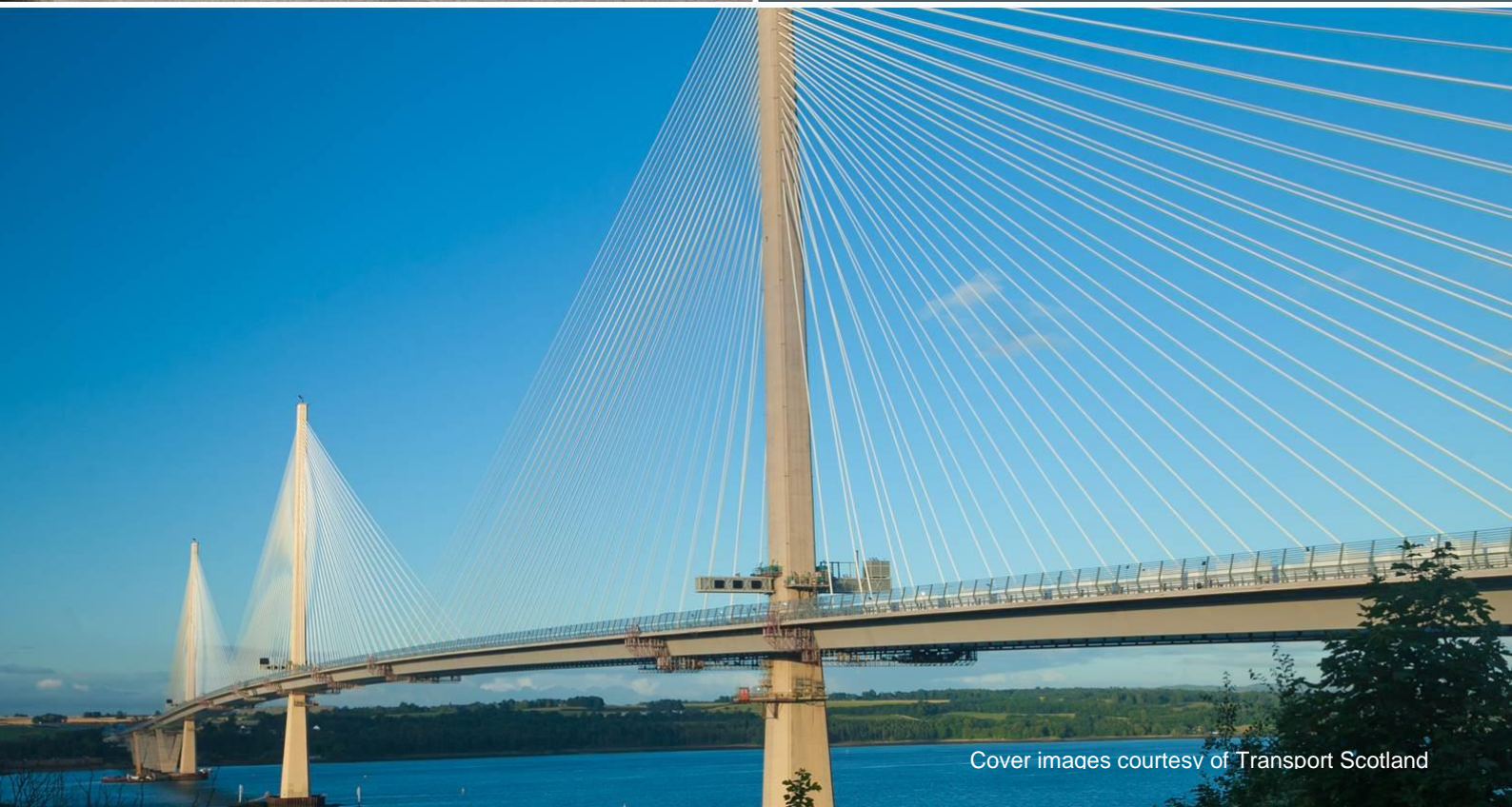CITB ANALYSIS

Local Construction Skills Needs for Scotland

An analysis of the opportunities presented by the construction landscape in seven local areas across Scotland

June 2018

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APPENDIX CONTENTS

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1. INTRODUCTION

The CITB Construction Skills Network (CSN) produces forecasts for twelve UK regions and devolved nations. Within that forecast Scotland is produced as a single forecast. CITB wish to develop an understanding of what is happening to skills and labour at a local level in Scotland and have commissioned the research outlined in this report to gain a deeper understanding.

1.1. AIMS

There are six aims of this research:

- Produce an assessment of the skills demand and supply in Scottish local areas for the next five years.
- Incorporate data from contractors, SMEs, government, and training groups to inform the analysis.
- Explore and reconcile any differences between the outputs of the Labour Forecasting Tool (LFT), the Construction Skills Network (CSN) and the regional skills analysis carried out by Skills Development Scotland.
- Compare the outputs from the analysis with State of Trade surveys and explore any divergence in the results.
- Use the outcomes of the area skills analyses to inform training and skills development decisions at a local level in full consultation with stakeholders;
- Explore possibilities by which the approach developed can be used in other regions of the UK; and determine the ongoing resource implications of maintaining the tools and models developed.

1.2. DEFINING LOCAL AREAS

For the purposes of this report we have split Scotland into seven areas. These areas are shown in the chart in Figure 1.
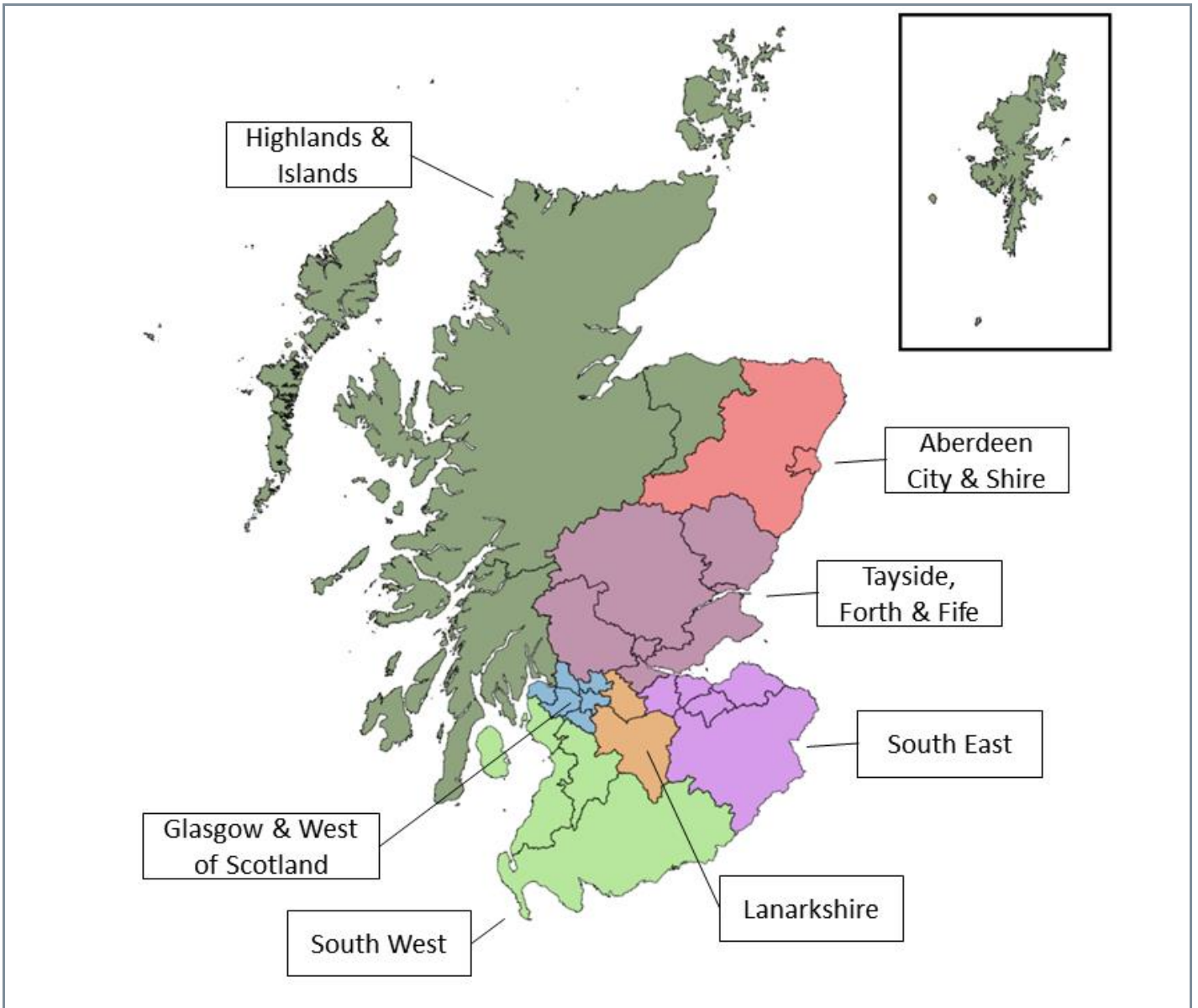
Figure 1: Map of Scotland by areas

There are 32 local authorities in Scotland. For the purposes of this report, they have been grouped together to form the seven areas. Throughout the course of this project the boundaries around each area have been agreed in consultation with industry, trade bodies and other interested parties. The areas are defined so that the 13 Skills Assessment Areas used by Skills Development Scotland can readily be mapped on to our seven areas. Equally, our seven areas can be aggregated so that their boundaries coincide with the Scottish Future Trust Hub Areas.

1.3. STRUCTURE OF THE REPORT

Following this introduction, the report is structured in various sections. Section 2 provides a description of the methodology used to establish the labour demand for Scotland. Section 3 outlines the total, combined labour demand arising from the forecast for the seven areas within Scotland. The spend analysis and overall forecasts for labour demand for each of the 7 identified areas of Scotland is provided in Sections 4 – 10. Section 11 provides analysis into the supply of the construction workforce in Scotland along with construction workforce training in Scotland. Whereas, section 12 provides analysis into the gap between the labour demand and the construction workforce supply in Scotland. The report recommendations for Scottish Construction are provided in Section 15.

2. DEMAND ANALYSIS METHODOLOGY

2.1. 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.
- How the LFT converts output into labour demand.

2.2. CALCULATING CONSTRUCTION OUTPUT

2.2.1. Data sources

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

2.2.2. 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 area: 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 1. 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.

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.

2.2.3. Other sources of 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 1. 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. We have also analysed and incorporated where appropriate data from the Scottish Infrastructure Investment Plan.

2.2.4. 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

2.3. 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 local 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 Scotland level with the CSN new build at the Scotland level sector by sector e.g. residential, non-residential, infrastructure etc.

3. If in any sector the known new-build Scotland 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:

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

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 local area level, it is assumed that the proportion of the total output represented by housing R&M is the same at the local area level as it is at the Scotland level in the CSN. The Glenigan new build factored housing output is therefore multiplied by the following ratio:

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

…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.

2.4. 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.

2.5. 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 A. 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 1.

Table 1: 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%

3. TOTAL SCOTTISH LABOUR DEMAND

This section outlines the total, combined labour demand arising from our forecast for the seven areas within Scotland. Subsequent sections show the labour demand in each area.

The overall labour demand profile for Scotland is shown in Figure 2. The solid blue area shows the labour demand arising from the Glenigan and NICP projects including any R&M included in Glenigan or the NICP. The red shaded area shows the likely total labour demand arising from estimates of other work. The total construction labour demand including the volume of R&M imputed from the CSN model in 2017 is 251,000.
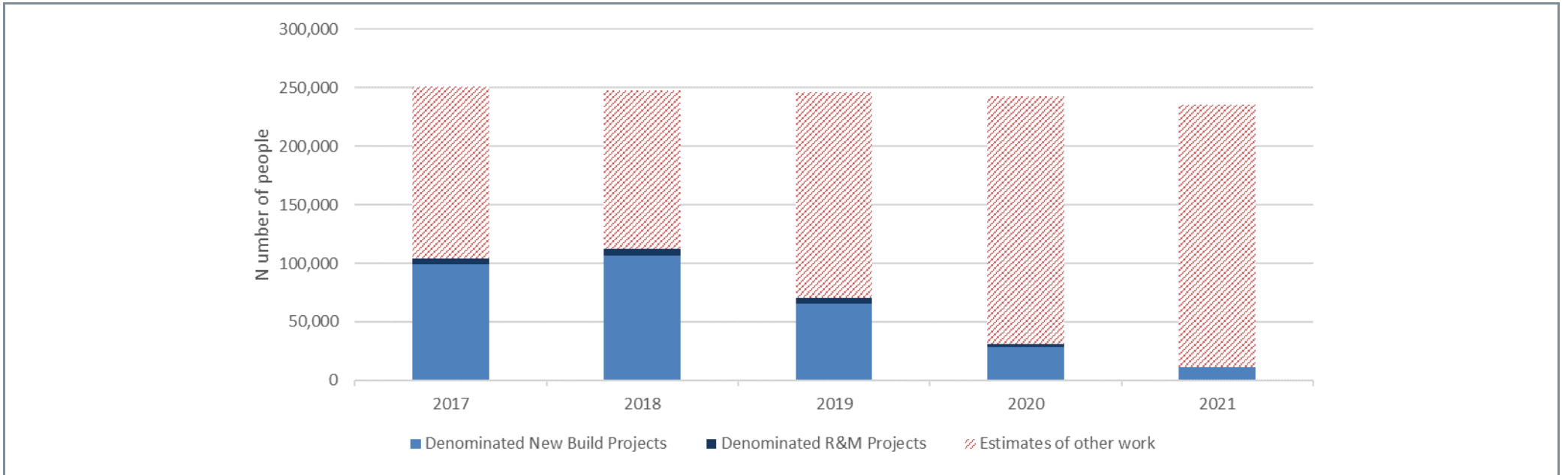
Figure 2: Total construction labour demand including estimates for both R&M and other work

For the peak year in Glenigan of 2018 the detailed breakdown for each of the 28 occupational groups for the denominated projects identified in Glenigan and the NICP is shown in Figure 3. This chart shows the breakdown by occupation for both the denominated pipeline and the estimates of other work.
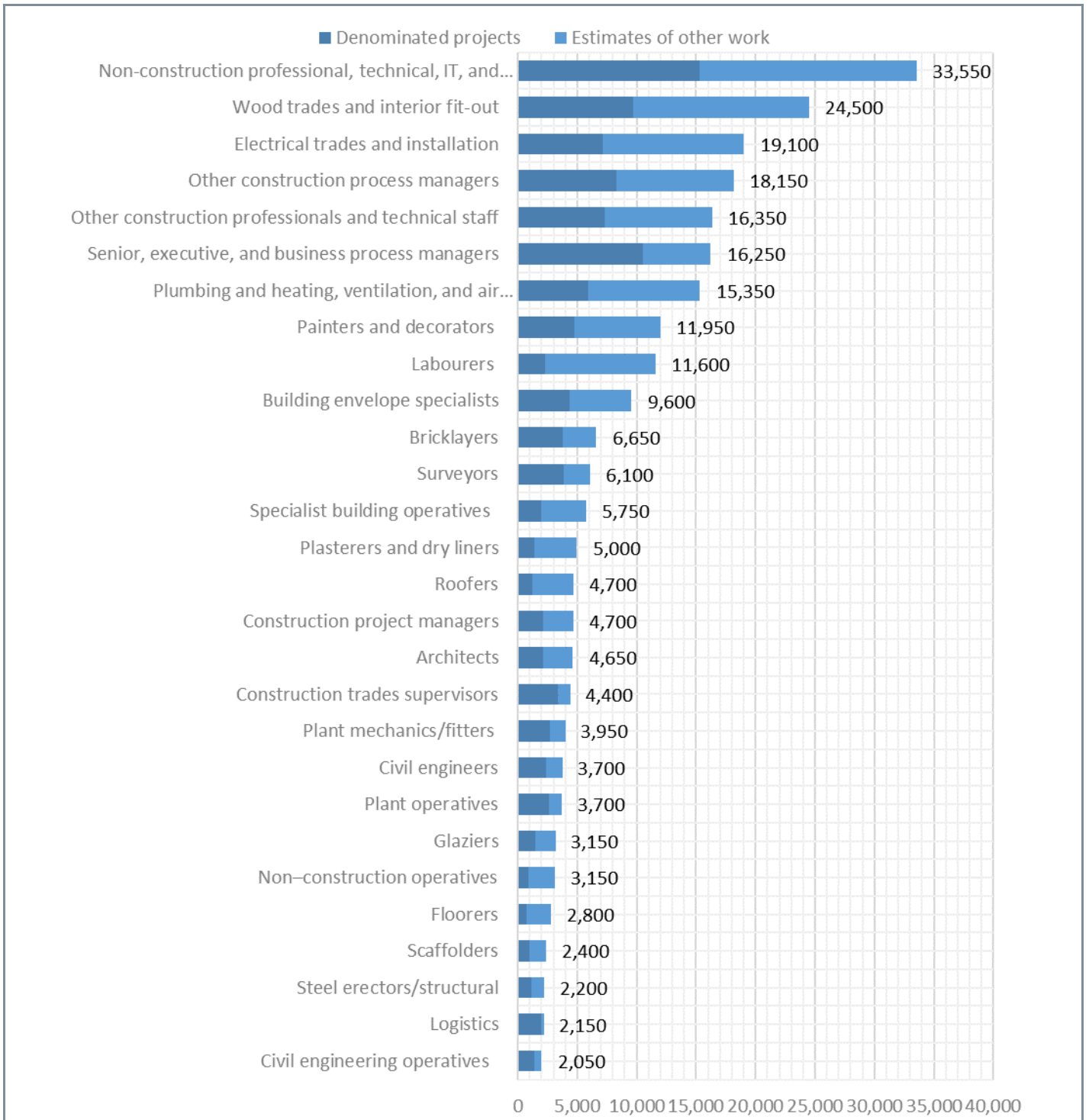
Figure 3: Construction labour demand by occupation in 2018

The labour demand generated by the total denominated projects and the estimates of other work have been calculated for each sector as shown in Table 2.

Table 2: Total construction labour demand by sector

Project Type	Denominated Pipeline Labour Demand in 2018 (People)	Estimates of Other Work Labour Demand in 2018 (People)	Total Labour Demand in 2018 (People)	% of total in 2018
Non-housing R&M	-	63,400	63,400	26%
Private Commercial	19,750	25,900	46,500	18%
Public Non-housing	32,950	5,150	39,850	15%
New Housing	26,600	10,550	36,850	15%
Housing R&M	4,200	27,550	31,750	13%
Infrastructure	22,100	3,350	24,550	10%
Private Industrial	4,900	900	4,600	2%
Total	110,500	136,800	247,400	100%

In summary, for Scotland:

- The labour demand arising from the construction spend in Scotland is about 247,400 people in 2018, taking account of estimates of other work including R&M in addition to the denominated project pipeline of projects.
- During 2018, the most labour-intensive non-manual occupation group is "non-construction professional, technical, IT and other office–based staff" with an annual demand of 33,550 people.
- The estimate of labour demand for the trade occupations for the year of 2018 is as follows:
    - The trade occupation for which demand is highest is "Wood trades and interior fit-out" with 24,500 people;
    - "Electrical trades and installation" follow with 19,100 people;
    - "Plumbing and heating, ventilation, and air conditioning trades" rank third, with a demand of 15,350 people.

4. LABOUR DEMAND IN ABERDEEN CITY & SHIRE

4.1. INTRODUCTION

Figure 4 shows the local authorities included in Aberdeen City & Shire. They are Aberdeen and Aberdeenshire.

Figure 4: Map of Aberdeen City & Shire including surrounding areas

The following sections provide an estimate of the labour demand that construction investment will create across Aberdeen City & Shire over the period 2017-2021. The outputs determined from the analysis described in Section 2 are reported along with the labour demand generated as calculated by the Labour Forecasting Tool.

4.2. PIPELINE OF DENOMINATED PROJECTS

4.2.1. Glenigan pipeline analysis

The initial review of the Glenigan database identified 238 projects in the Aberdeen City & Shire area. Of these, 45 projects were removed due to missing dates and 4 projects which were clearly identified as consultancy projects. A full set of the projects which were omitted from the analysis is provided in Appendix B. The spend in projects which were removed from the analysis is around £935 million of the total pipeline. The majority of spend originating from the removed projects comes from the construction of a golf resort in excess of £700 million which was removed due to having missing dates. The remaining spend consists of smaller developments less than £60 million. It is possible that this work will take place at some undefined 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, but an assessment of the labour demand is made in the estimates of other work from the additional projects.

The Mean Value Theorem was applied to the remainder of the pipeline to identify the significant projects. The process identified 49 significant projects accounting for just over 81% 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.

Table 3 shows the number of significant projects within the Aberdeen City & Shire area, the percentage of spend arising from the significant projects and the total spend. The construction spend shown in this table takes account of any adjustments for engineering works and any incomplete, duplicate or consultancy projects. Values are shown in 2017 prices, the base price used in the Glenigan database.

Table 3: Key data for significant projects in Glenigan in Aberdeen City & Shire[1]

	Number of projects	Construction spend (£m – 2017 values)
All Glenigan projects	189	3,676
Significant Glenigan projects	49	2,995
Percentage within significant projects	26%	81%

Appendix C provides a full breakdown of the significant projects and their construction values. The peak year for the Glenigan spend profile is 2017. The location of the significant projects within Aberdeen City & Shire can be seen in Figure 5. The radius of the markers is proportional to the value of the work taking place.
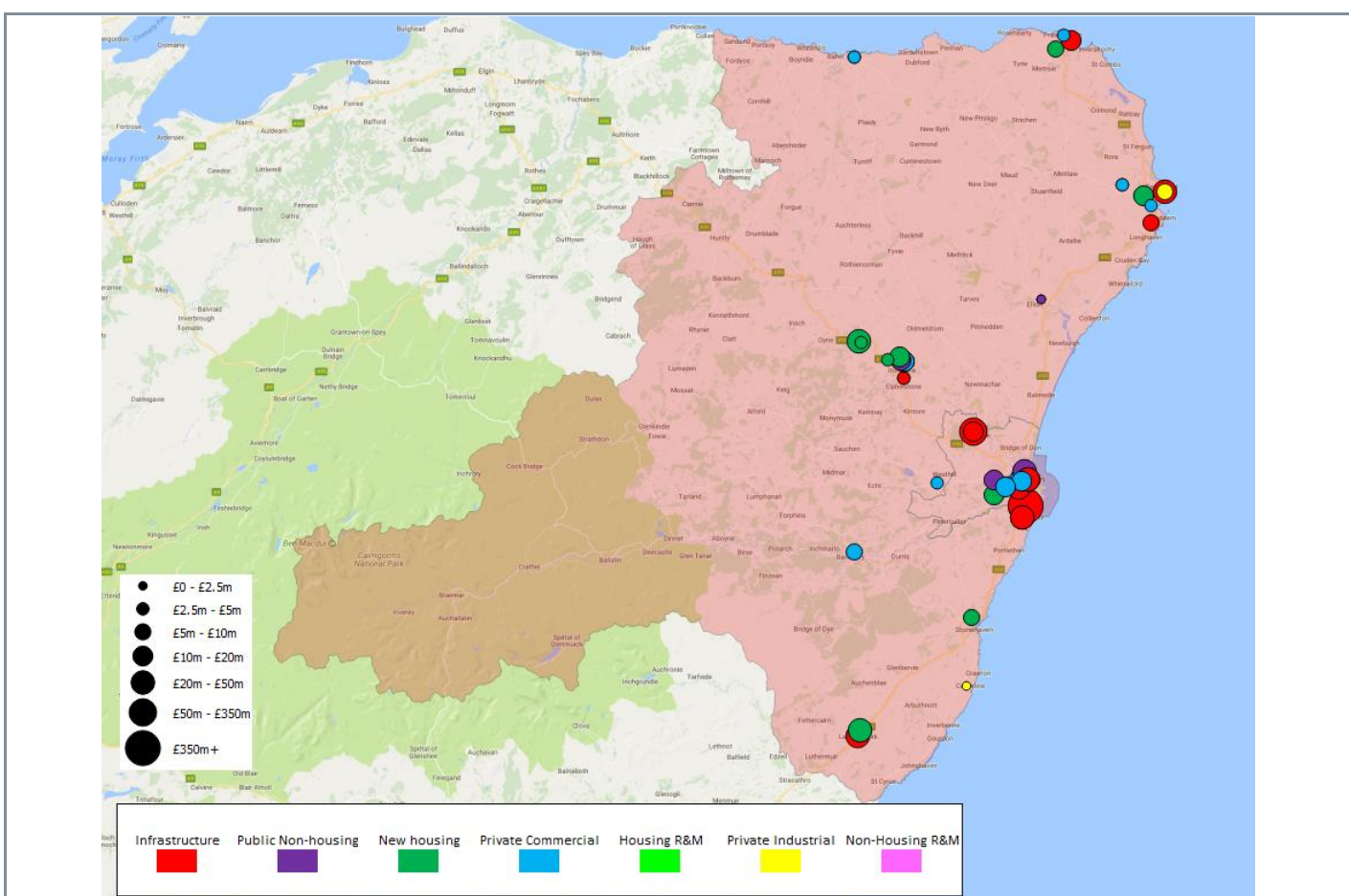
Figure 5: Location of significant projects included in the analysis in Aberdeen City & Shire

4.2.2.   Glenigan & NICP spend analysis

Implementing the methodology outlined in section 2 leads to the following findings for 2018. The tail off in the denominated projects is more likely to be due to a lack of future planning rather than an actual tail off in workload.

Table 4 shows the distribution by sector of new build spend for the total pipeline of denominated projects in 2018.

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[1] The values in this table are the values from the Glenigan pipeline to which the construction element percentage has been applied and thus reflect the adjusted values of infrastructure projects values to distinguish between construction and engineering construction.

Table 4: New-build construction spend by project type in 2018 (total defined project pipeline)

Project Type	Construction spend in 2018 (2017 values - £m)	% of total
Infrastructure	253	37%
Public Non-housing	189	28%
New Housing	140	20%
Private Commercial	94	14%
Private Industrial	9	1%
Total	685	100%

Table 5 shows the infrastructure construction spend from both Glenigan and the NICP in 2018 by sub-sector.

Table 5: Construction spend per infrastructure sub-type in 2018 (total defined project pipeline)

Project Type	Construction spend in 2018 (2017 values - £m)	% of total
Transport	210	83%
Energy	37	15%
Water	4	1%
General Infrastructure	3	1%
Total	253	100%

4.3. ESTIMATE OF TOTAL LABOUR DEMAND

As outlined in Section 2, the denominated project pipeline may not include smaller projects or repair and maintenance work. Figure 6 shows the outcomes of the analysis of future labour demand with an employment growth rate included. The solid blue area shows the labour demand arising from the new build Glenigan and NICP projects. Any R&M included in Glenigan or the NICP is also shown. The red shaded area shows the likely total labour demand arising from estimates of other work. The total construction labour demand including the volume of R&M imputed from the CSN model ranges from 31,800 in 2017 to 29,800 in 2021.
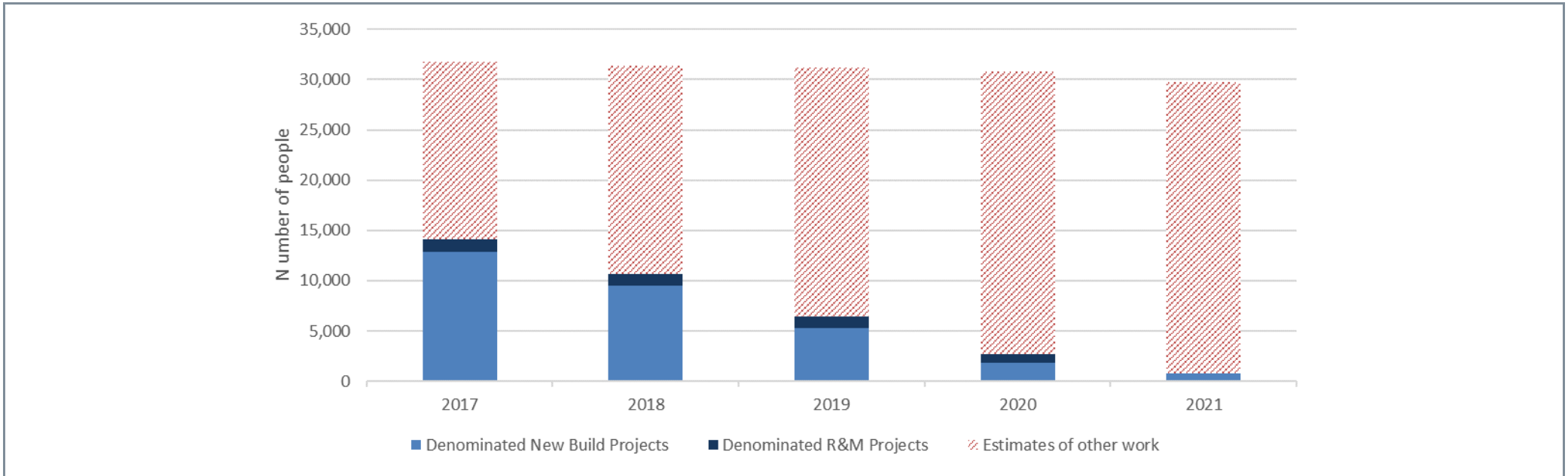
Figure 6: Total construction labour demand including estimates for both R&M and estimates of other work

4.3.1. Glenigan and NICP labour demand

For 2018 the detailed breakdown for each of the 28 occupational groups for the Glenigan and the NICP projects is shown in Figure 7. This shows the breakdown by occupation for both the pipeline of denominated projects and the estimates of other work.

Figure 7: Construction labour demand by occupation in 2018

4.3.2. Breakdown of labour demand by project type

Table 6 shows the labour demand generated by the denominated projects and the estimates of other work in 2018.

Table 6: Labour demand by work type in 2018

Project Type	Labour demand from denominated projects (People)	Labour demand from estimates of other work (People)	Total labour demand (People)	% of total
Non-housing R&M	-	9,500	9,500	30%
Public Non-housing	3,200	3,150	6,350	20%
Infrastructure	2,650	2,650	5,300	17%
New Housing	1,700	1,700	3,400	11%
Private Commercial	1,650	1,650	3,300	11%
Housing R&M	-	3,000	3,000	10%
Private Industrial	250	250	500	2%
Total	9,450	21,900	31,350	100%

4.4. SUMMARY OF DEMAND

- The labour demand arising from the construction spend in the Aberdeen City & Shire area peaks at about 31,350 people in 2018, taking account of estimates of other work including R&M in addition to the pipeline of denominated projects.

During 2018, the most labour-intensive occupation group is "non-construction professional, technical, IT and other office–based staff" with an annual demand of 4,250 people.

- The estimate of the three largest labour demands in the trade occupations for 2018 are as follows:
  - The trade occupation for which demand is highest is "Wood trades and interior fit-out" with 3,150 people;
  - "Electrical trades and installation" trades follow with 2,400 people;
  - "Plumbing and heating, ventilation, and air conditioning trades" rank third, with a demand of 1,900 people.

5. LABOUR DEMAND IN GLASGOW & WEST OF SCOTLAND

5.1. INTRODUCTION

Figure 8 shows the local authorities included in Glasgow & West Scotland. They are:

- East Dunbartonshire
- East Renfrewshire
- Glasgow
- Inverclyde
- Renfrewshire
- West Dunbartonshire

Figure 8: Map of Glasgow & West Scotland including surrounding areas

The following sections provide an estimate of the labour demand that construction investment will create across Glasgow & the West over the period 2017-2021. The outputs determined from the analysis described in Section 2 are reported along with the labour demand generated as calculated by the Labour Forecasting Tool.

5.2. PIPELINE OF DENOMINATED PROJECTS

5.2.1. Glenigan pipeline analysis

The initial review of the Glenigan database identified 478 projects in the Glasgow & West Scotland area. Of these, 51 projects were removed due to missing dates and13 projects which were clearly identified as consultancy projects. Also excluded was 1 duplicate project and 3 projects which were included in the NICP. A full set of the projects which were omitted from the analysis is provided in Appendix B. The spend in projects which were removed from the analysis is around £2,654 million. Half of spend originating from the removed projects comes from the 3 water

projects which were removed due to them being included in the NICP. The remaining spend consists of smaller developments aside from a few Frameworks which cost £150 million and £400 million. It is possible that this work will take place at some undefined 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, but an assessment of the labour demand is made in the estimates of other work from the additional projects.

The Mean Value Theorem was applied to the remainder of the pipeline to identify the significant projects. The process identified 113 significant projects accounting for just under 82% 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.

Table 7 shows the number of significant projects within the Glasgow & West Scotland area, the percentage of spend arising from the significant projects and the total spend. The construction spend shown in this table takes account of any adjustments for engineering works and any incomplete, duplicate or consultancy projects. Values are shown in 2017 prices, the base price used in the Glenigan database.

Table 7: Key data for significant projects in Glenigan in Glasgow & West[2]

	Number of projects	Construction spend (£m – 2017 values)
All Glenigan projects	410	5,536
Significant Glenigan projects	113	4,529
Percentage within significant projects	28%	82%

Appendix C provides a full breakdown of the significant projects and their construction values. The peak year for the Glenigan spend profile is 2018. The location of the significant projects within South West Scotland can be seen in Figure 9. The radius of the markers is proportional to the value of the work taking place.

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[2] The values in this table are the values from the Glenigan pipeline to which the construction element percentage has been applied and thus reflect the adjusted values of infrastructure projects values to distinguish between construction and engineering construction.

Figure 9: Location of significant projects included in the analysis in Glasgow & West Scotland

5.2.2. Glenigan & NICP spend analysis

Implementing the methodology outlined in section 2 leads to the following findings for 2018. The tail off in the denominated projects is more likely to be due to a lack of future planning rather than an actual tail off in workload.

Table 8 shows the distribution by sector of new build spend for the total pipeline of denominated projects in 2018.

Table 8: New-build construction spend by project type in 2018 (total defined project pipeline)

Project Type	Construction spend in 2018 (2017 values - £m)	% of total
New Housing	576	38%
Private Commercial	343	23%
Public Non-housing	341	23%
Infrastructure	239	16%
Private Industrial	10	1%
Total	1,509	100%

Table 9 shows the infrastructure construction spend from both Glenigan and the NICP in 2018 by sub-sector.

Table 9: Construction spend per infrastructure sub-type in 2018 (total defined project pipeline)

Project Type	Construction spend in 2018 (2017 values - £m)	% of total
General Infrastructure	110	46%
Transport	77	32%
Energy	41	17%
Water	6	3%
Flooding	5	2%
Total	239	100%

5.3.   ESTIMATE OF TOTAL LABOUR DEMAND

As outlined in Section 2, the denominated project pipeline may not include smaller projects or repair and maintenance work. Figure 10 shows the outcomes of the analysis of future labour demand with an employment growth rate included. The solid blue area shows the labour demand arising from the new build Glenigan and NICP projects. Any R&M included in Glenigan or the NICP is also shown. The red shaded area shows the likely total labour demand arising from estimates of other work. The total construction labour demand including the volume of R&M imputed from the CSN model ranges from 52,400 in 2017 to 49,100 in 2021.

Figure 10: Total construction labour demand including estimates for both R&M and estimates of other work

5.3.1. Glenigan and NICP labour demand

For 2018 the detailed breakdown for each of the 28 occupational groups for the Glenigan and the NICP projects is shown in Figure 11. This shows the breakdown by occupation for both the pipeline of denominated projects and the estimates of other work.

Figure 11: Construction labour demand by occupation in 2018

5.3.2. Breakdown of labour demand by project type

Table 10 shows the labour demand generated by the denominated projects and the estimates of other work in 2018.

Table 10: Labour demand by work type in 2018
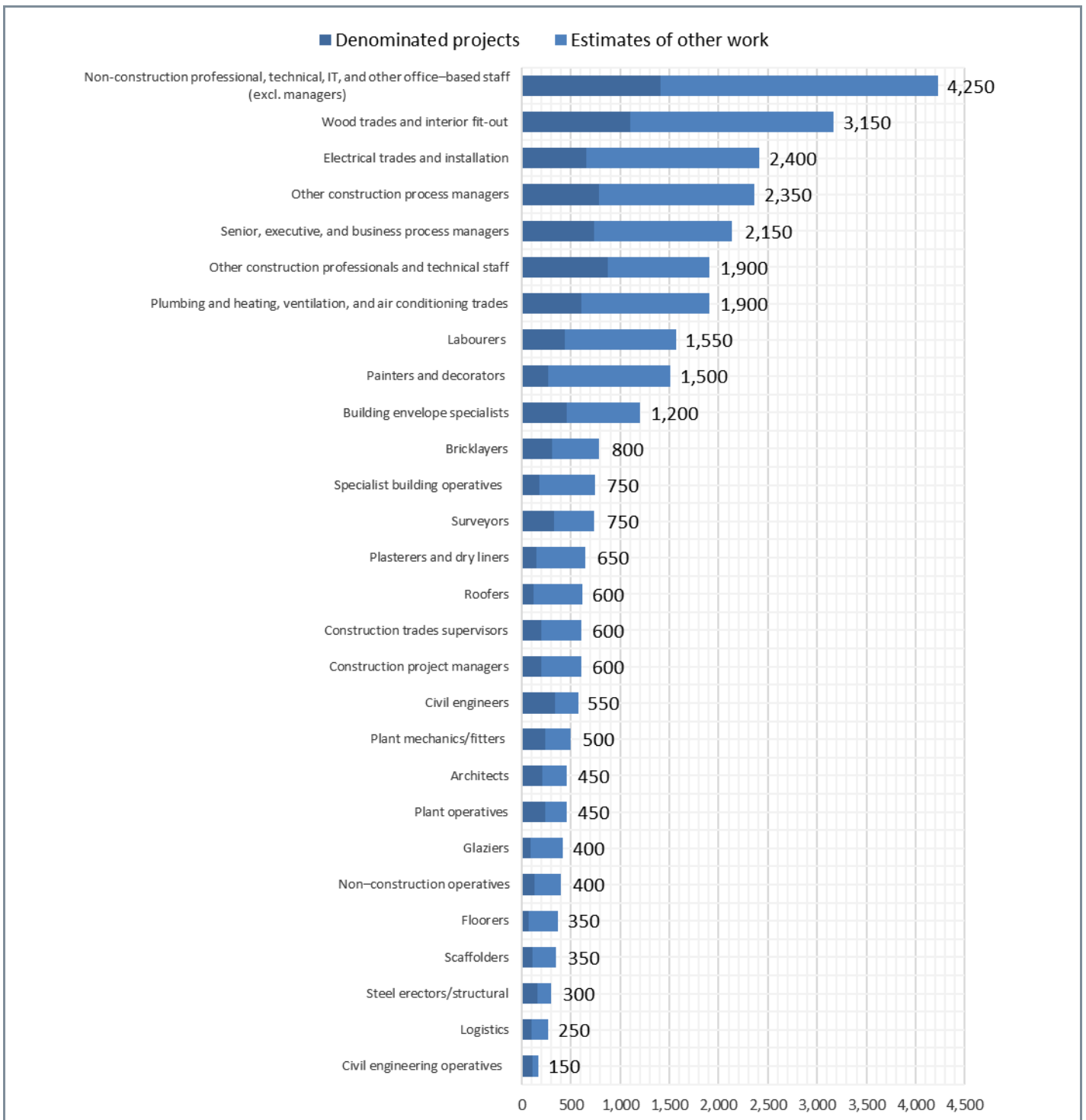
Project Type	Labour demand from denominated projects (People)	Labour demand from estimates of other work (People)	Total labour demand (People)	% of total
Private Commercial	6,100	8,450	14,550	28%
Non-housing R&M	-	11,000	11,000	21%
New Housing	7,050	2,450	9,500	18%
Housing R&M	800	7,450	8,250	16%
Public Non-housing	6,150	100	6,250	12%
Infrastructure	1,950	-	1,950	4%
Private Industrial	150	-	150	0%
Total	22,200	29,450	51,650	100%

5.4. SUMMARY OF DEMAND

- The labour demand arising from the construction spend in the Glasgow & West area peaks at about 51,650 people in 2018, taking account of estimates of other work including R&M in addition to the pipeline of denominated projects.

- During 2018, the peak year of the defined pipeline demand, the most labour-intensive occupation group is "non-construction professional, technical, IT and other office–based staff" with an annual demand of 7,100 people.

- The estimate of the three largest labour demands in the trade occupations for 2018 are as follows:

  - The trade occupation for which demand is highest is "Wood trades and interior fit-out" with 5,350 people;

  - "Electrical trades and installation" trades follow with 3,800 people;

  - "Plumbing and heating, ventilation, and air conditioning trades" rank third, with a demand of 3,350 people.

6. LABOUR DEMAND IN HIGHLANDS & ISLANDS

6.1. INTRODUCTION

Figure 12 shows the local authorities included in Highlands & Islands. They are:

- Argyll & Bute
- Highland
- Moray
- Comhairle nan Eilean Siar
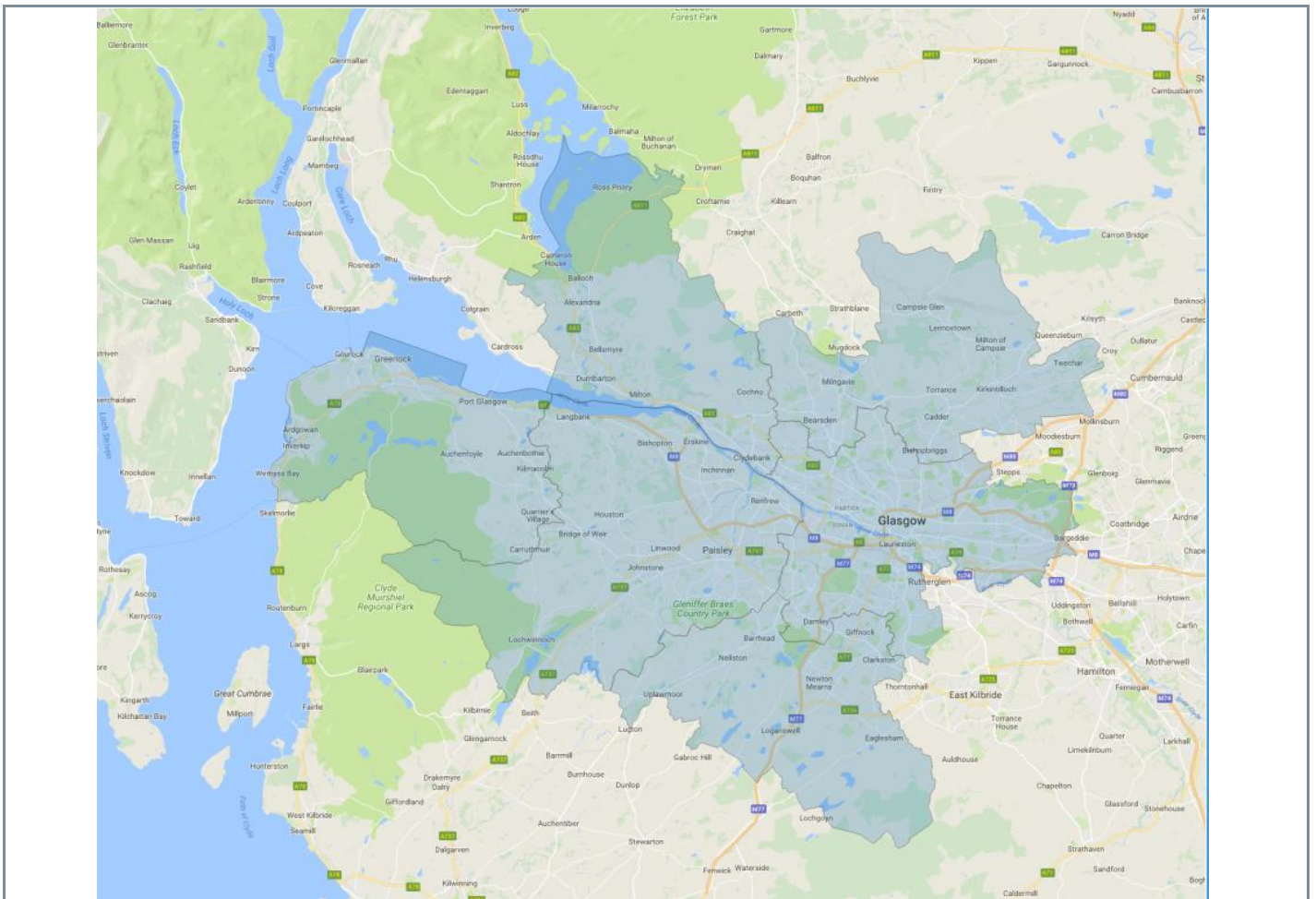- Orkney Isles
- Shetland Isles

Figure 12: Map of the Highlands & Islands including surrounding areas

The following sections provide an estimate of the labour demand that construction investment will create across Highlands & Islands over the period 2017-2021. The outputs determined from the analysis described in Section 2 are reported along with the labour demand generated as calculated by the Labour Forecasting Tool.

6.2. PIPELINE OF DEFINED PROJECTS

6.2.1. Glenigan pipeline analysis

The initial review of the Glenigan database identified 392 projects in the Highlands & Islands area. Of these, 63 projects were removed due to missing dates. Also excluded were 4 projects which were clearly identified as consultancy projects. A full set of the projects which were omitted from the analysis is provided in Appendix B. The spend in projects which were removed from the analysis is around £1,415 million of the total pipeline. The majority of spend originating from the removed projects comes from the construction of an offshore wind farm in excess of £1,200 million which was removed due to having missing dates. The remaining spend consists of smaller

developments less than £50 million. It is possible that this work will take place at some undefined 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, but an assessment of the labour demand is made in the estimates of other work from the additional projects.

The Mean Value Theorem was applied to the remainder of the pipeline to identify the significant projects. The process identified 60 significant projects accounting for just over 87% 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.

Table 11 shows the number of significant projects within the Highlands & Islands area, the percentage of spend arising from the significant projects and the total spend. The construction spend shown in this table takes account of any adjustments for engineering works and any incomplete, duplicate or consultancy projects. Values are shown in 2017 prices, the base price used in the Glenigan database.

Table 11: Key data for significant projects in Glenigan in Highlands & Islands[3]

	Number of projects	Construction spend (£m – 2017 values)
All Glenigan projects	325	5,760
Significant Glenigan projects	60	5,032
Percentage within significant projects	18%	87%

Appendix C provides a full breakdown of the significant projects and their construction values. The peak year for the Glenigan spend profile is 2018. The location of the significant projects within South West Scotland can be seen in Figure 13. The radius of the markers is proportional to the value of the work taking place.
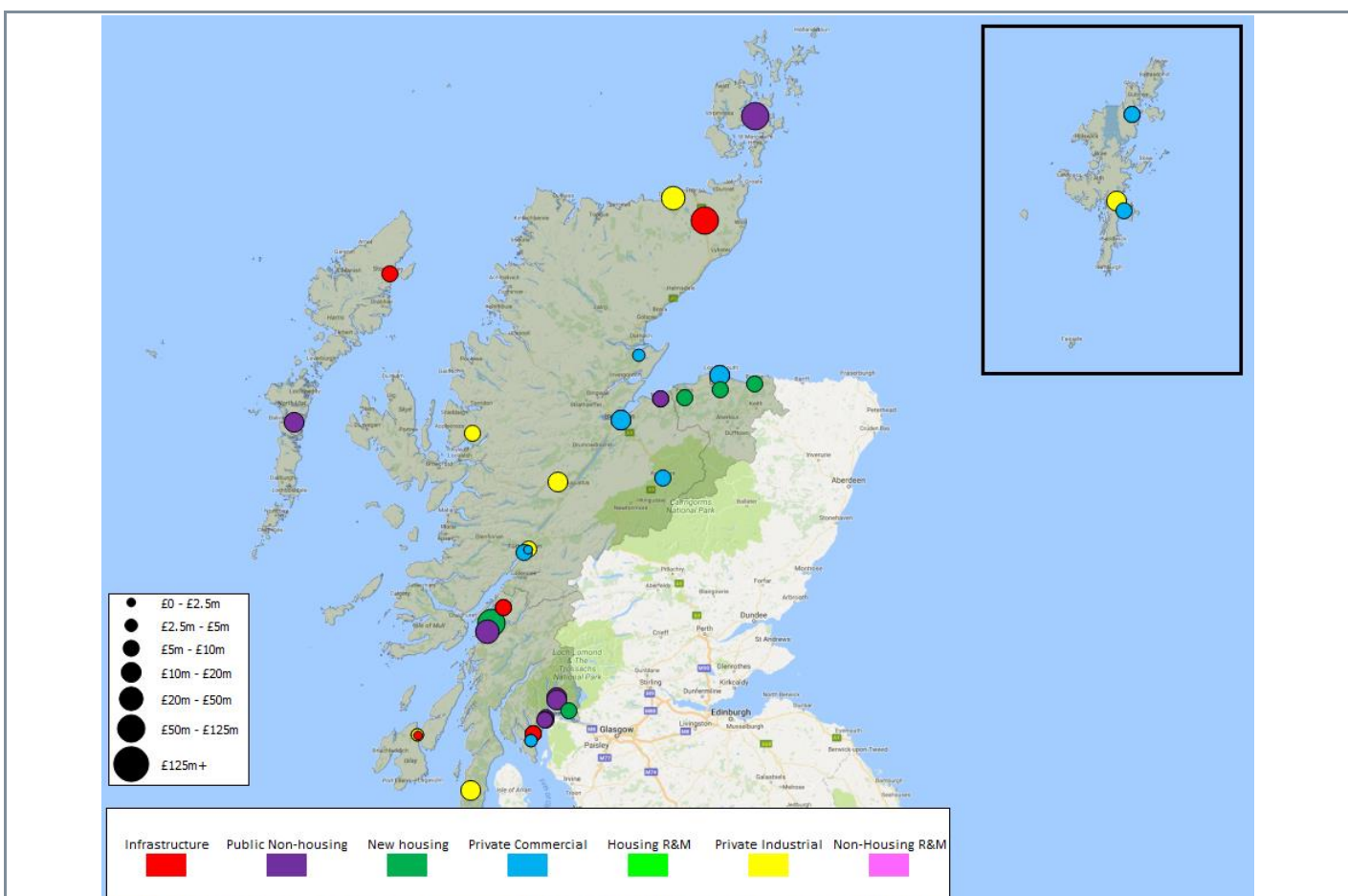
Figure 13: Location of significant projects included in the analysis in Highlands & Islands

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[3] The values in this table are the values from the Glenigan pipeline to which the construction element percentage has been applied and thus reflect the adjusted values of infrastructure projects values to distinguish between construction and engineering construction.
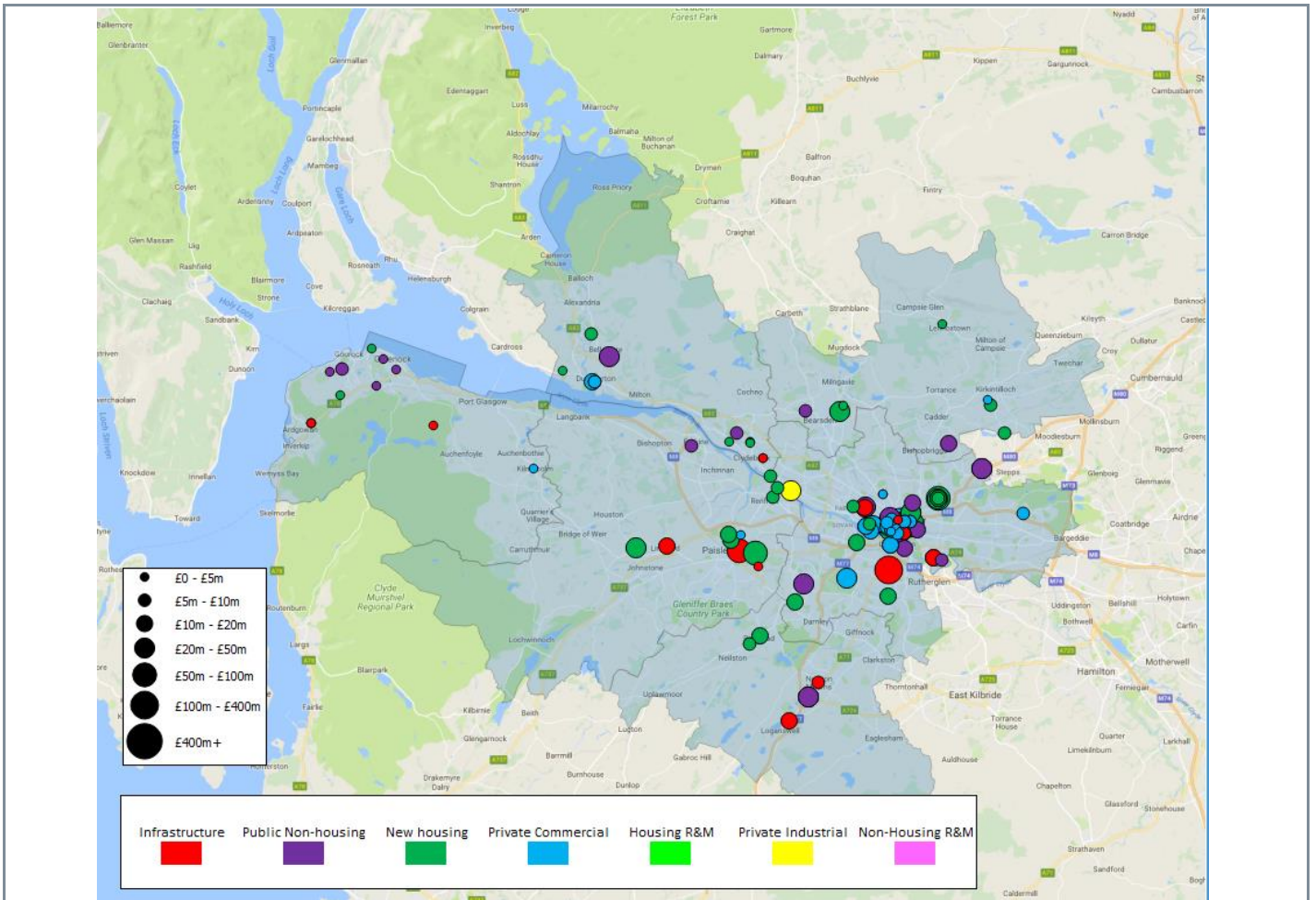
6.2.2. Glenigan & NICP spend analysis

Implementing the methodology outlined in section 2 leads to the following findings for 2018. The tail off in the denominated projects is more likely to be due to a lack of future planning rather than an actual tail off in workload.

Table 12 shows the distribution by sector of new build spend for the total pipeline of denominated projects in 2018.

Table 12: New-build construction spend by project type in 2018 (total defined project pipeline)

Project Type	Construction spend in 2018 (2017 values - £m)	% of total
Infrastructure	1,041	65%
Public Non-housing	235	15%
New Housing	182	11%
Private Commercial	70	4%
Private Industrial	64	4%
Total	1,592	100%

Table 13 shows the infrastructure construction spend from both Glenigan and the NICP in 2018 by sub-sector.

Table 13: Construction spend per infrastructure sub-type in 2018 (total defined project pipeline)

Project Type	Construction spend in 2018 (2017 values - £m)	% of total
Energy	639	61%
Transport	365	35%
Water	19	2%
General Infrastructure	16	1%
Flooding	2	0%
Total	1,041	100%

6.3. ESTIMATE OF TOTAL LABOUR DEMAND

As outlined in Section 2, the denominated project pipeline may not include smaller projects or repair and maintenance work. Figure 14 shows the outcomes of the analysis of future labour demand with an employment growth rate included. The solid blue area shows the labour demand arising from the new build Glenigan and NICP projects. Any R&M included in Glenigan or the NICP is also shown. The red shaded area shows the likely total labour demand arising from estimates of other work. The total construction labour demand including the volume of R&M imputed from the CSN model ranges from 35,900 in 2017 to 33,700 in 2021.
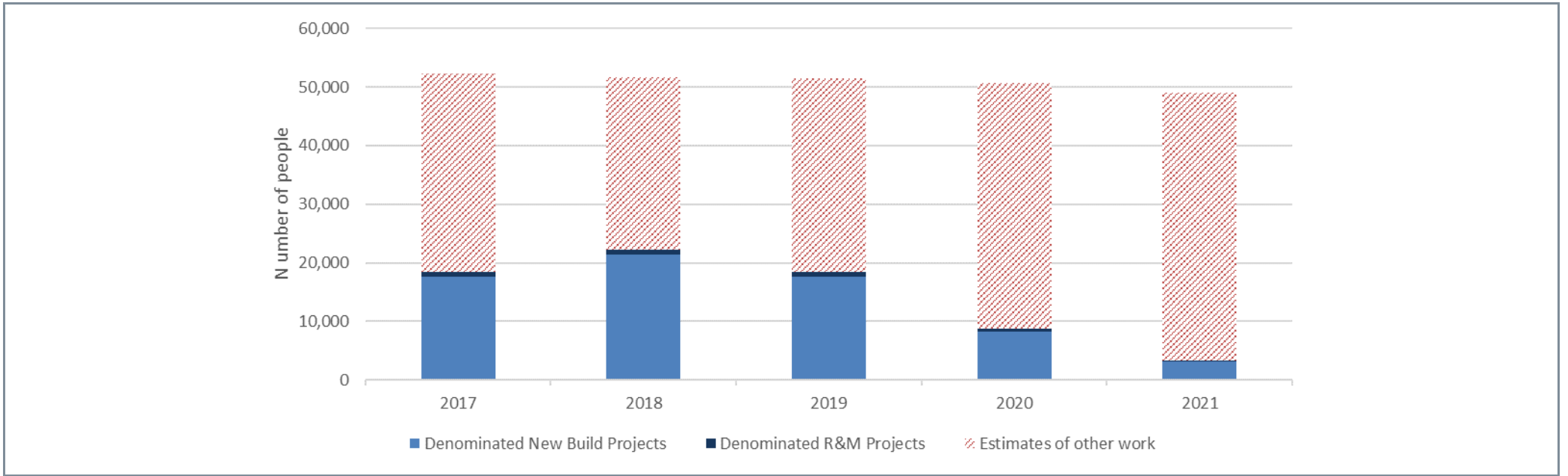
Figure 14: Total construction labour demand including estimates for both R&M and estimates of other work

6.3.1.   Glenigan and NICP labour demand

For 2018 the detailed breakdown for each of the 28 occupational groups for the Glenigan and the NICP projects is shown in Figure 15. This shows the breakdown by occupation for both the pipeline of denominated projects and the estimates of other work.
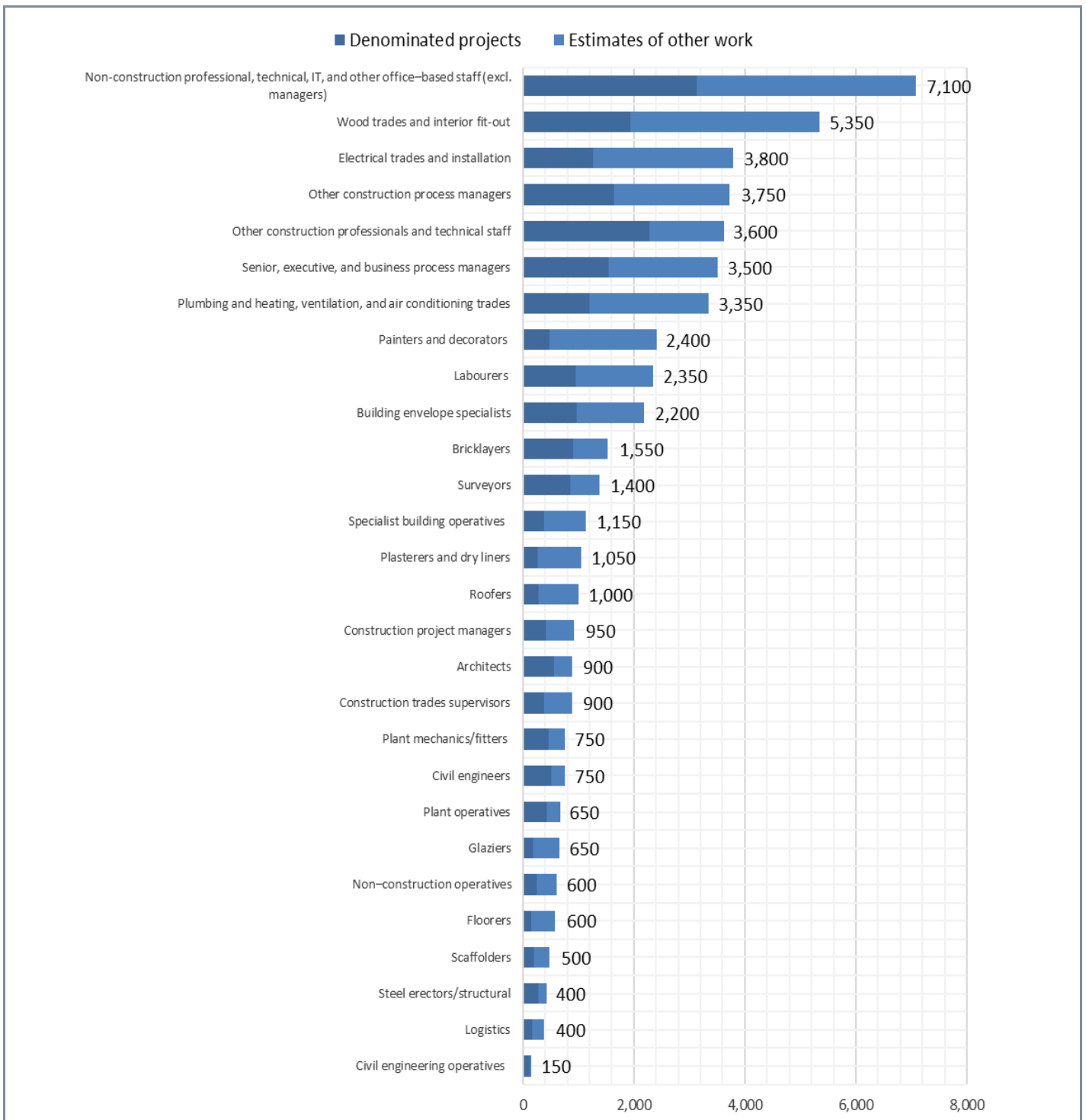

Figure 15: Construction labour demand by occupation in 2018

6.3.2. Breakdown of labour demand by project type

Table 14 shows the labour demand generated by the denominated projects and the estimates of other work in 2018.

Table 14: Labour demand by work type in 2018

Project Type	Labour demand from denominated projects (People)	Labour demand from estimates of other work (People)	Total labour demand (People)	% of total
Non-housing R&M	-	12,050	12,050	34%
Infrastructure	9,000	-	9,000	25%
Public Non-housing	4,550	50	4,600	13%
New Housing	2,250	750	3,000	8%
Private Commercial	1,300	1,700	3,000	8%
Housing R&M	100	2,500	2,600	7%
Private Industrial	1,150	-	1,150	3%
Total	18,350	17,050	35,400	100%

6.4. SUMMARY OF DEMAND

- The labour demand arising from the construction spend in the Highlands & Islands area peaks at about 35,400 people in 2018, taking account of estimates of other work including R&M in addition to the pipeline of denominated projects.

- During 2018, the most labour-intensive occupation group is "non-construction professional, technical, IT and other office–based staff" with an annual demand of 4,700 people.

- The estimate of the three largest labour demands in the trade and manual occupations for the peak year of 2018 are as follows:
    - The trade occupation for which demand is highest is shared between "Wood trades and interior fit-out" and "Electrical trades and installation" which both have 2,900 people;
    - "Labourers" rank second, with a demand of 1,900 people.

7. LABOUR DEMAND IN LANARKSHIRE

7.1. INTRODUCTION

Figure 16 shows the Local Authorities included in Lanarkshire. They are North Lanarkshire and South Lanarkshire.

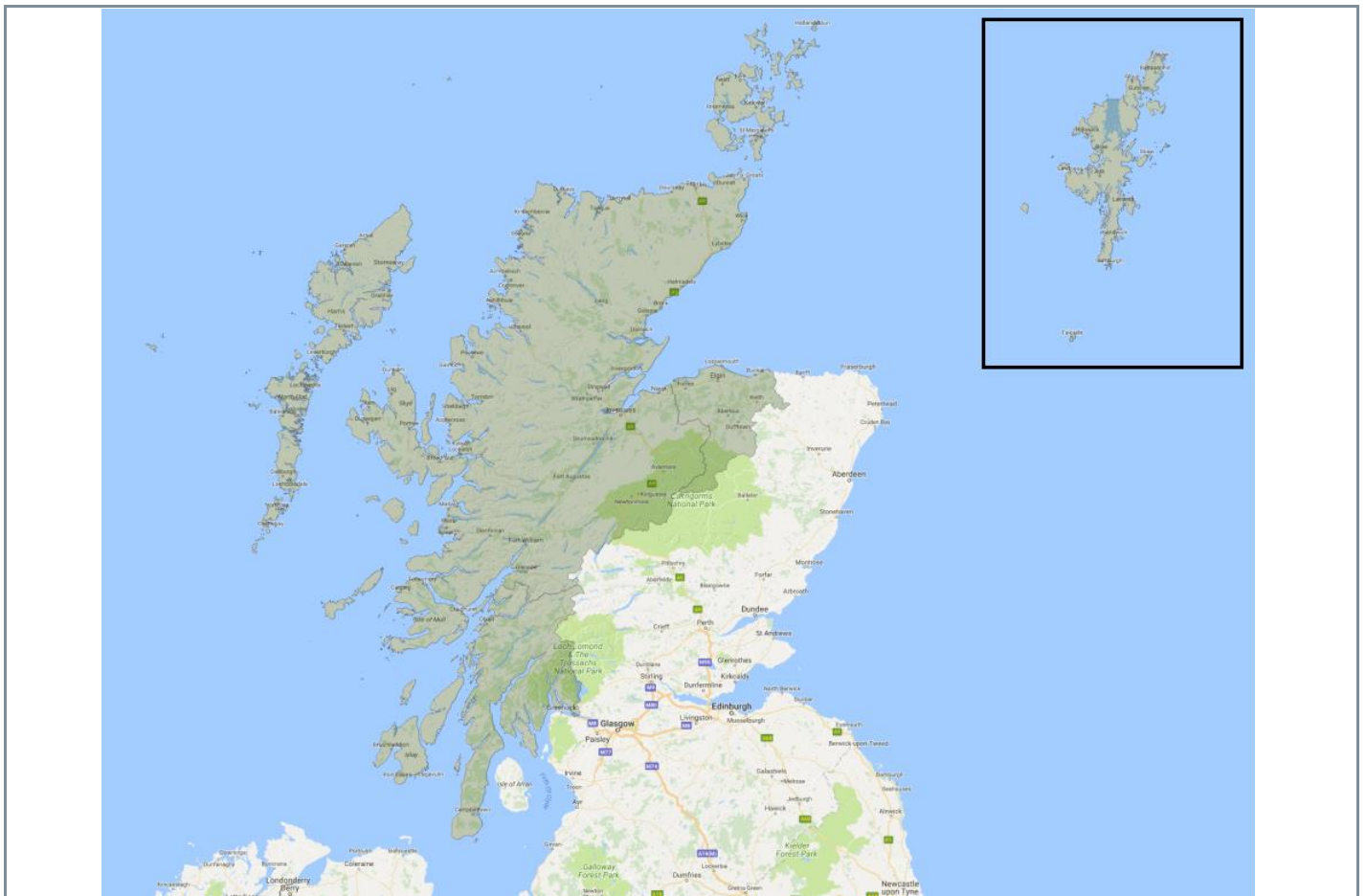**Figure 16: Map of Lanarkshire and surrounding areas**

The following sections provide an estimate of the labour demand that construction investment will create across Lanarkshire over the period 2017-2021. The outputs determined from the analysis described in Section 2 are reported along with the labour demand generated as calculated by the Labour Forecasting Tool.

7.2. PIPELINE OF DEFINED PROJECTS

7.2.1. Glenigan pipeline analysis

The initial review of the Glenigan database identified 218 projects in the Lanarkshire area. Of these, 30 projects due to missing dates. Also excluded were 2 projects which were clearly identified as consultancy projects and 2 projects which were included in the NICP. A full set of the projects which were omitted from the analysis is provided in Appendix B. The spend in projects which were removed from the analysis is around £1,368 million of the total pipeline. Around half of spend originating from the removed projects comes from one of the projects which was removed due to it being included in the NICP. The project is in excess of £700 million. A further high value project which was removed was a Consultancy Framework project with a value of £360 million. The remaining spend consists of smaller developments less than £120 million. It is possible that this work will take place at some undefined 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, but an assessment of the labour demand is made in the estimates of other work from the additional projects.

The Mean Value Theorem was applied to the remainder of the pipeline to identify the significant projects. The process identified 47 significant projects accounting for just over 79% 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.

Table 15 shows the number of significant projects within the Lanarkshire area, the percentage of spend arising from the significant projects and the total spend. The construction spend shown in this table takes account of any adjustments for engineering works and any incomplete, duplicate or consultancy projects. Values are shown in 2017 prices, the base price used in the Glenigan database.

Table 15: Key data for significant projects in Glenigan in Lanarkshire[4]

	Number of projects	Construction spend (£m – 2017 values)
All Glenigan projects	184	1,980
Significant Glenigan projects	47	1,565
Percentage within significant projects	26%	79%

Appendix C provides a full breakdown of the significant projects and their construction values. The peak year for the Glenigan spend profile is 2018. The location of the significant projects within Lanarkshire can be seen in Figure 17. The radius of the markers is proportional to the value of the work taking place.
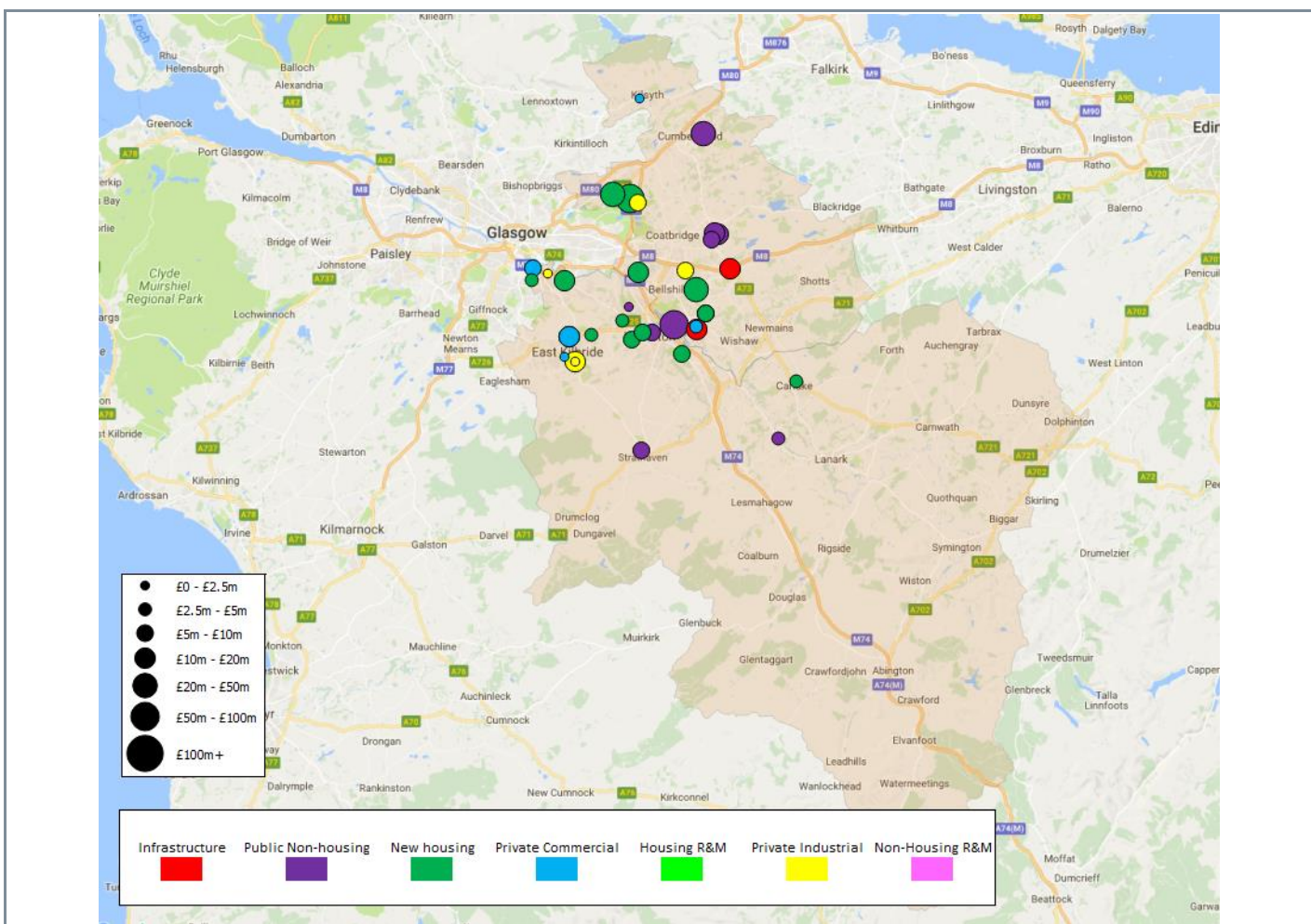
Figure 17: Location of significant projects included in the analysis in Lanarkshire

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[4] The values in this table are the values from the Glenigan pipeline to which the construction element percentage has been applied and thus reflect the adjusted values of infrastructure projects values to distinguish between construction and engineering construction.

7.2.2. Glenigan & NICP spend analysis

Implementing the methodology outlined in section 2 leads to the following findings for 2018. The tail off in the denominated projects is more likely to be due to a lack of future planning rather than an actual tail off in workload. Table 16 shows the distribution by sector of new build spend for the total pipeline of denominated projects in 2018.

Table 16: New-build construction spend by project type in 2018 (total defined project pipeline)

Project Type	Construction spend in 2018 (2017 values - £m)	% of total
New Housing	203	44%
Infrastructure	101	22%
Public Non-housing	94	20%
Private Industrial	37	8%
Private Commercial	30	6%
Total	465	100%

Table 17 shows the infrastructure construction spend from both Glenigan and the NICP in 2018 by sub-sector.

Table 17: Construction spend per infrastructure sub-type in 2018 (total defined project pipeline)

Project Type	Construction spend in 2018 (2017 values - £m)	% of total
Transport	54	54%
Energy	42	42%
General Infrastructure	5	5%
Total	101	100%

7.3. ESTIMATE OF TOTAL LABOUR DEMAND

As outlined in Section 2, the denominated project pipeline may not include smaller projects or repair and maintenance work. Figure 18 shows the outcomes of the analysis of future labour demand with an employment growth rate included. The solid blue area shows the labour demand arising from the new build Glenigan and NICP projects. Any R&M included in Glenigan or the NICP is also shown. The red shaded area shows the likely total labour demand arising from estimates of other work. The total construction labour demand including the volume of R&M imputed from the CSN model ranges from 13,400 in 2017 to 12,600 in 2021.
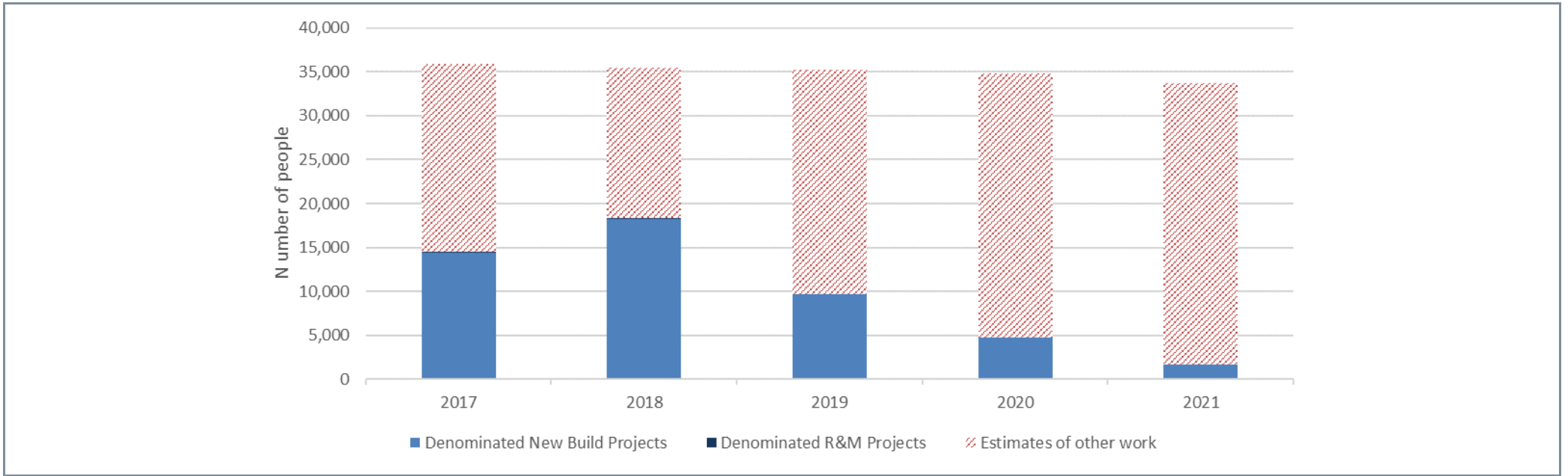
Figure 18: Total construction labour demand including estimates for both R&M and estimates of other work

7.3.1. Glenigan and NICP labour demand

For 2018 the detailed breakdown for each of the 28 occupational groups for the Glenigan and the NICP projects is shown in Figure 19. This shows the breakdown by occupation for both the pipeline of denominated projects and the estimates of other work.
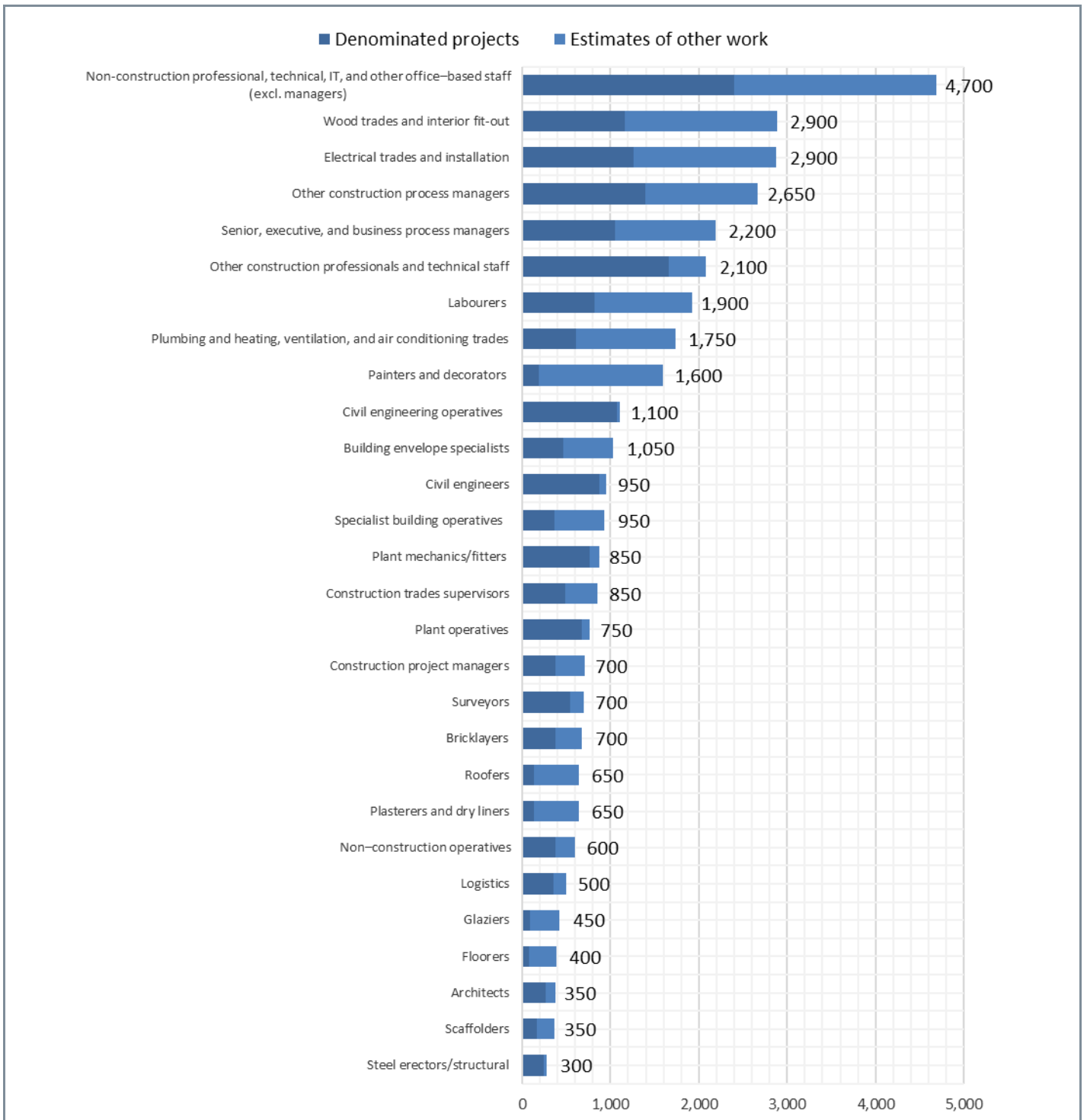

Figure 19: Construction labour demand by occupation in 2018

7.3.2. Breakdown of labour demand by project type

Table 18 shows the labour demand generated by the denominated projects and the estimates of other work in 2018.

Table 18: Labour demand by work type in 2018

Project Type	Labour demand from denominated projects (People)	Labour demand from estimates of other work (People)	Total labour demand (People)	% of total
New Housing	2,600	850	3,450	26%
Housing R&M	900	2,000	2,900	22%
Non-housing R&M	-	2,400	2,400	18%
Public Non-housing	1,700	-	1,700	13%
Private Commercial	550	750	1,300	10%
Private Industrial	750	-	750	6%
Infrastructure	700	-	700	5%
Total	7,200	6,000	13,200	100%

7.4. SUMMARY OF DEMAND

- The labour demand arising from the construction spend in the Lanarkshire area peaks at about 13,200 people in 2018, taking account of estimates of other work including R&M in addition to the pipeline of denominated projects.

- During 2018, the most labour-intensive occupation group is "non-construction professional, technical, IT and other office–based staff" with an annual demand of 1,750 people.

- The estimate of the three largest labour demands in the trade occupations for 2018 are as follows:

    - The trade occupation for which demand is highest is "Wood trades and interior fit-out" with 1,400 people;

    - "Electrical trades and installation" trades follow with 1,000 people;

    - "Plumbing and heating, ventilation, and air conditioning trades" rank third, with a demand of 950 people.

8. LABOUR DEMAND IN SOUTH EAST

8.1. INTRODUCTION

Figure 20 shows the local authorities included in South East. They are:

- Edinburgh
- East Lothian
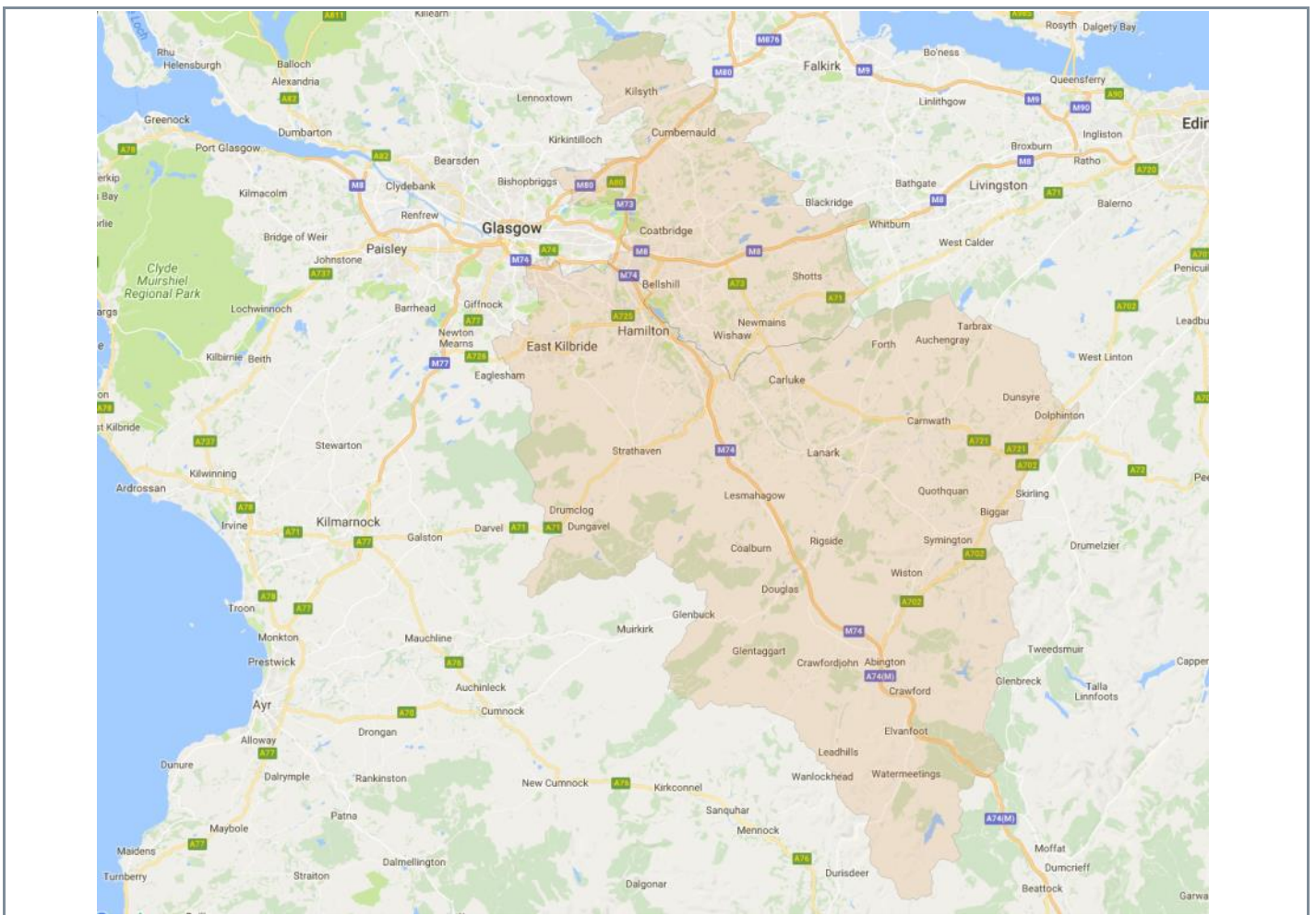- Midlothian
- Scottish Borders
- West Lothian

Figure 20: Map of South East Scotland and surrounding areas

The following sections provide an estimate of the labour demand that construction investment will create across South East over the period 2017-2021. The outputs determined from the analysis described in Section 2 are reported along with the labour demand generated as calculated by the Labour Forecasting Tool.

8.2. PIPELINE OF DEFINED PROJECTS

8.2.1. Glenigan pipeline analysis

The initial review of the Glenigan database identified 443 projects in the South East Scotland area. Of these, 57 projects due to missing dates. Also excluded were 8 projects which were clearly identified as consultancy projects. A full set of the projects which were omitted from the analysis is provided in Appendix B. The spend in projects which were removed from the analysis is around £1,029 million of the total pipeline. The majority of spend originating from

the removed projects comes from the development of a hub in excess of £400 million which was removed due to having missing dates along with a commercial project in excess of £200 million which was removed for the same reason. The remaining spend consists of smaller developments less than £87 million. It is possible that this work will take place at some undefined 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, but an assessment of the labour demand is made in the estimates of other work from the additional projects.

The Mean Value Theorem was applied to the remainder of the pipeline to identify the significant projects. The process identified 77 significant projects accounting for just under 84% 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.

Table 19 shows the number of significant projects within the South East Scotland area, the percentage of spend arising from the significant projects and the total spend. The construction spend shown in this table takes account of any adjustments for engineering works and any incomplete, duplicate or consultancy projects. Values are shown in 2017 prices, the base price used in the Glenigan database.

Table 19: Key data for significant projects in Glenigan in South East Scotland[5]

	Number of projects	Construction spend (£m – 2017 values)
All Glenigan Projects	378	9,175
Significant Glenigan Projects	77	7,700
Percentage within significant projects	20%	84%

Appendix C provides a full breakdown of the significant projects and their construction values. The peak year for the spend profile is 2018. The location of the significant projects within South East Scotland can be seen in Figure 21. The radius of the markers is proportional to the value of the work taking place.

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[5] The values in this table are the values from the Glenigan pipeline to which the construction element percentage has been applied and thus reflect the adjusted values of infrastructure projects values to distinguish between construction and engineering construction.

Figure 21: Location of significant projects included in the analysis in South East Scotland

8.2.2.   Glenigan & NICP spend analysis

Implementing the methodology outlined in section 2 leads to the following findings for 2018. The tail off in the denominated projects is more likely to be due to a lack of future planning rather than an actual tail off in workload.

Table 20

Table 20: New-build construction spend by project type in 2018 (total defined project pipeline)

Project Type	Construction spend in 2018 (2017 values - £m)	% of total
New Housing	554	35%
Private Commercial	387	24%
Public Non-housing	357	22%
Infrastructure	265	17%
Private Industrial	38	2%
Total	1,601	100%

Table 21 shows the infrastructure construction spend from both Glenigan and the NICP in 2018 by sub-sector.

Table 21: Construction spend per infrastructure sub-type in 2018 (total defined project pipeline)

Project Type	Construction spend in 2018 (2017 values - £m)	% of total
Transport	137	52%
Energy	70	26%
General Infrastructure	53	20%
Water	3	1%
Flooding	1	1%
Mining	1	0%
Total	265	100%

8.3. ESTIMATE OF TOTAL LABOUR DEMAND

As outlined in Section 2, the denominated project pipeline may not include smaller projects or repair and maintenance work. Figure 22 shows the outcomes of the analysis of future labour demand with an employment growth rate included. The solid blue area shows the labour demand arising from the new build Glenigan and NICP projects. Any R&M included in Glenigan or the NICP is also shown. The red shaded area shows the likely total labour demand arising from estimates of other work. The total construction labour demand including the volume of R&M imputed from the CSN model ranges from 55,700 in 2017 to 52,100 in 2021.
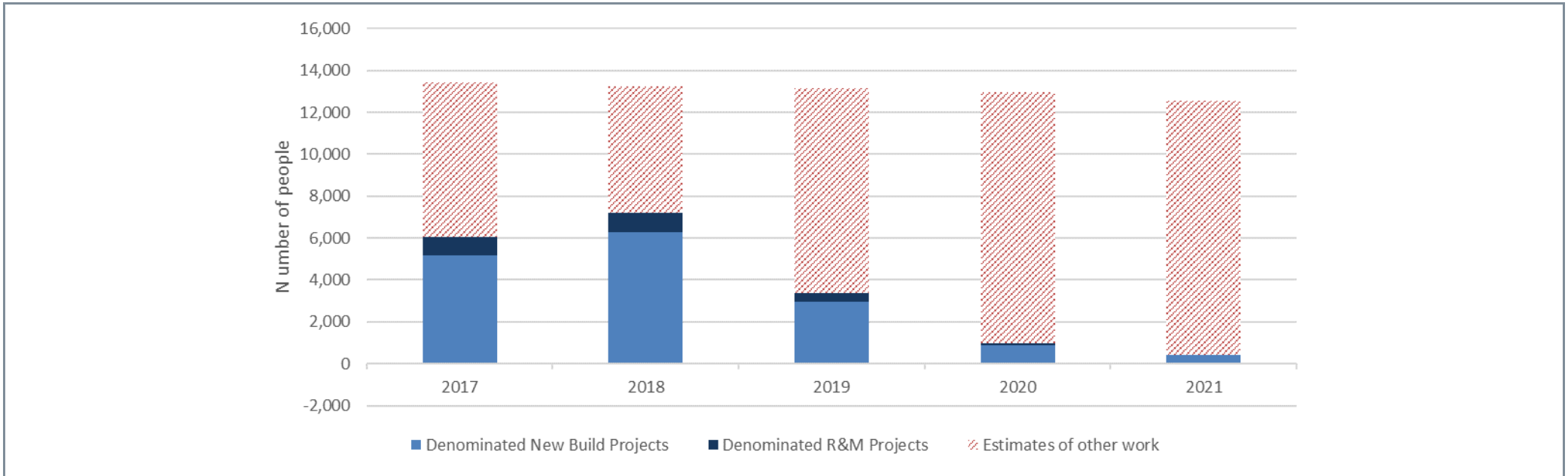
Figure 22: Total construction labour demand including estimates for both R&M and estimates of other work

8.3.1. Glenigan and NICP labour demand

For 2018 the detailed breakdown for each of the 28 occupational groups for the Glenigan and the NICP projects is shown in Figure 23. This shows the breakdown by occupation for both the pipeline of denominated projects and the estimates of other work.
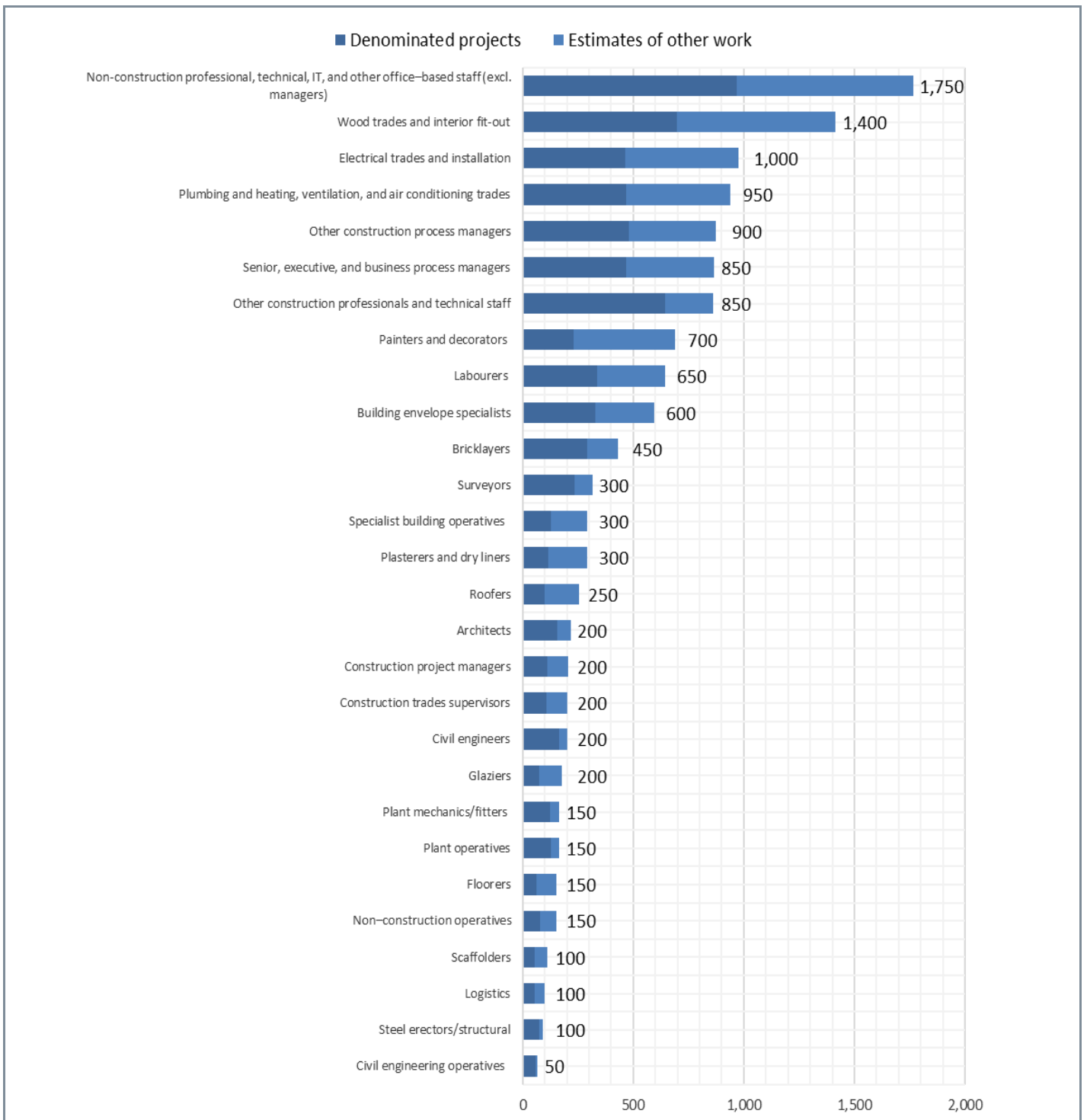

Figure 23: Construction labour demand by occupation in 2018

8.3.2. Breakdown of labour demand by project type

Table 22 shows the labour demand generated by the denominated projects and the estimates of other work in 2018.

Table 22: Labour demand by work type in 2018

Project Type	Labour demand from denominated projects (People)	Labour demand from estimates of other work (People)	Total labour demand (People)	% of total
Private Commercial	6,750	9,500	16,250	30%
Non-housing R&M	-	12,350	12,350	23%
New Housing	6,850	2,350	9,200	17%
Housing R&M	2,100	5,800	7,900	14%
Public Non-housing	6,200	100	6,300	11%
Infrastructure	2,150	-	2,150	4%
Private Industrial	700	-	700	1%
Total	24,750	30,100	54,850	100%

8.4.   SUMMARY OF DEMAND

- The labour demand arising from the construction spend in the South East Scotland area peaks at about 54,850 people in 2018, taking account of estimates of other work including R&M in addition to the pipeline of denominated projects.

- During 2018, the most labour-intensive occupation group is "non-construction professional, technical, IT and other office–based staff" with an annual demand of 7,500 people.

- The estimate of the three largest labour demands in the trade occupations for 2018 are as follows:

    - The trade occupation for which demand is highest is "Wood trades and interior fit-out" with 5,750 people;

    - "Electrical trades and installation" trades follow with 4,150 people;

    - "Plumbing and heating, ventilation, and air conditioning trades" rank third, with a demand of 3,550 people.

9. LABOUR DEMAND IN SOUTH WEST

9.1. INTRODUCTION

Figure 24 shows the local authorities included in South West Scotland. They are:

- Dumfries & Galloway
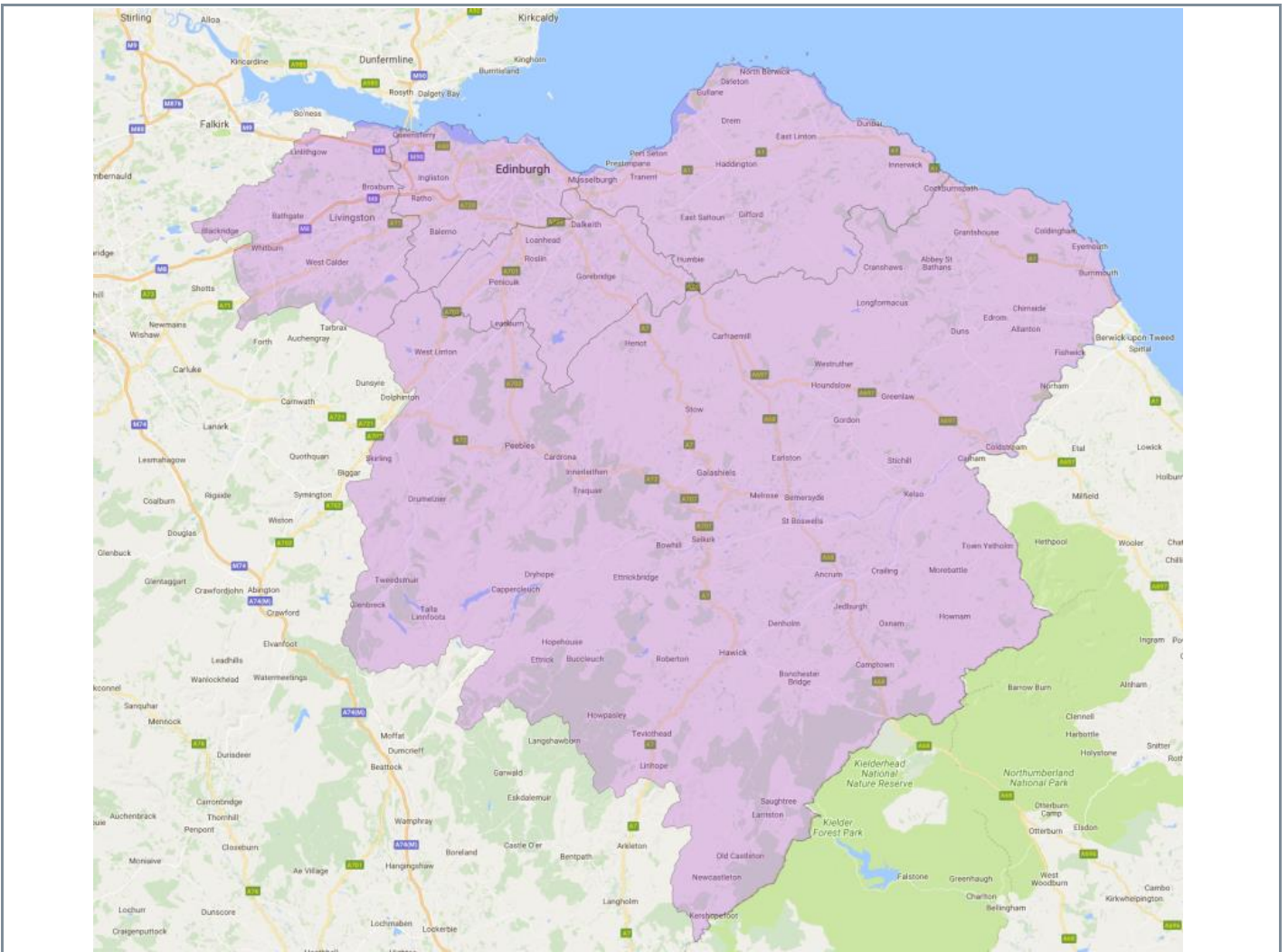- East Ayrshire
- North Ayrshire
- South Ayrshire

Figure 24: Map of South West Scotland and surrounding areas

The following sections provide an estimate of the labour demand that construction investment will create across South West Scotland over the period 2017-2021. The outputs determined from the analysis described in Section 2 are reported along with the labour demand generated as calculated by the Labour Forecasting Tool.

9.2. PIPELINE OF DENOMINATED PROJECTS

9.2.1. Glenigan pipeline analysis

The initial review of the Glenigan database identified 223 projects in the South West Scotland area. Of these, 1 project was removed due to missing values and 33 projects due to missing dates. Also excluded were 7 projects which were clearly identified as consultancy projects. A full set of the projects which were omitted from the analysis is provided in Appendix B. The spend in projects which were removed from the analysis is around £111 million of the total pipeline. Almost half of spend originating from the removed projects comes from the construction of a wind farm in excess of £18 million and the construction of 200 houses in excess of £15 million. Both of which were removed due to having missing dates. The remaining spend consists of smaller developments less than £10 million. It is possible that this work will take place at some undefined 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, but an assessment of the labour demand is made in the estimates of other work from the additional projects.

The Mean Value Theorem was applied to the remainder of the pipeline to identify the significant projects. The process identified 40 significant projects accounting for just under 77% 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.

Table 23 shows the number of significant projects within the South West Scotland area, the percentage of spend arising from the significant projects and the total spend. The construction spend shown in this table takes account of any adjustments for engineering works and any incomplete, duplicate or consultancy projects. Values are shown in 2017 prices, the base price used in the Glenigan database.

Table 23: Key data for significant projects in Glenigan in South West Scotland[6]

	Number of projects	Construction spend (£m – 2017 values)
All Glenigan Projects	182	1,099
Significant Glenigan Projects	40	846
Percentage within significant projects	22%	77%

Appendix C provides a full breakdown of the significant projects and their construction values. The peak year for the Glenigan spend profile is 2017. The location of the significant projects within South West Scotland can be seen in Figure 25. The radius of the markers is proportional to the value of the work taking place.
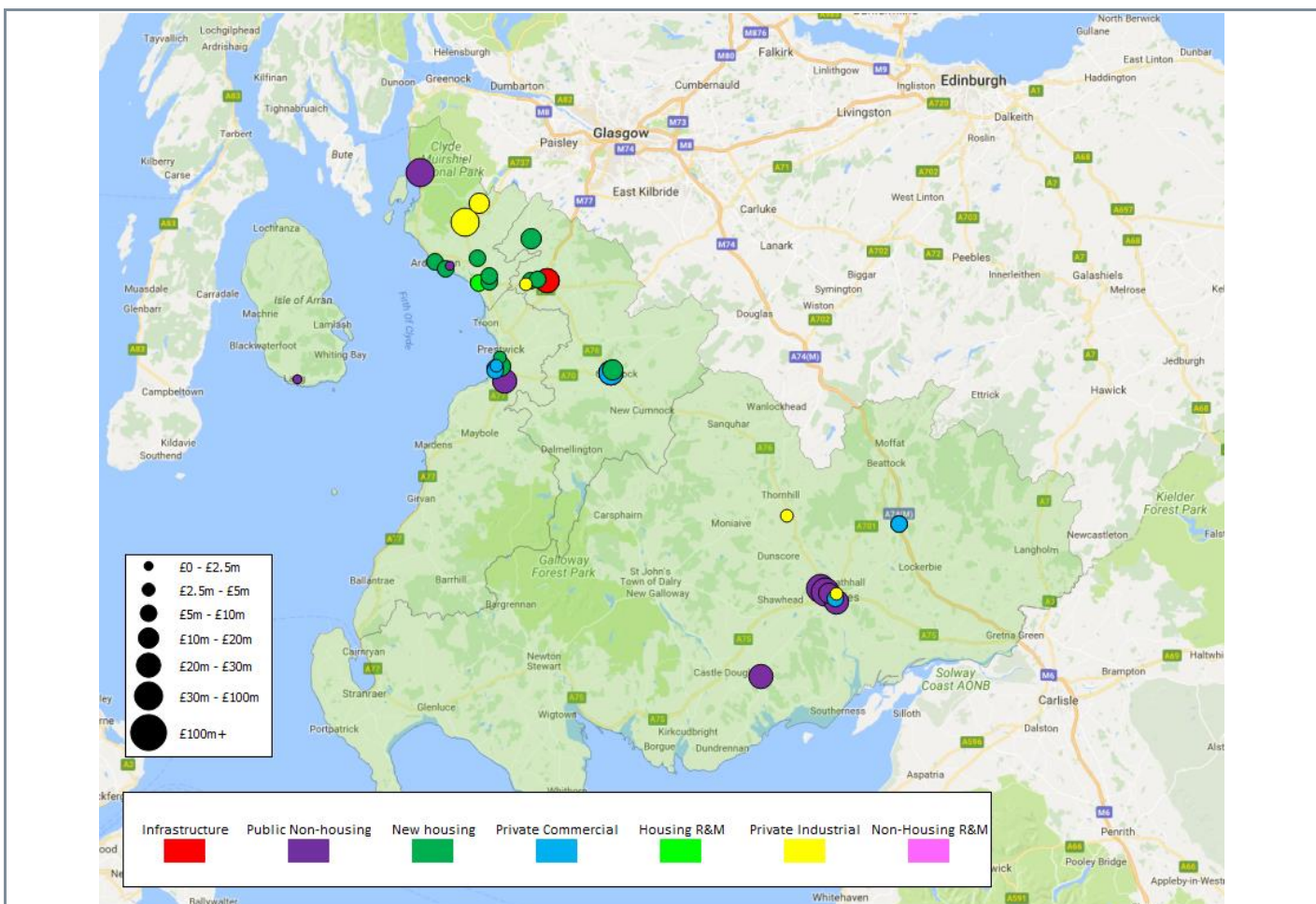
Figure 25: Location of significant projects included in the analysis in South West Scotland

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[6] The values in this table are the values from the Glenigan pipeline to which the construction element percentage has been applied and thus reflect the adjusted values of infrastructure projects values to distinguish between construction and engineering construction.
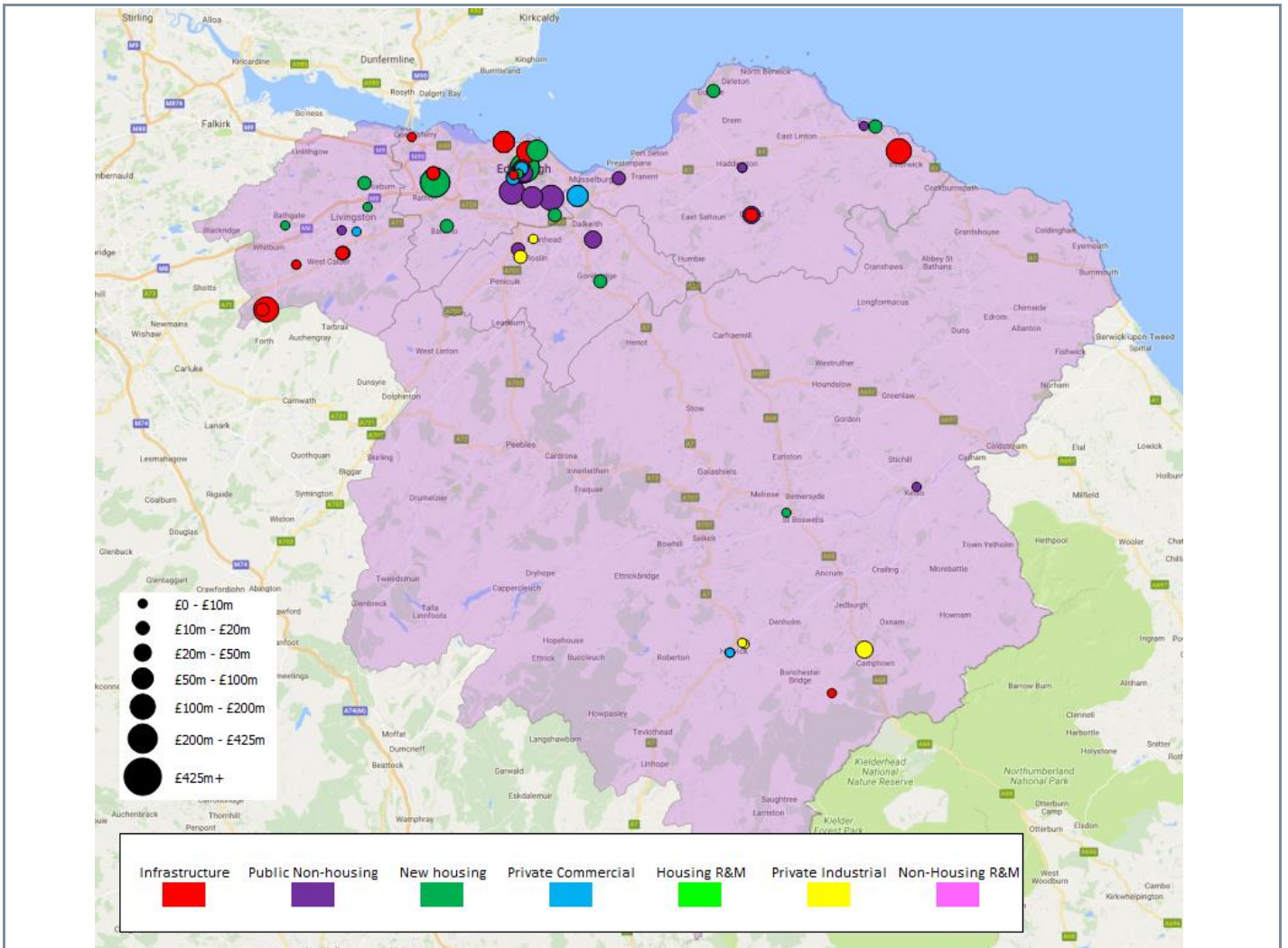
9.2.2. Glenigan & NICP spend analysis

Implementing the methodology outlined in section 2 leads to the following findings for 2018. The tail off in the denominated projects is more likely to be due to a lack of future planning rather than an actual tail off in workload.

Table 24

Table 24: New-build construction spend by project type in 2018 (total defined project pipeline)

Project Type	Construction spend in 2018 (2017 values - £m)	% of total
Public Non-housing	151	29%
Infrastructure	143	28%
New Housing	107	21%
Private Industrial	56	11%
Private Commercial	56	11%
Total	513	100%

Table 25 shows the infrastructure construction spend from both Glenigan and the NICP in 2018 by sub-sector.

Table 25: Construction spend per infrastructure sub-type in 2018 (total defined project pipeline)

Project Type	Construction spend in 2018 (2017 values - £m)	% of total
Transport	71	50%
Energy	46	32%
General Infrastructure	17	12%
Communications	4	3%
Flooding	3	2%
Water	2	2%
Total	143	100%

9.3. ESTIMATE OF TOTAL LABOUR DEMAND

As outlined in Section 2, the denominated project pipeline may not include smaller projects or repair and maintenance work. Figure 26 shows the outcomes of the analysis of future labour demand with an employment growth rate included. The solid blue area shows the labour demand arising from the new build Glenigan and NICP projects. Any R&M included in Glenigan or the NICP is also shown. The red shaded area shows the likely total labour demand arising from estimates of other work. The total construction labour demand including the volume of R&M imputed from the CSN model ranges from 17,900 in 2017 to 16,700 in 2021.
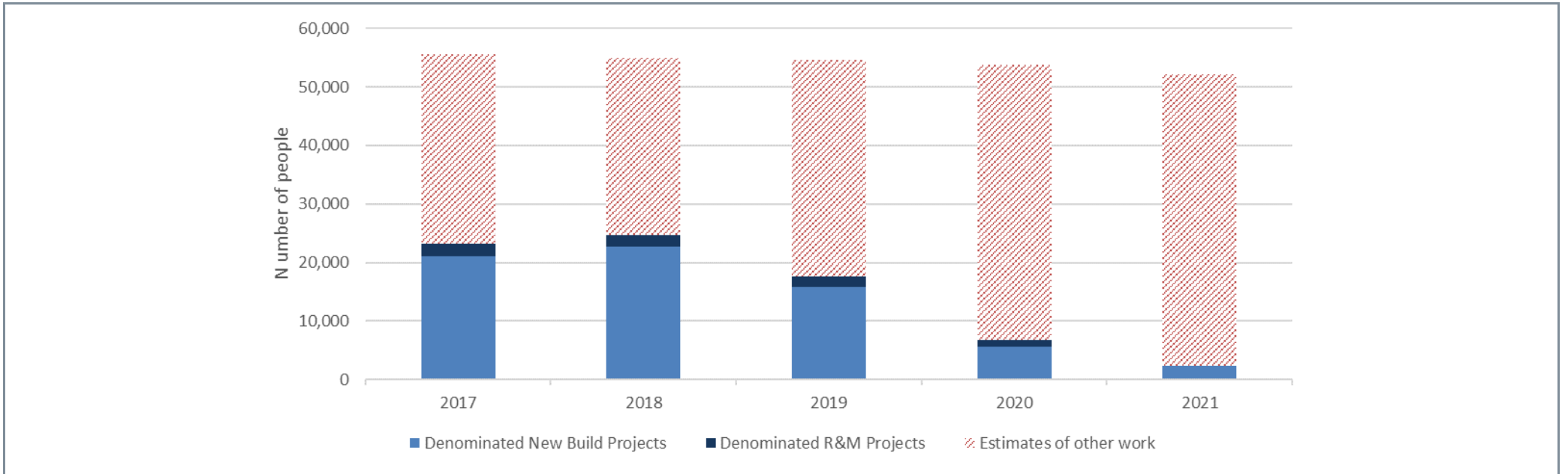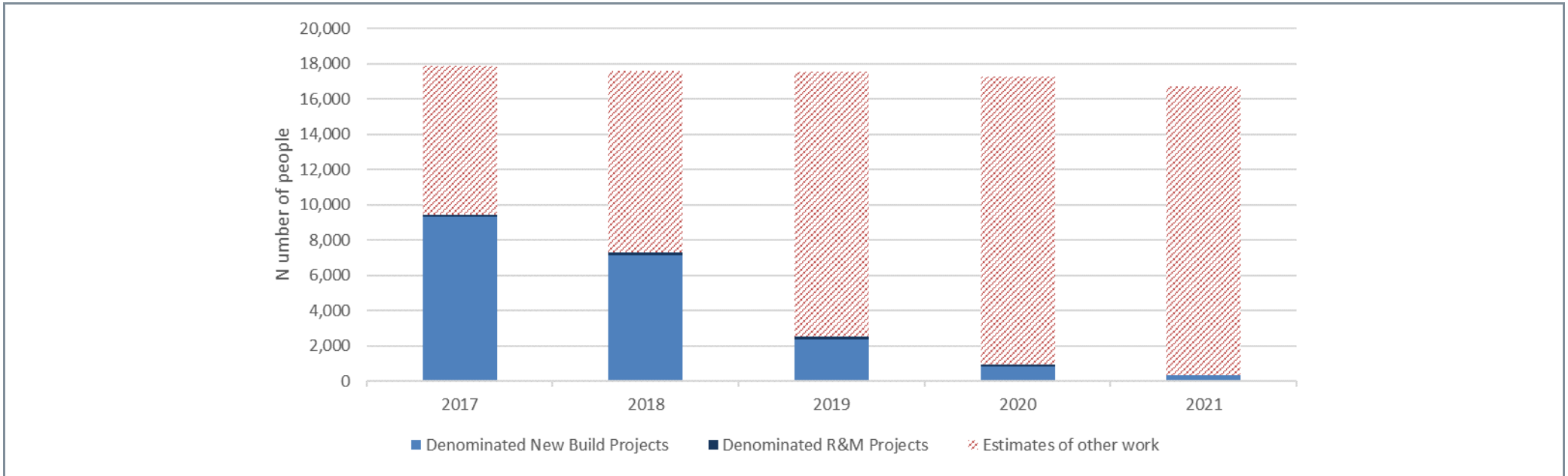
Figure 26: Total construction labour demand including estimates for both R&M and estimates of other work

9.3.1. Glenigan and NICP labour demand

For 2018 the detailed breakdown for each of the 28 occupational groups for the Glenigan and the NICP projects is shown in Figure 27. This shows the breakdown by occupation for both the pipeline of denominated projects and the estimates of other work.
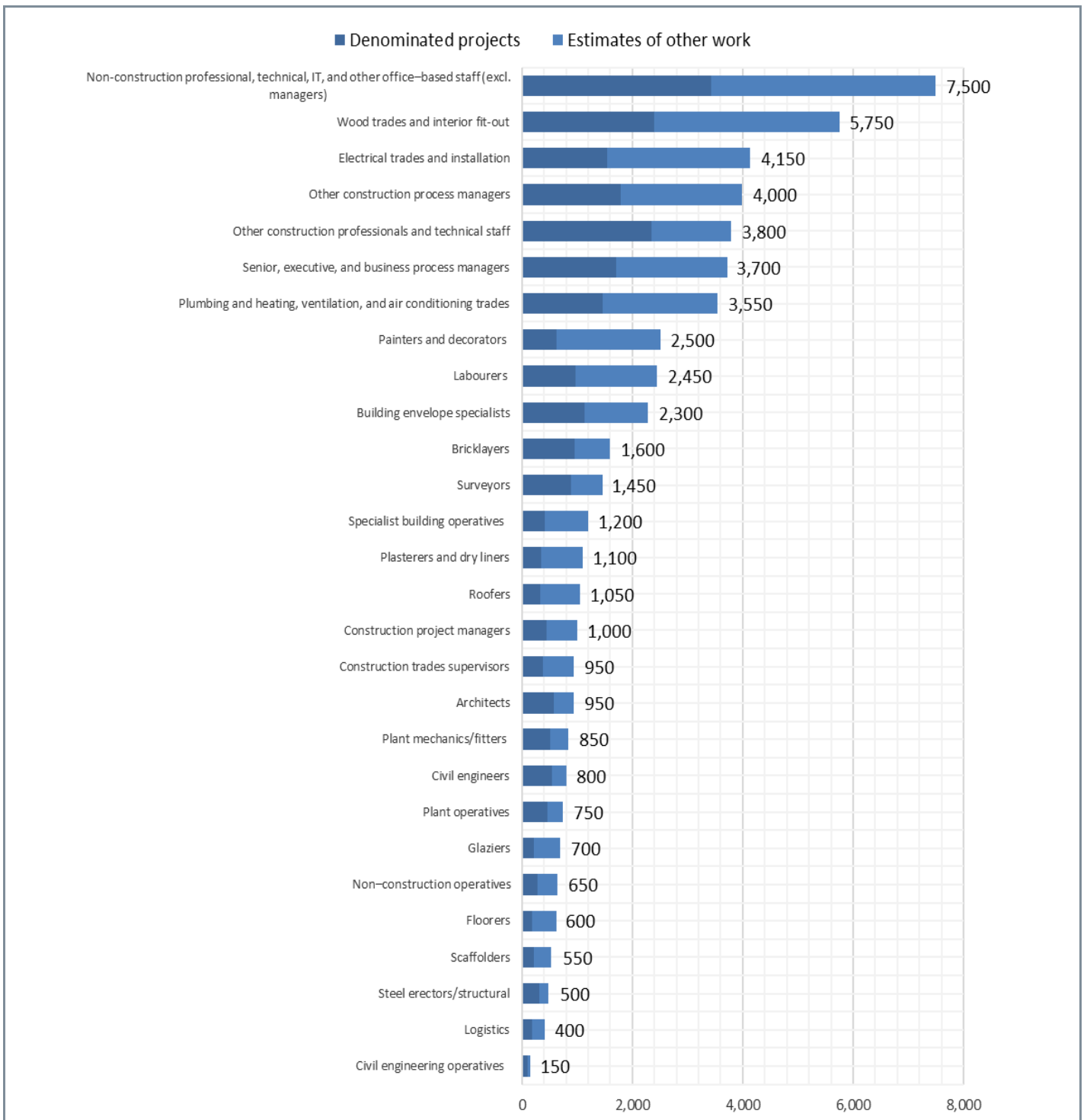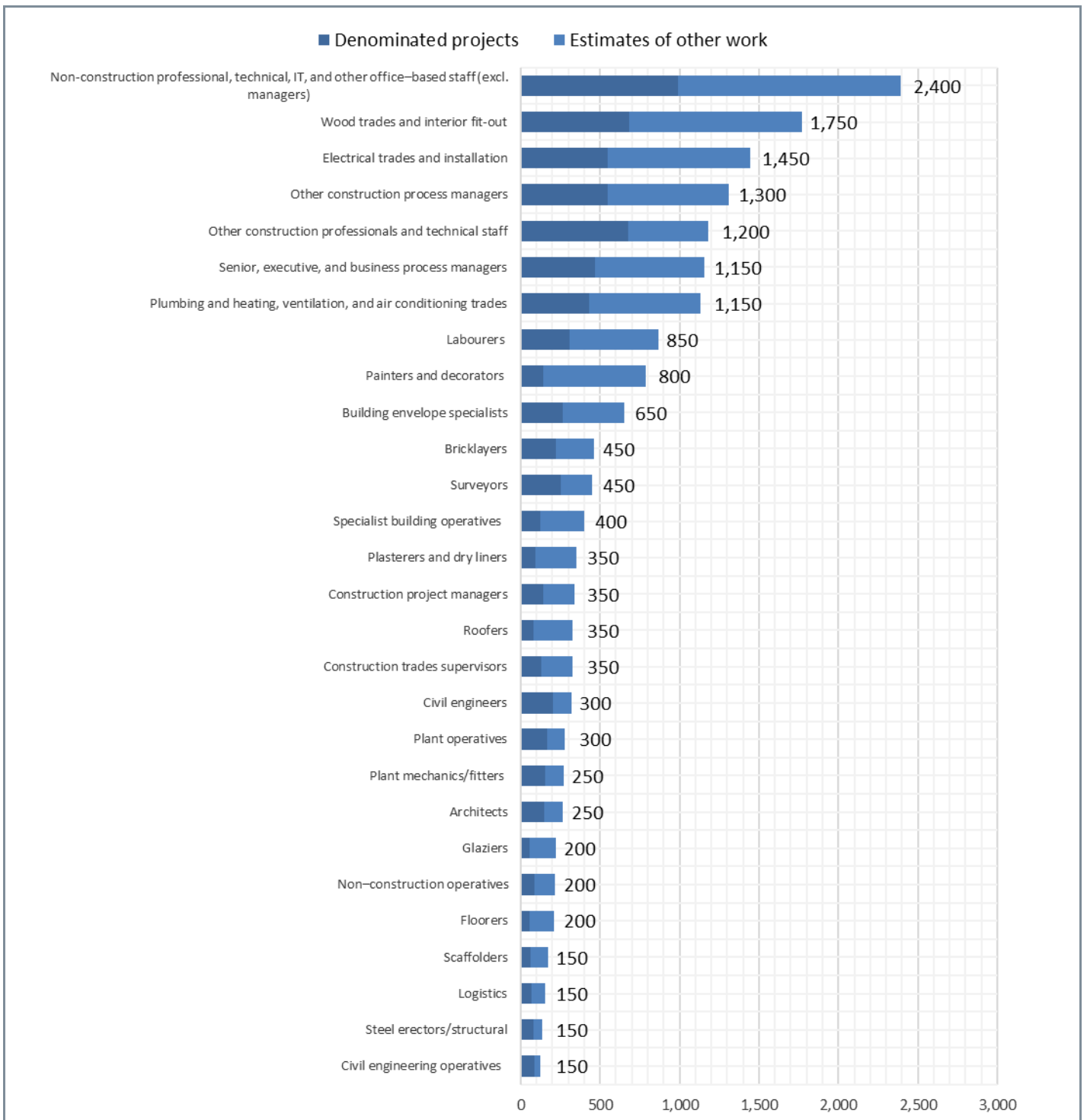
Figure 27: Construction labour demand by occupation in 2018

9.3.2. Breakdown of labour demand by project type

Table 26 shows the labour demand generated by the denominated projects and the estimates of other work in 2018.

Table 26: Labour demand by work type in 2018

Project Type	Labour demand from denominated projects (People)	Labour demand from estimates of other work (People)	Total labour demand (People)	% of total
Non-housing R&M	-	4,400	4,400	25%
Public Non-housing	2,650	1,650	4,300	24%
New Housing	1,350	850	2,200	13%
Infrastructure	1,100	700	1,800	10%
Private Industrial	1,050	650	1,700	10%
Housing R&M	-	1,650	1,650	9%
Private Commercial	950	600	1,550	9%
Total	7,100	10,500	17,600	100%

9.4. SUMMARY OF DEMAND

- The labour demand arising from the construction spend in the South West Scotland area is about 17,600 people in 2018, taking account of estimates of other work including R&M in addition to the pipeline of denominated projects.

- During 2018, the most labour-intensive occupation group is "non-construction professional, technical, IT and other office–based staff" with an annual demand of 2,400 people.

- The estimate of the three largest labour demands in the trade occupations for the peak year of 2018 are as follows:

  - The trade occupation for which demand is highest is "Wood trades and interior fit-out" with 1,750 people;

  - "Electrical trades and installation" trades follow with 1,450 people;

  - "Plumbing and heating, ventilation, and air conditioning trades" rank third, with a demand of 1,150 people.

10. LABOUR DEMAND IN TAYSIDE, FORTH & FIFE

10.1. INTRODUCTION

Figure 28 shows the local authorities included in Tayside, Forth & Fife. They are:

- Angus
- Clackmannan
- Dundee
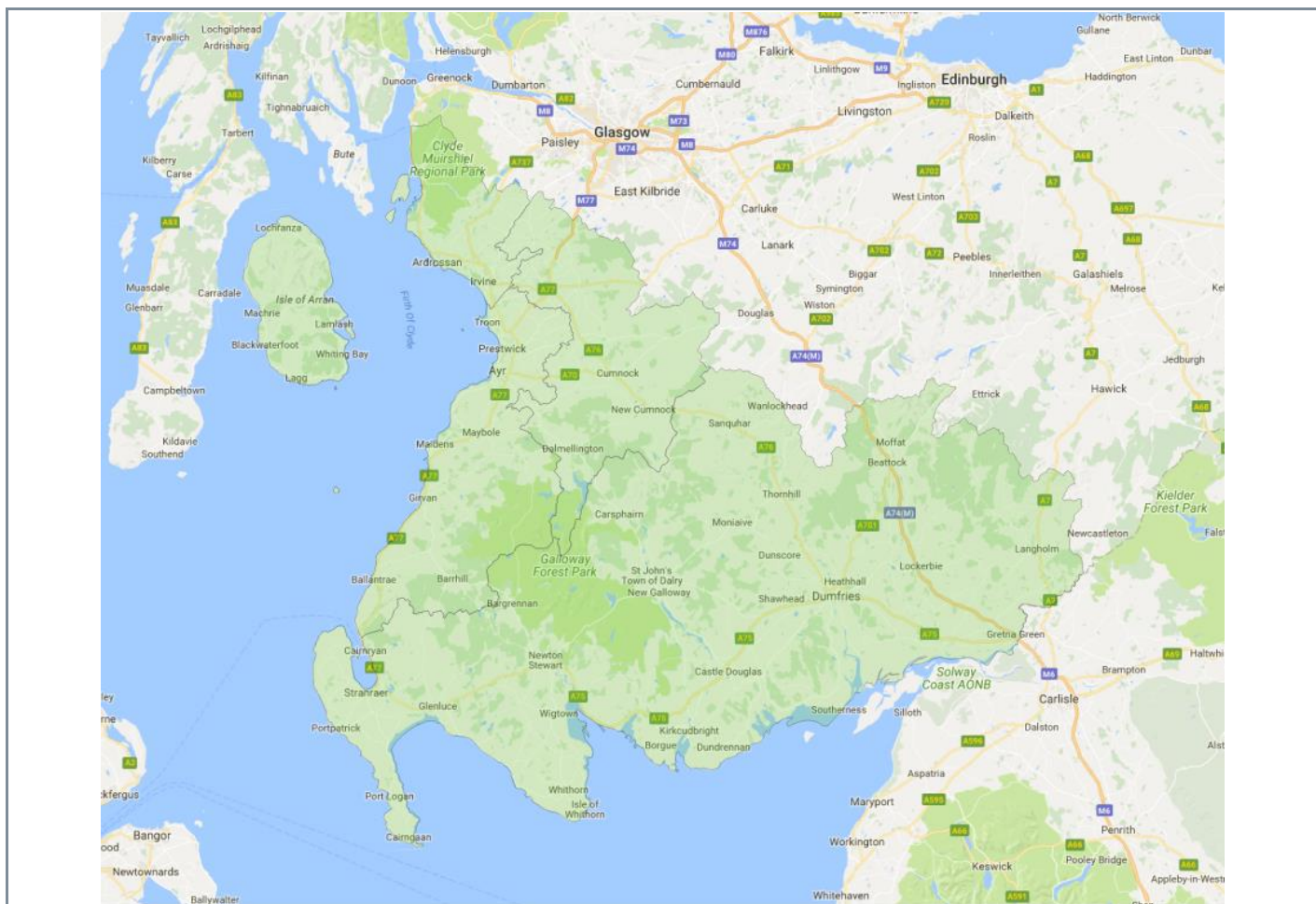- Falkirk
- Fife
- Perth & Kinross
- Stirling

Figure 28: Map of Tayside, Forth & Fife and surrounding areas

The following sections provide an estimate of the labour demand that construction investment will create across Tayside, forth & Fife over the period 2017-2021. The outputs determined from the analysis described in Section 2 are reported along with the labour demand generated as calculated by the Labour Forecasting Tool.

10.2. PIPELINE OF DENOMINATED PROJECTS

10.2.1. Glenigan pipeline analysis

The initial review of the Glenigan database identified 434 projects in the Tayside, Forth & Fife area. Of these, 69 projects were removed due to missing dates and 6 which were clearly identified as consultancy projects. A full set of the projects which were omitted from the analysis is provided in Appendix B. The spend in projects which were removed from the analysis is around £739 million of the total pipeline. The majority of spend originating from the removed projects comes from the construction of a renewable energy plant in excess of £325 million which was

removed due to having missing dates and Multi-Disciplinary Programme Support Services in excess of £180 million which was removed for being a consultancy project. The remaining spend consists of smaller developments less than £10 million. It is possible that this work will take place at some undefined 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, but an assessment of the labour demand is made in the estimates of other work from the additional projects.

The Mean Value Theorem was applied to the remainder of the pipeline to identify the significant projects. The process identified 88 significant projects accounting for just over 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.

Table 27 shows the number of significant projects within the Tayside, Forth & Fife area, the percentage of spend arising from the significant projects and the total spend. The construction spend shown in this table takes account of any adjustments for engineering works and any incomplete, duplicate or consultancy projects. Values are shown in 2017 prices, the base price used in the Glenigan database.

Table 27: Key data for significant projects in Glenigan in Tayside, Forth & Fife[7]

	Number of projects	Construction spend (£m – 2017 values)
All Glenigan projects	359	4,721
Significant Glenigan projects	88	3,925
Percentage within significant projects	25%	83%

Appendix C provides a full breakdown of the significant projects and their construction values. The peak year for the Glenigan spend profile is 2018. The location of the significant projects within South West Scotland can be seen in Figure 29. The radius of the markers is proportional to the value of the work taking place.

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[7] The values in this table are the values from the Glenigan pipeline to which the construction element percentage has been applied and thus reflect the adjusted values of infrastructure projects values to distinguish between construction and engineering construction.
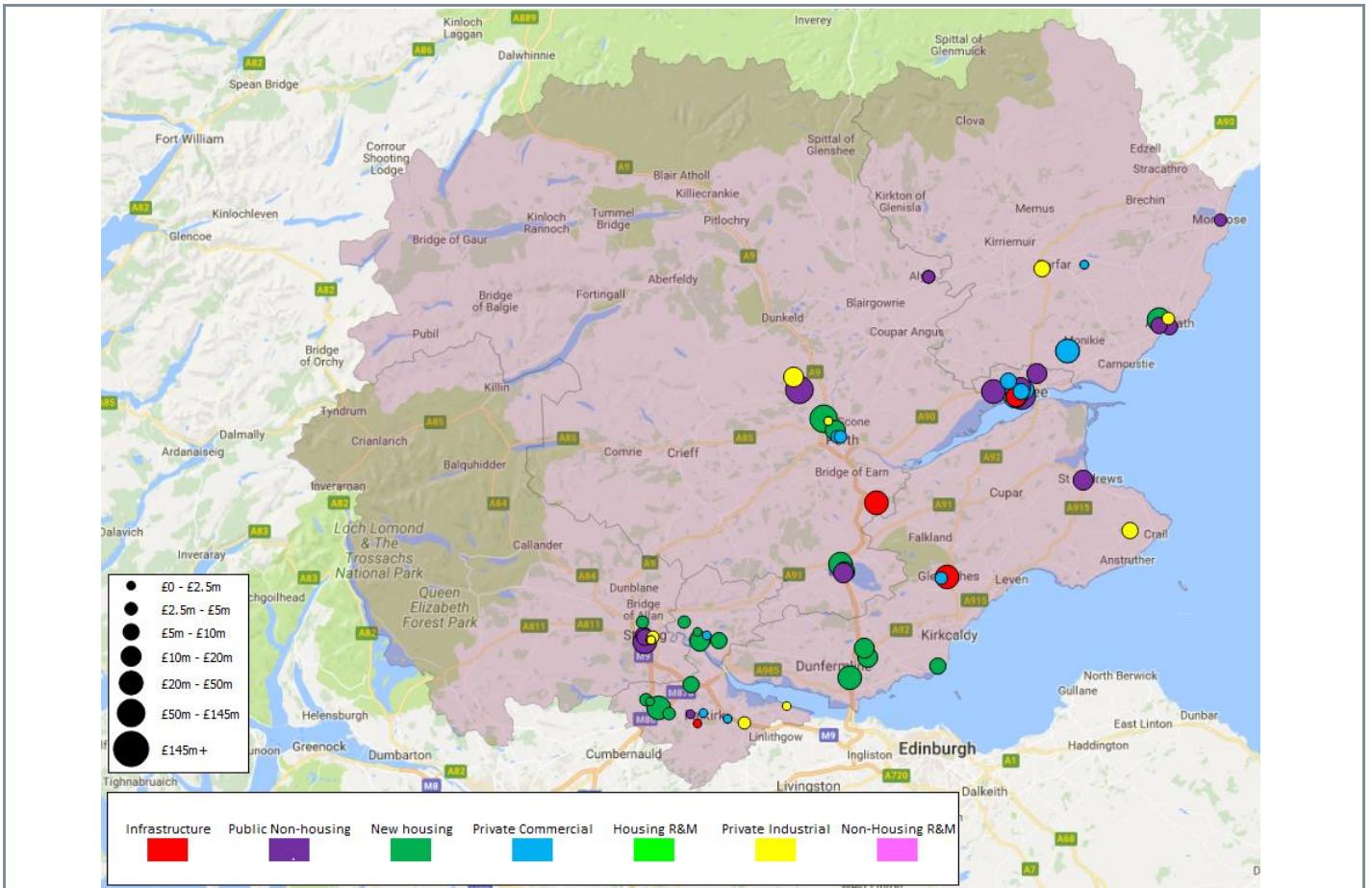
Figure 29: Location of significant projects included in the analysis in Tayside, forth & Fife

10.2.2. Glenigan & NICP spend analysis

Implementing the methodology outlined in section 2 leads to the following findings for 2018. The tail off in the denominated projects is more likely to be due to a lack of future planning rather than an actual tail off in workload.

Table 28

Table 28: New-build construction spend by project type in 2018 (total defined project pipeline)

Project Type	Construction spend in 2018 (2017 values - £m)	% of total
Infrastructure	658	39%
Public Non-housing	450	27%
New Housing	382	23%
Private Commercial	132	8%
Private Industrial	46	3%
Total	1,668	100%

Table 29 shows the infrastructure construction spend from both Glenigan and the NICP in 2018 by sub-sector.

Table 29: Construction spend per infrastructure sub-type in 2018 (total defined project pipeline)

Project Type	Construction spend in 2018 (2017 values - £m)	% of total
Transport	335	51%
Energy	304	46%
Communications	12	2%
General Infrastructure	3	0%
Flooding	2	0%
Mining	1	0%
Total	658	100%

10.3. ESTIMATE OF TOTAL LABOUR DEMAND

As outlined in Section 2, the denominated project pipeline may not include smaller projects or repair and maintenance work. Figure 30 shows the outcomes of the analysis of future labour demand with an employment growth rate included. The solid blue area shows the labour demand arising from the new build Glenigan and NICP projects. Any R&M included in Glenigan or the NICP is also shown. The red shaded area shows the likely total labour demand arising from estimates of other work. The total construction labour demand including the volume of R&M imputed from the CSN model ranges from 43,900 in 2017 to 41,100 in 2021.
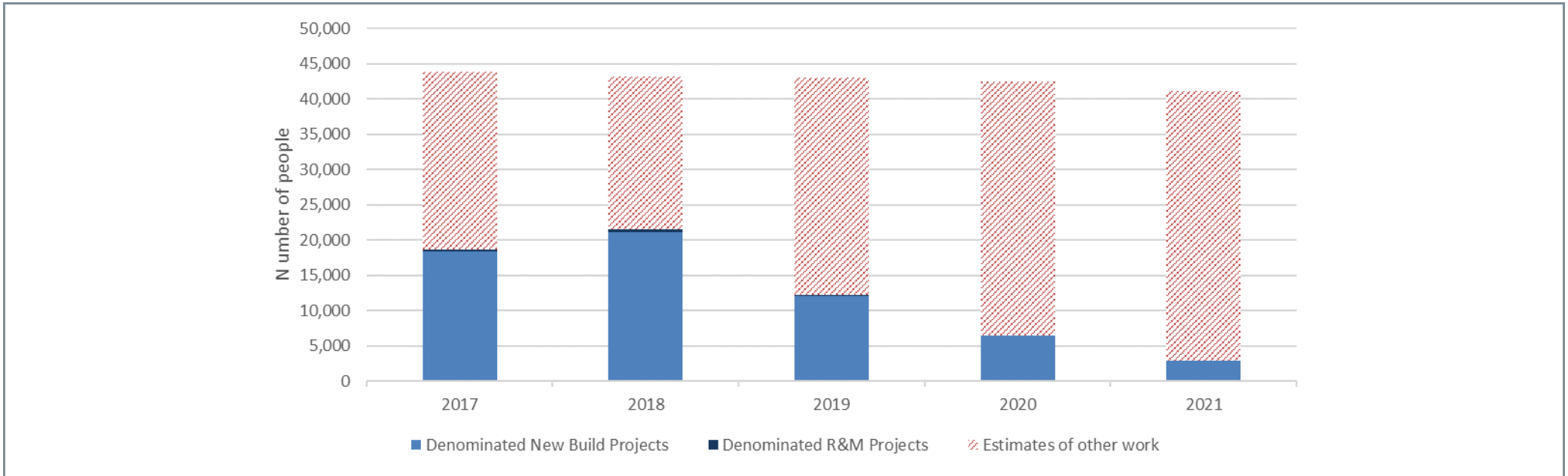
Figure 30: Total construction labour demand including estimates for both R&M and estimates of other work

10.3.1. Glenigan and NICP labour demand

For 2018 the detailed breakdown for each of the 28 occupational groups for the Glenigan and the NICP projects is shown in Figure 31. This shows the breakdown by occupation for both the pipeline of denominated projects and the estimates of other work.
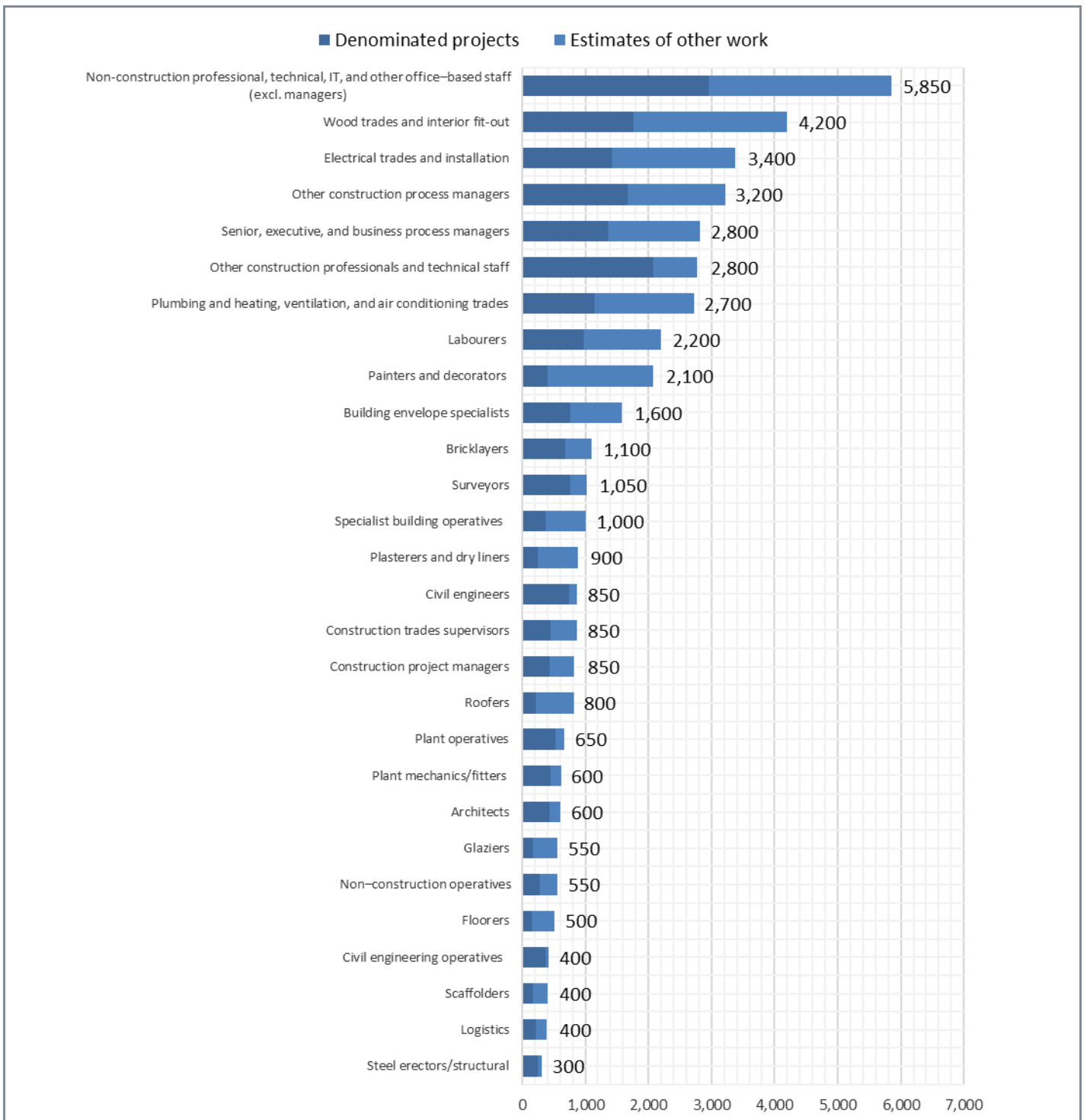
Figure 31: Construction labour demand by occupation in 2018

10.3.2. Breakdown of labour demand by project type

Table 30 shows the labour demand generated by the denominated projects and the estimates of other work in 2018.

Table 30: Labour demand by work type in 2018

Project Type	Labour demand from denominated projects (People)	Labour demand from estimates of other work (People)	Total labour demand (People)	% of total
Non-housing R&M	-	11,700	11,700	27%
Public Non-housing	8,500	100	8,600	20%
New Housing	4,800	1,600	6,400	15%
Private Commercial	2,450	3,250	5,700	13%
Housing R&M	300	5,150	5,450	13%
Infrastructure	4,550	-	4,550	11%
Private Industrial	850	-	850	2%
Total	21,450	21,800	43,250	100%

10.4. SUMMARY OF DEMAND

- The labour demand arising from the construction spend in the Tayside, Forth & Fife area is about 43,250 people in 2018, taking account of estimates of other work including R&M in addition to the pipeline of denominated projects.

- During 2018 the most labour-intensive occupation group is "non-construction professional, technical, IT and other office–based staff" with an annual demand of 5,850 people.

- The estimate of the three largest labour demands in the trade occupations for 2018 are as follows:

  - The trade occupation for which demand is highest is "Wood trades and interior fit-out" with 4,200 people;

  - "Electrical trades and installation" trades follow with 3,400 people;

  - "Plumbing and heating, ventilation, and air conditioning trades" rank third, with a demand of 2,700 people.

11. SUPPLY ANALYSIS

Previous sections looked at the demand for construction labour that will be generated by the pipeline of projects across Scotland, breaking that down within the seven areas used within the report. This section looks at recent employment trends for construction within the same seven areas to take a view on the supply of workers currently available, and then looks at factors such as age, mobility and training.

When looking at the breakdown of construction occupations with the seven areas, the 28 occupational groups have placed into 11 broader groups. This is to allow a more meaningful comparison of demand and supply as separating 28 occupations and 7 areas was considered to be too great a level of disaggregation.

The recession in 2008 and falling output meant by 2013 construction employment in Scotland had reduced by nearly 35,000 workers, which represented a 14% decline between 2008 and 2013. (ref: Figure 32)
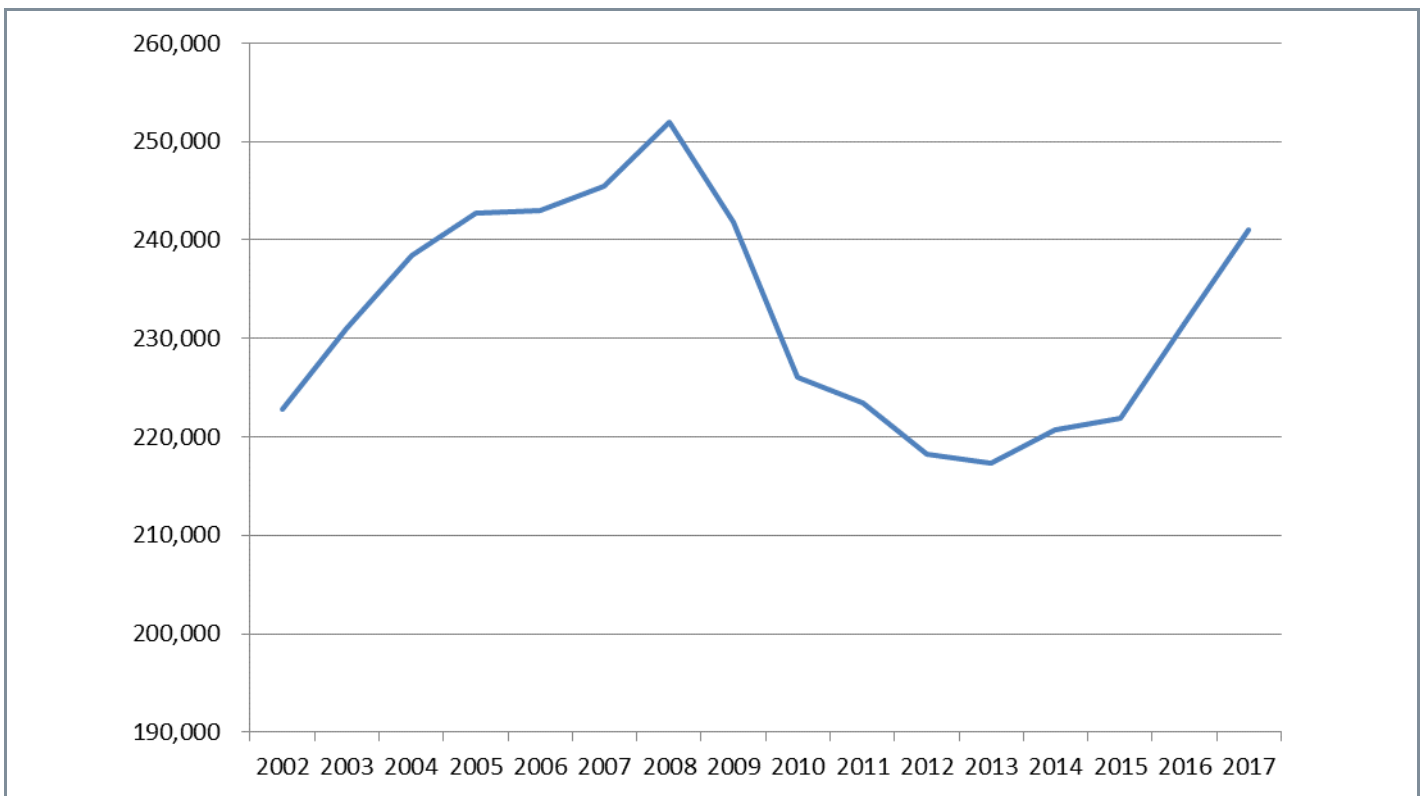
Figure 32: Construction employment in Scotland from 2002 – 2017 (Source: CITB, 2017)

As business conditions have improved since 2013, employment has increased, however employment in 2017 at around 241,000 is still forecast to be slightly lower than the previous peak in 2008.

To give an indication of the area distribution of Scotland's construction workforce, the ONS Annual Population Survey (APS) has been used in preference to the Business Register Employment Survey (BRES) for two main reasons.

Both APS and BRES allow area based analysis by industry sectors, however the APS includes self-employed workers, which in recent years has accounted for around 25% of Scotland's construction workforce (excluded from BRES data), and is based upon the area where people say they work.

It is for these reasons that the APS workplace analysis data was considered as being a suitable means to give an area breakdown for the construction workforce within Scotland and when looking at workforce figures across the seven areas from 2013 to 2017, three areas consistently account for nearly 60% of the total workforce (ref: Figure 33).

- Glasgow & West
- South East
- Tayside, Forth and Fife

Figure 33: Construction workforce by area, 2013-2017 (Source: NOMIS, 2017)

Workforce patterns, will to a large extent, mirror general population distribution therefore a significant proportion of the workforce being within the central belt area of Scotland would be expected.

While overall employment has grown between 2013 and 2017, there are only slight fluctuations in the relative area shares and the overall pattern indicates a degree of consistency and stability in the construction workforce by area, ref. Table 31. From Jan 2016 to Jun 2017 the average % shares of the construction workforce within Scotland has been:

Table 31: Construction employment share by area, 2016-2017 (Source: NOMIS, 2017)

Area	Share
Glasgow & West	22%
South East	18%
Tayside, Forth & Fife	18%
Aberdeen City & Shire	12%
Lanarkshire	11%
South West	10%
Highlands & Islands	9%

Looking at the share of construction businesses located across Scotland again shows the same three areas accounting for over half of the construction businesses within Scotland (54%).

While there is some consistency between employment and business shares, there are two notable differences.

Table 32: Construction enterprises by area, 2015-2017 (Source: NOMIS, 2017)

Area	2015	2016	2017	Average
Tayside, Forth & Fife	19.8%	19.4%	19.5%	19.6%
South East	17.2%	17.2%	17.1%	17.2%
Glasgow & West	16.6%	17.0%	17.1%	16.9%
Highlands & Islands	14.0%	14.0%	13.5%	13.8%
Lanarkshire	12.1%	12.1%	12.3%	12.2%
Aberdeen City & Shire	10.9%	10.7%	10.6%	10.7%
South West	9.4%	9.6%	9.8%	9.6%

Firstly, Glasgow & West has a lower % share compared to Tayside, Forth & Fife or South East. The indication here is that there will be more employment in either large or medium sized businesses within the Glasgow & West area.

Secondly, the opposite pattern occurs in the Highlands & Islands which has 9.3% of employment and 13.8% of businesses, which means employment is biased towards Micro sized businesses.

This might have implications for businesses ability to successfully bid and work on projects that have larger contract values, with larger companies possibly being better resourced. However there is a balance here as micro sized companies may have fewer overheads and be more fleet of foot in responding.

As there is a degree of consistency within employment and business shares across Scotland in recent years (ref. Table 33), we can use this information to estimate the occupational breakdown within each area and then use this as a basis for comparing the existing workforce to the demand projections.

Table 33: Construction employment share by area, Jan 2016- Jun 2017 (Source: NOMIS, 2017)

Area	Share
Glasgow & West	21.8%
South East	17.7%
Tayside, Forth & Fife	17.6%
Aberdeen City & Shire	12.5%
Lanarkshire	11.5%
South West	9.5%
Highlands & Islands	9.3%

Allocation of the CSN estimated construction employment in Scotland for 2017 of 241,000 workers into the seven areas is shown in Table 34, and Table 35 breaks these overall numbers down into the main occupational classifications to compare against the demand analysis.

Table 34: Estimated construction workforce by area, Jun 2017 (Source: CITB, 2017)

Area	Workforce
Glasgow & West	52,500
South East	42,750
Tayside, Forth & Fife	42,500
Aberdeen City & Shire	30,250
Lanarkshire	27,800
South West	22,800
Highlands & Islands	22,450

Table 35: Workforce, by occupation and area, 2017 (Source: CITB, 2017)

Occupations	Glasgow & West	South East	Tayside, Forth & Fife	Aberdeen City & Shire	Lanarkshire	South West	Highlands & Islands
Construction Managers and Supervisors	8,800	7,150	7,100	5,050	4,650	3,800	3,750
Construction Professional & Technical	9,950	8,100	8,050	5,750	5,250	4,300	4,250
Labourers	2,600	2,150	2,100	1,500	1,400	1,150	1,100
Non-construction trades	900	750	750	550	500	400	400
Skilled trades - bricklaying	1,550	1,250	1,250	900	850	700	650
Skilled trades - electrical	4,300	3,500	3,500	2,500	2,300	1,850	1,850
Skilled trades - other occupations (e.g. roofing, flooring, scaffolders, etc.)	8,700	7,100	7,050	5,000	4,600	3,750	3,700
Skilled trades - painting and decorating	2,000	1,600	1,600	1,150	1,050	850	850
Skilled trades - plumbing & HVAC	2,550	2,050	2,050	1,450	1,350	1,100	1,100
Skilled trades - wood occupations	5,050	4,150	4,100	2,900	2,700	2,200	2,150
Support staff - office based	6,050	4,900	4,900	3,500	3,200	2,600	2,600
Grand Total	52,500	42,750	42,500	30,250	27,800	22,800	22,450

With construction work being project based with varying timespans, the existing workforce is essentially the main component of supply for future demand identified by the pipeline analysis, especially as it is adaptable, flexible and mobile. However, before looking at demand against supply there are some factors that should be touched upon.

There will be a natural demographic flow of workers out of the sector into retirement, as people leave and join the sector, which in turn in influenced by general working trends in the sector such as how far people are prepared to travel to work. There is also the question on how training of new entrants fits within this and each of these factors (demographics, mobility and training) is briefly considered in turn.

11.1. CONSTRUCTION WORKFORCE PROFILE

11.1.1. Construction Workforce Profile – Demographics

The age demographic profile for the construction sector in Scotland compared to the all industry profile is shown in Figure 34.

There is almost no difference in the make-up of older workers with very similar shares for those aged 45-54 and 55+. Where there is a difference in the lower share of younger workers, those aged under 24, which is in part will be due to the sector going into significant recession in 2008 and not being seen as an attractive career prospect until it was growing again from around 2013.
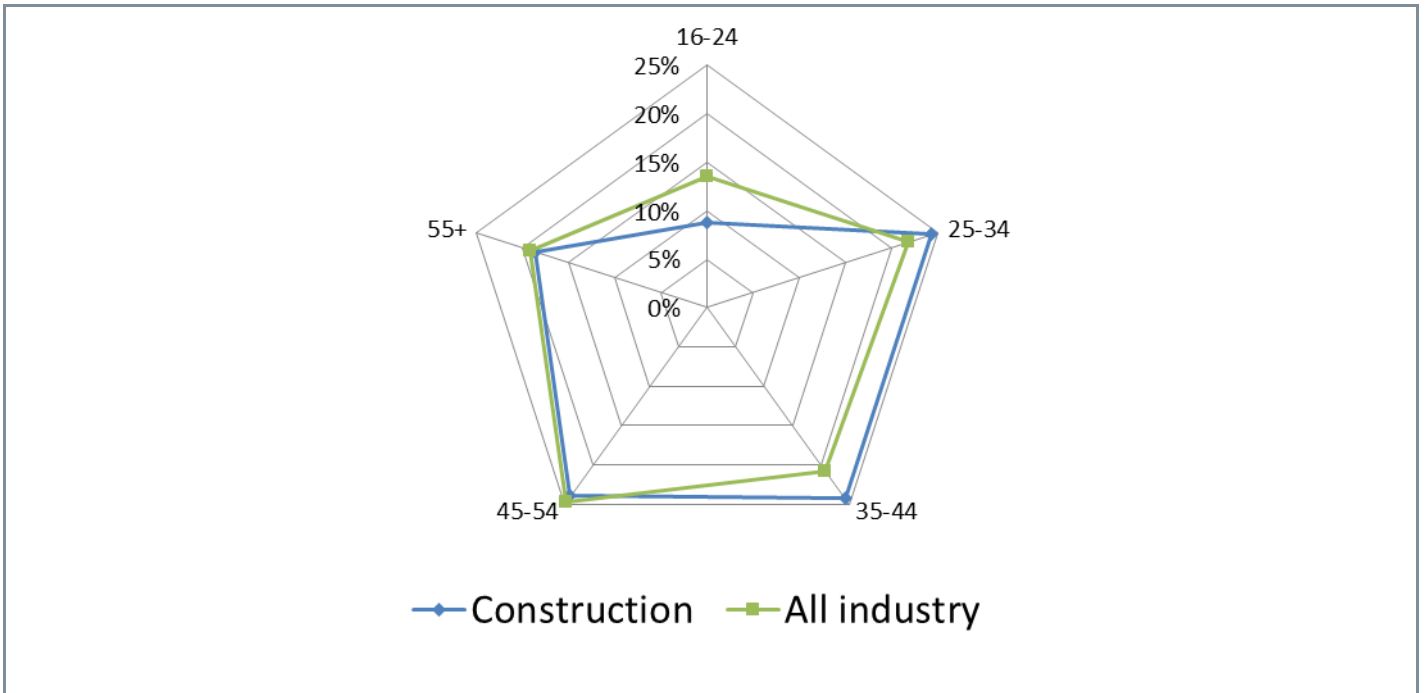
Figure 34: Age profile, Construction and All Industry, Scotland, 2016 (Source: CITB/ONS)

Construction, along with other sectors faces a future issue when retirement rates start to pick-up, however as Figure 35 illustrates, when looking at single age data for UK construction, year-on-year retirement rates are set to remain at less than 2% per year for around the next 5-10 years and we would expect a similar year-on-year distribution pattern in Scotland as the broader construction age profile in Scotland is similar to the corresponding UK picture for ages 45+, ref Figure 36.
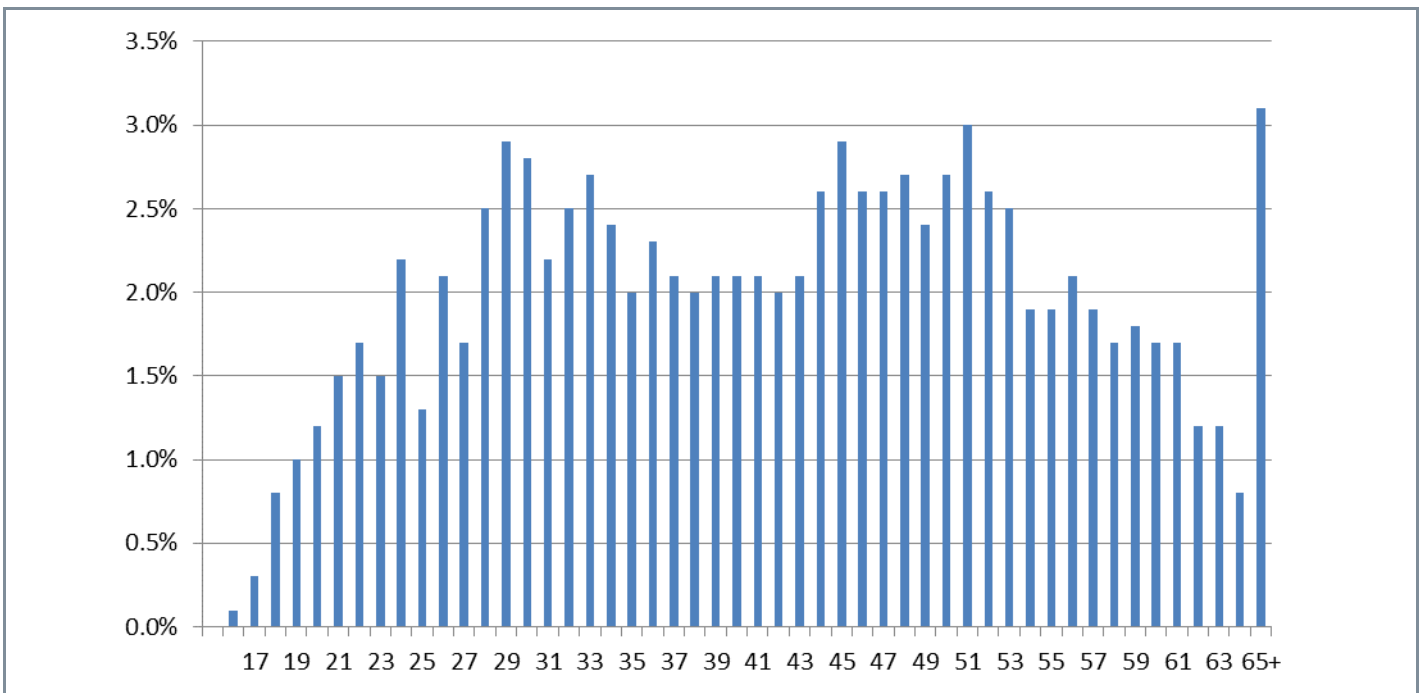
Figure 35: Single age profile of UK construction industry (Source: ONS, 2017)
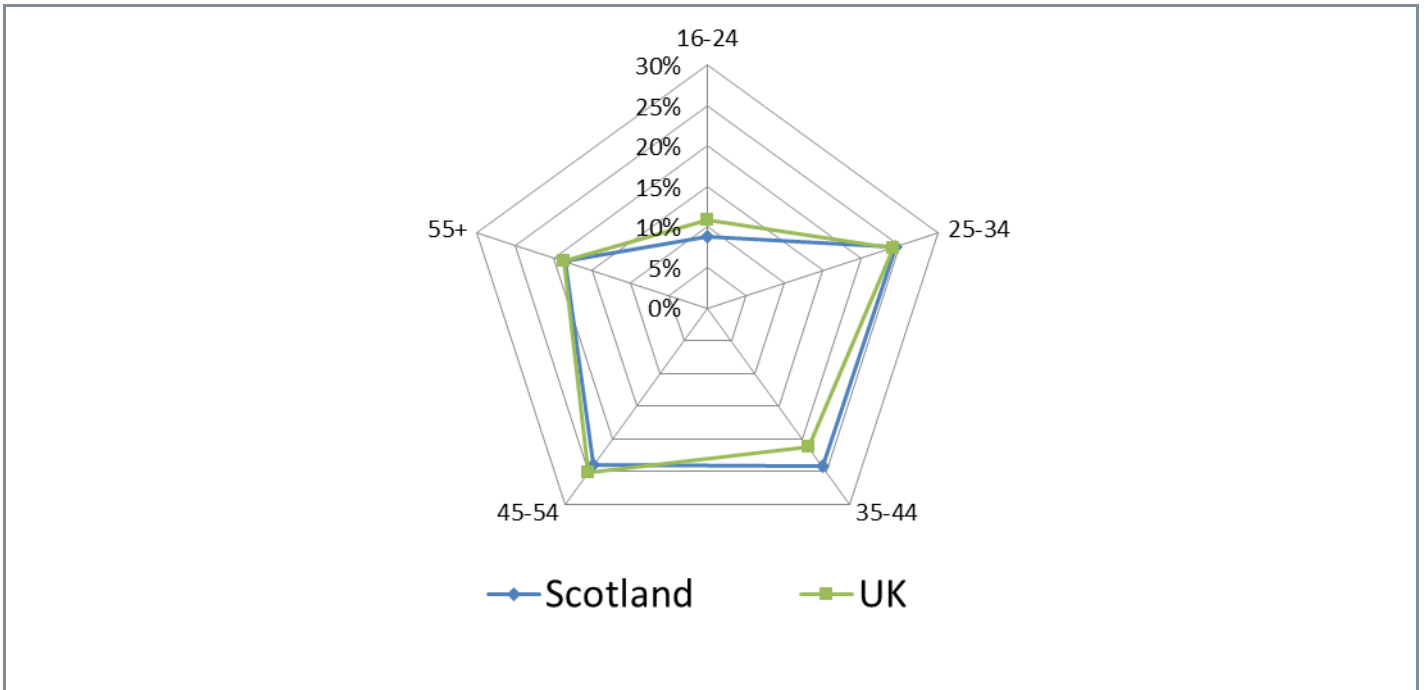
Figure 36: Age profile, Scottish and UK construction, 2016 (Source: CITB/ONS)

11.1.2. Attracting young people

Investigating the reasons as to why recruitment of young people into the industry has been such a challenge is useful in order to highlight the areas where any action should be directed in order to enhance and improve the appeal of construction as a career option. The Construction Information, Advice and Guidance (CIAG) research carried out by CITB on an annual basis investigates young people's opinions of the construction industry as a potential career choice and highlights the extent of the problem.[8] Although improving, the average score for the attractiveness of the construction industry amongst young people is just 4.2 out of 10.

The reasons for scoring the attractiveness so low are varied, but the most commonly cited are around the perception of a career in construction as being:

- A low paid industry
- Not offering good career progression
- Long working hours
- Mundane/unglamorous
- Risky/dangerous
- Lack of different routes into the industry
- A feeling the industry is for unprofessional and low qualified individuals – a 'fall back' career
- A fear they will not be surrounded by like-minded people (related to the preceding point)

The attractiveness of the industry amongst females is even lower, rating the attractiveness on average at 3.2out of 10, as well as amongst some ethnic groups such as Black/African/Caribbean and Black British ethnic groups who also score it on average 3.2. Such low appeal amongst these groups significantly reduces the talent pool from which the construction industry is recruiting from, and is reflected in the fact they are significantly underrepresented within the industry.

Any action taken to tackle this problem needs to address the points above and counteract these negative perceptions of the industry. Key focus should be communication that focuses on the professional and technical nature of careers in the industry. Although the range of construction skilled trades makes up 55% of the construction workforce in Scotland, there is still 45% of the workforce employed across professional, technical and office based roles. Construction therefore offers a huge variety of both academic and practical roles ('something for everyone'),

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[8] Careers Information Advice and Guidance Research Report 2016 (CITB)

opportunities for career progression, as well as financial reward. There is also a need to address the concerns around safety in the industry in order to overcome perceptions of risk and danger.

Research also showed a positive association and link between knowledge and attractiveness, and that where knowledge of the industry was high amongst young people, and/or where they had exposure to the industry via friends and family, they had a more positive perception of the industry. Any opportunities to increase this knowledge base at a young age and also their exposure to the industry should also strongly be considered as a means of challenging negative and inaccurate stereotypes of the industry. A key aspect of this is engaging with careers advisors in schools to ensure they have both the knowledge and motivation/willingness to be able to talk to and encourage young people to consider construction as a career choice.

11.1.3. Attracting workers from other industries

There are other industries which contain workers with technical and practical skills that are transferrable into the construction industry, and as such, should also be considered to fill the void left by those retiring. The armed forces is a good example; many ex-military personnel are skilled in many of the right areas required to succeed in construction and often only need minimal training in order to begin making a contribution.

In addition, many roles in the construction industry are not necessarily construction-specific, and where this is the case, workers can easily shift to work in the construction sector. The most notable examples here include project managers, non-construction operatives and non-construction professional, technical, IT, and other office-based staff.

11.1.4.   Construction Workforce Profile – Mobility

CITB has carried out a number of studies looking at the levels of workforce mobility in the UK construction industry to provide an indication of the extent to which the workforce is adaptable, flexible and willing to travel.

Work carried out in 2015 showed that for the Scottish construction workforce:

- 37% of workers had been in the construction industry for 20 years or more (UK figure 31%)
- 74% only ever worked within the construction industry (UK figure 70%)
- 84% see their future plans as working in construction (UK figure 79%)
- 89% have remained in Scotland throughout their career in construction (UK figure 80%)
- 96% were living in Scotland when they started working in construction
- 95% did their first training/qualification in Scotland

With regards to travelling to work, there is a difference between the average and the furthest distance Scottish construction workers are prepared to travel, as shown in Figure 37. Although the average travel to work distance for over three quarters of workers is less than 20 miles, nearly half of workers had to travel more than 50 miles to reach a site in the last 12 months.

Scotland has a stable workforce that is employed and trained within Scotland, and one that largely works within quite a short average travelling distance. However, it is also a workforce that is prepared to travel quite long distances when the need arises, which will have implications when looking at demand and supply in each of the seven areas within Scotland.
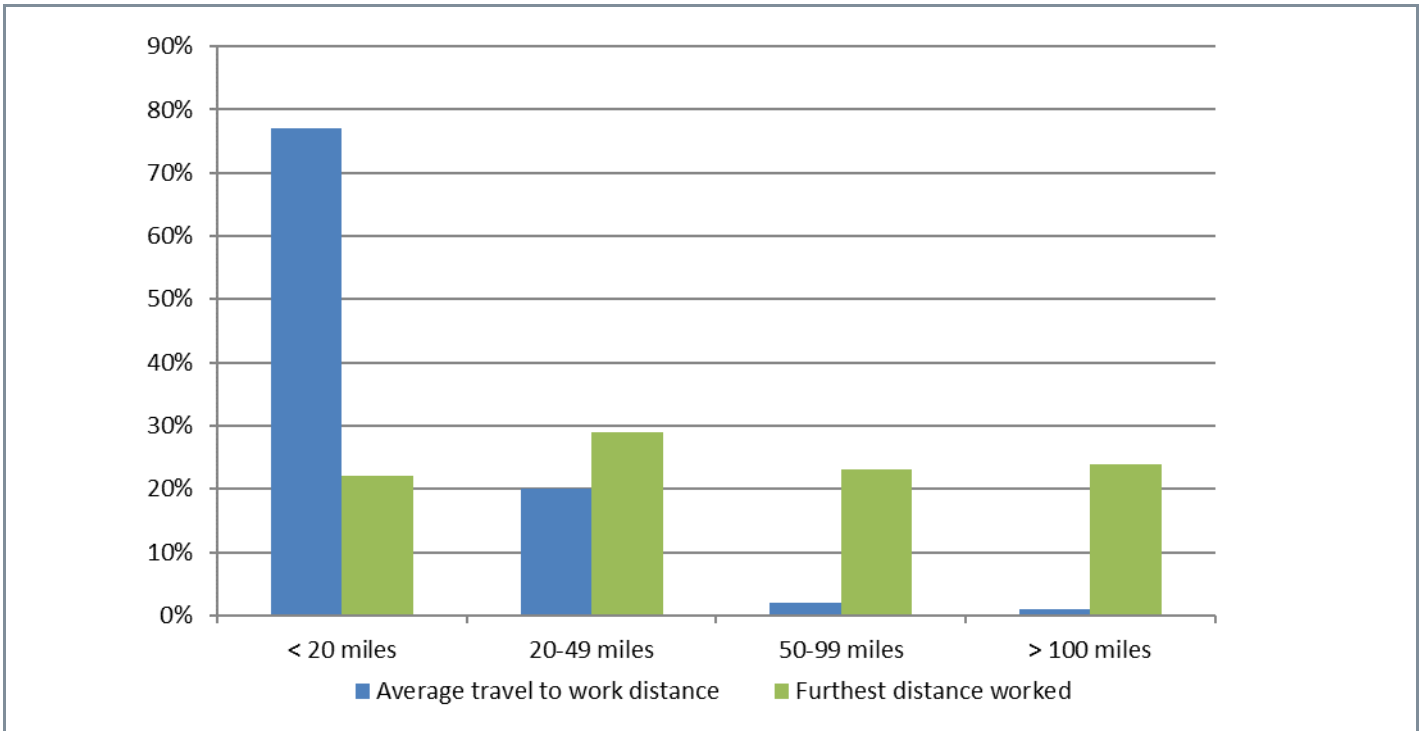
Figure 37: Average travel to work distance compare to furthest distance (Source: CITB, 2015)

11.2. CONSTRUCTION WORKFORCE TRAINING

11.2.1. Construction workforce training overview

Before at an overview of training there are three general points to outline. The first point is that while there are some aspects of training that are consistent between Scotland and other areas of the UK, there are also some notable differences due to devolved Government powers. This section will therefore focus on training happening within Scotland and limit comparisons with other areas of the UK.

The second point to note is the level of change/reform that has happened within both the Further and Higher Education (FE & HE) sectors in recent years. For FE there has been a rationalisation of training providers, whereas for HE there has been the introduction of student fees in some areas of the UK. These changes have also been happening during a period when the economy and construction sector in particular went into recession, which means identifying trends can be challenging. However, the growth and stability in recent years does allow a view to be taken on more recent trends in the FE and HE sectors.

The last point to touch on is that for construction there is an extremely wide range of training that is carried out, both to support people looking to enter the industry and those already working within it to develop their skills. This can range from health and safety training to ensure a worker can operate safely on a site, company specific training and development, through to recognised achievement of formal qualifications.

This overview will focus on recognised qualification achievement which is made up of two main strands:

- Further education – for the construction sector typically taking the form of Scottish Vocational Qualifications (SVQs) and Modern Apprenticeships
- Higher education – made up predominantly of degree and postgraduate qualifications, but also includes foundation degrees, HNCs and HNDs.

11.3. CONSTRUCTION FURTHER EDUCATION

Construction related qualifications account for around 6% of all FE and HE qualification s in Scotland (SFC, 2011-12 t0 2015-16). The overview of enrolment volumes for construction subjects across both higher and further education in Scotland is shown on Figure 38 and highlights some key points. Note: for consistency the details in Figure 38 are sources from SFC data, using the Superclass definition of Construction & Property – Built Environment. For HE this will not include Civil Engineering, however this will be covered in a more detailed view presented later.

When it comes to the volume of training, further education has significantly more than higher education. The balance has shifted in recent years from the 90%/10% shares (FE/HE) seen in 2007-08 to around 87%/13% (FE/HE) in the last two to three years, however the volume is still further education.

Although there is the difference in relative volumes, Figure 38 also highlights the impact that changes have had in each area. There has been a large drop in FE volumes from a high point on 2007-8 of nearly 25,000 enrolments to around 15,000 in 2015-16, a drop of -37%. HE has also shown a drop from around 2,700 enrolments in 207-08 to 2,300 in 2015-16, a drop of -15%. A more detailed analysis of HE data is presented later which includes civil engineering qualifications, which are not included in the construction subjects considered for Figure 38.

Enrolment volumes have stabilised in both areas in recent years, settling down at around 15,000 enrolments per year in FE and 2,300 for HE (excluding HE Civil Engineering).
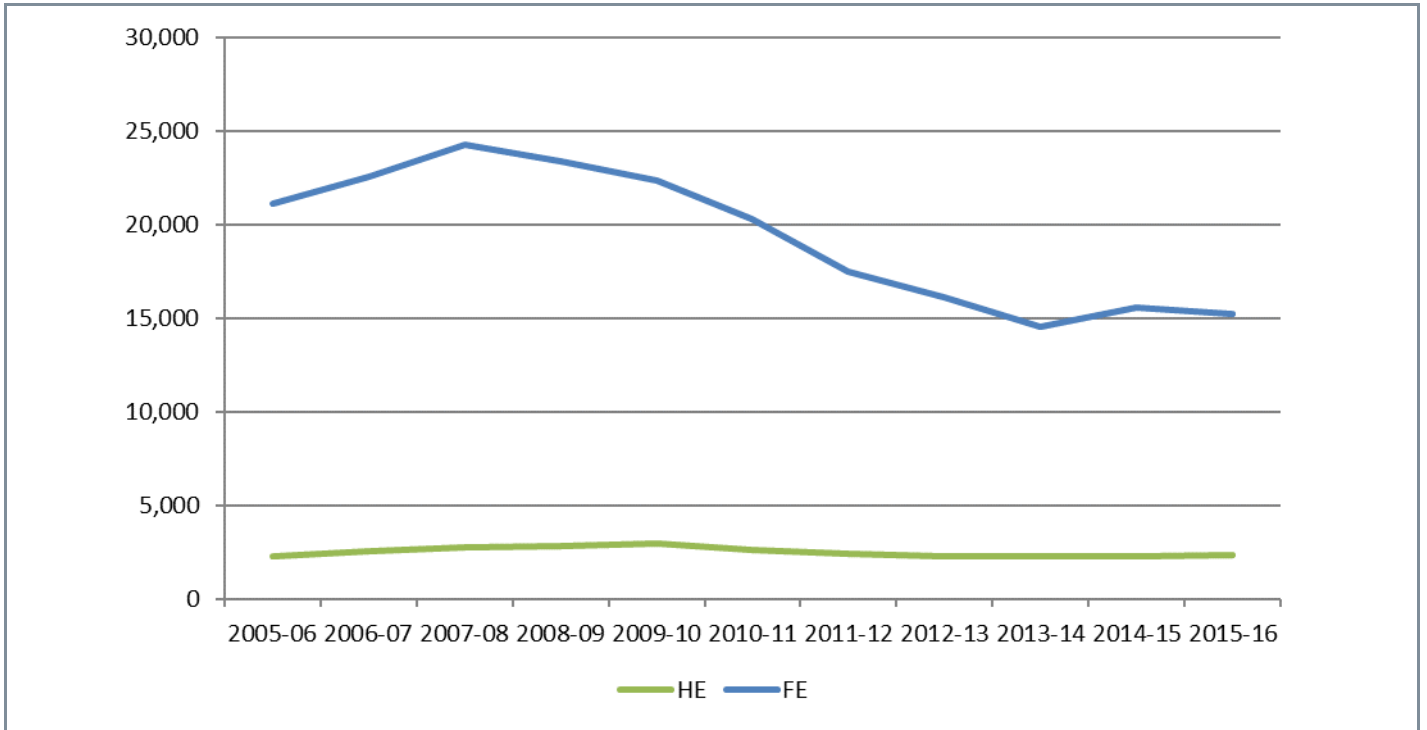
Figure 38: Enrolments, construction subjects, 2005-06 to 2015-16 (Source: SFC, 2017)

While there has been an overall decline in FE, over the same period there has been a different pattern in construction apprenticeship starts in Scotland as shown by Figure 39. There was a dip in apprentice starts following the recession in 2007-08, however the numbers began to pick up in 2010 and have increased significantly in the last couple of years.

In part this increase will be due to the introduction of apprenticeships at Level 2 for civil engineering operatives and also an increase in starts on higher level apprenticeships – those at Level 4 and above.
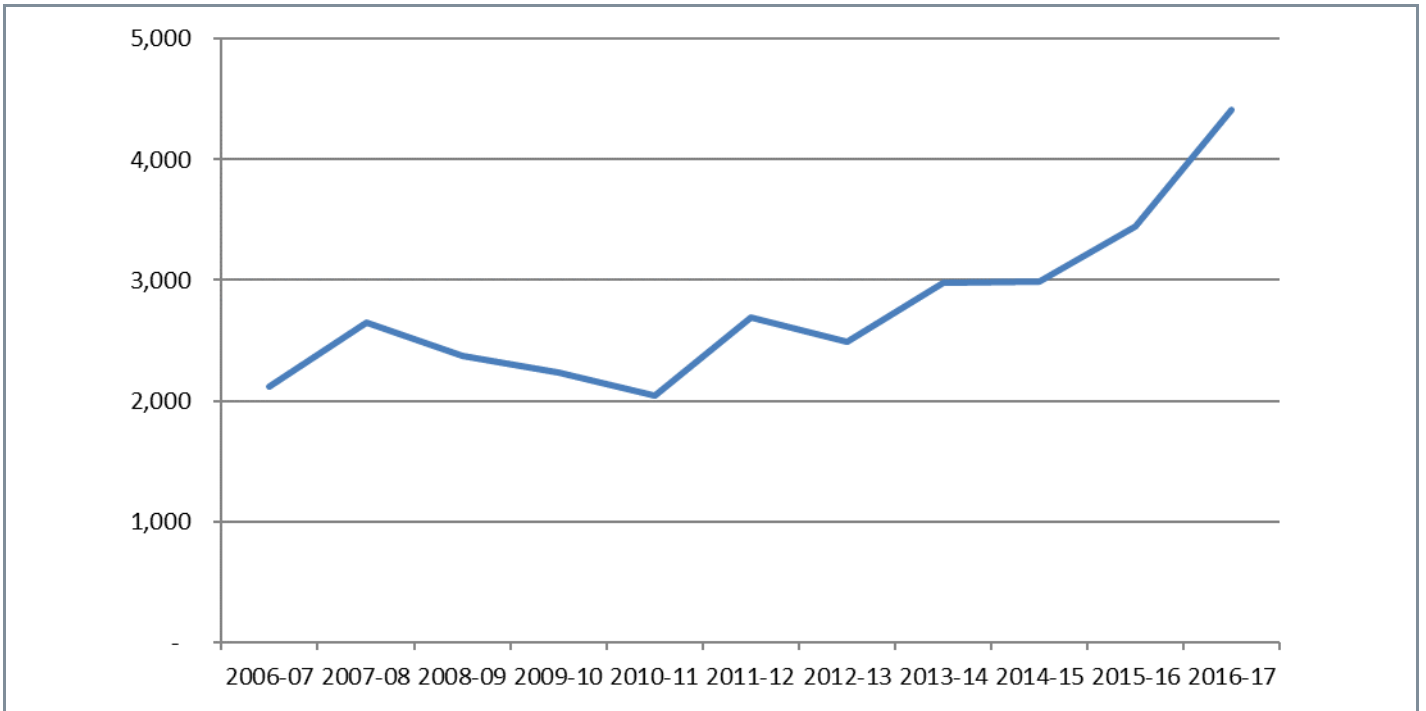
Figure 39: Construction apprenticeship starts, all ages, all levels (Source: SDS, 2006-07 to 2016-17)

The mix of FE enrolments covers a range of qualification types, which can be placed into four broad categories;

- Skills for Work: courses that offer learners opportunities to learn these skills through a variety of practical experiences that are linked to vocational areas.
- Vocational Qualifications: Scottish Vocational Qualifications (SVQs)
- Group Awards: such as Professional Development Awards (PDAs)
- Other qualifications; modules of learning
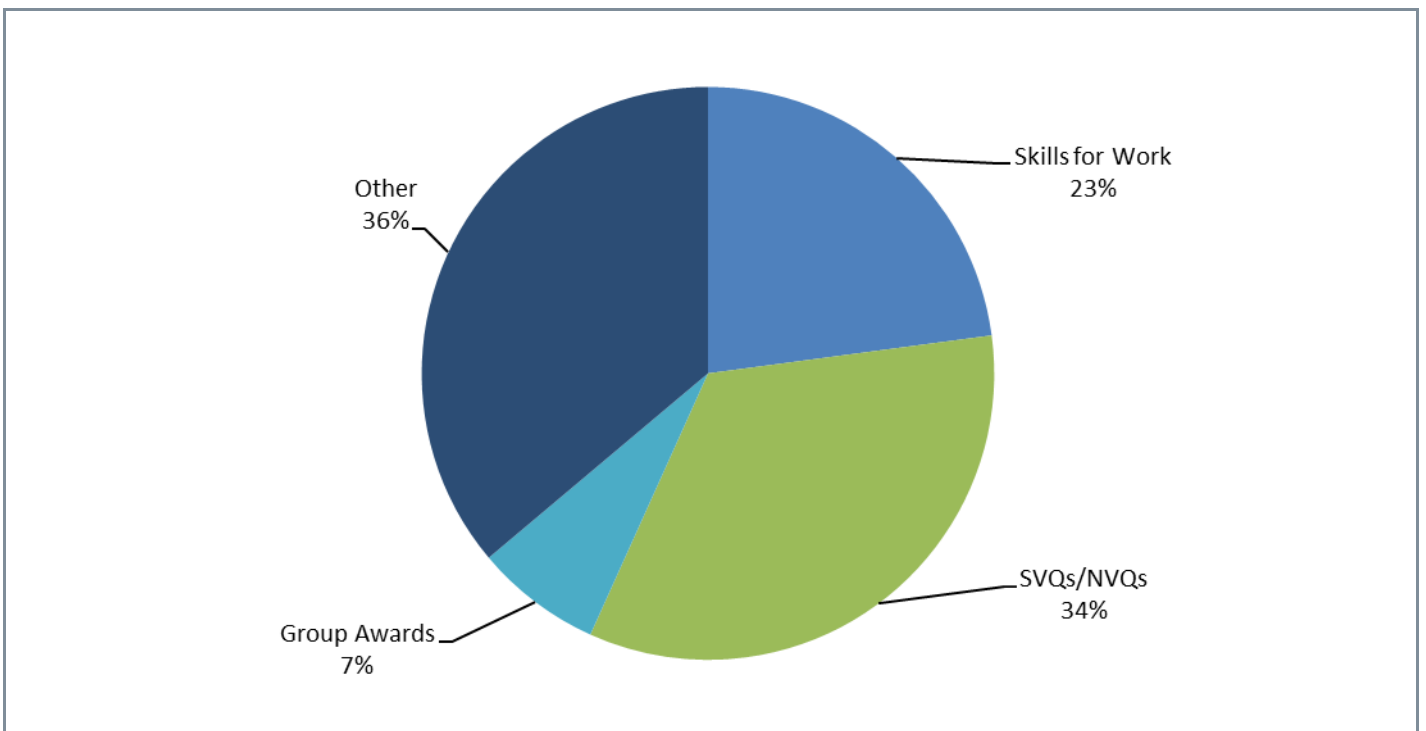
Figure 40: FE qualification categories, 2015-16 (Source: SFC)

Figure 40 illustrates that while the construction sector places an emphasis on vocational qualifications such as SVQs, which accounted for about a third of all construction related FE training in 2015-16. This is consistent with

data received from SQA, the main awarding organisation for construction qualifications in Scotland, which indicates around 30% of qualification entries were on SVQ's in 2016.

The SFC and SQA data both also show that there is a wide range of other training that takes place covering Skills for Work, and other qualification types. The two main SQA qualifications in terms of number of entries in Scotland during 2016 were:

- Health and Safety in a Construction Environments (3,750 entries)
- Certificate in Signing, Lighting and Guarding (2,400 entries)

For SVQs the main volumes were:

- SVQ Level 2: Plant Operations (Construction), (1,200 entries)
- SVQ Level 2: Construction Operations and Civil Engineering Services (Construction): Construction Operations (700 entries)
- SVQ Level 4: Construction Site Management (Construction): Building and Civil Engineering (630 entries).

Although there isn't one overall source of achievement data for further education in Scotland, there is a degree of consistency in figures published by SFC on InFact and data received from SQA.

As apprenticeships contain a SVQ as part of the framework, apprenticeship details will be included within SVQ figures from both SFC and SQA. Comparing these details against apprentices start figures published by Skills Development Scotland allows us to estimate that around 70% of SVQ entries are linked to an apprenticeship. This supports the view from industry that apprenticeships are widely recognised as being important for the construction industry.

Analysis of the different apprenticeship frameworks being taken in Scotland shows the main proportion are at SVQ Level 3, which account for around 60% of all starts, ref, Figure 41.
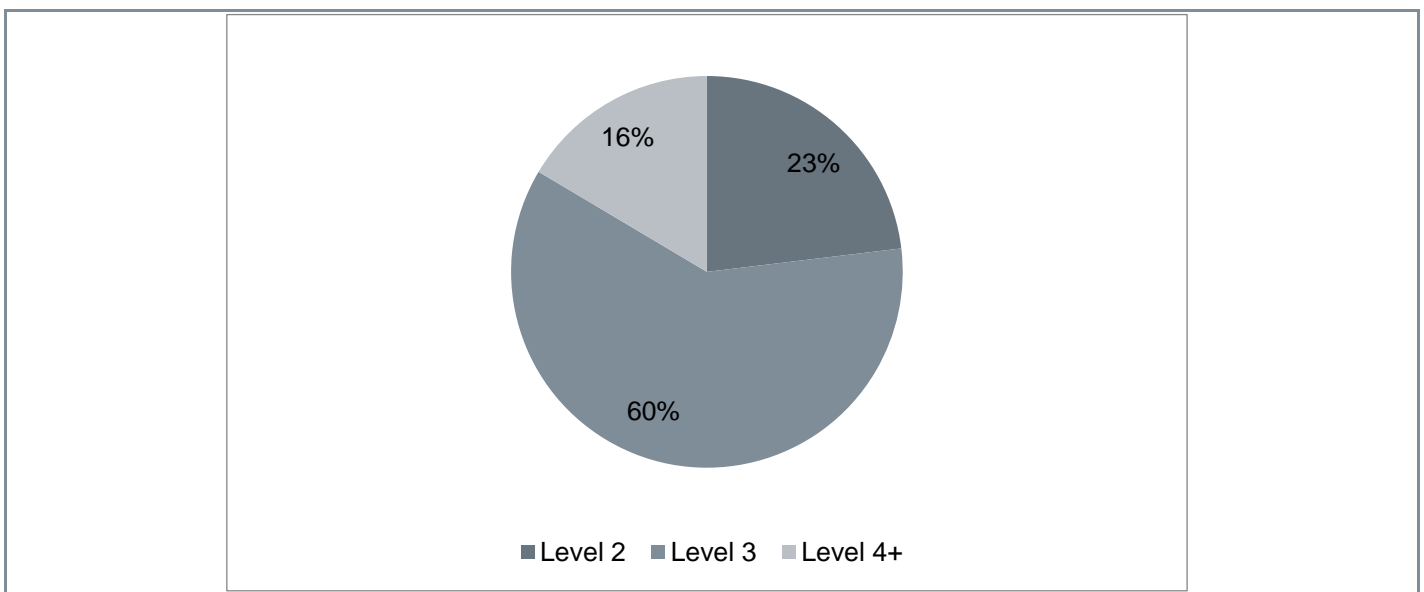
Figure 41: Apprentice starts by Level, 2016 (Source: MA Online)

Within each Level the main pathways are:

- Level 2: Civil engineering operatives and Scaffolding
- Level 3: Wood trades; Supervisory; Painting & decorating and Bricklaying
- Level 4+: Construction management

11.3.1. Further education training at an area level

It is possible to take a view of construction training using the same area breakdowns used for demand and supply.

Table 36 shows the overall area breakdown of construction FE enrolments and the area share of SVQ/NVQ qualifications only.

Table 36: Average construction FE enrolments by area, all FE and SVQs only (Source: SFC)

Area	All construction FE	SVQs only
Glasgow & West	23.4%	22.8%
South East	14.8%	15.8%
Tayside, Forth & Fife	18.9%	21.2%
Aberdeen City & Shire	3.6%	4.3%
Lanarkshire	16.0%	13.1%
South West	10.1%	10.2%
Highlands & Islands	13.1%	12.7%

For most areas there is consistency between shares of all construction FE and the portion that is related to SVQs, apart from a slightly higher share of SVQ enrolments in the Tayside, Forth & Fife Area and a slightly lower share in Lanarkshire.

There does appear to be a slightly different emphasis in Lanarkshire as the area accounts for nearly a third (32%) of all enrolments in Scotland on Skills for Work courses in 2015/16.

11.4. CONSTRUCTION HIGHER EDUCATION

Figure 42 below shows the general pattern of where Higher Education students in Scotland come from (Region of domicile), where they study (Region of HE provider) and where they are employed after graduating (Region of employment). Although this covers all subject areas, it is useful in illustrating that although some students leave Scotland to study elsewhere in the UK, the majority live, study and are employed within Scotland.
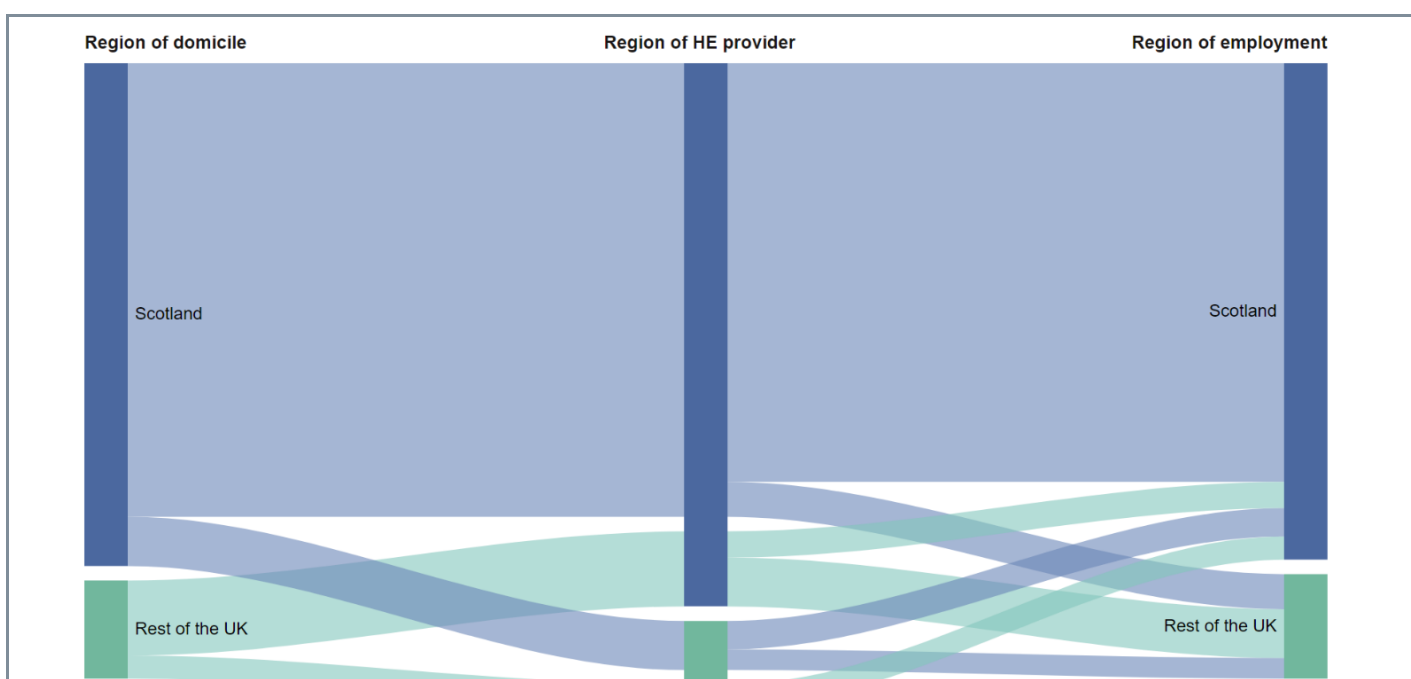
Figure 42 Scottish Higher Education Leavers by domicile, HE Region and Region of Employment (HESA: 2017)

As noted earlier (Figure 38) the headline pattern of enrolments in higher education construction subjects has remained relatively constant in recent years, and this is also reflected in data looking at enrolments by main HESA subject areas.

Table 37 shows that there are three main subject areas for construction: civil engineering, building and architecture. Together, these areas account for over 85% of enrolments each year.

Table 37: UK domicile higher education enrolments by main subject areas, Scotland 2010/11 - 2015/16 (Source: HESA)

Enrolments by main subject area	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16
(H2) Civil engineering	860	800	810	725	775	765
(K1) Architecture	610	595	595	540	560	565
(K2) Building	635	515	540	605	635	630
(K3) Landscape & garden design	40	40	20	25	45	35
(K4) Planning (urban, rural & regional)	235	235	180	240	215	270
(K9) Others in architecture, building & planning	35	30	40	45	30	15
Total	2,420	2,215	2,190	2,180	2,260	2,280

However, specialism within Universities limits the extent to which regional analysis of demand and supply can be examined. Tables 38, 39 and 40, show enrolments for UK Domicile students in Scottish Universities for 2015-16. In each of the main subject areas, different Universities account for the main number of learners. It is only Edinburgh Napier University that is the top five providers for each subject, while The University of Strathclyde is within the top two providers for civil engineering and architecture.

Table 38: 2015-16 Enrolments, UK Domicile

Civil Engineering	Total	% of Total
Heriot-Watt University	160	21%
The University of Strathclyde	130	17%
Edinburgh Napier University	110	14%
Glasgow Caledonian University	60	8%
The University of Dundee	55	7%
The University of the West of Scotland	55	7%
The University of Edinburgh	55	7%
Other Universities	140	18%
Total (All)	765	100%

Table 39: 2015-16 Enrolments, UK Domicile

Building	Total	% of Total
Glasgow Caledonian University	280	44%
University of the Highlands and Islands	120	19%
Heriot-Watt University	90	14%
Edinburgh Napier University	90	14%
The Robert Gordon University	50	8%
Other Universities	>10	-
Total (All)	630	100%

Table 40: 2015-16 Enrolments, UK Domicile

Architecture	Total	% of Total
The University of Edinburgh	130	23%
The University of Strathclyde	110	19%
Glasgow School of Art	100	18%
The Robert Gordon University	80	14%
Edinburgh Napier University	50	9%
The University of Dundee	50	9%
Other Universities	>50	-
Total (All)	565	100%

While the majority of Scottish students doing construction qualification are likely to remain and be employed within Scotland, these tables illustrate that the decision on which University students choose isn't just a factor of where students live or where demand is.

Also another aspect relevant to professional and technical occupations is that there can be the need for a worker to be a member of a relevant professional body or institution, for example:

- Architects – the Royal Incorporation of Architects in Scotland (RIAS) or the Royal Institute of British Architects
- Chartered Surveyors – the Royal Institution of Chartered Surveyors
- Civil Engineers – the Institution of Civil Engineers
- Town Planners – the Royal Town Planning Institute

This can require a period of professional accreditation when the student is in work after achievement of their degree, which extends the time that it takes for someone to be considered competent in their role after having achieved their initial qualification.

The specialisms within Scottish Universities, along with the requirement for professional/technical accreditation, constrain the degree to which demand and supply from higher education institutions can be broken down into areas within Scotland.

12.   GAP ANALYSIS

This section draws together the details from the Demand and Supply sections to form a view on possible gaps, and how this relates to training provision. The section also considers how the gap analysis relates to details from recent state of trade surveys.

Table 41 below shows the overall gap analysis for Scotland, broken down by occupation and Table 42 gives the gap analysis by area and occupational groups.

Table 41: Demand; Supply and Gap analysis: Scotland (Source: WLC & CITB)

Occupation	2018 Demand	2017 Supply	Gap	Gap as a % of supply
Senior, executive, and business process managers	16,350	14,700	-1,650	-11%
Construction project managers	4,650	3,350	-1,300	-39%
Other construction process managers	18,150	17,650	-500	-3%
Non-construction professional, technical, IT, and other office–based staff (excl. managers)	33,550	27,700	-5,850	-21%
Construction trades supervisors	4,700	4,700	-	0%
Wood trades and interior fit-out	24,500	23,300	-1,200	-5%
Bricklayers	6,650	7,200	550	8%
Building envelope specialists	9,600	5,250	-4,350	-83%
Painters and decorators	11,600	9,150	-2,450	-27%
Plasterers and dry liners	5,000	3,150	-1,850	-59%
Roofers	4,700	4,600	-100	-2%
Floorers	2,800	2,400	-400	-17%
Glaziers	3,150	2,100	-1,050	-50%
Specialist building operatives	5,750	4,650	-1,100	-24%
Scaffolders	2,400	2,100	-300	-14%
Plant operatives	3,700	4,800	1,100	24%
Plant mechanics/fitters	3,950	3,500	-450	-13%
Steel erectors/structural	2,050	2,300	250	11%
Labourers	11,950	12,050	100	1%
Electrical trades and installation	19,100	19,750	650	3%
Plumbing and heating, ventilation, and air conditioning trades	15,350	11,650	-3,700	-32%
Logistics	2,200	2,650	450	17%
Civil engineering operatives	2,150	2,450	300	12%
Non–construction operatives	3,150	4,250	1,100	26%
Civil engineers	4,400	6,500	2,100	32%
Other construction professionals and technical staff	16,250	28,550	12,300	43%
Architects	3,700	3,550	-150	-4%
Surveyors	6,100	7,050	950	13%
Total (Sum of occupations will not round to total due to rounding)	247,400	241,000	-6,400	-3%

Table 42: Demand v Supply by Area (Source: WLC & CITB)

Occupational Groups	Aberdeen City & Shire	Glasgow & West	Highlands & Islands	Lanarkshire	South East	South West	Tayside, Forth & Fife	Scotland
Construction Managers and Supervisors	-13%	-3%	-71%	54%	-35%	18%	-8%	-9%
Construction Professional/Technical	36%	33%	4%	70%	14%	49%	34%	33%
Labourers	-4%	11%	-72%	54%	-15%	23%	-4%	0%
Non-construction trades	25%	34%	-52%	69%	14%	46%	26%	25%
Skilled trades - bricklaying	12%	2%	-2%	48%	-25%	32%	13%	8%
Skilled trades - electrical	3%	12%	-56%	57%	-18%	23%	3%	4%
Skilled trades - other occupations*	-20%	-9%	-114%	47%	-43%	13%	-16%	-19%
Skilled trades - painting and decorating	-32%	-21%	-88%	35%	-55%	9%	-29%	-27%
Skilled trades - plumbing & HVAC	-30%	-32%	-60%	30%	-71%	-2%	-32%	-31%
Skilled trades - wood occupations	-9%	-5%	-33%	47%	-39%	20%	-2%	-5%
Support staff - office based	-22%	-17%	-82%	45%	-52%	9%	-20%	-21%
Grand Total	-4%	2%	-58%	52%	-28%	22%	-2%	-3%

Key

Supply is greater than Regional Demand	
Potential shortfall in regional Supply	
Significant shortfall in regional Supply	

Skilled trades – other occupations* covers the likes of roofers, floorers, scaffolders and other occupations not identified above.

With overall demand in 2018 estimated at 247,400 and an existing workforce of nearly 241,000, the overall workforce Gap Analysis across Scotland is estimated at nearly 6,400 workers, which represents a shortfall of 3% on current employment.

However as Table 41 shows there are some noticeable variations in particular occupations, such as building envelope specialists; construction project managers and glaziers, which all have high levels of potential demand.

Some of the volatility in the gap analysis can be due to relatively low workforce numbers for particular occupations; however the occupational groups used in Table 42 show some noticeable potential gaps in a number of areas such as:

- Painting and decorating
- Plumbing & HVAC
- Office based support staff - office based
- Skilled trades - other occupations

Table 42 also highlights the potential regional variation with both the Highland & Islands and the South East areas having shortfalls across a range of occupations, whereas Lanarkshire and the South West are show a surplus of supply.

Table 43 draws together an overview of businesses, workforce and training, highlighting a variation in the Aberdeen City & Shire area, where the level of construction training is lower than what would be expected given the business and workforce shares.

Table 43: Overview of Business, Workforce and Training

Area	Business share	Workforce share	Construction FE	SVQs only
Glasgow & West	16.9%	21.8%	23.4%	22.8%
South East	17.2%	17.7%	14.8%	15.8%
Tayside, Forth & Fife	19.6%	17.6%	18.9%	21.2%
Aberdeen City & Shire	10.7%	12.5%	3.6%	4.3%
Lanarkshire	12.2%	11.5%	16.0%	13.1%
South West	9.6%	9.5%	10.1%	10.2%
Highlands & Islands	13.8%	9.3%	13.1%	12.7%

12.1. FEDERATION OF MASTER BUILDERS (FMB) STATE OF TRADE SURVEY AND THE GAP ANALYSIS

The FMB survey focus is on small and medium-sized (SME) firms throughout the UK construction sector with the survey dispatched to the entire membership every quarter. Around 400 responses are received which are weighted according to turnover. The typical firm responding is either a general builder or building contractor directly employing ten or fewer people and turning over between £100,000 and £500,000 per annum.

Within the FMB survey the following questions are asked:

- Has your firm experienced difficulty in recruiting skilled staff in the past three months?
- Which occupations have been difficult to obtain?

Scottish results for the above question have been analysed for the latest three FMB surveys (Q4 2016, Q1 2017, and Q2 2017).

Figure 43 illustrates that for some occupations such as civil engineering operatives and electricians, over the past three quarters, Scottish firms have found it increasingly difficult to recruit skilled staff. However, there are other occupations that have become easier to hire since the beginning of this year such as carpenters/joiners and supervisors. In fact, in the latest quarter, no Scottish members indicated difficulty in recruiting either floorers or scaffolders.
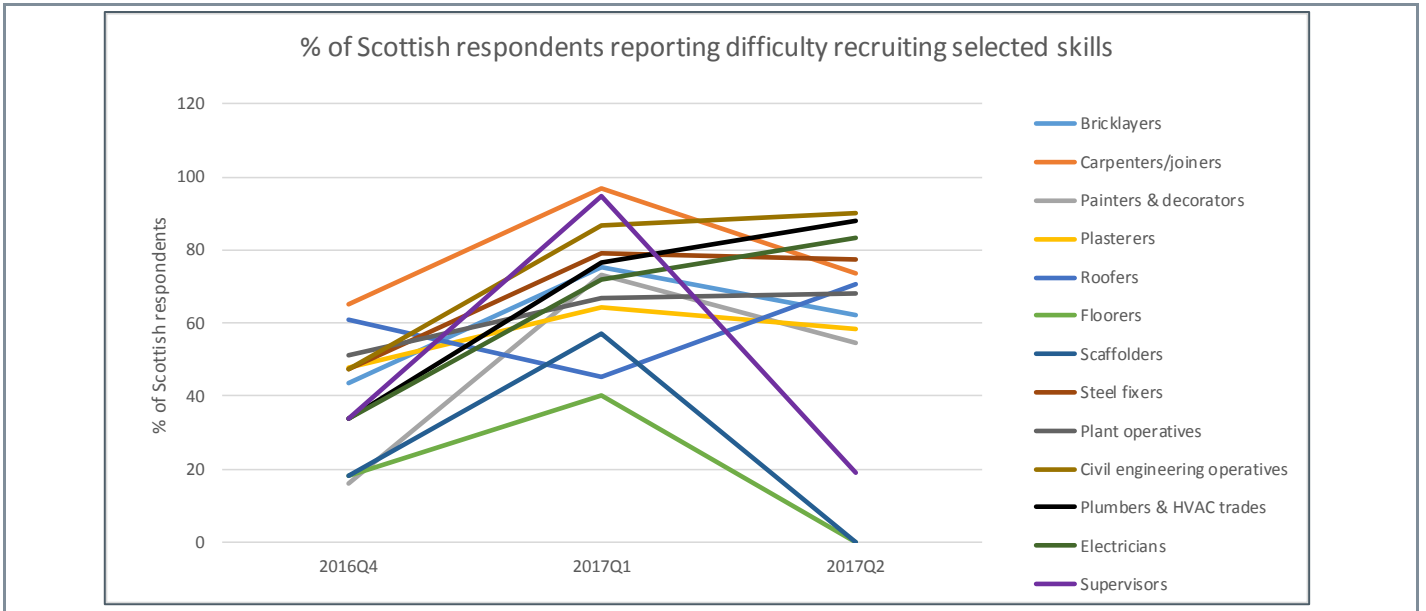
Figure 43: FMB Survey

12.1.1. Comparison with gap analysis

Under the FMB state of trade survey there are 8 occupations that are a direct match with the CSN occupational groupings used for the gap analysis, shown in Table 44.

Table 44: FMB and Gap Analysis, Scotland

Occupations	FMB	Gap analysis
	% reporting difficulty 2017 Q2	**Gap as a % of base employment**
Bricklayers	62	8%
Painters and decorators	55	-27%
Roofers	70	-3%
Floorers	0	-19%
Scaffolders	0	-15%
Plant operatives	68	22%
Civil engineering operatives	90	11%
Plumbers and HVAC trades	88	-31%

In the gap analysis a negative percentage indicates a potential shortfall in the workforce and a positive one a potential oversupply.

The analysis of the gap analysis and the FMB figures produces mixed results. For five of the occupations (painters & decorators, roofers, floorers, scaffolders and plumbers & HVAC trades) the FMB figures and the gap analysis are largely supportive as they indicate a shortfall in supply. However, discrepancies are apparent between the two sets of data for bricklayers, plant operatives and civil engineering operatives where Scottish FMB members have reported these occupations as difficult to recruit whereas the gap analysis estimates a labour surplus in those occupations.

There are five occupations used in the FMB state of trade survey that have a relationship with some of the CSN occupational groupings but they aren't a direct match, shown in Table 45.

Table 45: FMB and Gap Analysis, Scotland

Occupations FMB (CSN)	FMB	Gap analysis
	% reporting difficulty 2017 Q2	Gap as a % of base employment
Carpenters (Wood trades)	74	-5%
Plasterers (Plasterers and dry liners)	58	-57%
Steel fixers (Steel erectors)	77	12%
Electricians (Electrical trades)	83	4%
Supervisors (Construction trades supervisors)	19	0%

The data from the FMB and gap analysis support each other for all occupations listed above bar steel fixers and electricians, both of which are indicated as difficult to recruit by a substantial percentage of FMB members but the gap analysis suggests a slight surplus for both.

12.2. CIVIL ENGINEERING CONTRACTORS ASSOCIATION (CECA) STATE OF TRADE SURVEY AND THE GAP ANALYSIS

CECA's Scotland Workloads Trends survey responses are weighted by size of firm to ensure that results are representative of the industry. The results are typically weighted balances and are calculated by taking the difference between firms reporting an increase in workloads, for example, and the proportion of firms experiencing a fall. The survey also gives an insight into the availability of skilled and other operatives. The results of the latter have been analysed below.

Concerns surrounding hiring skilled operatives has been falling over the past three quarters whereas those reporting a shortage of other operatives has been volatile. This can be seen in Table 46.

Table 46: CECA State of Trade Survey

	Q4 2016	Q1 2017	Q2 2017
	Supply of resources required (%)		
Skilled operatives	55	40	24
Other operatives	37	3	16

12.2.1. Comparison with gap analysis

Unfortunately, it is not possible to break down the skilled and other operatives any further. However, there is likely to be a relationship between skilled operatives as defined by the Scotland Workloads Trends survey and civil engineering and plant operatives that are under the CSN. Both civil engineering and plant operatives are estimated to see a labour surplus this year, which complements the declining trend of skilled operatives required under the Scotland Workloads Trends survey.

Other operatives are likely to include a variety of trades from bricklayers to logistics personnel. It is therefore difficult to associate this occupation with occupational groupings under the CSN.

12.3. CONCLUSIONS

- There is an underlying element of consistency in the current distribution of businesses, workforce and training that has the capacity to flex to respond to future demand
- The analysis looks at matching regional demand to the supply of labour; the mobility of construction workers gives a fluid picture, with workers at times travelling longer distances to work.
- However there are particular pressures in some areas such as:
  - Demand in the Highlands & Islands and South East
  - Training in the Aberdeen City & Shire area
  - Workforce numbers in the Highlands & Islands
  - Potential shortage in Painting & Decorating and Plumbing & HVAC skills
- Evidence shows that there is a range of provision spanning both FE and HE covering all occupations

- With around 70% of SVQs linked to apprenticeships, this will be a key focus for future workforce development
- Higher education. The majority of students live, study and work in Scotland, however it is difficult to link regional demand to regional location of HE institutions.
- Qualification infrastructure remains an issue. Training needs to be flexible to meet the workforce needs in Scotland. Realistically the FE infrastructure cannot deliver everything as it needs substantial resource (training areas, assessors, equipment, etc.) and therefore some centralisation of training is pragmatic.
- There is an ongoing need to replace members of the construction workforce (measure through the CSN ARR).

The analysis of relevant State of Trade data and the gap analysis should be caveated by the fact that the Scottish extract from both the FMB and CECA surveys are based on relatively small survey samples, an average of 18 per quarter over the past three quarters for the FMB's and 26 per quarter for CECA's. In the case of the FMB survey, while some of the results support the conclusions of the gap analysis, others do not, while the very high level breakdowns available in the CECA survey make any meaningful comparison with the gap analysis difficult. However other survey data from CITB (Employer Panel and Employer Research, 2017) and RICS also points towards a similar view with employers experiencing skills shortages across a range of trades.

13. UNDERSTANDING OTHER SOURCES OF DATA

As part of this research we have undertaken to collate the outputs from the various sources of data which are available to us. This included a comparison with other sources of data and also other forecasting methods. These included forecasts from the Skills Development Scotland, Office for National Statistics and Scottish Government Data and the Construction Skills Network.

13.1. SKILLS DEVELOPMENT SCOTLAND

Skills Development Scotland publish regional skills assessments for each of 13 areas across Scotland. As part of this exercise SDS publish forecasts of employment from 2016-2024[9]. Forecasts are produced by sector and also by occupation. Two definitions of sector are used by SDS:

- The industry sector – this is defined by those employed within Standard Industrial Classification (SIC) 41 Construction of buildings, SIC 42 Civil engineering and SIC 43 Specialised construction activities.
- The key sector – this is defined as SIC 41-43 plus 71.1 (Architectural and engineering activities and related technical consultancy) and 74.9 (quantity surveying activities) along with some manufacturing and mineral extraction sectors.

The CITB model uses a definition which includes SIC 41-43, 71.1 & 74.9 which is broader than in the SDS industry sector, but narrower than the key sector definition since we do not include the manufacturing and mineral extraction.

The SDS output by occupation is expressed at the 2-digit SOC code level. The CITB output by occupation expressed in 28 occupational groups aggregated from 166 4-digit SOC codes.

The main difference between the forecasts produced by SDS and those included in this report is that all of the SDS areas are forecasting a growth in construction employment between 2016-24, but the CITB forecasts are suggesting a decrease in construction employment due to a significant reduction in infrastructure output over the period.

We have inspected the forecasts of construction employment for each of the thirteen RSA areas. These have been grouped into the seven geographical areas we are considering.

We have found that in all but one of the seven areas our forecast is larger than the SDS industry sector. In four areas the key sector forecast is smaller than the estimate of labour demand calculated in this report. These differences are most likely due to different assumptions between the modelling in relation to a) the difference between where people work place is based and the location of the projects they are working on; b) productivity gains and c) differences in the work practices between, for example, urban and rural areas.

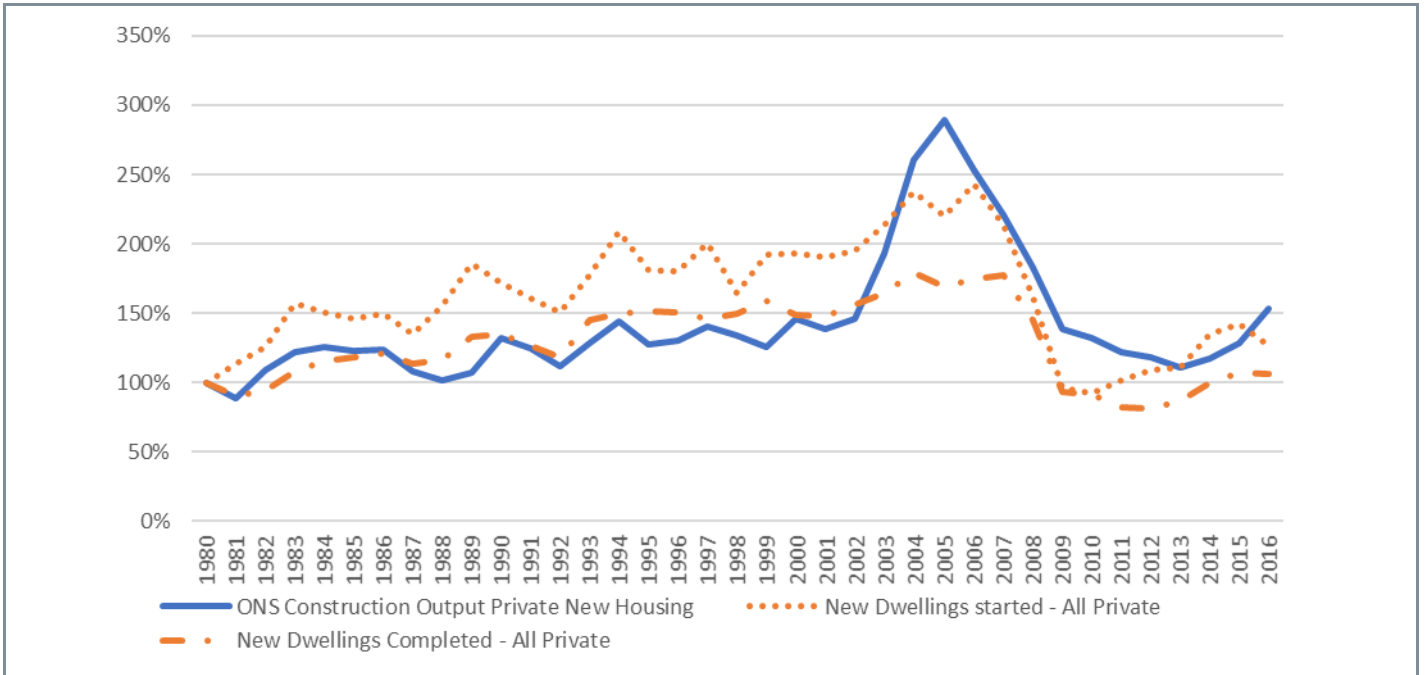## 13.2. PUBLISHED HOUSING STATISTICS

The ONS publish construction output statistics which present the historical value of work undertaken in Scotland. This data set is a key driver of the CSN forecasts. For housing the following data is available:

1. New build, by:
   i. Public
   ii. Private
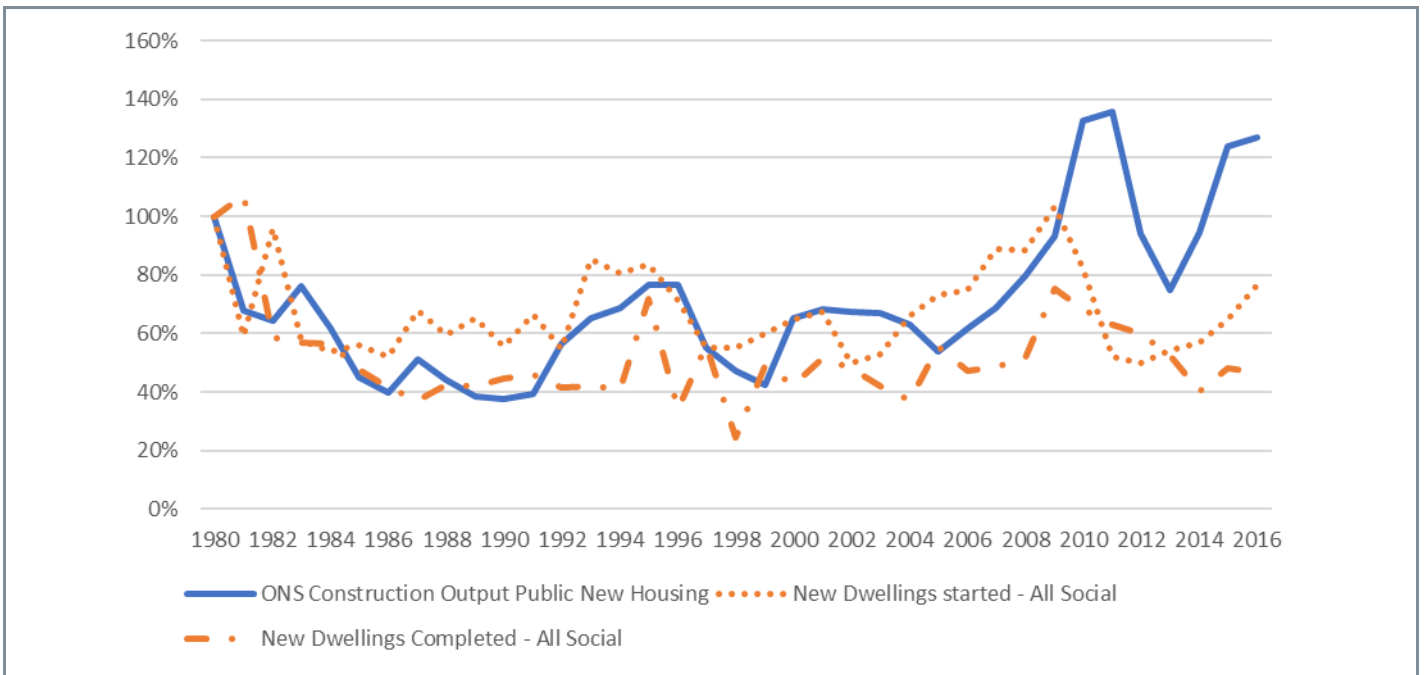2. Repair and maintenance (public and private)

In analysing the construction output in new build housing we have carried out a comparison of the numbers of starts and completions[10] housing in comparison to the value of work collected in the construction output statistics. Figure 44 and Figure 45 show the private and public sector housing output, starts and completions normalised to 1980 values. The analysis shows that although there are differences between starts and completions there is considerable consistency between housing completions and the ONS outputs except between 2003 and 2008. It would require further investigation to determine the cause of the apparent inconsistency between housing starts and completions and housing.

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[9] http://www.skillsdevelopmentscotland.co.uk/what-we-do/partnerships/regional-skills-assessments/
[10] http://www.gov.scot/Topics/Statistics/Browse/Housing-Regeneration/HSfS/NewBuildAllSector

Figure 44: Private new dwellings outputs and completions/starts (1980 =100)

Figure 45: Public new dwellings outputs and completions/starts (1980 =100)

We have also analysed the repair and maintenance sector in more detail. This is a slightly more challenging area because the construction output statistics do not distinguish between public and private housing repair and maintenance. There are no other sources of private housing repair and maintenance data. In the public sector, repair and maintenance in housing generally takes place only on the social housing stock. Data on social housing repair and maintenance is somewhat fragmented. The Scottish Government published data for each local authority that

benefits from the housing revenue fund[11]. Registered Social Landlords (RSLs) are not included in that publication, but the Scottish Housing Regulator publishes an analysis of spend for RSLs.

The latest published figures are for 2015/16. The sum of the RSL and the Local authority housing repair and maintenance spending is £657m. There is no comparable value in the construction output statistics, but the total housing R&M spend is £1,864m over the same period. This suggests that the value of public housing R&M accounts for around 30% of the total housing R&M. This is reasonably consistent with the fact that in March 2015 around 24% of the occupied Scottish housing stock was socially rented[12].

14. LOCAL AREA STAKEHOLDER CONSULTATION

Between June and September 2017, we held five workshops across Scotland with four objectives:

- Present the draft skills needs for the local area
- Obtain feedback on results of demand, supply and gaps analysis
- Advise on the optimal approach to developing local skills strategies
- Determine the value of local area analyses

Workshops were held in Inverness, Aberdeen, Dundee, Galashiels and Glasgow and attracted between four and a dozen attendees at each one. Attendees represented a range of construction stakeholders from contractors (both main contractors and SMEs), training providers, skills bodies (such as Skills Development Scotland) and further and higher education. In each workshop a presentation of the methodology and results was followed by a facilitated in order to check whether or not the results chimed with local intelligence, and to elicit wider commentary.

Without exception it was agreed that there was great value in looking at training and skills provision at a local level. The benefits of the preliminary labour demand, supply and gap analysis which was presented was immediately obvious to the people attending the workshops. The key challenge which arose from all of the sessions was how best the labour market intelligence could be used to help develop, support and influence construction skills training in the local areas. It was generally agreed that here was not "one size fits all" for all of the areas of Scotland and that bespoke methods of bringing people together to understand the skills challenges was crucial.

In general, the results presented from the analyses were viewed as credible and robust by those attending the workshops. The geographical breakdown was considered appropriate with a slight concern raised in Edinburgh & the Borders that the major conurbations in Edinburgh and the Lothians may presented different issues from the rural locations in the borders.

Within the workshops there were some comments raised by the attendees which are specific to the local areas, but there were also some themes which emerged repeatedly across the five sessions. These are discussed below.

The issue of recruitment and retention of the right people to enter the industry in the first place was raised in the workshops. This was particularly an issue for those in Tayside, Forth and Fife. The challenge is two-fold: firstly, in attracting people in the first place and secondly encouraging firms to recruit. The difficulties in making the industry appear an attractive place to work and the absence of clear career progression pathways were significant barriers to obtaining the right people.

Notwithstanding the support for developing local skills strategies, the transient nature of the construction workforce across Scotland, and indeed across the UK was debated. This is both a threat and an opportunity. It is an opportunity in that peaks in the workload (particularly in rural areas such as the borders and the Highlands & Islands) can be smoothed by importing labour from elsewhere. It can also be seen as a threat as the local workforce can be attracted elsewhere. There was a view that main contractors on major projects in rural areas can only deliver by working with a local supply chain. There was also view that employers should work more closely together in recruitment.

These peaks and troughs in the industry tend to be driven by major projects. The definition of a major project is highly dependent upon the context. In Glasgow & West of Scotland, it may be £50m and occur relatively frequently resulting in a reasonably constant year on year workload: in the Highlands & Islands it may be £5m and occur relatively infrequently, resulting in spikes in demand. The two situations require different strategies. In conurbations like Glasgow & West of Scotland, it is not unreasonable to include major projects when planning skills strategies. In the Highlands & Islands there is neither value in nor sufficient lead time for training to satisfy spikes in demand. In these situations, there is little option but to import the required additional labour.

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[11] http://www.gov.scot/Topics/Statistics/Browse/Housing-Regeneration/HSfS/HRAmainpage/HRAStatistics2017/HRAstatistics1617exceltables
[12] http://www.gov.scot/Topics/Statistics/Browse/Housing-Regeneration/HSfS/KeyInfoTables

The occupations in which there were perceived skills shortages also varied from area to area. In Aberdeen City & Shire there was a view that sufficient operatives with building skills were available, but there was an under-provision of the civil engineering skill set. Not unconnected to this was the need to distinguish between skilled and unskilled labourers in construction and developing appropriate routes for those people into the industry.

The need for specialist skills (e.g. workers involved in for example lead-roofing) was highlighted in other areas.

The question of transferability of skills was also debated. This was particularly relevant in Aberdeen where there is a potentially large pool of people within the oil and gas sector who could potentially transfer into construction. There was also a potential opportunity in the borders to recruit from agriculture. It was generally agreed that it was difficult to recruit from the oil and gas sector since the salary expectations and the ability to retain staff long term were specific challenges.

There were concerns that procurement procedures in the public sector did not take enough account of skills requirements. For example, on major projects there was often insufficient time to mobilise a skilled workforce. Questions were raised as to whether the skills-related commitments made by contractors at the pre-qualification stage were being delivered. It was proposed that CITB should encourage clients to start monitoring and reporting these deliverables.

Overall, the workshops demonstrated a strong appetite for considering skills at a local level. Although some of the issues facing the industry apply equally across the nation these can be made particularly acute by a number of local factors including geography, the existing workforce, current and planned workload and previous and planned training provision.

Further workshops have taken place across the seven areas to share final findings and feedback received incorporated into this report.

15. RECOMMENDATIONS

The report proposes recommendations that include:

1. **Utilise the evidence base presented to develop regional skills action plans** – take this information, as a starting point and work with all relevant stakeholders to create the seven regional skills action plans The overall aim of this planning is to maintain the construction workforce at the right level with the right mix of skills, replacing the pipeline of people needed. This local planning approach needs to be informed by local evidence set against the backdrop of national activity. Scotland is delivering construction activity from its existing workforce so ensuring planning for the right future workforce is vital. An updated view of project demand and supply of labour is vital in ensuring market confidence for industry on a consistent basis.

2. **Discuss and decide how to manage emerging skills gaps at a regional and occupational level- ensuring the right training infrastructure is in place now and for the future** - this report, for the first time provides a view at both geographical and occupational level of potential skills gaps. Notably across skilled trades in Painters & Decorators, Plumbing and HVAC and across a whole range of support staff needed to underpin the supply chain across Scottish construction. At a management level there are concerns around emerging gaps in Construction Managers and Supervisors. The report also highlights the supply of labour differences between geographical areas specifically Lanarkshire, where labour supply appears plentiful and the South East and the Highlands & Islands where the pressure on the labour supply is at its highest, though this has to be viewed in context given the rural nature of the areas and the mobile nature of the workforce- particularly regarding large projects and pressure points in terms of ensuring the right training provision is in place. It is recognised that there is a need to interrogate data even further to uncover the labour reality for the Highlands & Islands and this is addressed in our final recommendation.

3. **Focus on recruitment and retention building on the success of Scottish Apprenticeships** – recruiting and retaining through the available Scottish workforce is crucial to the construction sector. Attracting both young people and mature adults is vital both as apprenticeships and career changers. Offering clear career progression pathways and showcasing construction as an attractive proposition needs to continue at local levels and as an integral part of regional skills action plans.

   Building on the value and success of Scottish apprenticeships needs to continue and it is recognised that recruiting and retaining apprenticeships is a challenge across all seven areas, compounded by numeracy and literacy issues. It is also recognised that SME's train many apprentices who then move on to larger companies when qualified. Regional planning needs to work across the education sector and with both CITB and SDS to determine how the optimum outcome can be achieved for Scottish apprentices in a realistic environment through a blend of both physical and immersive learning solutions.

4. **Seek to address issues that are significant for Scotland; specifically upskilling and the challenges of rural locations** – the report highlights specific issues that are a particular challenge for Scotland. The first is upskilling and the absence of any real programme of activity to address the issue.

   Linked to this is the challenge of operating in rural pockets where construction workers are required to be highly mobile and multi-skilled. The Highlands & Islands is the clear example but in reality the majority of Scotland is rural. It is recognised through employer feedback that the workforce addresses any peak in demand in rural locations by a reactive and mobile workforce, including imported labour, but that an improved scheduling of projects and forward demand management would enable employers to be more supported in working together and utilising local supply-chains.

5. **Using procurement and funding as a lever for change**- any report of this nature will place significant value on not just the data results but the views of the industry gained through consultation. During this process a strong view was expressed throughout that procurement and funding should be explored across the seven regional areas to determine where levers could be utilised to shape social value & community benefits across Scotland- this includes both aspects of employment and skills planning and enabling timescales that allow local contractors to tender.

6. **Maintain this evidence base annually** – this report delivers analysis of demand, supply and skills gaps for the Scottish construction sector at seven geographical levels. This has not been achieved to date and represents a 'starting point' from which the information should be utilised to inform regional planning.

   It is certainly recognised that more work is needed to unpick the information available on training data and that the demand profile needs further work to understand the range of information between larger projects and repair & maintenance. The research exercise has also further exposed the challenges of data available at occupational group level and the need to understand specific drivers in unique areas such as the Highlands & Islands.

Industry needs the confidence to plan then train and develop and at this level. Updated annually this research, will track trends in Scotland and add immense value by providing the underpinning evidence needed to make informed decisions. This can only be achieved through true collaboration with partners.

16. NEXT STEPS

CITB will continue to work with all industry, education and government partners across the seven regions to develop action plans to address the issues raised in this report and the recommendations above.

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1.0	23/11/2017	First Draft
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