Labour Demand Estimates for Ireland's National Housing Targets, 2021-2030

September 2021

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Executive Summary

An average of 33,000 housing units are needed each year until 2030

The Expert Group on Future Skills Needs was asked to estimate the effect on employment and occupations of the Annual Target of 33,000 new housing units in the forthcoming 'Housing for All Plan'. The Economic & Social Research Institute had previously estimated this to be the annual level of housing delivery required in the Irish economy based on population and economic growth. The aim of the EGFSN's analysis is to quantify the number of workers and the types of occupations required to deliver on this target.

Modelling a housing delivery scenario to 2030

It was necessary to translate this housing target into an annual delivery profile over the 2021-2030 period. To achieve an annual average of 33,000 over the decade, housing completions would need to ramp up from the current annual output of approximately 20,000 in 2020, to 33,000 by 2025, before peaking at around 40,000 at the end of the decade.

27,500 additional workers are required to meet these targets

Based on this profile, total labour demand from housing construction (displayed in the graph below) is estimated to rise from approximately 40,000 full-time equivalent workers at its 2019/20 level, to 67,500 workers by the middle of the decade, when the 33,000 new housing unit target is expected to be reached. This represents an estimated additional 27,500 workers over five years. Total demand is estimated to peak at just over 80,000 workers towards the end of the decade.

Estimated labour demand for new housing construction
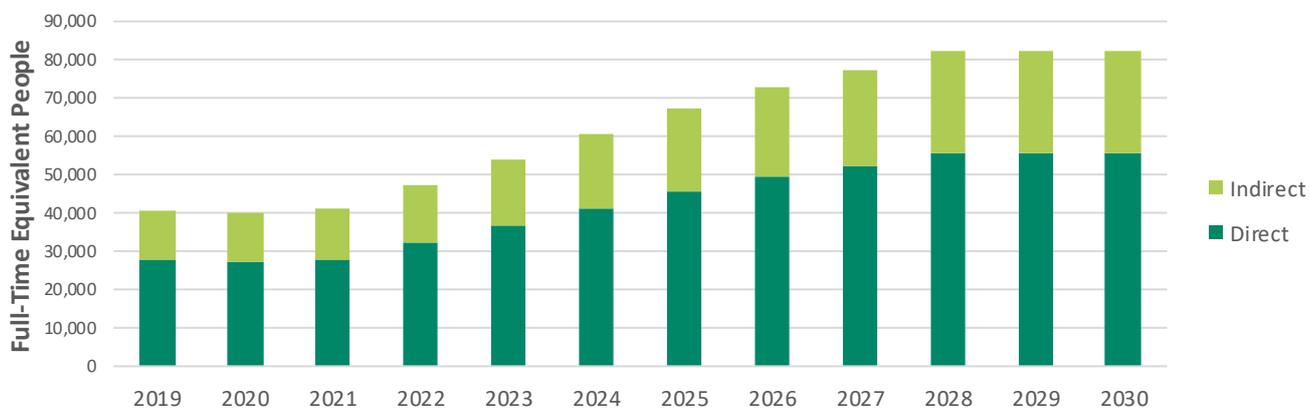
Additional labour requirements by occupation

The analysis also quantified the additional labour requirements at an occupational level, compared to 2019/2020 levels. Occupations were classified according to whether they were 'Core' or 'Niche' skills. Core skills account for 50% of the total labour demand, and include Carpenters, Electricians, Plumbers and Construction workers. 'Niche' skills represent smaller, more specialised occupations and account for a further 7% of total labour demand, including Floorers / Wall Tilers, Construction supervisors, roofers and window fitters. The top 10 occupations in terms of growth are:

Carpenters & Joiners (+2,500)
Electricians (+1,900)
Elementary Construction Occupations (+1,800)
Plumbers (+1,300)
Painters & Decorators (+1,100)

Bricklayers & masons (+700)
Production Managers (+690)
Plasterers (+680)
Architects & Planners (+670)
Construction Operatives (+650)

1.   Introduction

The Expert Group on Future Skills Needs (EGFSN) is the independent group that advises the Government on the current and future skills needs of the Irish economy. The EGFSN was asked to estimate the effect on employment and occupations of the Annual Target of 33,000 new houses to support the development of the 'Housing for All' Plan, which was published in September 2021. The target was initially announced by the Taoiseach Micheál Martin in December 2020, based upon the Economic and Social Research Institute's (ESRI) projection of 33,000 new homes each year to meet growing demand[1]. The target was subsequently confirmed by Housing Minister Darragh O'Brien with the progression of the Affordable Housing Bill through the Oireachtas in 2021.

The ESRI provided estimates of structural housing demand at a regional level in the long run, based on regional demographic projections and projections for rates of household formation. Regional housing demand has significant implications for housing policy in terms of the number of housing units required, the areas in which they are needed and the types of housing. By applying county-level age-specific headship rates and incorporating expected housing obsolescence, they converted the population projections into estimates of structural housing demand. In the baseline scenario, the level of housing demand is around 28,000 per annum over the medium term, although it is higher in the short run given recent net international migration inflows. Housing demand in the high international migration scenario is expected to be close to 33,000 per annum and around 26,000 per annum in the low international migration scenario.

In 2019 and 2020, housing completions stood at just over 20,000 units per annum (as shown in Figure 1.1), and although this is a significant increase compared to previous years, it is still significantly below the 33,000 per annum estimated by the ESRI. Reaching the ESRI target (as an average over the 2021-2030 period) will require housing delivery to accelerate in the coming years, and to exceed this figure in later years (to attain an average of 33,000 over the period). As is evident from Figure 1.1 the completion of single houses (rural and urban) has remained relatively stable over the last ten years, the completion of apartments has increased significantly over the last five years, while the highest growth in completions is for scheme houses (estate houses).

Figure 1.1: Housing completions by building type, 2011-2020

Source: Central Statistics Office, 2020

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[1] Bergin, A and García-Rodríguez, A. 2020 Regional Demographics and Structural Housing Demand at a county level. Economic and Social Research Institute; Department of Housing, Local Government and Heritage
https://www.esri.ie/system/files/publications/RS111.pdf

Government, local authorities and the construction sector face constraints in achieving this level of housing delivery. A particular constraint faced by the construction sector at present – one that was highlighted extensively in the Expert Group on Future Skills Needs (EGFSN) *Building Future Skills* report[2] – is labour. The report highlighted both labour and skills shortages as a major constraint to housing supply, and made several recommendations aimed at closing this gap.

While *Building Future Skills* included a quantitative analysis of the numbers and types of skills required by the Built Environment sectors over the coming decade, this analysis was not based on any particular target or levels of housing delivery, but was focused on long-term trends based on population and economic growth, which included a boom and bust cycle, resulting in under-delivery of housing. Given the highly cyclical nature of the construction sector in recent years – where housing delivery plummeted in the aftermath of the 2008 global financial crisis and subsequent recession, despite continuing population growth – it is prudent to update these figures to account for short-to-medium term labour requirements in light of these revised targets.

2. Methodology

The aim of this analysis is to quantify the skills/labour needed to deliver on the Government's housing targets; both in terms of total numbers of Full-Time Equivalent[3] (FTE) workers, as well as the types of occupations that are likely to be required. This follows a similar analysis of the entire Built Environment sector that was undertaken as part of the EGFSN's *Building Future Skills* report, where a labour demand model was built to quantify long-term labour needs over the 2020-2030 period. However, the labour demand model developed for *Building Future Skills* was not intended to account for any particular target or activity within the construction sector; but to estimate long-term labour demand based on population and economic growth over the decade. This means that to estimate demand relating to a specific activity (i.e. the construction of c. 33,000 houses a year), a slightly different methodological approach is required.

The modelling is primarily based on a national 'Input-Output' model for Ireland that has been integrated with occupational data from Census 2016; the methodology for which is described in this section.

2.1 Data Sources

The analysis in this report draws from three key data sources:

- **2015 National Input-Output Tables –** The model used to estimate labour demand is a national Input-Output model for Ireland, which is derived from the 2015 Input-Output Tables from the Central Statistics Office. These tables break down the Irish economy into 58 sectors, and detail the flows between sectors, households, government and the rest of the world. The most recent version of these tables is from 2015.

- **Census 2016 Detailed Occupational Data –** The 2015 Input-Output tables were supplemented by Detailed Occupational data from Census 2016, which lists employment in each sector according to the numbers employed by each occupation. Occupations in the Census are based on the 'Standard Occupational Classification (SOC) 2010'[4] system, which is a hierarchical system of classifying occupations by both skill level (levels *within* the same job type – e.g. managers and operatives) and specialisation (different job types – e.g. Engineer and Plumber). SOC is based on 840 detailed occupational groups, although only 329 of these are included in the 2016 Census results.

- **SCSI 'Real Cost of Housing' reports –** The *Real Cost of Housing* reports by the Society of Chartered Surveyors Ireland were used as the primary source of cost data for houses and apartments. Two of these reports – the 2020 report for houses[5] and the 2021 report for

[2] EGFSN, 2020. Building Future Skills. http://skillsireland.ie/all-publications/2020/building-future-skills.html
[3] Full Time Equivalents (FTE) refer to the number of full-time workers required to carry out a certain workload.
[4] Office for National Statistics, 2020. 'Standard Occupational Classification 2010. Volume 1 Structure and descriptions of unit groups'. Available at https://bit.ly/3twUBSM. (Accessed 01/07/21)
[5] SCSI, 2020. 'The Real Cost of New Housing Delivery. SCSI Cost of Housing Delivery Report 2020'. Available at: https://mk0societyofchag3d3v.kinstacdn.com/wp-content/uploads/2020/11/SCSI-Real-Cost-of-New-Housing-Delivery-Report-2020_compressed-1.pdf. Accessed (01/07/21).

apartments[6] - contain estimates for the cost of delivering housing, split into the main inputs (e.g. construction costs, professional fees, levies etc.). It should be noted that this is primarily based on housing costs in the Greater Dublin Area, although as cost categories such as land and margin have been excluded from the analysis, they are still likely to reflect the workload involved in the construction process.

2.2 Input-Output Analysis

Input-Output (IO) analysis is a form of economic modelling that examines linkages between different sectors of the economy in order to determine the effect of a change in economic activity in one sector on the overall economy. IO modelling is based on the circular flow of income, which is the concept that one person or business' expenditure is another's income. This means that every €1 directly spent by a business or consumer will have some impact on the wider economy beyond itself: for instance, when a company spends money on purchasing supplies or hiring workers, those suppliers and employees will increase their own spending in response; creating a chain effect that ripples throughout the economy. This chain is known as the multiplier effect, and this can be broken down into three distinct expenditure effects:

- **Direct effects** refer to the initial increase in expenditure by a business, investor or consumer.

- **Indirect effects** relate to the additional spending that arises as suppliers to the industry alter their production in order to meet that initial change in demand. These effects are represented by Type I multipliers within economic impact analysis, which measure the combined direct and indirect effects of expenditure.

- **Induced effects** relate to increases in spending by households as a result of increased employment and earned income. Type II multipliers measure the combined direct, indirect and induced impacts of expenditure.

The purpose of IO modelling is to quantify this multiplier effect for a sector or organisation given its relationship to other sectors, and to use this information to estimate its full economic impact. In addition to monetary impacts, IO / Multiplier analysis can be used to estimate the employment and labour demand arising from an increase in construction activity. This was done by linking the detailed occupational data from Census 2016 with the 2015 IO tables to produce employment coefficients by occupation and sector. In effect, these coefficients tell us that every €1 in output from the 'Construction' or 'Architectural and Engineering Services' sectors will require a certain number of each occupation to produce. By providing an estimate of the spending in each sector, this can provide a very detailed breakdown of the likely labour force involved in a certain activity; in this case, the construction of new housing. For the purpose of this analysis, we are reporting on the direct and indirect impacts only, as these relate to the skills required in the Built Environment sector.

It is important to acknowledge the assumptions used and limitations of IO modelling. IO models are static, meaning that they represent the economy at a fixed point in time. As IO tables in Ireland are only published every five years, any investment or economic changes that occur between publication are generally not included, meaning that these tables can quickly become out of date in times of economic growth or structural change. The use of the 2015 IO tables therefore relies on an assumption that the technical coefficients (i.e. the ratio of labour and capital used in production) remain the same for the construction sector. In particular, the analysis assumes that the composition of labour inputs per €1 of construction sector output have not changed significantly over the interim period. This is a reasonable assumption for the construction sector, as it was noted in the *Building Future Skills* report that productivity in the sector has remained largely similar over time. Any changes in building specifications in the intervening period (i.e. such as the design guidelines for apartments) are instead reflected in changes to the structure of building costs, which is taken into account by the use of up-to-date cost data.

IO models are based on the value of output by sector, meaning that it was necessary to translate the broad housing target into an annual cost breakdown by sector. This required assumptions regarding the profile of housing delivery over the decade, including annual completion numbers and building

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[6] SCSI, 2021. 'The Real Cost of New Apartment Delivery. Analysis of Apartment Development Costs and Viability'. Available at: https://scsi.ie/business/build/apartmentcosts/ (Accessed 01/07/21).

types, as well as the costs associated with these building types. These are outlined in the following two sections.

2.3 Housing Scenarios

Although the number of houses built is expected to average at 33,000 per year over the decade, the current rate of housing delivery means that this profile will require a ramp-up from the current figure of 20,000 over the coming years, followed by an exceedance towards the end of the decade. The modelling assumed an increase in annual housing completions of about 3,000 units per year until it reaches about 33,000 houses in 2025. In order to compensate for an undersupply at the beginning of the decade, this profile continues to grow to a peak of approximately 40,000 houses by 2028; thereby achieving the average target of 33,000 houses over the decade (Figure 2.1).

Figure 2.1: Modelled housing delivery scenario, 2021-2030

In terms of the breakdown between house types, this was also based on recent completion and planning data, as well as relevant Government policy objectives. Due to the emphasis on compact urban growth in national planning policy and efforts to make use of infill and brownfield sites in urban areas, apartments are likely to feature more heavily in the overall makeup of the total housing supply into the future. The proportion of apartments was assumed to grow to about 35 per cent of housing completions; up from the 20 per cent it currently accounts for. The number of single, one-off houses completed each year has remained largely static over the previous decade, and this trend is assumed to continue.

2.4 Housing Costs

Unit costs for housing and apartments were sourced from the SCSI's *Real Cost of Housing* series. These reports break housing costs into its sub-components, which can then be apportioned to sectors within the IO model. The majority of costs were predictably apportioned to the construction sector, although other cost categories (such as professional fees, levies etc.), were apportioned to other sectors as shown in Table 2.1.

Table 2.1: Apportionment of housing costs

NACE[7] Activities	Housing Cost Component
Construction	Construction costs
Architectural and Engineering Services	Professional Fees
Public administration	Development levies
Electricity and Gas Supply	Electricity and Gas Levies
Water Collection, treatment and supply	Irish Water levies
Real Estate Activities	Real estate / selling costs
Legal and Accountancy	Legal fees

Certain 'costs' do not necessarily represent additional economic activity or output for which labour would be required, and were therefore removed from these unit costs. This included land costs, VAT, Developer's Margin and Finance costs. Conversely, costs that are typically excluded from the headline cost of social housing developments, such as development, gas or water levies, still represent implicit costs or activities that need to be carried out, and were included within the unit costs used for the model.

The costs contained in these reports were apportioned to NACE sectors and converted to 2015 prices (the base year of the IO model), as shown in Table 2.2 below. Prices were converted using the Consumer Price Index and Construction Cost Index (for construction costs only). It should be noted that apartment costs in the SCSI report are based on four building categories, ranging from low-rise suburban apartments to high-rise urban developments. The cost for apartments shown in the table below are based on the mid-point between 'Category 2' and 'Category 3' apartments (medium-rise suburban/urban apartments), which are likely to be the most common based on existing planning policies.

Table 2.2: Unit cost inputs for houses and apartments in 2015 values

	Cost per House	Cost per apartment
Construction	€163,232	€216,622
Architectural and Engineering Services	€5,565	€18,223
Public administration	€8,668	€13,962
Electricity and Gas Supply	€1,080	€2,156
Water Collection, treatment and supply	€3,960	€5,193
Real Estate Activities	€5,221	€4,731
Legal and Accountancy	€4,620	€4,158

Source: SCSI, 2020-2021

Combining these unit costs with the scenarios outlined in the previous section provides the annual level of output in each sector for which labour will be required to support. In 2021, the construction of 20,000 units would generate approximately €4.2 billion in output, which would rise to €7 billion per annum if the 33,000 unit target is achieved. This annual output (split by sector) was used as the basis for the IO modelling, to generate labour demand by occupation.

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[7] NACE stands for "Nomenclature generale des Activites economiques dans les Communautes europeennes" and refers to the industrial classification used by Eurostat and used by the Central Statistics Office.

3. Analysis

This section describes the results of the analysis. Section 3.1 presents the total labour demand arising from the modelled level of 33,000 dwellings per annum, split between 'direct' (housing construction industry itself) and 'indirect' (incorporating wider supply chain) demand, while Section 3.2 breaks these total Full Time Equivalents by occupation. In line with the EGFSN's Built Environment Skills report, individual occupations are further separated into 'Core' and 'Niche' occupations. Annual additional Full Time Equivalents by occupation are given, showing the difference over the next decade compared to the 2019 demand for labour on new dwelling construction.

3.1 Total Labour Demand

Figure 3.1 shows both 'direct' and 'indirect' demand, which gives a sense of the scale of these activities. While indirect demand is generally thought of as activities further up the supply chain (e.g. the production of building materials), the construction sector is relatively unique in that it has a high rate of 'self-consumption', which refers to a situation where a sector purchases inputs from other businesses in the same sector. Nineteen per cent of the value of inputs to the construction sector come from other construction businesses (compared to between 4-5 per cent typical of other sectors), which is likely due to the frequent use of sub-contracting on building developments. This means that although referred to as 'indirect' labour demand, a significant portion of this is likely to be directly involved in housing construction, and should be considered when assessing skills gaps attached to these targets.

Based on current levels of housing delivery, the results suggest that direct labour demand is around 27,830 FTE in 2021, or 41,000 if indirect labour demand is included. Based on the modelled housing delivery scenario, direct labour demand is expected to increase to over 45,000 by 2025 (the year when the annual completions are modelled to reach 33,000 dwellings), before peaking at over 55,000 FTE by the end of the decade. Including indirect labour demand, this amounts to a total labour demand of around 67,250 by 2025 and over 82,300 by 2030.

Figure 3.1: Total direct and indirect full-time labour demand
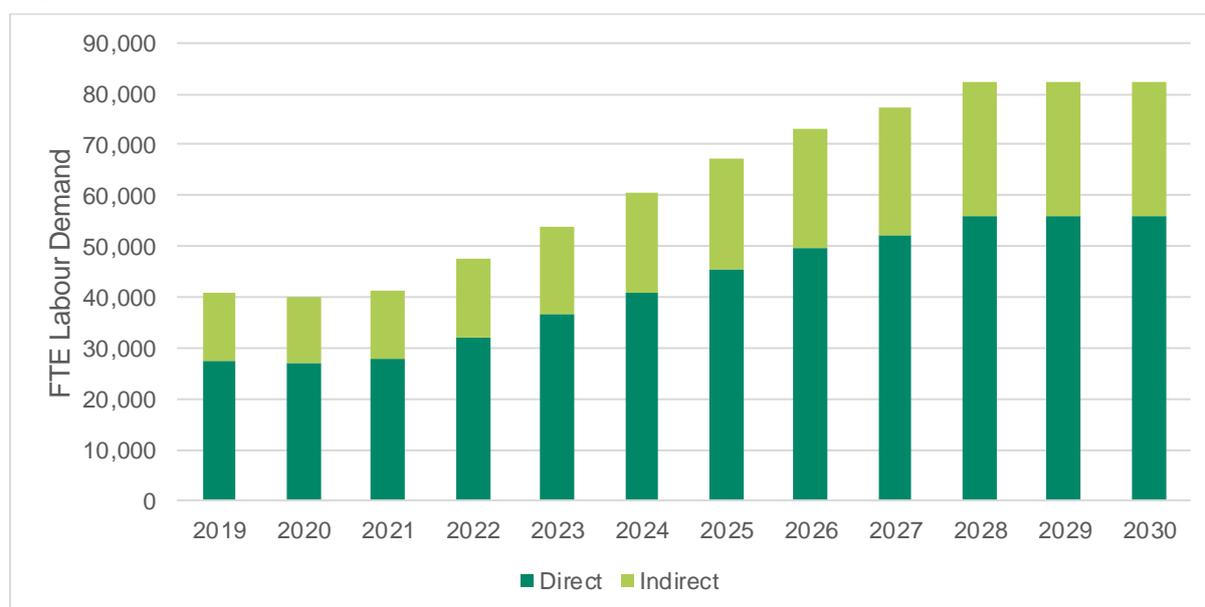
It is important to note that total labour demand can vary depending on the proportion that apartments comprise of the overall target. Apartments tend to have both higher construction costs and a different cost structure to houses, meaning that a higher share of apartments than the 35 per cent of total new dwellings assumed in this analysis will likely lead to higher labour demand. In particular, apartment developments generally require greater input into the design and planning processes than houses, meaning that occupations associated with these sectors – such as architects, planners or engineers – are likely to represent a greater proportion of the total labour demand.

3.2   Occupational Labour Demand

Building Future Skills identified a number of key occupations for the Built Environment sector, which it refers to as 'Core' and 'Niche' occupations. The thirteen 'Core' occupations are the most prevalent occupations, collectively account for 55 per cent of total employment in the Built Environment sector. The seventeen 'Niche' occupations generally represent a smaller proportion of total employment (35 per cent across the Built Environment sectors), which are heavily concentrated within the sector. Both Core and Niche occupations are critical to day-to-day activities in the construction sector, and the attainment of the Government's housing targets.

Table 3.1 shows labour demand estimates for the thirteen Core occupations for 2018-2030, based on the housing scenario outlined in Section 2. These occupations account for over 50 per cent of total labour demand, underscoring their significance to achieving Ireland's housing targets. The largest occupation is 'Carpenters and Joiners', which the modelling suggests would need to increase from around 3,700 FTE in 2019-2020, to 6,000 by the middle of the decade, and to 7,400 by 2030 when the housing completions are expected to reach their peak. The next largest Core occupations required are 'Electricians', 'Elementary Construction Occupations', 'Construction and Building Trades not elsewhere classified (n.e.c.)', and 'Plumbers'.

Table 3.2 presents labour demand estimates for the seventeen Niche Occupations between 2018 and 2030, based on the housing scenario described previously. These account for around 7 per cent of labour demand, with the largest occupations being 'Floorers and Wall Tilers', 'Construction and Building Trades Supervisors', 'Roofers', 'Glaziers' and 'Construction Project Managers'.

Table 3.1: Forecast direct labour demand - 'Core' skills

Occupation	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
5315 Carpenters and joiners	3,697	3,640	3,722	4,293	4,874	5,465	6,066	6,583	6,954	7,418	7,418	7,418
5241 Electricians and electrical fitters	2,766	2,724	2,786	3,215	3,651	4,095	4,547	4,936	5,214	5,562	5,562	5,562
9120 Elementary construction occupations	2,655	2,616	2,675	3,087	3,507	3,933	4,368	4,742	5,010	5,344	5,344	5,344
5319 Construction and building trades n.e.c.*	2,234	2,200	2,250	2,595	2,947	3,304	3,667	3,981	4,205	4,485	4,485	4,485
5314 Plumbers and heating and ventilating engineers	1,923	1,894	1,937	2,235	2,538	2,846	3,160	3,430	3,623	3,865	3,865	3,865
5323 Painters and decorators	1,563	1,539	1,573	1,815	2,060	2,310	2,564	2,783	2,940	3,136	3,136	3,136
5321 Plasterers	994	978	1,001	1,154	1,310	1,469	1,630	1,769	1,869	1,994	1,994	1,994
5312 Bricklayers and masons	1,014	999	1,022	1,178	1,338	1,500	1,665	1,807	1,909	2,036	2,036	2,036
1122 Production managers and directors in construction	1,008	992	1,015	1,171	1,330	1,491	1,656	1,797	1,899	2,025	2,025	2,025
8149 Construction operatives n.e.c. (incl. 8141 Scaffolders, stagers and riggers)	940	925	946	1,092	1,240	1,390	1,543	1,675	1,770	1,888	1,888	1,887
2121 Civil engineers	827	817	836	968	1,104	1,242	1,384	1,506	1,592	1,699	1,698	1,698
2431 Architects and town planners (incl. 2433 Quantity surveyors and 2434 Chartered surveyors)	886	877	898	1,043	1,193	1,346	1,503	1,640	1,733	1,850	1,849	1,848
8229 Mobile machine drivers and operatives n.e.c.	637	627	642	740	840	942	1,046	1,135	1,199	1,279	1,279	1,279
Core Skills Subtotal	21,144	20,828	21,302	24,587	27,932	31,335	34,797	37,785	39,916	42,580	42,579	42,577

*n.e.c = not elsewhere classified

Table 3.2: Forecast direct labour demand - 'Niche' skills

Occupation	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
5322 Floorers and wall tilers	629	619	633	730	829	930	1,032	1,120	1,183	1,262	1,262	1,262
5330 Construction and building trades supervisors	493	485	496	573	650	729	810	879	929	991	991	991
5313 Roofers, roof tilers and slaters	365	360	368	424	482	540	600	651	688	733	733	733
5316 Glaziers, window fabricators and fitters	372	366	375	432	491	550	611	663	700	747	747	747
2436 Construction project managers and related professionals	302	298	305	351	399	448	497	540	570	608	608	608
5225 Air-conditioning and refrigeration engineers	187	185	189	218	247	277	308	334	353	377	377	377
3121 Architectural and town planning technicians (incl. 3122 Draughtspersons)	174	172	176	206	236	266	298	326	345	368	368	368
5216 Pipe fitters	100	98	101	117	133	149	166	181	191	203	203	203
8221 Crane drivers	66	65	67	77	88	98	109	118	125	133	133	133
9235 Refuse and salvage occupations	26	26	26	30	35	39	43	47	49	53	53	53
8124 Energy plant operatives	43	43	44	50	57	64	72	78	82	88	88	88
1255 Waste disposal and environmental services managers	13	12	13	15	17	19	21	23	24	26	26	26
2435 Chartered architectural technologists	38	37	38	45	52	59	66	72	76	82	82	82
8126 Water and sewerage plant operatives	20	20	20	23	27	30	33	36	38	41	41	41
Niche Skills subtotal	**2,828**	**2,787**	**2,851**	**3,292**	**3,741**	**4,199**	**4,665**	**5,067**	**5,353**	**5,711**	**5,710**	**5,710**

3.3   Additional Labour Requirements

Finally, Table 3.3 and Table 3.4 show a forecast of the 'additional labour requirements' for Core and Niche occupations. This takes into account both the additional labour demanded to meet the uplift in housing completions, as well as a 'replacement rate' to take into account retirement or leakages from the Construction Sector. Replacement rates estimate the proportion of a labour force that would be expected to leave or retire from the sector each year, and were estimated based on the age profile of the labour force[8]. As replacement rates for the existing workforce were already incorporated into the estimates developed as part of *Building Future Skills,* these rates were only applied to the *new* annual labour demand as part of this analysis.

The current baseline demand is modelled based on average 2019-20 housing completions, while the Forecast Demand is based on the *Housing for All* target of approximately 33,000 completions per year. The difference between the Forecast Demand and the Baseline indicates the additional FTE workers (compared to 2019-20 levels) required to meet the demand associated with this housing target. To avoid double-counting, replacements were calculated annually based only on this *additional* demand. Adding these two together indicates the additional FTE workers that need to be trained or attracted into the sector in response to this change in demand.

For instance, the new labour requirements for carpenters of 2,536 suggests that an additional 2,536 carpenters will need to be recruited or trained in total (compared to 2019-20 levels) in order to reach the target of 33,000 houses per annum, and to account for any exits from the sector among this workforce in the interim.

While the table below shows the *total* additional labour requirements to reach this level of housing delivery, annual training requirements will ultimately depend on the profile of delivery over the decade. For example, if it is intended to reach this target by 2025 (as the modelling scenario outlined above assumes), then 2,536 carpenters would need to be trained over five years – or approximately 507 per annum.

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[8] Replacement rates of between 2% and 2.2% per annum were calculated for the Built Environment sectors in *Building Future Skills*, and these were applied to this analysis. It should be noted that these rates were originally calculated for the *existing* workforce, whereas in this analysis, they have only been applied to the new workforce. This means that even though they are quite low, it is likely that they still overestimate the replacements, as new workers (i.e. workers that have newly trained or immigrated) are much less likely to retire or leave the sector than the average existing worker.

Table 3.3: Forecast new labour requirements - 'Core' skills

Occupation	Code	Baseline (2019-20)	Forecast Demand (Target)	Replace-ments	Total Additional Labour Requirements	Annual Additional Labour Requirements*
		A	B	C	D = (A – B) + C	D / 5
Carpenters and joiners	5315	3,668	6,083	122	2,536	507
Electricians and electrical fitters	5241	2,745	4,561	91	1,907	381
Elementary construction occupations	9120	2,635	4,382	88	1,834	367
Construction and building trades n.e.c.	5319	2,217	3,678	74	1,535	307
Plumbers and heating and ventilating engineers	5314	1,909	3,169	63	1,324	265
Painters and decorators	5323	1,551	2,571	51	1,072	214
Plasterers	5321	986	1,635	33	682	136
Bricklayers and masons	5312	1,007	1,669	33	696	139
Production managers and directors in construction	1122	1,000	1,661	33	694	139
Construction operatives n.e.c. (incl. Scaffolders, stagers and riggers)	8149	933	1,548	31	646	129
Civil engineers	2121	822	1,392	31	602	120
Architects and town planners (incl. Quantity surveyors and Chartered surveyors)	2431	881	1,516	35	669	134
Mobile machine drivers and operatives n.e.c.	8229	632	1,049	21	438	88

*Note: Annual Requirements are based on achieving the targeted level of output over a five-year period (i.e. by 2025)

Table 3.4: Forecast new labour requirements - 'Niche skills'

Occupation	Code	Baseline (2019-20)	Forecast Demand (Target)	Replace-ments	Total Additional Labour Requirements	Annual Additional Labour Requirements*
		A	B	C	D = (A – B) + C	D / 5
Floorers and wall tilers	5322	624	1,035	21	431	86
Construction and building trades supervisors	5330	489	812	16	339	68
Roofers, roof tilers and slaters	5313	363	601	12	251	50
Glaziers, window fabricators and fitters	5316	369	612	12	255	51
Construction project managers and related professionals	2436	300	499	10	209	42
Air-conditioning and refrigeration engineers	5225	186	309	6	129	26
Architectural and town planning technicians (incl. Draughtspersons)	3121	173	301	6	135	27
Pipe fitters	5216	99	167	3	71	14
Crane drivers	8221	66	109	2	46	9
Energy plant operatives	8124	26	43	1	18	4
Waste disposal and environmental services managers	1255	43	72	1	31	6
Chartered architectural technologists	2435	13	21	0	9	2
Water and sewerage plant operatives	8126	37	67	1	31	6

*Note: Annual Requirements are based on achieving the targeted level of output over a five-year period