60	130	-19%	92%
Broxbourne	660	650	590	490	450	-32%	63%
North Hertfordshire	120	90	200	80	80	-33%	66%
Dacorum	700	480	480	600	400	-43%	42%
Grand Total	**2370**	**2590**	**2320**	**2560**	**2650**	**12%**	**72%**

Table 8 above shows that, as a whole, the Hertfordshire area has experienced an increase in the number of construction learner starts of 12% across the five years, whilst the wider East region experienced a decline of -5% over the same period. East Hertfordshire saw the most marked increase. However, five Herts districts saw decreases, with the most notable being in Broxbourne, North Hertfordshire and Dacorum.

Whilst the college based courses are an important stepping stone or progression route for learners to acquire knowledge, construction employers tend to have a preference for practical or competence based skills, so in the next section, apprenticeships are investigated in more detail.

3.2. APPRENTICESHIPS

Numbers of apprenticeship starts have been increasing in Hertfordshire overall. Table 9 below shows that the local authority areas making the biggest contribution to the increase between 2012/13 and 2016/17 are Three Rivers, Stevenage and Welwyn Hatfield. However, four areas, Dacorum, St Albans, Hertsmere and Watford, have seen a decrease over the same period.

When looking at Hertfordshire, the number of apprenticeship starts rose by 29% from 2012/13 to 2016/17, compared to a 12% increase throughout the same time frame for the total number of construction learner starts within the local area. At 29%, the increase in apprenticeships starts within Hertfordshire from 2012/13 to 2016/17 was lower than in the East region, which experienced a 34% increase.

Table 9: Unique apprenticeship starts by Hertfordshire LADs, construction subjects (Source: CITB/ESFA)

Local Authority	2012/13	2013/14	2014/15	2015/16	2016/17	Increase/ decrease	% Net Change
Three Rivers	50	60	80	220	160	110	220%
Stevenage	40	30	100	60	90	50	125%
Welwyn Hatfield	20	10	20	30	40	20	100%
East Hertfordshire	50	50	80	40	60	10	20%
Broxbourne	100	100	70	70	100	0	0%
North Hertfordshire	50	50	50	40	50	0	0%
Dacorum	60	60	40	70	50	-10	-17%
St Albans	90	110	90	100	70	-20	-22%
Hertsmere	30	30	50	50	20	-10	-33%
Watford	30	50	30	50	20	-10	-33%
Grand Total	**480**	**510**	**560**	**640**	**650**	**140**	29%

Table 10 below considers apprenticeship starts by occupation between 2012/13 and 2016/17: The biggest increases in volumes (increases of 10 and higher) have been in electrical trades, plumbers, scaffolders, bricklayers, construction trade supervisors, glaziers, plant mechanics and plasterers. Two occupations, civil engineering operatives (nec) and specialist building operatives (nec), have experienced a decrease over the same time frame. In 2016/2017, electrical trades, plumbing and wood trades have the largest numbers of apprenticeships starts: These trades have had consistently higher apprenticeship start numbers over the five-year time period.

Table 10: Unique apprenticeship starts by occupation in Hertfordshire, construction subjects (Source: CITB/ESFA)

Occupation	2012/13	2013/14	2014/15	2015/16	2016/17	Increase/ decrease
Electrical trades and installation	130	140	120	160	180	50
Plumbing and HVAC Trades	130	120	150	140	160	30
Scaffolders	10	20	30	20	40	30
Bricklayers	30	20	40	40	40	10
Construction Trades Supervisors	0	0	0	0	10	10
Glaziers	10	10	0	0	20	10
Plant mechanics/fitters	0	0	10	10	10	10
Plasterers	0	10	10	10	10	10
Building envelope specialists	0	0	0	0	0	0
Floorers	0	10	10	0	0	0
Other construction professionals & technical staff	10	10	30	40	40	0
Painters and decorators	20	10	10	10	10	0
Roofers	0	0	0	0	0	0
Wood trades and interior fit-out	110	90	110	120	110	0
Civil engineering operatives nec*	20	20	10	0	10	-10
Specialist building operatives nec*	20	40	30	100	10	-10
Grand Total	**480**	**510**	**560**	**640**	**650**	170

*not elsewhere classified

Table 11 considers apprenticeship starts by provider. Around 80 different providers in total have delivered apprenticeships in construction for the Hertfordshire area between 2012/13 and 2016/17. The bulk of training is being delivered by 10 providers which account for nearly 88% of all provision in the locality, with the top five providers accounting for 74% of provision.

Table 11: Unique apprenticeship starts by provider in Hertfordshire, construction subjects (Source: CITB/ESFA)

Local Authority	2012-13	2013-14	2014-15	2015-16	2016-17	Total	% Share
CITB-ConstructionSkills	106	126	132	124	157	645	22.7%
West Herts College	57	71	71	138	143	480	16.9%
Hertford Regional College	89	89	83	52	75	388	13.7%
Oaklands College	66	77	70	82	80	375	13.2%
North Hertfordshire College	24	29	66	50	50	219	7.7%
JTL	20	21	28	34	37	140	4.9%
Harlow College	20	17	21	20	23	101	3.6%
Learning Curve Group ltd				85		85	3.0%
Cambridge Regional College	10	7	7	5	3	32	1.1%

Mpower Training Solution ltd	3	5	13	2	5	28	1.0%

3.3. HIGHER EDUCATION

There are five broad HE qualifications that relate to construction: Architecture, Building, Landscape & garden design, Planning, Civil Engineering, and a small number of other courses linked to architecture, building & planning. Of these construction related courses, the three that are most relevant to delivering construction projects are Civil Engineering, Architecture, and Building.

There are a number of significant challenges to address in understanding Higher Education's place in UK construction. Most significantly, those starting and completing HE level qualifications tend to be willing to travel significant distances to study and then find employment. For many students the opportunity to leave home and move to a new town or city is one motivation for entering Higher Education. In the UK, this has become normalised. University students are more likely to move into a region to study and then, once graduated, out of a region to find employment.

A 2014 study undertaken by Education Phase on behalf of TV Licensing indicated that the average distance from home to place of HE study was around 90 miles. This also indicated that of the sample, only around 5% of HE students were studying within 20 miles of home but that 78% moved 60 or more miles or were from overseas.

However, when questioned, different institutions respond differently – with some universities indicating that they believe they attract students from closer to home while others have a more national and often international focus. This is, in part, down to the course type and its availability elsewhere. But there appears to be a rough correlation between the UCAS points required for entry to some universities and the distance students' travel. Typically the most demanding universities draw students from a greater average distance.

3.3.1. Local provision

Within the area, relevant higher education is provided by:

- The University of Bedfordshire (Architecture / Building), the University of Hertfordshire (Architecture / Building / Planning / A.I, Robotics and Data Innovation Centre).

Beyond the immediate LEP area, but readily accessible within the East region are:

- University of Cambridge (Civil engineering, Architecture, Building, Planning (urban, rural & regional) Others in architecture, building & planning), Anglia Ruskin University (Civil engineering, Architecture, Building, Planning)

  Cranfield University (post-graduate Civil Engineering); University of Essex (Building / Landscape & garden design); Writtle University College (Architecture / Landscape and garden design).

Naturally, there are many other providers across London, the South East and the East Midlands. In terms of student numbers, the most significant are in London:

- Kingston University (Civil Engineering, Architecture, Building, Landscape & Garden design); London South Bank University (Civil Engineering; Building; Planning (urban, rural & regional); University College London (Civil Engineering, Architecture, Building, Landscape & Garden Design, Planning (urban, rural & regional, Others in architecture, building & planning); The University of Westminster (Architecture, Building, Planning (urban, rural & regional).

3.3.2. Degree level apprenticeships

Some provision for higher level training for professional roles is available as degree apprenticeship programmes that attract government subsidy and are available to potential students as debt free education.

This is an attractive opportunity that could be highlighted to applicants and employers but that also requires support from employers to recruit at age 18 rather than 21 (graduate). This may help fill some higher level skills gaps earlier as the apprentice can start to make a contribution in their professional roles after one year of study.

3.4. CAREER PROGRESSION

Relatively limited information is available to explain any trends in career progression. The complexity of occupations, qualifications and the inability to track individuals make establishing a clear picture extremely difficult.

There is some anecdotal evidence to suggestions that:

- Some more experienced workers are able to move into supervisory roles.
- Some experienced workers take on a greater variety of occupational skills (and are therefore able to say they have experience working in several occupations)
- There is more structured career progression among the professions (backed by professional development / CPD routes through professional chartership, to allow individuals to work progressively towards Member or Fellow status. However not all professionals will be a part of a professional body.)
- The professions are more likely to work to an older age in their chosen field. However this is balanced against professionals tending to start at an older age as a result of the need for higher level education and accreditation.

In December 2016 CITB commissioned a report considering "Career progression in the construction industry". This identified a number of trends in relation to the Progression of construction workers into teaching and training roles.

Anecdotal evidence suggests that the primary issue, especially amongst full-time teaching staff, is fear about losing touch with one's professional or vocational background. There is a view that that regular return to industry should be facilitated so that technical teachers could refresh their practical knowledge, skills, and stay abreast of innovation.

Results of a 2010 study into what employers wanted from training and trainers showed that, while they prioritised industry skills and knowledge above education skills and knowledge, a complex mixture of the two was required, which was generally felt to be lacking.

This suggests that initiatives aiming to utilise 'retirees' in Vocational Education Training (VET) needs to consider how individuals can keep their skills up-to-date.

In this sense whilst any initiative to engage retirees in training has some benefit in terms of keeping skilled people engaged with the sector it creates another challenge if employers perceive those individuals to have 'out-dated' skills.

4. MOBILITY OF THE WORKFORCE

Construction workforces are fluid by nature and this section of the report will look at findings from the CITB survey into Workforce Mobility and Skills in the UK Construction Sector 2015 to give a picture of mobility within the workforce. Data specific to the East will be analysed in order to understand how this might impact on future training interventions and the supply of job opportunities for local people.

4.1. MAIN POINTS – MOBILITY

- More than a quarter of East of England construction workers have worked in the construction industry for over 20 years (27%) and a total of more than half have worked in the industry for at least 10 years (52%).
- At the time of the research just over half of all construction workers in the East of England were working in the same region/nation in which they were living in when they started their construction career (55%).
- The average (mean) distance from workers' current residence (taking into account temporary residences) to their current site was 27 miles (22 miles is the UK average).
- Three quarters of all East of England construction workers are confident that when they finish their current job their next job will allow them to travel to work from their permanent home on a daily basis (76%).
- Overall two-fifths of all construction workers have only worked on one project type (40%).
- Amongst construction workers under the age of 60 in the East of England, well over a third (38%) believe they will definitely want to be working in the construction sector in five years' time, a further third (33%) believe it is very likely they will, and 10% believe it is quite likely they will. In total over four-fifths of workers in the region aged under 60 believe that it is likely they will still be working in construction in five years' time.

Table 12 below shows the region or nation an employer operates in, compared with the region or nation they were previously working in. This is taken from the CITB survey into Workforce Mobility and Skills and gives an indication of the inter-regional movement of workers.

The East region has a lower proportion of workers who spend some or all of their time in the region compared to most others, implying relatively high mobility. Relatively large percentages have worked in Greater London and the South East, though some have gone further afield.

As some respondents would have indicated that they had worked in more than one region, the totals for percentage figures in the table exceed 100%.

4.2. WORK HISTORY

More than a quarter of East of England construction workers have worked in the construction industry for over 20 years (27%) and a total of more than half have worked in the industry for at least 10 years (52%).

The most likely reason for employees working in the East of England region is because their employers sent them there (50% of all workers), this compares to just 36% for the UK as a whole, suggesting a greater reliance on workers from other regions than may be typical in other parts of the UK. Just over two-fifths (43%) of workers in the East state that they work in the region because they grew up there, this compares to 55% across the whole of the UK.

In terms of the regions/nations in which workers' current employer operates, around two-thirds (67%) of workers in the East of England reported that their employer operated within the region they were currently working in (the second lowest figure in the UK after the South East at 65%), while 27% operated in London, 23% in the South East and 16% in the East Midlands.

These figures suggest the workforce in the East is more transitory that might be expected in other regions.

Table 12: Region / nation employer operates in, compared with region / nation working in

Region / nation employer operates in	Region / nation currently working in											
	EM %	EE %	GL %	NE %	NW %	NI %	SC %	SE %	SW %	WA %	WM %	YH %
East Midlands	**83**	16	8	13	3	2	4	12	8	7	24	11
East of England	12	**67**	**15**	11	2	1	4	19	8	7	9	6
London	10	**27**	**84**	13	4	1	5	27	12	7	9	6
North East	9	9	8	**93**	3	1	4	6	7	7	8	15
NORTH WEST	11	9	8	14	**93**	1	4	6	7	11	11	10
Northern Ireland	3	3	3	2	1	**99**	3	2	1	3	2	1
Scotland	6	4	6	9	1	2	**97**	2	4	4	5	4
South East	13	23	27	12	3	*	4	**65**	21	7	11	6
South West	9	5	7	10	3	*	4	18	**83**	10	15	5
Wales	6	5	5	8	3	*	4	3	10	**96**	14	4
West Midlands	21	9	8	12	6	*	4	7	12	9	**92**	8
Yorkshire & the Humber	15	10	7	19	4	1	5	6	8	8	8	**88**
Republic of Ireland	1	2	3	*	*	2	1	1	1	2	2	*
Other parts of Europe	*	*	*	1	0	0	0	0	*	0	1	0
Outside Europe	*	1	0	*	0	0	0	0	*	0	*	0
Other / Unsure	1	3	2	3	2	*	1	3	1	*	1	3
Unweighted bases	410	366	452	427	435	274	463	439	494	290	352	369

Source: Workforce Mobility and Skills in the UK Construction Sector 2015 Report. BMG Research on behalf of CITB.
Base: All respondents. *denotes less than 0.5%

4.3. WORKER ORIGINS

Workers were asked which region/nation they were living in just before they got their first job in construction in the UK. Overall just over half of all construction workers in the East of England were working in the same region/nation in which they were living in when they started their construction career (55%) the same as for the South East and slightly higher than London at 50%. Workers currently based in the East of England, therefore, are among the least likely to have remained in the same region/nation in which they were based for their first construction job.

In addition, only half of the construction workers in the East of England (50%) have remained in the same region/nation as they did their first qualification/training in. This is the lowest proportion of all the regions/nations in the UK, meaning that workers in the East are the most mobile. Among other regions/nations, the figure ranges from 55% of workers in the South East remaining in the area where they took their first qualification to 96% in Northern Ireland.

4.4. TRAVEL TO SITE

Almost two-thirds (63%) of construction workers in the East of England have their current residence in the region, with 37% travelling into the region for work from another region/nation in which their current residence is based. Only the South East had a higher figure for inward travel to work with 42% of workers living outside the region. At the time of the survey 12% of construction workers in the East had travelled into the region from the East Midlands, and a further 12% had travelled in from London.

Workers in the East were asked to indicate the furthest distance they have worked from their permanent or current home in the last 12 months: one in eight construction workers have worked no more than 20 miles away (12%) and a further third have worked between 21 and 50 miles away (34%). This leaves more than half that have worked more than 50 miles away from their permanent home (52%), with more than a quarter that have worked between 51 and 100 miles away (29%). Just under a quarter of construction workers in the East that have worked more than 100 miles away (23%) which is about average for the UK.

4.5. SITE DURATION AND CHANGE

Three in ten construction workers in the East of England (30%) do not expect to work on that site for more than a month, including 7% that only expect to be there for about a week or less. About four in ten anticipated being on site for more than a month, but less than a year (39%), while one in eight expects to stay on that site for a year or longer (13%). In just under one in five cases (18%) workers did not know how much longer they could expect to be on site, indicating that a significant minority of temporary workers are living with a certain amount of uncertainty and insecurity.

Three quarters of all construction workers in the East of England are confident that when they finish this job they will get a job that allows them to travel from their permanent home to work on a daily basis (70%).

4.6. SUB-SECTOR AND SECTOR MOBILITY

All workers were asked which of six types of construction work (New Housing, Housing Repair and Maintenance, Commercial, Private Industrial, Public Non-Housing, or Infrastructure) they have spent periods of at least three months at a time working in.

Overall two fifths of all construction workers have only worked on one project type (40%), compared with a fifth in 2012 (19%), which again suggests a pattern of increased stability in the sector.

4.7. LEAVING THE SECTOR

In order to assess the potential outflow from the sector in the next five years (based on workers' preferences), all workers were asked how likely it is that in five years' time they will still want to be working in construction. Excluding those aged 60 and over (as those over 60 may be assumed to be considering retirement in the next 5 years): 38% believe they will definitely want to be working in the construction sector, 33% believe it is very likely they will want to be working in the construction sector and 10% believe it is quite likely they will want to be working in the construction sector, a total of 81%. Only 5% think that they will not want to be working in the construction sector in five years' time which is less than in 2012 (18%).

Overall the findings from the Mobility survey indicate that the East of England has one of the most mobile construction workforces in the UK. There is evidence of a high degree of movement between neighbouring regions, (specifically nearly one-quarter of the workforce is from either the East Midlands or London).

4.7.1. An aging workforce

An analysis of Construction Skills data from the ONS Labour Force Survey over four quarters Autumn 2016 to Spring 2017 indicates an average age for UK construction workers of a little over 42 years. However within this there is significant variation that will be linked to a number of factors including career progression and the different starting ages for professional roles compared with manual occupations. For all non-manual roles the average age is approaching 44; whereas for manual roles it is just over 41. However, 11% of the construction workforce are 60 or over and so likely to retire in the near future. And there are a number of occupations that appear to be disproportionately represented by the over 60s. These include:

- 1122 Production managers and directors in construction – 15%
- 3122 Draughtspersons – 19%
- 2431 Architects – 14%
- 2434 Chartered surveyors – 15%
- 2433 Quantity surveyors – 13%
- 5250 Skilled metal, electrical and electronic trades supervisors – 35%
- 5323 Painters and decorators – 14%
- 8149 Construction operatives nec – 12%
- 5314 Plumbers and heating and ventilating engineers – 11%

It is likely that many individuals will progress during their career from one occupation into supervisory or managerial roles and so this is likely to additionally diminish the workforce in some important occupations.

Other roles are particularly physically challenging, meaning that individuals will need to change career or retire earlier than the norm. Examples of this probably include: (8141) Scaffolders, stagers and riggers for which there are no workers listed in the age ranges above 54.

If new recruits are not encouraged to join the industry the risk is that the available workforce will decline.

4.8. HERTFORDSHIRE'S GEOGRAPHY IN CONTEXT

Table 12 above gives an indication of the inter-regional movement of workers but it is important to consider the relative location of Hertfordshire within that context. London is likely to have a very significant effect on the construction workforce and is expected to draw significant number of workers from Hertfordshire. Table 12 gives a good indication that this is the case with a net movement from the East of England to London and with Hertfordshire closest to London the proportions are likely to be more significant than for the whole of the East.

Similarly, CITB has seen significant demand from and shortages within the Greater Cambridge and Greater Peterborough LEP area that shares a large part of the East. This probably indicates that the demand is centred around Cambridge and may also present a net draw of workers to it from Hertfordshire.

The Greater Cambridge & Greater Peterborough report is available via the CITB website.

4.9. THE IMPACT OF BREXIT

While the issue of leaving the EU is of particular interest to the UK construction industry, it is impossible to offer with any certainty predictions of what may happen or how it will affect the local economy and construction, CITB has published a review that considers some potential implications for UK construction.

Migration in the UK construction industry and built environment sector

The report, published in July 2018, found that while more employers are feeling the impact of Brexit, less than a third have taken action or plan to do so as it approaches. The report updates CITB's previous 2017 migration research.

It is also clear that the UK's migrant construction workforce are not distributed evenly across the UK – with very significantly more migrant workers operating in London and the South East. This may mean that the risk of migrants returning to their country of origin in response to Brexit is likely to have the greatest immediate impact in London and the South East.

4.10. BARRIERS AND OPPORTUNITIES FOR PEOPLE ENTERING THE CONSTRUCTION INDUSTRY

Recruiting and retaining a sufficient talent pool has been one of the key challenges for the construction and built environment (CBE) sector for years. The challenge of finding and training the next generation of construction workers is immediate and pressing. CITB's 2017 White Paper considers:

- The value vocational qualifications offer to both individuals and employers in construction
- What happens to those leaving FE after completing a construction related course, and how many end up working in the sector
- The reasons people leave construction jobs or apprenticeships early.

Achievers and leavers: barriers and opportunities for people entering the construction industry

5. MODERN METHODS OF CONSTRUCTION AND DIGITAL SKILLS

In initial consultation, stakeholders enquired about the potential of modern methods of construction, offsite and modular construction to help address the needs of the construction industry. Stakeholders have also enquired about the opportunities presented by digital technologies.

Digital technologies are hoped to open up opportunities to simplify and automate some tasks and enhance productivity. However there is no simple description or common understanding of an ever expanding list of new technologies with a multitude of applications. Some have already been adopted and have quickly become normalised – notably in surveying, in design and in the way that smart mobile telecommunications have enabled the sharing of information and enabled remote working. But the benefits have tended to be for professional roles and very large projects.

Building Information Modelling (BIM) is increasingly referred to, and visualisation and design tools are slowly being adopted. Future opportunities may include better analysis and application of data and the integration of multiple technologies.

While no specific analysis has been undertaken to consider the specific opportunities and limitations associated with offsite in the Hertfordshire area, CITB has published a report that provides a timely assessment of how the adoption of offsite is changing the skills and training landscape for construction. This report is available on the CITB website.

Faster, Smarter, More Efficient: Building Skills for Offsite Construction

There has in recent years been interest and investment in modular housing and while it represents only a small proportion of UK housing output it may open up opportunities to help address Hertfordshire's housing aspirations. The profile of the workforce required is very different to deliver pre-manufactured housing components that are assembled and finished on site. Many of the traditional roles are relocated into manufacturing sites but there is a need for groundwork and the provision of utilities as well as assembly, likely to require plant operatives that are already in high demand for Hertfordshire's significant infrastructure developments.

5.1. SKILL SETS

A 2018 study by CITB: Unlocking construction's digital future: A skills plan for industry found that the way to optimise construction's next step into the digital domain is not to just consider technological skills, or technological trades, but also a technological mind-set. An individual should ideally have a firm grasp of their trade, and an understanding of digital tools and data – but almost as importantly - problem-solving and creative skills. Training people in how to use tech on its own is little use – they need to understand why it is the right tool for the job, what data to capture and share and how else it could be used. Figure 11 visualises the space in which anybody within construction would ideally sit – in all instances moving up, and to the right:

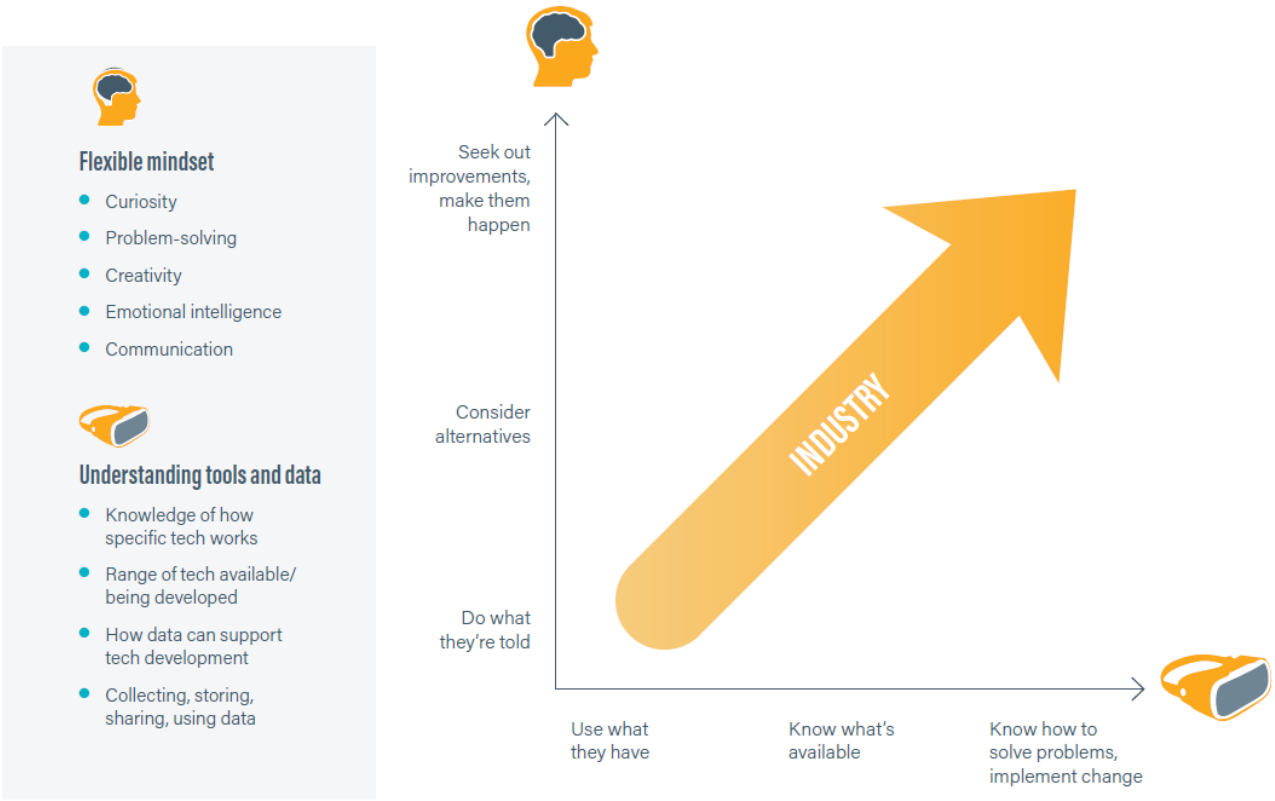


Figure 13: The two groups of competencies needed to push the industry forward, UNLOCKING CONSTRUCTION'S DIGITAL FUTURE: A skills plan for industry

Thus, digital upskilling must focus on competencies, going beyond skills and including knowledge, experience and behaviours; ways of thinking -rather than how to use specific pieces of tech; training that is conceptual rather than applied.

One aspect of training that is easier to categorise concerns data; ideally, anyone preparing themselves to use any sort of technology in the construction industry must undertake efforts to embed data collection and processing to support their own learning and access to wider technology. The report recommends:

- Demystifying the term 'data' and its meaning is a priority
- Teaching how – and why - to collect, store, share or use data well to strategically solve problems
- How to collect and use data to make the case for tech use / prove its efficiency

Using skills frameworks will help visualise the industry's capabilities and illustrate where action is needed. It can be used as a practical tool by contractors, etc, to help priorities upskilling, training needs and recruitment requirements. Further support is required for:

- Operational staff, who need to be able to make better use of technology
- Managerial / strategic staff need to be able to develop flexible mindset and understand tools and data

The focus on both mind-set and understanding should be embedded in training from the curriculum upwards, though HE and FE and on into construction businesses. One way to visualise the development in one's mind-set concerning technology is in Figure 12, as follows:

Figure 14: Scale of digital competency, UNLOCKING CONSTRUCTION'S DIGITAL FUTURE: A skills plan for industry

Many digital leaders understand that they need employees who have creative problem solving skills and that they are competing for these people with every other industry. To address this competition, many construction firms are targeting a new wave of construction workers, with different skillsets, including 'digital' skills. These may come from non-construction training routes, e.g. computer science, and undertake training to become proficient in an actual construction trade (e.g. architecture).

Over 2018 and 2019, the CITB have invested over £7m in the skills to modernise construction. We have provided £3.3m in funding for Immersive Learning and £1.5m to develop training materials to support offsite construction. We will also be shortly launching a £2.35m digital skills funding commission which will equip leaders with skills to digitise their business define and embed standardised digital competences and enable industry to deliver training and development in line with defined competencies.

5.2. RECOMMENDATIONS

For Hertfordshire LEP, considerations can be made on how to partner with/ who to partner with, support or echo efforts by others in industry to address structural barriers to inefficiency, including digital adoption or use (e.g. CLC, Build UK, Project 13), considering how to share or swap best practice with **other industries** on digital upskilling (retail, creative industries).

For the training opportunities that exist within Hertfordshire LEP, curriculum development can enhance individual's soft skills that allow them to adapt as well as give them the competencies to meet the demands of employers today.

6. THE DIFFERENCE BETWEEN DEMAND AND SUPPLY

6.1. MAIN POINTS

The occupations for which there appears to be the greatest risk of a shortfall between anticipated peak demand and the estimated supply of workers are:

Among skilled trades:

- Civil engineering operatives nec*
- Electrical trades and installation
- Painters and decorators
- Specialist building operatives nec*

Non construction roles

- Non–construction operatives

Before looking at demand for construction compared with supply of construction workers, it should be noted that the Glenigan dataset used to produce the demand view is based on projects that are picked up at various stages of the planning process. As such there will be projects in the pipeline that may not go ahead or be subject to delay; additionally there will be newer projects that will be added to the list. In this respect the view is essentially a snapshot of what potential work could look like.

It is also important to note that the demand calculations are based on data covering the Hertfordshire area, whereas the supply figures are an extrapolation of data for the East region.

When looking forward, there will be less visibility on future projects for work that requires shorter planning times. Research carried out by CITB on behalf of UK Contractors Group UKCG showed that the lead time from planning to work starting on site varied by the type of work and value. Large scale infrastructure and commercial projects take the longest time whereas lower value work in general, along with work in the industrial sector, is able to get on site quickest.

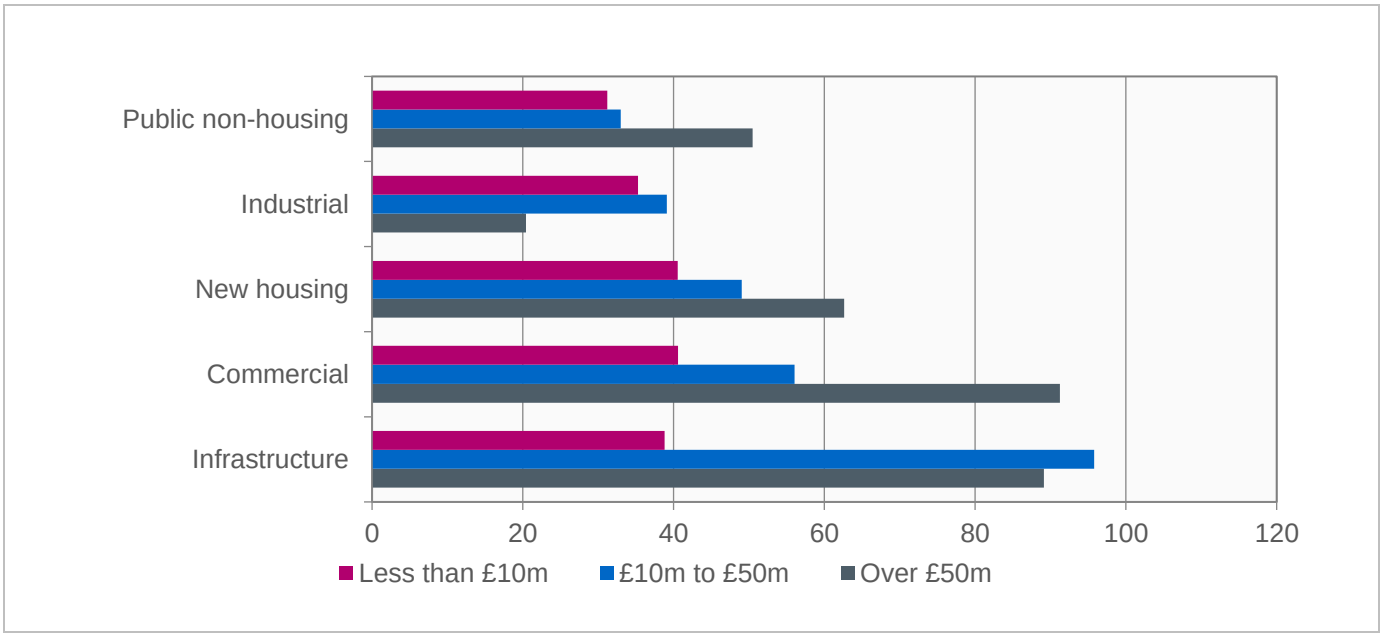


Figure 15: Average number of weeks from planning to work on site, UK 2010-2013 (Source: UKCG/Glenigan)

There will also be work carried out that does not require planning permission, for example household repair and maintenance (R&M) work, and this can account for a significant share of work in the construction sector. Current estimates for R&M work in the East region indicate that it accounts for 45% of yearly construction output[6].

Also, whilst different types of projects can be categorised by their type of build, such as housing, commercial or industrial, the workforce skills required are less easy to categorise in the same way as some occupations will be able to apply their skills across a number of sectors. Evidence from the 2015 Mobility research shows that the East of England as a region is amongst those least likely to report its' construction workers working on one project type (40% against a UK average of 48%). Occupations such as banksmen and plasterers are most likely to have only worked on one project type, whilst electricians and scaffolders are more likely to have worked on a wider range of projects[7].

6 CITB (2018) Construction Skills Network – East of England
7 CITB(2015) Workforce Mobility and Skills in the UK Construction Sector – East

6.2. GAP ANALYSIS

With current construction employment in the Hertfordshire area estimated at 45880, the identified demand forecast for 2019 accounts for 88% of current employment, before reducing in later years as current visibility for future identified projects decreases. Employment and demand by occupation for 2019 is shown in Table 13.

Table 13: Occupational breakdown of demand for Hertfordshire area against current employment

Occupation	Hertfordshire - Current Employment	Risk: shortfall compared with 2017 employment
SKILLED TRADES		
Civil engineering operatives not elsewhere classified (nec*)	260	1.3
Electrical trades and installation	3,510	1.1
Painters and decorators	2,280	1.1
Specialist building operatives not elsewhere classified (nec*)	1,090	1.1
Glaziers	600	1.0
Plant mechanics/fitters	650	1.0
Roofers	900	0.9
Wood trades and interior fit-out	4,700	0.9
Scaffolders	460	0.9
Plant operatives	630	0.9
Plumbing and heating, ventilation, and air conditioning trades	2,830	0.9
Labourers nec*	2,360	0.8
Building envelope specialists	1,720	0.8
Plasterers and dry liners	950	0.7
Steel erectors/structural	340	0.7
Floorers	520	0.7
Bricklayers	1,060	0.7
Logistics	390	0.6
PROFESSIONAL ROLES		
Surveyors	1050	1.0
Construction project managers	900	1.0
Construction trades supervisors	920	1.0
Other construction process managers	3540	1.0
Other construction professionals and technical staff	2790	0.9
Senior, executive, and business process managers	3130	0.9
Architects	660	0.7
Civil engineers	840	0.6
NON CONSTRUCTION ROLES		
Non–construction operatives	570	1.3
Non-construction professional, technical, IT, and other office–based staff (excl. managers)	6240	0.8
Total	45880	0.9

Source: CITB/WLC

Note: nec*: not elsewhere classified; HVAC: Heating, ventilation and air-conditioning.

Table 13 indicates that there are some possible disparities where there is a risk that demand will outstrip the current estimates for employment available locally. These occupations show high relative risk of shortage in comparison with other occupations.

The gap analysis compares the number of workers calculated as being required to meet the peak construction demand (as described in the demand section of this report) with the number of workers estimated as being available in the Hertfordshire area (as described in the supply section of the report). This gives an indication as to the comparative risk of a shortfall between construction occupations.

An example: Roofers has a risk rating of 0.9. Therefore, the demand is just below current supply. Whilst this does not mean an immediate risk of shortfall, any changes in employment, and provision of training, should be closely monitored over the next few years.

Those occupations highlighted:

- **RED** – [Top quartile] are at high risk of an immediate shortfall of workers and are worthy of urgent consideration for action to increase numbers of skilled workers.
- **AMBER** – [Second quartile] appear to be at moderate risk of a shortfall and should be reviewed to determine where opportunities for further training and development exist
- **BLUE** – [Third quartile] do not appear to demonstrate an immediate risk of a shortfall but this may be a reflection of people being based in Hertfordshire but meeting demand in neighbouring areas and so should be monitored and tested to compare with local qualitative opinions.
- **GREEN** – [Bottom quartile] appear to be at low risk compared with other occupations. This does not mean changes in construction demand, training provision or the movement of workers will not change this status and so monitoring is recommended.

Those occupations at risk appear most likely to be:

Among skilled trades:

- Civil engineering operatives nec*
- Electrical trades and installation
- Painters and decorators
- Specialist building operatives nec*

Non construction roles

- Non–construction operatives

6.2.1. Digital construction occupations

Ideally, all occupations could (or should) use digital technology in the workplace. From autonomous vehicles all the way through to productivity apps, there is a place for technology and modern methods of construction across the range of occupations. As previously touched upon, it is easier, and more useful, to look at the integration of technology as an approach, rather than a strictly defined skill or trade. Having said that, there are occupations unavoidably tied with certain technologies, which are focussed upon below.

Surveyors – Drones/ Unmanned aerial vehicles

- A drone is autonomous; a UAV is not; the vehicles currently in the public eye are UAVs; A UAV can be quicker, cheaper, provide a different perspective, provide alternative data, and access more areas, it can support an entire project through site surveys, 3D & elevation models, volume analysis and marketing images

Civil engineers/ Architects – Building information modelling

- A process that allows multiple stakeholders and those in architecture, engineering, and construction to collaborate on the planning, design, and construction of a building within a 3D model. It can also span into the operation and management of buildings using data that owners have access to.

Civil engineers/ Architects – Augmented Reality/ Virtual Reality

- VR creates an artificial environment, presented to the user in such a way that the user accepts it as realistic; AR is a way of viewing a real object or scene that is augmented with immersive inputs including video, sound or graphics

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

- Data analytics is the process of examining data sets in order to analyse behavioural data and patterns, usually with the aid of specialized systems and software. It is used to enable organizations to make more-informed business decisions, including the enhancement of productivity. The latter is especially desirable to the construction industry

Plant operatives - Automation (including on site robotics and autonomous vehicles)

- A robot is a machine designed to execute one or more tasks automatically with speed and precision; CITB has previously carried out research on the skills needs for offsite construction which includes the adoption of factory robotics. The use of autonomous vehicles in construction include plant machinery, such as excavators, that are programmed with a digital map and linked to GPS, enabling more accurate and productive plant works

Figure 14 takes these occupations and compares their relative supply against demand. Apart from a slight increase in surveyors, the demand for these occupations is actually lower than supply.

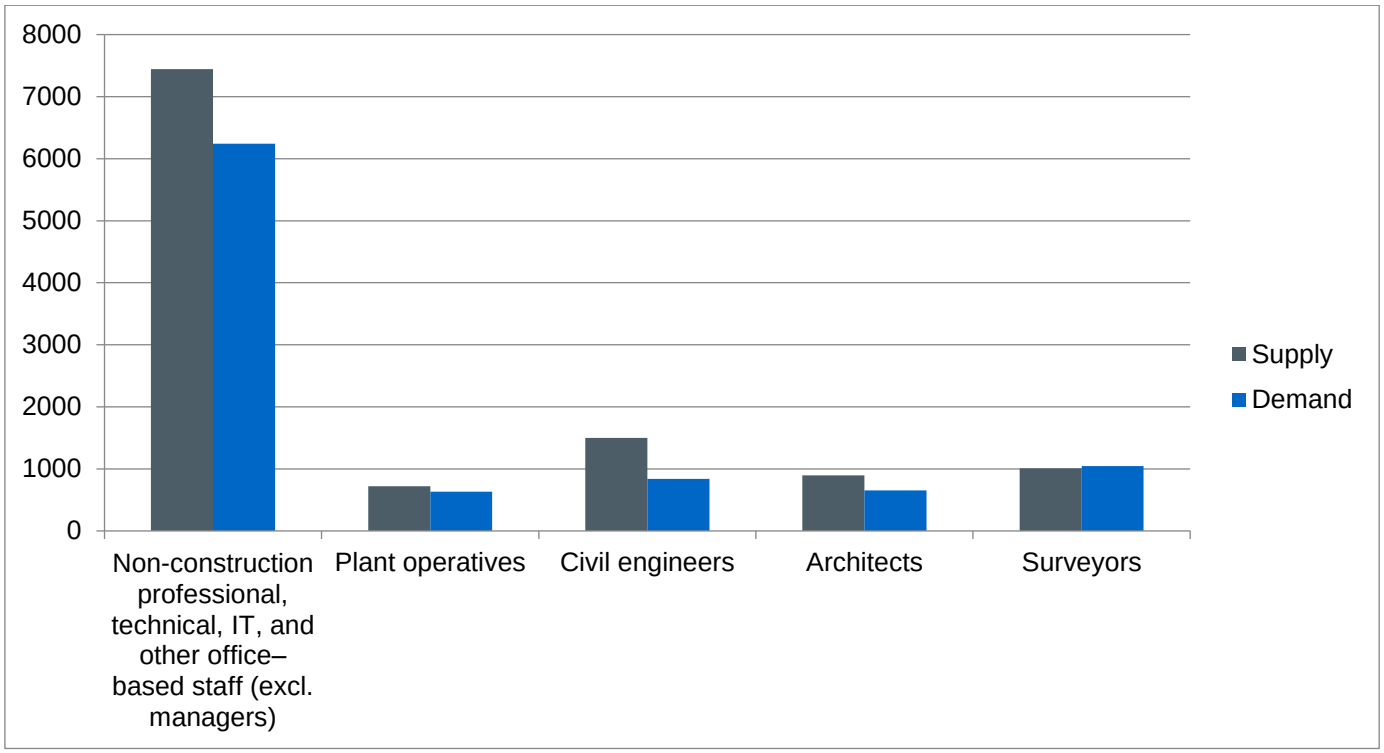


Figure 16: Digital construction occupations – supply against demand

As well as risk (in demand vs supply), demand volume is a large consideration. With the exception of the first occupation (listed below), the rest are below average in demand, compared to all other trades in the LEP:

- Non-construction professional, technical, IT, and other office–based staff (excl. managers): 6240
- Surveyors: 1050
- Civil engineers: 840
- Architects: 660
- Plant ops: 630

Many construction firms are targeting a new wave of construction workers, with different skillsets, including ‘digital’ skills. These may come from non-construction training routes, e.g. computer science, and undertake training to become proficient in any of the trades above – but more than likely the first.

6.2.2. Construction specific occupations

As indicated in section 6.2, there are four skilled trades at greatest risk of supply shortage:

Civil engineering operatives not elsewhere classified (nec) includes road and rail construction operatives and quarry workers. Competence qualification achievements are in line with average levels relative to the east as a whole. In addition, apprenticeship starts are rising. Overall, however, training numbers look insufficient to meet peak demand.

Electrical trades and installation: NVQ L3 Diploma needed, mostly achieved via an apprenticeship. Local qualification provision is well below the regional average; Apprenticeship starts are rising. Again, however, training supply looks insufficient to meet peak demand.

Painters and decorators - Entry to this occupation is normally through work experience, with training such as NVQs offering the quickest way to get qualified with entry levels taking up to a year to complete (of course it can take much longer to become fully skilled and experienced). Local qualification achievements below average; apprenticeship starts falling; training numbers look insufficient to meet peak demand.

Specialist building operatives nec include a range of workers who undertake tasks such as operating insulating equipment, fixing plasterboard or dry linings to ceilings and walls, helping to construct, maintain, repair and demolish buildings and clean and resurface eroded stonework for example. There are no formal academic entry requirements for this role and training is typically provided on-the-job. Local qualification starts are above the regional average, and apprenticeship starts are rising; Local training provision is probably sufficient.

6.2.3. Cross-sector occupations

As skills in these occupations can be used in other sectors, the degree to which demand can be met will be influenced by factors other than construction demand.

It should also be noted that for some professions workers often have an office location away from the site location and travel between them. And for some, there is anecdotal evidence to suggest that demand is met by provision based in other centres of population.

Excluding ‘non– construction operatives’, the majority of these occupations work within construction. Specialist building operatives nec* contains trades closely associated, or within, construction; Painters and Decorators almost all sit within construction.

43% of Civil engineering operatives nec* do not work within construction – a high proportion sit under the divisions of ‘Transportation, Communications, Electric, Gas and Sanitary service’, ‘Manufacturing’ and ‘Public Administration’.

The occupational group Electrical trades and installation contains 3 SOC codes, of which, cross sector data is available for: 5241 'Electricians and electrical fitters' and 5242 'Telecomms engineers'. Together, construction only constitutes 13% of all divisions. The rest primarily sit under the divisions of ‘Transportation, Communications, Electric, Gas and Sanitary service’ and ‘Public Administration’.

6.2.4. Non-construction roles

Non-construction operatives covers a wide spectrum of activities spanning various processes such as assembly, machining and treatment as well as areas such as security and cleaning. Job-holders tend to move between construction and other sectors such as manufacturing and wholesale/distribution. It is possible that experienced workers could be required by other sectors as well as across the broader East region. Whilst a local shortage appears likely, related training data is not available spanning the diversity of roles involved.

6.3. GAP ANALYSIS – TRAINING NEEDS

Looking at the future demand against current competence based training, there are two aspects:

- Is there training in the areas of potential demand?
- Is there the volume of training required across the spread of occupations?

Taking the first of these, **‘is there the training in the areas of potential demand?’**

Looking at priority occupations (unfortunately training data is not available for Non- construction operatives):

Civil engineering operatives nec*

Training provision is very good, with competence qualification achievements sixth highest in the Hertfordshire area. Of the main occupations qualifications, it is the highest contributor to the East as a whole, providing 34% of all competence qualification achievements across the entire region. 2012/13 and 2016/17 output of achievements were consistent.

Apprenticeship starts for this occupation are somewhat average, and have decreased between 2012/13 and 2016/17.

Electrical trades and installation

Training provision is excellent; competence qualification achievements are second highest in the Hertfordshire area (Plumbing and HVAC trades are number one). Of the main occupations qualifications, it makes significant contribution to the East, providing 22% of all competence qualification achievements across the entire region. Between 2012/13 and 2016/17, the output of achievements have steadily risen.

Apprenticeship starts for this occupation are the best in the Hertfordshire LEP (for construction occupations), with 130 starts in 2012/13, increasing to 180 in 2016/17.

Painters and decorators

Training provision is moderately low (in the 'Occupations to Monitor category) and of some concern. It is in the bottom half of all competence qualification achievements in the Hertfordshire area. Of the main occupations qualifications, it is the highest contributor to the East as a whole, providing 34% of all competence qualification achievements across the entire region. 2012/13 and 2016/17 output of achievements were consistent.

Apprenticeship starts for this occupation are somewhat average, and have stagnated between 2012/13 and 2016/17.

Specialist building operatives nec*

Training provision is very good, with competence qualification achievements fourth highest in the Hertfordshire area. Of the main occupations qualifications, it makes significant contribution to the East, providing 23% of all competence qualification achievements across the entire region. The period of 2012/13 and 2016/17 has seen an unstable output of achievements, but overall there was some negative growth.

Apprenticeship starts for this occupation are the lowest in the Hertfordshire LEP, and have decreased between 2012/13 and 2016/17.

In summary: Civil engineering operatives nec*, Electrical trades and installation, Painters and decorators and Specialist building operatives nec* appear to have good provision **overall**, providing some assurance against the risk of training shortfall. However, consideration should be given to the below- average provision of competence qualification achievements Painters and decorators have received over the last few years.

Is there the required volume of training across a good spread of occupations?

The main training volumes are:

- Plumbing and HVAC Trades
- Electrical trades and installation
- Wood trades and interior fit-out
- Specialist building operatives (not elsewhere classified)
- Plant operatives
- Civil Engineering Operatives (not elsewhere classified)

For most of the 'at risk' occupations, training is generally at rates similar to or better than the average against the region.

7. CONCLUSIONS AND RECOMMENDATIONS

The aim of the Hertfordshire LEP should be to achieve progress in addressing the long term and immediate challenges that the construction industry faces in the area. Balancing the supply of construction workers and skills against future demand and ensuring that a well-qualified workforce is in place is likely to be assisted by the Local Enterprise Partnership encouraging collaboration between influential local stakeholders. Progress is likely to be the result of a succession of incremental and interlinked actions undertaken by organisations working towards common goals.

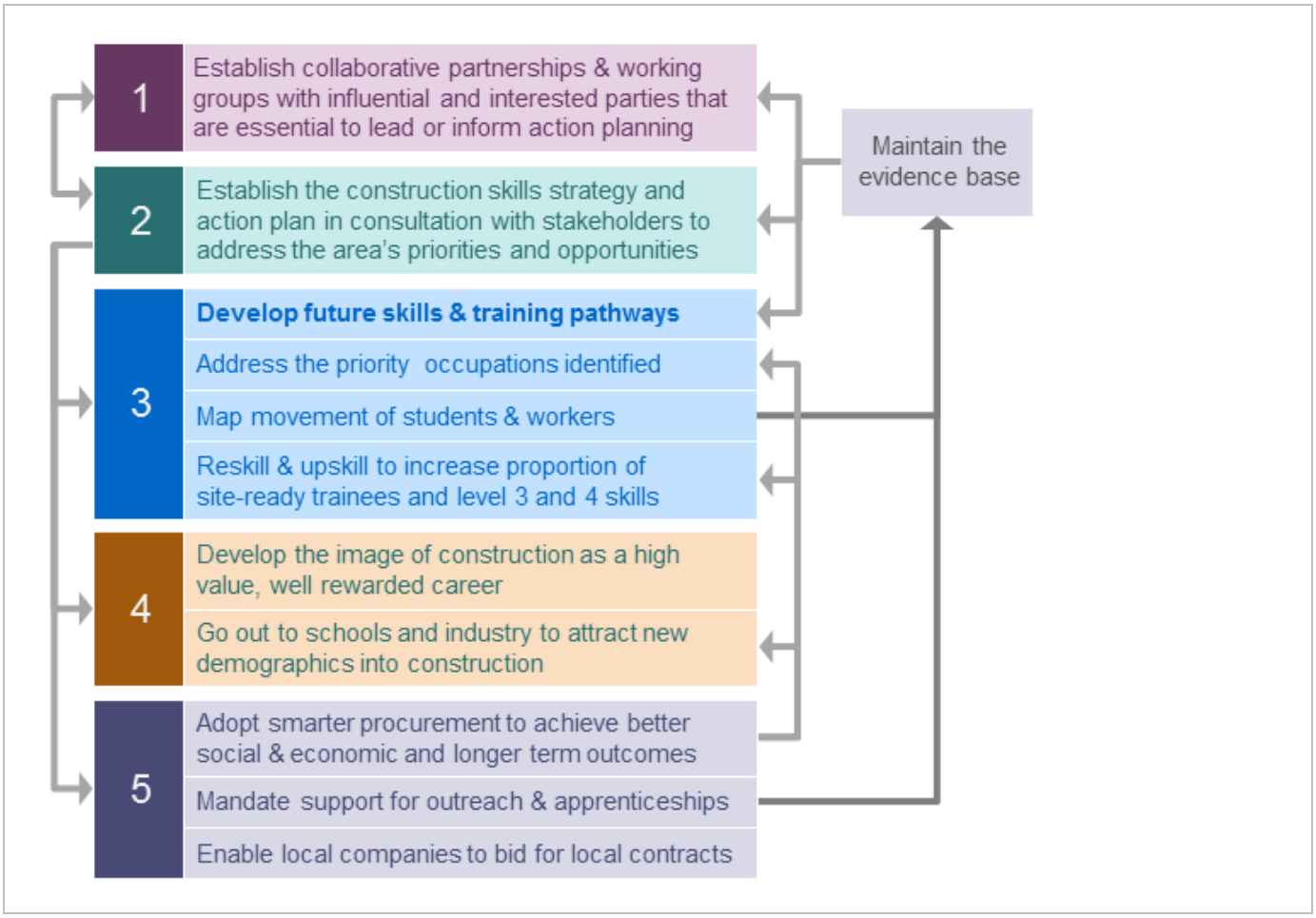
There is strong evidence to suggest that the Hertfordshire LEP area will suffer a shortage for some construction occupations. While these may be drawn in from others areas, it seems more likely that any net effect will be for workers to be drawn to other neighbouring areas of population and so the risk of inadequate local skills is that construction may be delayed or increase in price, inhibiting the achievement of local social and economic goals. London is likely to have a significant pull on the construction workforce; similarly, there is demand from, and shortages within, Cambridgeshire.

The risk of inadequate local resource is that construction may be delayed or increase in price, inhibiting the achievement of local social and economic goals. In particular it seems likely that future aspirations for new housing may not be met and that several major infrastructure projects will be competing for workers with similar projects across the UK and internationally.

Action planning

It is the responsibility of the Hertfordshire LEP and its influential stakeholders to review the recommendations, update the area's construction skills strategy and agree an action plan to address the challenges and opportunities that exist across Hertfordshire LEP. The Skills Board and LEP need not deliver the action plan but should take a leading role in coordinating and overseeing or delegating action and monitoring progress.

There are six integrated recommendations.



7.1. COLLABORATIVE PARTNERSHIPS

7.1.1. Conclusion

It will be essential to ensure that those interested in construction and with an influence over outputs and construction skills in the Hertfordshire LEP area work together.

Some significant initial progress has already been made with a network of colleges and private training establishments, sector specialists and other organisations already working together. However there will be significant opportunities to work together to: align better the training delivered with the needs of construction employers; to find new opportunities for drawing people into construction related careers and to deliver action that addresses the following recommendations.

7.1.2. Recommendation

a. The Hertfordshire LEP should ensure that relevant stakeholders and influencers are engaged. Share available evidence with them with a view to building collaborative action plans. Points of common interest should be established to encourage these stakeholders to input to, and take ownership of, the construction skills actions. This will maintain a sense of shared ownership of the challenges, priorities and solutions. Those stakeholders should include: local construction businesses; major employers; local authorities; developers (especially those interested in housing); housing associations; those responsible for managing infrastructure (transport and utilities); construction training providers, local influencers and universities.

b. Early on, establish a construction working group comprising those with a remit to develop, or influential in, the built environment in the Hertfordshire LEP area and neighbouring areas and task it with delivering outputs that achieve the LEP's desired social and economic outcomes. This should take ownership of 7.2 below.

c. Longer term projections and the development of scenarios may enable an assessment of the potential impacts of major initiatives that may skew demand (For example: garden communities; Bradwell B, Sizewell C or the Lower Thames Crossing.) Scenario planning and actions around skills pathways and career development should, in response, focus on delivering appropriate levels of high quality training to meet the future demand for site based trades (see related recommendations below).

d. Identify demographic data available and associate actions with opportunities for target candidates where the greatest potential social and economic impact can be gained by addressing occupational shortfalls or other priorities.

e. Establish processes whereby those responsible for: setting local regulation and funding developments can agree with construction suppliers holistic outcome-based approaches for tackling social and economic opportunities. This might consider moving towards a balance of awarding contracts based on good value for money and achieving wider benefits linked to: the built environment; training; support for apprenticeships; outreach; etc. This links to requirements outlined in the *Public Services (Social Value) Act.*

7.2. SKILLS STRATEGY: ACTION PLANNING AND EXPLOITATION

Establish (or develop) a Hertfordshire LEP construction skills strategy and action plan which recognises collective and potentially unique actions and solutions that may be required across Hertfordshire.

7.2.1. Conclusions

An ambition to develop construction skills and training pathways should be to match training and development with the needs of employers and the local economy. In support of this ambition, further understanding is needed of where the potential sources of people are to meet the needs of the Hertfordshire area and what the end-to-end skills and training pathways are that need to be in place to enable improved flows of people and skills supply to meet demand. These pathways may include localised initiatives supporting training needed by particular groups to enable them to access more formalised elements of training and careers pathways.

In the area around 88% of Further Education (FE) training is provided by nine providers; so the greatest potential impact is through mediated collaboration with and between the FE colleges.

The majority of training provision is at low levels. These may be a necessary introduction to construction in an individual's development but often are insufficient in meeting the needs of employers and so very often do not lead to a career in the occupation for which the individual has received trained. This is supported by an apparent mismatch between training achievements and supply for some occupations.

Also, construction employers have expressed concern that often those newly qualified and having gained site access through a CSCS card or similar are not equipped with the variety of skills required – these might include general competencies such as numeracy, literacy, timekeeping, productivity, interpersonal skills.

This suggests a need to work with colleges, employers and graduating students to help ensure that a greater proportion move into appropriate additional and vocational training and the career for which they have a qualification.

7.2.2. Recommendations

a. Develop a Hertfordshire LEP construction skills strategy along with an action plan that ensures that priority is given to trades highlighted in this report as being:

- In high volumetric demand AND at high risk of a shortfall in numbers.
- In high volumetric demand
- At high risk of a shortfall in numbers

Priority occupations	High demand occupations	At risk occupations
• Electrical trades • Painters and decorators	• Non construction trades (excl. managers) • Wood trades • Other construction process managers • Electrical trades • Senior, executive, and business process managers • Plumbing and HVAC trades • Other construction process professionals and technical staff • Labourers • Painters and decorators	• Civil engineering operatives • Electrical trades • Painters & decorators • Specialist building operatives • Non- construction operatives

b. There may be some additional roles, where there is anticipated to be high demand in the future and where there is high demand from neighbouring areas and significant projects. For example: plant operatives; steel fixers and civil engineering operatives.

c. Most local authorities are under pressure to maintain the provision of new housing but there are apparent shortages in some occupations in demand by house builders. A recommended action is to establish with local construction suppliers whether this trend is likely to continue and if so ensure that training provision addresses future demand for occupations of relevance, in particular site-based roles of relevance to house builders (see below).

d. An early action plan should assess if employers are facing specific skills shortages or skills wage inflation and what short-term interventions can be activated to address them. If issues are identified, consideration should be given to pursuing funding that can be utilised to support delivery of new training interventions.

e. Early consideration should be given to those occupations that need to be site-based, for which demand cannot be met by office based roles that could be located outside the Hertfordshire LEP area.

Site based roles

While it is important to have sufficient provision of all construction roles locally, it is possible that in some cases the provision can be met from outside the Hertfordshire area.

Many professional roles such as architects, surveyors and senior managers may only need to visit the construction site occasionally. There may also be roles that are more mobile that travel to the site for a short duration but can operative over a large area – for example plant or scaffolding

However there are many roles that can only operate on the construction site and for which local provision is essential. Examples of those roles – also particularly relevant in house building include: bricklayers; building envelope specialists; electrical trades and installation; floorers; glaziers; painters and decorators; plasterers & dry liners; plumbing and HVAC trades; roofers; wood trades and interior fit-out. Most of the roles identified as being in high demand or at risk for the Hertfordshire area are these site based roles.

f. Identify demographic data available and associate, as far as possible, relevant skills and training pathways and actions with opportunities for those where the greatest potential social and economic impact can be gained by addressing occupational shortfalls or other priorities.

g. Develop a co-ordinated approach to training and skills development that, as far as possible, integrates the development of multiple skills to enhance the success rates of initial construction training. (See 7.3 below.)

7.3. DEVELOP TRAINING PATHWAYS DEVELOP FUTURE SKILLS

7.3.1. Conclusions

It is clear there is high demand for several construction occupations and so there will be continuing demand to train people in essential skills. There are also some apparent gaps between supply and demand where immediate action would help address shortfalls in the near future.

CITB has received anecdotal evidence that in some locations, colleges would like to support the provision of more apprenticeships but that employers are not always providing the opportunities.

Anecdotal feedback indicates that it is often competencies and behaviours that need to developed as well as construction specific technical skills. This is particularly relevant as new approaches and technologies are introduce and is critical in ensuring individuals develop and progress along a career pathway.

There will also be a developing need for new skills to address new construction methods (e.g. offsite and modular build and the need for BIM applications.) [BIM is Building Information Modelling.]

The CITB report – 'Faster, Smarter, More Efficient: Building Skills for Offsite Construction' – provides an assessment of how the adoption of offsite is changing the skills and training landscape for construction.

The CITB report Unlocking construction's digital future: A skills plan for industry goes some way to try and describe the developing technological landscape and where opportunities may be. This highlights a need for new competencies and attributes in addition to specific technical skills.

There is also evidence to suggest that major infrastructure projects will utilise new technologies and require higher level skills and demand more: construction supervisors, scaffolders, plant operatives, civil engineers and civil engineering operatives – increasing labour demand pressures on role already in short supply across the UK.

7.3.2. Recommendations

a. By working together the major colleges should avoid duplication of effort or share resources, enhance specialisations and explore innovative ways of delivering the curriculum that meets employers' and students' needs.

b. The aims of this should be to: reduce the provision of under-subscribed courses; add provision for over-subscribed courses; add additional or enhance specialist courses to reflect the potential need for new construction skills and balance the provision of training with anticipated demand from the construction contractors locally. Pilot a range of options incrementally to test validity and effectiveness and achieve the most expedient solutions.

c. There is national pressure to increase the supply of roles including: construction supervisors, scaffolders, plant operatives, civil engineers civil engineering operatives. In relation to Hertfordshire LEP, in particular, these are likely to be in high demand if the proposed new nuclear projects go ahead at Sizewell and Bradwell and the demand for these skills should provide a guide.

d. Address any anticipated specific local needs and ensure that training delivers what employers need as part of a complete package of training initiatives.

e. Identify and facilitate how FE colleges and employers can engage with specialist training providers as well as with major projects, to establish greater provision for priority roles:

f. This may involve establishing training pathways through which students can complete initial knowledge based training before progressing into vocational training and apprenticeships and gaining site experience (while finishing their training).

g. Consideration should also be given to building an understanding of the economic and transport inhibitors that may prevent people accessing training and apprenticeships. Are there options for ensuring that training is provided where it is accessible; that those with limited financial support can receive support with the provision of appropriate clothing and equipment or that there is assistance with transport to remote worksites. This is particularly relevant for remote and sparsely populated places which, in Hertfordshire LEP present challenges to some potential students

h. This is also a need to progressively increase provision of individuals with a diverse set of new skills and who have the competencies and attributes to adopt new technologies and working practices. In some cases these 'softer' skills may already be part of education in non-construction activities.

- For some candidates it may be that training should also incorporate development of greater skills in: numeracy and literacy.

7.4. OUTREACH: BUILD A MORE POSITIVE IMAGE OF CONSTRUCTION WITH YOUNG PEOPLE. AND INCREASE RECRUITMENT THROUGH NEW ENTRANCE POINTS, CAREER CHANGERS AND RESKILLING.

7.4.1. Conclusion

Construction is sometimes associated with negative and inaccurate stereotypes that deter potential recruits, with education choices and career decisions often influenced in school and sometimes at a very early age.

It is increasingly clear that influences and preferences are established early in childhood and so it may be appropriate to build a positive profile of construction with children before the age of 11 as well as during secondary education.

7.4.2. Recommendation

a. With an anticipated long term demand for some skills, the potential exists for a schools outreach programme to build a positive perception of construction as offering high value, rewarding careers and encourages applications for construction skills courses and apprenticeships from a broader spectrum of young people – in particular ethnic minorities and women.

b. There are further opportunities for outreach with those aged 16 and above, in particular those studying relevant STE(A)M subjects but who have not considered that they lead into interesting and rewarding professions in construction or supporting construction.

   [CITB has supported employers and other stakeholders across the construction and built environment to develop an industry led initiative called Go Construct (www.goconstruct.org). This initiative inspires individuals to find out more about the sector, to access an experience with employers from school engagement via the Construction Ambassador scheme and find work experience placements.]

c. There may also be more mature audiences that can be encouraged to move into construction careers. This may include people with relevant transferable skills (e.g. from manufacturing or ex-military see *Careers Transition Partnership*) or those where there is a significant social gain by ensuring they are in valuable employment, e.g. ex-offenders and so contact should be made with HM Prison Service and DWP. Targeted intervention should be included within the construction skills action plan. In some cases co-ordinated action may be appropriate to help people into construction who may otherwise have faced barriers.

   There is anecdotal evidence to suggest that often ex-offenders have undertaken relevant training but find it difficult to enter the construction industry. Typically many ex-offenders welcome the opportunity to capitalise on new-found skills and tend to be committed and realistic about construction work.

   The opportunity is for stakeholders and influencers in Hertfordshire LEP to establish provision that brings ex-offenders in to work, to gain experience – giving them the capacity to find employment with local companies.

   An example may be available from HMP Highpoint in Suffolk that provides level 2 training in: plumbing, carpentry, fixed interiors, tiling, and street-works (utility groundworks) for around 100 inmates a year. They then need to gain on-site experience for an NVQ [some mobile CSCS-related testing is provided by HMP, leading to the issue of a Green Labourer's card].

d. There is an opportunity to maximise Go Construct and introduce other similar employer and local authority led initiatives to raise engagement between the local employers, educators and individuals from all backgrounds (e.g. the Careers and Enterprise Company.)

e. For the long term, Careers advice should engage very young audiences – i.e. pre-secondary education – to address early on negative stereotypes that may deter some groups from construction careers.

f. Early on, careers advisors educators and parents should be targeted to change perceptions of construction among significant influencers.

7.5. USE PROCUREMENT AND PLANNING REGULATION TO ENABLE SKILLS DEVELOPMENT

7.5.1. Conclusion

Construction is delivered through construction employers and suppliers, funded by private developers as well as by local authorities and regulated by local planning authorities. These organisations are better placed to prepare for the future if they have certainty on construction plans and programmes. Small and micro companies, in particular, have limited ability to maintain the processes and people to search for local opportunities or enable collaboration to support larger projects.

Public bodies have a requirement under the Public Services (Social Value) Act to ensure procurement addresses wider social, environmental and economic benefits.

The opportunities for small and micro companies (with limited resources and means) to respond to complex requirements, or invest in delivering services outside a basic construction contract, are severely limited.

Larger suppliers have expressed the view that some problems encountered with section 106 agreements include that: they are poorly thought out in terms of delivering tangible benefits; rarely are developed with contractors and agreed outputs are not measured and reported against.

7.5.2. Recommendations

a. The potential exists through smarter approaches to procurement (including co-ordinated approaches to Section 106 agreements) to encourage those tendering for construction and infrastructure contracts or those funding developments to be mandated to include provision for recruitment, training, apprenticeships and outreach that is co-ordinated across the Local Enterprise Partnership area, to achieve both good value for money and wider social benefits.

b. Early engagement with employers to discuss any such approach should be adopted as standard to find ways of ensuring that such requirements take into consideration the industry's needs and circumstances. (i.e. discuss wider social gains with potential suppliers well before tender documents are published. Let construction contractors input to sections 106 discussion.).

c. Provision could be made to hold contractors to account for commitments made. Such an approach could be co-ordinated through the Hertfordshire LEP and local authorities and be a requirement of planning applications and local authority and public sector contracts.

d. Procurement of major contracts, or conditions of planning consent could mandate the sharing of supply and sub-contracting through a locally managed portal available to businesses based within the region.

e. Consideration of the use of smaller lots when procuring schemes and supporting access for small and medium sized employers onto frameworks and supply chains to enable them to grow their businesses which will build further delivery capacity across the Hertfordshire LEP.

7.6. MAINTAIN & ENHANCE THE EVIDENCE BASE

Utilise local qualitative knowledge and experience to inform the findings of this report. And use other sources of data available to help inform decision making. CITB publishes a range of research of relevance to the construction industry but other relevant information is also regularly published.

As part of this report, the Hertfordshire LEP is given 12 months access to the Labour Forecasting Tool, including the source project data used to compile this report. This should be utilised as part of the action planning process to test scenarios, and to update and check the evidence base that supports decision making as circumstances change.

Ensuring that pipeline visibility assists the local industry in reducing risks such as economic instability or maintaining sustainable employment. The demand forecasts produced using data from Glenigan are the result of a snapshot at a moment in time and so it is wise to update demand at regular intervals according to the need and capability.

END

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Version	Date	Details of modifications
First draft	10th March 2020	First draft for consultation
Second draft	22nd October	Second draft for consultation
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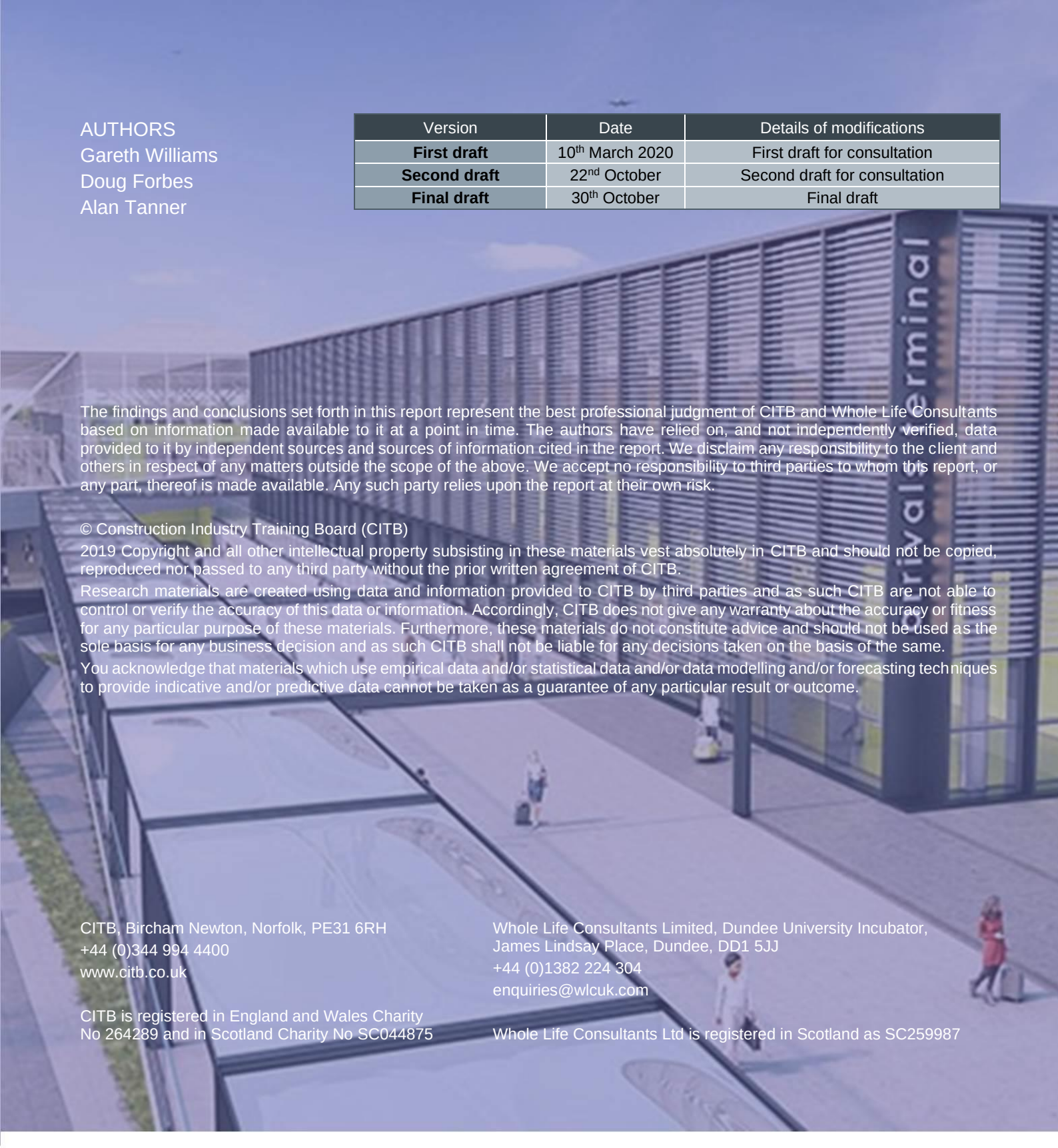

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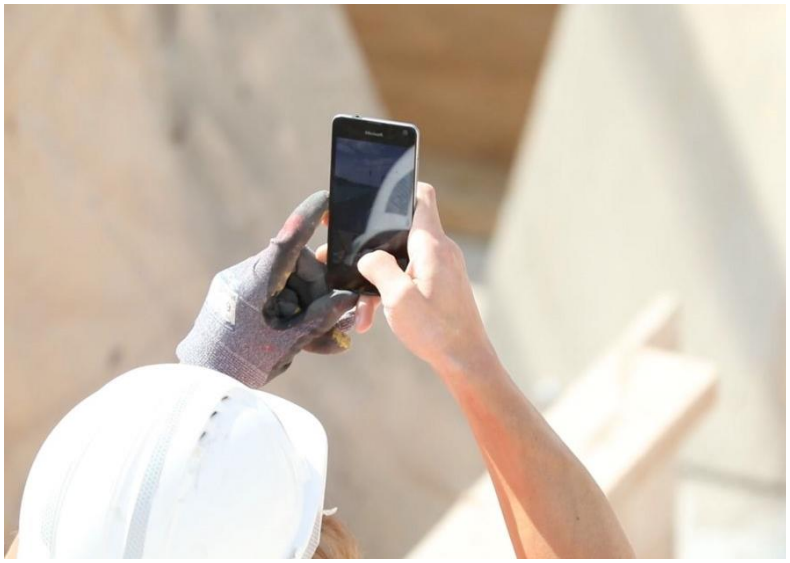
CITB Analysis

Construction skills gap analysis for Hertfordshire



An analysis of the opportunities presented by the construction landscape in the Hertfordshire LEP with consideration of smart construction

March 2020

APPENDIX CONTENTS

LIST OF TABLES

APPENDIX A. DEMAND ANALYSIS METHODOLOGY

Introduction

The Construction Skills Network (CSN) provides labour market intelligence for the construction industry. Developed by Experian on behalf of CITB it forecasts labour demand in each of 12 UK regions and provides forecasts of how the industry will change year on year. It is not designed however to predict labour demand at a sub-regional level. For this purpose, we use our prize-winning Labour Forecasting Tool (LFT) developed on behalf of CITB. Labour demand is calculated by converting the volume of construction activity forecast to take place in any geographical region into forecast labour demand using labour coefficients (the number of person years required to produce £1m of output). For the sake of consistency with ONS terminology the 'volume of activity' is referred to as 'output' throughout this report. The following sections describe:

- the sources of data we use;
- how the output is calculated;
- how we deal with the absence of comprehensive data that is the typical situation beyond the first year or two of our analysis;
- how we reconcile any differences between the results produced by the LFT and those produced by the CSN;
- the steps we take to deal with any shortcomings in the sources of data; and
- how the LFT converts output into labour demand.

Calculating construction output

Data sources

There are two principal sources of data: the Glenigan database and the National Infrastructure and Construction Pipeline (NICP).

Glenigan

The original purpose of the Glenigan database is to allow contractors to identify leads and to carry out construction market analysis. It is updated every quarter to provide details of planning applications from local authorities supplemented with additional project-specific data. Of particular relevance to this report, it provides a description of each project, its name, location, value, and in most cases, projected start and end dates. It contains many tens of thousands of projects. The Glenigan pipeline does not identify every single project in an LEP: projects which are small (typically but not exclusively those less than £250,000 in value), and most that involve repair and maintenance are not included.

We have used the latest available cut of Glenigan data including all the relevant projects which started before 2017 but excluding those which are already complete. We have included in our analysis only those projects shown to be at the following planning stages because there is a reasonable probability that these projects will be realised in practice.

- Planning not required
- Detail plans granted
- Reserved matters granted
- Application for reserved matters
- Plans approved on appeal
- Listed building consent

The values of some infrastructure projects given in the Glenigan database are the total value of construction and engineering works. In these cases, since the scope of this study is limited to the construction sector, an estimate of the engineering value has been calculated and subtracted from the total value. This provides what we have termed the construction value. The percentages applied to the total value of each infrastructure project type to derive the construction value are shown in Table A1 below. The construction/engineering proportions have been validated through work we have undertaken for other clients and have been used in the production of Infrastructure UK's National Infrastructure Plan for Skills and the Construction Skills Network forecasts.

An initial review of the projects in the pipeline is carried out to ensure that only projects which have (a) a defined value and (b) defined start and end dates, are considered in the analysis, and that no projects are duplicated. For example "major leads" and "frameworks" may include smaller projects that are separately identified in the database.

Because of the size of the database, it is impossible to review the details of every project. Instead, we identify the small number of projects that represent the greatest value, the so-called significant projects. To do this, we use the Mean Value Theorem developed at the University of Dundee which states that maximum information from any set of data is obtained simply by considering the data whose value is greater than the average. This is a version of the Pareto rule which suggests that 80% of the value in a data set is contained within the 20% of items whose value is the greatest. The significant projects are then thoroughly inspected to make sure that the information reported in the Glenigan database is consistent and accurate as far as can be ascertained. Any anomalies are resolved, if necessary by returning to the source of the data. Since this process typically picks up the projects whose value represents 80% of the total, the scope for any errors in the remaining data to have a significant impact is severely limited.

Table A1: Proportion of total value related to construction

Infrastructure type	Sub-type	Construction value as a proportion of total value
Flooding	Flooding	90%
Transport	Bridges	100%
	Road tunnel	100%
	Roads	100%
	Air traffic control	100%
	Airports	100%
	Ports	90%
	Stations (underground/Network Rail)	80%
	Mixed rail	55%
	Electrification	35%
	Underground/DLR (not incl. stations)	35%
	Rail maintenance	10%
	Trams	55%
	Contactless ticketing	20%
Water	Water/wastewater treatment works	90%
Communications	Broadband/Digital infrastructure	20%
Energy	Photovoltaics	80%
	Generation (biomass)	50%
	Generation (energy from Waste)	50%
	Generation (nuclear)	50%
	Undefined electricity generation	40%
	Generation (fossil fuel)	25%
	Generation (renewables - offshore)	20%
	Generation (renewables - onshore)	10%
	Gas Transmission/distribution	30%
	Electricity transmission/distribution	25%
	Interconnectors	20%
	Nuclear decommissioning	60%
	Smart meters	0%
	Oil and gas	10%
Mining	Mining	80%
General infrastructure	General infrastructure	100%

For the significant projects, the project descriptions in the database are assigned the most appropriate project type to be used when the data is input to the LFT (each type is driven by a different underlying model). Cases where a project consists of more than one type are broken down into multiple forecasts which are assigned specific project types to more closely predict the labour demand. This takes account of the different types of work which may exist within a single project, e.g. mixed developments comprising residential, commercial and industrial buildings. For the non-significant projects, the default project type defined in the Glenigan pipeline is applied.

In order to maintain consistency with the CSN we have limited our forecast to the same time period as the most recently published CSN forecast.

NICP data

The Infrastructure and Projects Authority (formerly Infrastructure UK and Major Projects Authority) compiles a pipeline of UK infrastructure and construction projects and the associated annual public and private investment.

We examine the NICP data to identify infrastructure projects or programmes of work taking place in the region under consideration that are not included in the Glenigan database. The construction cost is calculated from the total cost reported in the NICP using the percentages in Table A1. Projects in the Glenigan dataset and the NICP are combined (ensuring that there is no double counting) to create a pipeline of 'known' projects for the area. We have only considered those projects which are specifically allocated to the region under consideration in the NICP (i.e. projects at a national level have not been considered).

The pipeline includes both construction and infrastructure projects but for the purposes of this analysis we have included only projects which are clearly defined specific projects rather than regional programmes of work. This reduces the risk of double counting in the Glenigan data.

CSN data

The CSN model produced by Experian also uses Glenigan as a major source of data relating to the volume of construction activity in the UK. Experian supplement the Glenigan data with market intelligence collected by a variety of means including a series of 'Observatories' held every six months in each region, at which representatives of the industry are invited to comment on the validity of Experian's data and findings. In Experian's annual CSN report, their estimate of the output in each of the following sectors is published:

- Public housing
- Private housing
- Infrastructure
- Public non-housing
- Industrial
- Commercial
- Housing repair and maintenance
- Non-housing repair and maintenance

Aligning the Glenigan pipeline with CSN output

The following process is undertaken to ensure that the value of work in the Glenigan pipeline is aligned with output as measured by the CSN.

1. Considering the government region within which the research area lies, identify only the new build in the known projects by removing all repair and maintenance projects.
2. Compare the output identified in the known projects as new build at the regional level with the CSN new build at the regional level sector by sector e.g. residential, non-residential, infrastructure etc.
3. If in any sector the known new-build regional output for the peak year is more or less than that forecast by the CSN for the same year then the value of each new build known project is factored by the following ratio:

$$\frac{Value\ of\ CSN\ new\ build\ at\ regional\ level\ for\ given\ sector}{Value\ of\ known\ new\ build\ projects\ at\ regional\ level\ for\ given\ sector}$$

The outputs calculated in this way are referred to as 'factored new build outputs'

This process takes account of both projects (typically less than £250k in value) not included in the known projects and those whose value or probability of realisation is over-optimistic.

4. To take account of housing repair and maintenance (R&M) at the research Hertfordshire LEP level, it is assumed that the proportion of the total output represented by housing R&M is the same at the local level as it is at the regional level in the CSN. The Glenigan new build factored housing output is therefore multiplied by the following ratio:

$$\frac{Value\ of\ CSN\ housing\ R\&M\ at\ regional\ level}{Value\ of\ CSN\ new\ build\ housing\ at\ regional\ level}$$

to derive the output in housing R&M to be added to the factored new build output

5. The non-housing R&M to be added to the factored new build non-housing output is calculated in a similar way. [This tales account of the work undertaken by self-employed workers.]

Dealing with the 'cliff edge'

As the time horizon extends there is less clarity on what is planned. As a result, the number of known projects declines the further into the future we look. This apparently declining workload is highly unlikely to reflect the total amount of work that will take place in the future. It is almost certain that there will be additional projects that come on stream which are yet to be identified. To overcome this 'cliff edge' effect we assume, based on an analysis of historical data, that the future workforce is approximately equal to the peak. It should be noted that the peak labour demand refers to the current "snapshot" of the scheduled construction spend. It is prudent to expect that, should the investment in future years follow the same pattern, the peak labour demand figures are likely to be roughly similar assuming the mix of projects remains consistent. The peak has, therefore, been projected forwards and backcast to create a more likely scenario of the ongoing workforce. The employment growth rate is based on the CSN employment forecast for the whole region under consideration.

A consequence of this approach is the implicit assumption that the proportion of people in each occupation in the additional projects remain unchanged year on year.

Calculating total labour demand

Our Labour Forecasting Tool is used to determine the labour demand generated by the construction outputs in the peak year. The LFT can determine the labour demand generated by a pipeline of construction projects given only the project types, their start and end dates and their locations. It quantifies the month-by-month demand in each of the 28 occupational groups shown in Appendix B. To do this, it uses labour coefficients (person years to produce £1m of output) derived from historical ONS data. The labour coefficients are updated annually as new data becomes available, and indexed to take account of different locations and changes in prices.

There are different labour coefficients for each occupation and for each of the following project types:

- residential
- non-residential
- infrastructure
- residential R&M
- non-residential R&M

Infrastructure projects can be broken down into the types shown in Table A1.

APPENDIX B. OCCUPATIONAL DEFINITIONS

Reference is made in this report to a range of occupational aggregates for construction occupations. This appendix contains details of the 166 individual occupations which are aggregated into 28 occupational aggregates.

Table A2: Occupation definitions

Occupations included within construction occupational aggregates (Four-digit codes refer to Office for National Statistics Standard Occupational Classification Codes).	
1 Senior, executive, and business process managers[8]	
(1115) Chief executives and senior officials (1131) Financial managers and directors (1132) Marketing and sales directors (1133) Purchasing managers and directors (1135) Human resource managers and directors (1251) Property, housing and estate managers (1136) Information technology and telecommunications directors (2150) Research and development managers	(1162) Managers and directors in storage and warehousing (1259) Managers and proprietors in other services nec (1139) Functional managers and directors nec (2133) IT specialist managers (2134) IT project and programme managers (3538) Financial accounts managers (3545) Sales accounts and business development managers
2 Construction project managers[8]	
(2436) Construction project managers and related professionals	
3 Other construction process managers[8]	
(1121) Production managers and directors in manufacturing (1122) Production managers and directors in construction (1161) Managers and directors in transport and distribution (1255) Waste disposal and environmental services managers	(3567) Health and safety officers (3550) Conservation and environmental associate professionals
4 Non-construction professional, technical, IT, and other office–based staff (excl. managers)[8]	
(3131) IT operations technicians (3132) IT user support technicians (3534) Finance and investment analysts and advisers (3535) Taxation experts (3537) Financial and accounting technicians (3563) Vocational and industrial trainers and instructors (3539) Business and related associate professionals nec (3520) Legal associate professionals (3565) Inspectors of standards and regulations (2136) Programmers and software development professionals (2139) Information technology and telecommunications professionals nec (3544) Estate agents and auctioneers (2413) Solicitors (2419) Legal professionals nec (2421) Chartered and certified accountants (2424) Business and financial project management professionals (2423) Management consultants and business analysts (4216) Receptionists (4217) Typists and related keyboard occupations (3542) Business sales executives (4122) Book-keepers, payroll managers and wages clerks (4131) Records clerks and assistants (4133) Stock control clerks and assistants (7213) Telephonists (7214) Communication operators (4215) Personal assistants and other secretaries (7111) Sales and retail assistants (7113) Telephone salespersons	(3541) Buyers and procurement officers (3562) Human resources and industrial relations officers (4121) Credit controllers (4214) Company secretaries (7129) Sales related occupations nec (7211) Call and contact centre occupations (7219) Customer service occupations nec (9219) Elementary administration occupations nec (2111) Chemical scientists (2112) Biological scientists and biochemists (2113) Physical scientists (3111) Laboratory technicians (3421) Graphic designers (2463) Environmental health professionals (2135) IT business analysts, architects and systems designers (2141) Conservation professionals (2142) Environment professionals (2425) Actuaries, economists and statisticians (2426) Business and related research professionals (4124) Finance officers (4129) Financial administrative occupations nec (4138) Human resources administrative occupations (4151) Sales administrators (4159) Other administrative occupations nec (4162) Office supervisors (7130) Sales supervisors (7220) Customer service managers and supervisors (4161) Office managers

[8] Managerial, professional & office based staff

5 Construction trades supervisors[9]	
(5250) Skilled metal, electrical and electronic trades supervisors (5330) Construction and building trades supervisors	
6 Wood trades and interior fit-out[9]	
(5315) Carpenters and joiners (8121) Paper and wood machine operatives	(5442) Furniture makers and other craft woodworkers (5319) Construction and building trades nec (25%)
7 Bricklayers[9]	
(5312) Bricklayers and masons	
8 Building envelope specialists[9]	
(5319) Construction and building trades nec (50%)	
9 Painters and decorators[9]	
(5323) Painters and decorators	(5319) Construction and building trades nec (5%)
10 Plasterers[9]	
(5321) Plasterers	
11 Roofers[9]	
(5313) Roofers, roof tilers and slaters	
12 Floorers[9]	
(5322) Floorers and wall tillers	
13 Glaziers[9]	
(5316) Glaziers, window fabricators and fitters	(5319) Construction and building trades nec (5%)
14 Specialist building operatives not elsewhere classified (nec)[9]	
(8149) Construction operatives nec (100%) (5319) Construction and building trades nec (5%)	(9132) Industrial cleaning process occupations (5449) Other skilled trades nec
15 Scaffolders[9]	
(8141) Scaffolders, stagers and riggers	
16 Plant operatives[9]	
(8221) Crane drivers (8129) Plant and machine operatives nec	(8222) Fork-lift truck drivers (8229) Mobile machine drivers and operatives nec
17 Plant mechanics/fitters[9]	
(5223) Metal working production and maintenance fitters (5224) Precision instrument makers and repairers (5231) Vehicle technicians, mechanics and electricians	(9139) Elementary process plant occupations nec (5222) Tool makers, tool fitters and markers-out (5232) Vehicle body builders and repairers
18 Steel erectors/structural fabrication[9]	
(5311) Steel erectors (5215) Welding trades (5214) Metal plate workers, and riveters	(5319) Construction and building trades nec (5%) (5211) Smiths and forge workers (5221) Metal machining setters and setter-operators
19 Labourers nec[9]	
(9120) Elementary construction occupations (100%)	
20 Electrical trades and installation[9]	
(5241) Electricians and electrical fitters (5249) Electrical and electronic trades nec	(5242) Telecommunications engineers
21 Plumbing and heating, ventilation, and air conditioning trades[9]	
(5314) Plumbers and heating and ventilating engineers (5216) Pipe fitters	(5319) Construction and building trades nec (5%) (5225) Air-conditioning and refrigeration engineers
22 Logistics[9]	
(8211) Large goods vehicle drivers (8212) Van drivers (9260) Elementary storage occupations	(3541) Buyers and purchasing officers (50%) (4134) Transport and distribution clerks and assistants

[9] Skilled trades & operatives

23 Civil engineering operatives not elsewhere classified (nec)[9]	
(8142) Road construction operatives (8143) Rail construction and maintenance operatives	(8123) Quarry workers and related operatives
24 Non–construction operatives[9]	
(8117) Metal making and treating process operatives (8119) Process operatives nec (8125) Metal working machine operatives (8126) Water and sewerage plant operatives (8132) Assemblers (vehicles and metal goods) (8133) Routine inspectors and testers (8139) Assemblers and routine operatives nec	(9249) Elementary security occupations nec (9233) Cleaners and domestics (9232) Street cleaners (5113) Gardeners and landscape gardeners (6232) Caretakers (9241) Security guards and related occupations (3319) Protective service associate professionals nec
25 Civil engineers[8]	
(2121) Civil engineers	
26 Other construction professionals and technical staff[8]	
(2122) Mechanical engineers (2123) Electrical engineers (2126) Design and development engineers (2127) Production and process engineers (2461) Quality control and planning engineers (2129) Engineering professionals nec (3112) Electrical and electronics technicians (3113) Engineering technicians (3114) Building and civil engineering technicians	(3119) Science, engineering and production technicians nec (3121) Architectural and town planning technicians (3122) Draughtspersons (3115) Quality assurance technicians (2432) Town planning officers (2124) Electronics engineers (2435) Chartered architectural technologists (3531) Estimators, valuers and assessors (3116) Planning, process and production technicians
27 Architects[8]	
(2431) Architects	
28 Surveyors[8]	
(2433) Quantity surveyors (2434) Chartered surveyors	

APPENDIX C. GLENIGAN PROJECTS REMOVED FROM HERTFORDSHIRE

This appendix contains a list of all the Glenigan projects removed from the analysis, stating the reason for their exclusion.

Table A3: Removed Glenigan projects from Hertfordshire

	Heading	Local authority	Value (£m)	Start date	End date	Reason for omission
1	3 Flats & 2 Shop/Office Units	Dacorum	0.3			Missing dates
2	Flood Defences	Watford	0.3			Missing dates
3	6 Flats & Offices/1 Retail Unit	Broxbourne	0.4			Missing dates
4	Garden Centre Retail Building	East Hertfordshire	0.4			Missing dates
5	9 Flats & 1 Doctors Surgery	Watford	0.5			Missing dates
6	10 Flats (Conversion/Extension)	North Hertfordshire	0.5			Missing dates
7	2 Industrial Units	Hertsmere	0.5			Missing dates
8	Offices/Workshops	North Hertfordshire	0.5			Missing dates
9	Care Home (Extension)	St. Albans	0.5			Missing dates
10	5 Houses & 1 Workshop	East Hertfordshire	0.5			Missing dates
11	Petrol Station	Watford	0.5			Missing dates
12	10 Flats & 1 Commercial/Retail Unit	East Hertfordshire	0.6			Missing dates
13	12 Office Units	North Hertfordshire	0.6			Missing dates
14	Dental Surgery (Alterations)	Stevenage	0.6			Missing dates
15	10 Flats & 1 Retail Unit (New/Alterations)	Stevenage	0.6			Missing dates
16	10 Flats & 1 Retail/1 Restaurant/1 Training Centre	North Hertfordshire	0.7			Missing dates
17	13 Flats (Conversion)	East Hertfordshire	0.7			Missing dates
18	14 Flats	Broxbourne	0.8			Missing dates
19	Hotel (Extension)	Welwyn Hatfield	0.9			Missing dates
20	Office Building	East Hertfordshire	1.0			Missing dates
21	Sheltered Care Home (Extension)	Hertsmere	1.0			Missing dates
22	18 Flats (Conversion)	St. Albans	1.0			Missing dates
23	21 Flats	North Hertfordshire	1.1			Missing dates
24	Office (New/Alterations)	Three Rivers	1.2			Missing dates
25	Military Accommodation Block	Three Rivers	1.2			Missing dates
26	Care Home	Three Rivers	1.2			Missing dates
27	School Music Block (Extension/Alterations)	Welwyn Hatfield	1.4			Missing dates
28	26 Flats (Conversion)	Dacorum	1.4			Missing dates
29	Light Industry/Warehouse/Distribution	East Hertfordshire	1.4			Missing dates
30	27 Flats (Conversion)	St. Albans	1.5			Missing dates
31	13 Houses (New/Conversion)	St. Albans	1.5			Missing dates
32	School Sports Hall (Extension)	Broxbourne	1.5			Missing dates
33	30 Flats (Conversion)	Three Rivers	1.6			Missing dates

34	29 Flats & 1 Retail Unit	Watford	1.6			Missing dates
35	26 Residential Units/Offices/Depot Units	Dacorum	2.0			Missing dates
36	40 Flats	Three Rivers	2.0			Missing dates
37	Design & Technology Building (Extensions)	East Hertfordshire	2.0			Missing dates
38	Hospital Cancer Care Unit (Extension)	East Hertfordshire	2.2			Missing dates
39	18 Houses & 10 Flats	Dacorum	2.3			Missing dates
40	Care Home	Hertsmere	2.5			Missing dates
41	Storage Building	East Hertfordshire	2.5			Missing dates
42	51 Flats/Shop/Office/Restaurant/Pub Units	North Hertfordshire	2.6			Missing dates
43	51 Flats (Conversion)	Dacorum	2.7			Missing dates
44	Petrol Station	Three Rivers	2.8			Missing dates
45	4 Office Units	Dacorum	3.0			Missing dates
46	Light Industry/Office (Extension/Alterations)	North Hertfordshire	3.2			Missing dates
47	School Science Block (Extension)	Three Rivers	3.3			Missing dates
48	Storage/Distribution Warehouse & Restaurant/Take Away Unit	Dacorum	3.5			Missing dates
49	64 Flats	Stevenage	3.5			Missing dates
50	Retail Units & Office (New/Alterations)	St. Albans	4.7			Missing dates
51	Film Studio (Extension)	Hertsmere	7.0			Missing dates
52	Car Park Redevelopment	Hertsmere	8.0			Missing dates
53	107 Residential Units	St. Albans	8.2			Missing dates
54	Hospital (Refurbishment)	Watford	9.8			Missing dates
55	272 Flats/Offices/Leisure & Retail Units	Dacorum	13.6			Missing dates
56	Brent Cross Cricklewood Regeneration	Hertsmere	15.0			Missing dates
57	Residential Care Home	St. Albans	19.0			Missing dates
58	6 Retail/Office & Restaurant Units	Dacorum	19.0			Missing dates
59	Battery Storage Facility	Welwyn Hatfield	20.0			Missing dates
60	408 Flats	Watford	20.3			Missing dates
61	Interchange (Upgrading)	Watford	38.0			Missing dates
62	Consultancy Services Framework	Watford	172.0	15/02/2018	17/02/2022	Consultancy
63	Professional Services for Construction Management Framework	Welwyn Hatfield	0.6	22/03/2017	24/03/2021	Consultancy
64	Client Support Service Term Contract	Welwyn Hatfield	94.5	01/10/2012	01/10/2019	Consultancy
65	150 Flats & 1 Retail Unit	Dacorum	8.9	01/11/2018	28/11/2019	Duplicate
66	School (Extension)	St. Albans	0.5	14/10/2019	29/06/2020	Duplicate
67	174 Residential Units/Retail Units and Market Place	Three Rivers	172.0	02/07/2018	26/06/2020	Duplicate
68	Hotel (Fit Out)	East Hertfordshire	6.0	16/09/2019	14/12/2020	Duplicate

APPENDIX D. SIGNIFICANT GLENIGAN PROJECTS IN HERTFORDSHIRE

This appendix provides a list of all the significant projects analysed. The projects appear in the order they were put into the LFT.

Table A4: Significant Glenigan projects in Hertfordshire

	Description	Local authority	Value (£m)	Start date	End date	Project type
1	Highway Works	Welwyn Hatfield	420.0	01/10/2012	01/10/2019	Infrastructure
2	Town Centre Redevelopment	Dacorum	294.7	09/05/2015	05/08/2023	New housing, Public Non-housing, Private Commercial
3	Housing Refurbishment Contract	Dacorum	235.6	01/07/2014	01/07/2024	Housing R&M
4	Freight Interchange Development	St. Albans	220.0	10/06/2019	10/06/2024	Infrastructure
5	15 Flats/1 Commercial Unit & Multi Storey Car Park	East Hertfordshire	189.7	01/07/2019	30/06/2030	New housing, Private Commercial, Infrastructure
6	Junction (Improvements)	North Hertfordshire	156.1	30/03/2020	30/07/2025	Infrastructure
7	Housing Repairs & Maintenance Contract	Hertsmere	90.0	01/04/2019	03/04/2034	Housing R&M
8	Office	Watford	85.0	03/11/2018	15/06/2020	Private Commercial
9	Property Works Framework	East Hertfordshire	65.1	10/11/2015	03/11/2020	Public Non-housing
10	154 Flats & 3 Office/Gym/Restaurant/Cafe Units	Watford	62.7	12/11/2018	15/03/2027	New housing, Private Commercial
11	86 Flats/1 Office & Commercial Units	St. Albans	57.4	15/04/2019	12/04/2021	New housing, Private Commercial
12	Major Refurbishment Contract	Stevenage	55.0	16/03/2018	17/03/2023	Housing R&M
13	Residential care community	Watford	53.0	10/09/2018	10/06/2019	New housing, Private Commercial, Public Non-housing
14	70 Flats/1 Hotel & Retail Units	East Hertfordshire	47.4	13/08/2018	09/09/2019	New housing, Private Commercial
15	Road Works	Three Rivers	46.0	03/02/2020	05/04/2021	Infrastructure
16	348 Residential Units	St. Albans	45.8	21/09/2018	20/09/2019	New housing
17	1340 Flats/114 Extra Care Flats & Commercial Units	Welwyn Hatfield	44.3	19/07/2019	30/06/2023	New housing, Public Non-housing, Private Commercial
18	155 Houses & 151 Flats	Hertsmere	42.6	01/11/2017	31/10/2019	New housing
19	95 Key Worker Flats	Watford	37.7	29/01/2018	06/07/2019	New housing
20	514 Residential/Retail Development	Three Rivers	37.6	12/09/2016	11/09/2023	New housing, Private Commercial
21	206 Residential Units	St. Albans	34.3	10/04/2019	30/09/2022	New housing
22	Aggregates Treatment & Recycling Facility	East Hertfordshire	34.0	07/10/2019	07/04/2020	Infrastructure
23	180 Homes	East Hertfordshire	33.2	11/07/2016	31/12/2019	New housing, Infrastructure
24	50 Flats & 1 Office Building	Watford	29.0	03/12/2018	06/01/2020	New housing, Private Commercial
25	90 Residential Units	Broxbourne	26.9	05/06/2017	31/08/2019	New housing
26	275 Residential Units (Framework)	North Hertfordshire	26.9	11/04/2016	13/04/2020	New housing

	Description	Local authority	Value (£m)	Start date	End date	Project type
27	485 Residential & Retail/Commercial Units	Watford	25.0	26/11/2018	27/11/2023	Public Non-housing, Public Non-housing
28	Television Stage/Temporary Film	Hertsmere	24.2	27/09/2018	05/03/2020	Private Commercial
29	Bridges & Structures Maintenance Works Framework Agreement	East Hertfordshire	24.0	31/07/2017	02/08/2021	Infrastructure
30	101 Flats & 1 Office Building	East Hertfordshire	21.8	18/12/2017	17/12/2018	New housing, Private Commercial
31	School Building	St. Albans	20.7	02/07/2018	27/12/2019	Public Non-housing, Infrastructure
32	School	Hertsmere	20.2	24/07/2017	12/07/2019	Public Non-housing
33	Building Maintenance Framework	Stevenage	19.5	06/09/2018	08/09/2022	Public Non-housing
34	Roundabout Works	East Hertfordshire	19.4	12/08/2019	08/02/2021	Infrastructure
35	90 Flats	Watford	17.9	09/12/2019	09/08/2021	New housing
36	Offices & Retail Units	Hertsmere	17.3	12/09/2019	19/11/2020	Private Commercial
37	School	Broxbourne	16.9	18/11/2019	19/10/2020	Public Non-housing
38	94 Flats & Commercial Units (New/Conversion)	Stevenage	16.4	29/04/2019	29/03/2021	New housing, Private Commercial, Public Non-housing
39	Veterinary College (New/Extension)	Welwyn Hatfield	16.3	23/09/2019	22/03/2021	Public Non-housing
40	Warehouse Club (New/Conversion)	Stevenage	15.9	18/06/2018	15/07/2019	Private Industrial
41	93 Flats	Watford	15.7	01/05/2018	13/03/2020	New housing
42	School	Three Rivers	15.6	04/06/2018	11/10/2019	Public Non-housing
43	5 Retail Units/ 1 Bank	Dacorum	15.5	02/12/2019	23/11/2020	Private Commercial
44	69 Houses & 13 Flats	North Hertfordshire	14.8	16/07/2018	30/10/2020	New housing
45	46 Flats & 39 Houses	East Hertfordshire	14.5	01/01/2019	02/07/2021	New housing
46	Refinery Building	North Hertfordshire	14.1	21/10/2019	20/07/2020	Private Industrial, Private Commercial
47	291 Flats & 1 Industrial Building	Watford	13.0	29/10/2019	22/06/2021	Private Industrial, New housing
48	Hotel/Leisure Facility	Dacorum	12.7	02/09/2019	27/04/2020	Private Commercial
49	87 Flats	Dacorum	12.6	16/04/2018	16/12/2019	New housing
50	279 Residential Units	North Hertfordshire	12.6	30/06/2020	22/02/2022	New housing
51	71 Sheltered Flats	North Hertfordshire	12.6	01/10/2018	25/10/2019	New housing
52	Leisure Centre, Arts and Cultural Facilities (New/Extension)	St. Albans	12.5	29/04/2019	30/10/2019	Public Non-housing, Private Commercial
53	Manufacturing Centre	Stevenage	11.9	12/09/2018	05/09/2019	Private Industrial
54	4 Industrial/Commercial Buildings	Welwyn Hatfield	11.5	16/10/2019	15/07/2020	Private Industrial, Private Commercial
55	Aparthotel (Conversion/Alterations)	Broxbourne	10.6	03/02/2020	22/03/2021	Private Commercial
56	46 Houses & 19 Flats	Dacorum	10.6	31/12/2018	08/05/2020	New housing
57	227 Flats	Watford	10.3	02/09/2019	27/08/2021	New housing
58	Hotel & 2 Retail Units/Restaurants/Pubs	St. Albans	10.0	05/07/2019	31/01/2020	Private Commercial
59	78 Flats	Hertsmere	9.9	19/01/2018	19/11/2019	New housing

	Description	Local authority	Value (£m)	Start date	End date	Project type
60	155 Homes & School	Broxbourne	9.9	30/07/2018	26/08/2019	New housing, Public Non-housing
61	Supermarket/Non Food Retail Unit & Gym	St. Albans	9.0	30/09/2019	24/04/2020	Private Commercial
62	10 Flats	Hertsmere	9.0	23/09/2019	21/09/2020	New housing
63	4 Retail Units & 1 Restaurant	St. Albans	7.9	12/11/2018	10/06/2019	Private Commercial, Public Non-housing, Infrastructure
64	170 Flats	Dacorum	7.8	07/01/2019	27/07/2020	New housing
65	Medical Laboratory (Fit Out)	Stevenage	7.8	14/05/2018	15/07/2019	Public Non-housing
66	Hotel	Welwyn Hatfield	7.8	03/02/2020	05/10/2020	Private Commercial
67	110 Flats	Dacorum	7.6	22/10/2019	06/04/2021	New housing
68	108 Residential Units	North Hertfordshire	7.5	03/09/2018	30/09/2019	New housing
69	10 Flats	Hertsmere	7.2	02/07/2018	02/07/2019	New housing
70	Elderly Dementia Care Home	Broxbourne	7.2	14/09/2020	14/12/2021	New housing
71	Hotel & Builders Merchant	Three Rivers	7.0	20/08/2018	16/12/2019	Private Commercial, Private Industrial, Infrastructure
72	146 Flats & Commercial Units	Watford	6.9	25/03/2019	22/06/2020	New housing, Private Commercial
73	Advanced Research Centre	St. Albans	6.5	17/12/2019	08/06/2021	Public Non-housing
74	102 Residential Units & 1 College Teaching Block	Dacorum	6.4	17/09/2018	11/06/2019	New housing, Public Non-housing
75	Office (Fit Out)	Watford	6.3	28/01/2019	26/07/2019	Private Commercial
76	37 Flats & 8 Retail Units	Watford	6.2	02/07/2018	31/07/2019	New housing, Private Commercial
77	Elderly Care Home	Welwyn Hatfield	6.1	21/10/2019	16/11/2020	New housing
78	Office & Petrol Filling Station	Stevenage	6.0	16/09/2019	15/06/2020	Private Commercial, Infrastructure
79	65 Houses/19 Flats	Dacorum	5.9	10/01/2020	05/02/2021	New housing
80	83 Houses/Flats	North Hertfordshire	5.8	15/10/2018	21/10/2019	New housing
81	University Business & Social Building (Extension)	Welwyn Hatfield	5.7	03/12/2018	29/11/2019	Public Non-housing
82	Supermarket	Watford	5.5	11/02/2019	19/11/2019	Private Commercial
83	2 Commercial Units	Watford	5.3	11/11/2019	10/08/2020	Private Industrial
84	Indoor Tennis Centre	East Hertfordshire	5.2	24/09/2018	24/04/2019	Infrastructure, Private Commercial
85	Student Accommodation	Hertfordshire County Council	5.2	09/09/2019	17/08/2020	Public Non-housing
86	Multi-Storey Car Park	East Hertfordshire	5.0	21/01/2019	16/08/2019	Infrastructure
87	Coffee Shop	North Hertfordshire	5.0	19/08/2019	25/05/2020	Private Commercial
88	West Herts College - Educational Building Phase 2	Dacorum	4.9	14/01/2019	31/01/2020	Public Non-housing
89	Dementia/Care Home	Hertsmere	4.9	11/11/2019	28/12/2020	Public Non-housing
90	School Building	Hertfordshire County Council	4.6	16/09/2019	18/05/2020	Public Non-housing
91	School (Refurbishment)	Welwyn Hatfield	4.6	24/02/2020	26/04/2021	Public Non-housing
92	Multi Storey Car Park	Dacorum	4.4	11/02/2019	01/10/2019	Infrastructure

	Description	Local authority	Value (£m)	Start date	End date	Project type
93	Care Home	East Hertfordshire	4.3	15/10/2018	15/07/2019	Public Non-housing
94	Railway Station (Extension/Alterations)	St. Albans	4.0	02/09/2019	27/04/2020	Infrastructure
95	4 Industrial Units	Dacorum	4.0	04/02/2019	02/09/2019	Private Industrial
96	Industrial Building	North Hertfordshire	3.6	28/01/2019	05/08/2019	Private Industrial, Private Commercial
97	Hotel & Restaurant/Takeaway	Dacorum	3.5	09/12/2019	20/07/2020	Private Commercial
98	5 Business Units (Extension/Alterations)	Watford	3.5	18/11/2019	18/05/2020	Private Industrial
99	Place Of Worship (Extension)	Watford	3.4	09/03/2020	07/12/2020	Public Non-housing
100	School Classrooms (Extension)	East Hertfordshire	3.3	11/11/2019	11/06/2020	Public Non-housing
101	Care Home (Extension/Alterations)	Three Rivers	3.0	01/07/2019	23/03/2020	Public Non-housing
102	Office (Fit Out)	North Hertfordshire	3.0	13/08/2019	13/02/2020	Private Commercial
103	Retail Unit (Alterations)	Stevenage	2.2	28/10/2019	10/02/2020	Private Commercial
104	Car Dealership (New/Alterations)	East Hertfordshire	1.8	14/10/2019	27/01/2020	Private Commercial
105	School (Extension)	East Hertfordshire	1.3	12/08/2019	25/10/2019	Public Non-housing
106	Service Station Redevelopment	Hertsmere	1.3	30/09/2019	25/11/2019	Infrastructure

APPENDIX E. NICP AND COUNTY COUNCIL SUBMITTED PROJECTS IN HERTFORDSHIRE

This appendix provides a list of all the NICP and projects analysed. The projects appear in the order they were put into the LFT.

Table A5: NICP and LEP projects in Hertfordshire

	Name	Value (£m)	Start date	End date	Source
1	Anglian Water: Wastewater Service AMP6	103.2	01/04/2018	31/03/2020	NICP
2	Anglian Water: Water Service AMP6	55.9	01/04/2018	31/03/2020	NICP
3	Highways Maintenance Block Funding (SR10 allocation) East of England	55.5	01/04/2018	31/03/2021	NICP
4	UK Power Networks - East (EPN) RIIO	33.4	01/04/2018	31/03/2021	NICP
5	Local Enterprise Partnerships Allocation for Transport in Strategic Economic Plans - East of England	30.8	01/04/2018	31/03/2021	NICP
6	East of England Development programme	25.9	01/04/2018	31/03/2021	NICP
7	Integrated Transport Block - East of England	16.3	01/04/2018	31/03/2021	NICP
8	West Anglia Main Line Capacity Increase	14.6	01/04/2018	31/03/2019	NICP
9	National Productivity Investment Fund Round 1 East	9.5	01/04/2018	31/03/2020	NICP
10	East of England Construction programme	2.2	01/04/2018	31/03/2021	NICP
11	East Anglia	0.8	01/04/2018	31/03/2021	NICP

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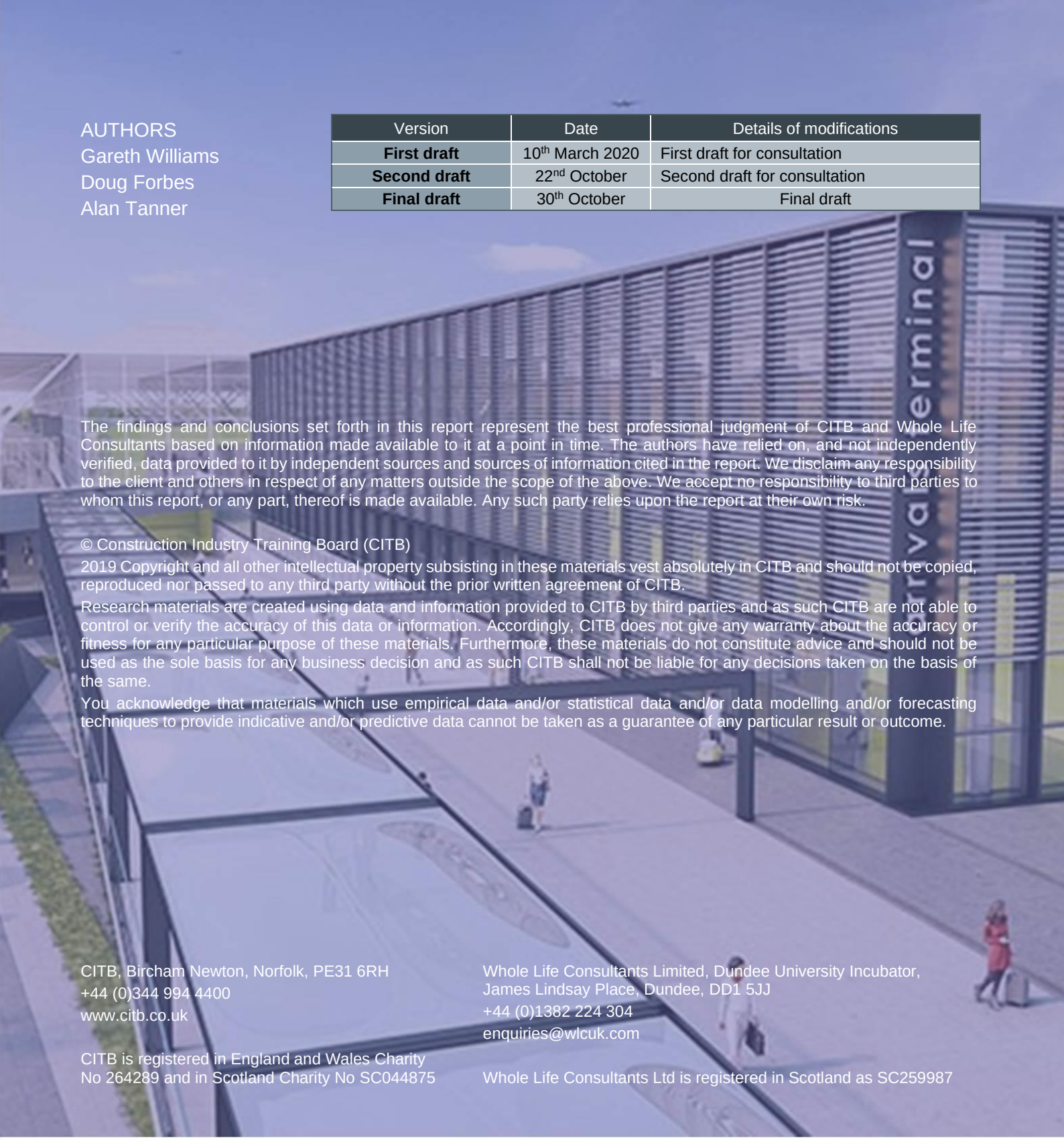

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