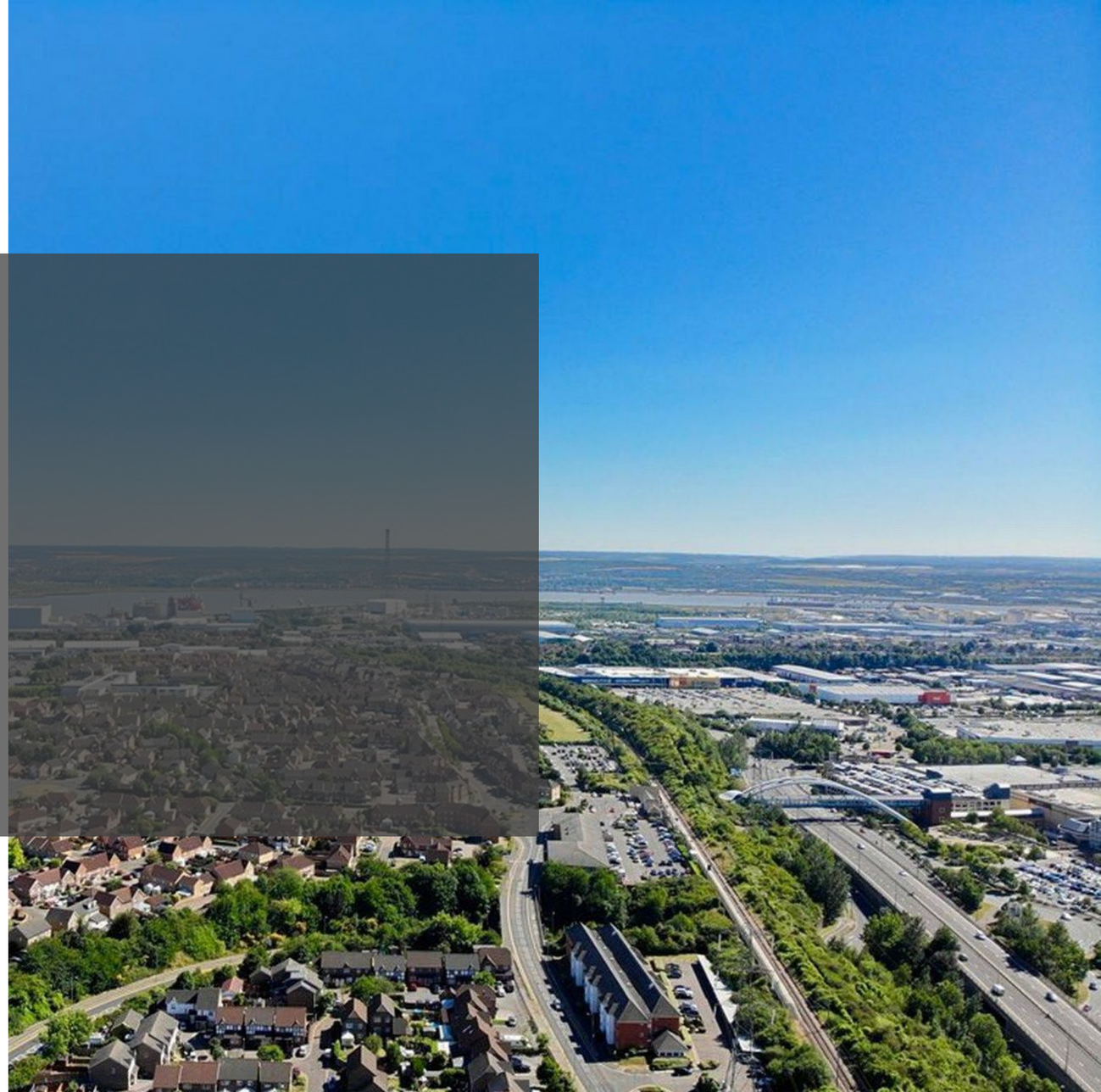
Major Projects in the SELEP Area

Skills and Employment
November 2021

SOUTH EAST
LOCAL ENTERPRISE
PARTNERSHIP

mace

Contents



The South East Major Projects Group (MPG) was established in May 2020. The group came about through the engagement of major projects in the South East Local Enterprise Partnership (SELEP) Local Industrial Strategy consultation. During this, it was identified that the projects shared many common challenges and opportunities and that there was value in coming together, with the LEP and its wider partnership, to share practice and collaborate on activities. The area of skills and employment was agreed as a top priority, which led to this commission in collaboration with the LEP's Skills Advisory Panel (SAP), to build on its existing evidence base of current and future skills needs.

SELEP is the largest LEP area outside of London and the population is set to increase to 5 million by 2039. The geography includes East Sussex, Essex, Kent, Medway, Southend and Thurrock. It is an area of international significance with eight ports, two airports and high-speed rail links. The area is home to more than 176,000 enterprises, of which 97% are small or micro, and a working age population of over 2.5 million. The SELEP also has the largest percentage of the working population working in construction of any LEP area, at 7% (Nomis).

This commission identifies the challenges and opportunities the SELEP area is likely to face over the next 15 years in meeting the demand for jobs and skills, in part due to the significant range of new major projects emerging. This report explores the projects and the demands they create, considered within the context of the current skills supply position, and it sets out a series of recommendations to be taken to maximise growth benefits to the area within a sustainable and positive approach.

The SELEP area is seeing an extraordinary amount of growth in its pipeline of major projects, presenting a multi-billion-pound boost to the economy. Since May 2020, the MPG has formed a strategic channel of engagement, ensuring benefits realisation and the mitigation of potential risks. The projects are at varying stages of development, some well advanced in terms of Development Consent Order (DCO) work and planning application production, while others are at an earlier stage. It should be noted, therefore, that there is understandably a wide range in the accuracy of data generated by each project (or programme) to inform the development of a robust, sustainable skills supply/needs analysis.

The MPG links with the SELEP SAP, which represents key sectors across the area and includes some of the major projects. Both are now supported by a Major Projects Skills sub-group, which will develop an action plan to respond to the recommendations in this report. It is highly beneficial that such groupings have already formed and are taking forward work (such as a webinar held in May 2021 and presence on the SELEP and South East Skills websites). Clearly these groups will have a strong role to play in delivering against an action plan resulting from this report, which can happen at speed if necessary. This is important given the size of the existing and ever-increasing skills gap.

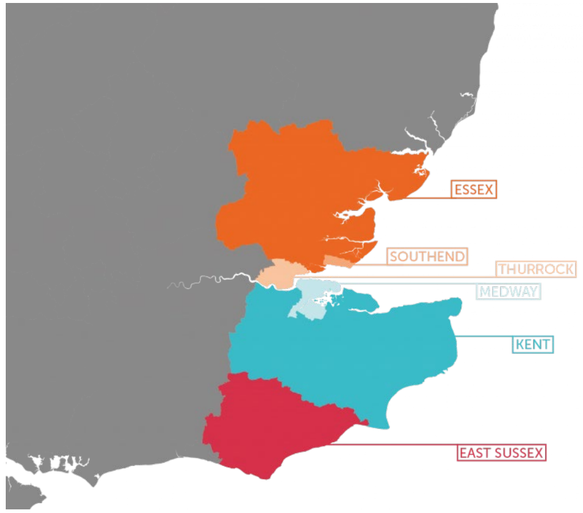
It is of critical importance to ensure that projects are delivered with confidence by private and public sector partners, ensuring the local workforce and business receive the skills required to succeed in the delivery of the major projects pipeline. In this way and of equal importance, local communities can maximise the opportunities presented by this high value and diverse range of projects through jobs, income and the creation of regional prosperity. With this vision comes challenges. From our analysis we note that some people do not have access to the opportunities the pipeline of projects provide. In some areas there are barriers of above-average rates of unemployment, poor education attainment and high levels of deprivation.

There is a need to take into account the growing number of skills also required across other sectors, particularly at higher level, alongside those required by the major projects. The sometimes-low level of employer investment in workforce training and apprenticeship places, and the increased skills shortages overall with high levels of job vacancies, makes for a challenging employability environment and many employers competing for labour. This report also touches on the need for an upskilled workforce base in technological advancement industries, including digital twinning, AI, robotics, modern methods of construction, advanced manufacturing and engineering, and the emergence of autonomous technology. In order to align this skills gap, there needs to be a robust and agile skills system that can pro-actively respond to the economy in order to compete in what is becoming a globally competitive market.

This report examines sixteen projects across the SELEP area: an initial eight core projects that are currently engaged with the MPG skills group, alongside eight other sample projects which we have identified as "significant", with an estimated combined construction value of £28.5bn. Bradwell B has been excluded from the construction costs. As one of the largest Nationally Significant Infrastructure Projects in the country and due to the early nature of proposal development, construction costs have not yet been defined. By way of comparison, the construction cost of the Hinkley Point C project in Somerset is £21bn.

In terms of skills requirements, the report identifies the forecast of future skills levels projected on the selected projects in the short, medium, longer terms, and the further impact they have on the already-present skills gap.

The report puts forward recommendations as to how the skills gap can be reduced. Time is of the essence; days, not months, of delay in developing a comprehensive action plan could make the chasm between demand and supply grow wider. There is an opportunity to maximise the benefits such an unprecedented level of new major project activity can bring to the benefit of its communities, but also a real threat to project implementation should a skilled workforce not be created.



This report provides projected workforce information on projects within the SELEP federated areas of Kent and Medway, Essex, Southend, Thurrock and East Sussex. We have included Freeport East, which is in both North Essex and East Suffolk and therefore within both the SELEP and New Anglia LEP coverage areas.

The impact of the COVID-19 pandemic must not be underestimated in contributing to skills shortages, nor the loss of access to a wider European market of skills, both of which bring into stark contrast the need to create the vibrant workforce of the future right now. A recent industry survey by construction consultancy Gleeds has warned that shortages will get worse, with availability of labour and materials impacted. For March to May 2021, the Office for National Statistics also recorded the highest number of vacancies in the construction sector for 20 years, with 35,000 vacant roles waiting to be filled.

It is important to note that the projects will be drawing on a workforce of existing small- and medium-sized contractors across the area who are already struggling to recruit, and that this in turn impacts on the FE sector which struggles to recruit tutors aligned to industry as it can't match industry salaries. These factors combined illustrate how vital collective action is, in responding to the recommendations within this report.

Projects Reviewed and their Locations

The eight core projects are:

- The London Resort, Swanscombe Peninsula, Kent
- The Lower Thames Crossing, Kent, Thurrock and London
- Housing and town centre development at the Hoo Peninsula, Medway
- Ebbsfleet Garden City, Kent
- Bradwell B Nuclear Power Station, Maldon, Essex
- Thames Freeport, Thurrock
- UK Health Security Agency (UKHSA) Relocation to Harlow, Essex (previously known as Public Health England)
- Freeport East, Felixstowe, Suffolk and Harwich, Essex

Mace have also analysed a further eight major projects in less detail in order to establish the short-, medium- and longer-term job requirements of a larger portfolio of significant projects progressing within a similar time frame. It was agreed that the report would benefit from undertaking additional analysis of such other major projects in the area, to give a perspective of the broader impact. This would enable a more holistic review of skills demand and supply to be produced. It should be noted that this is not an exhaustive list and these projects serve as an illustration of the scale of the challenge across different project types including energy, housing, commercial. An explanation as to why these projects were chosen is provided on page 11.

The eight additional projects are:

- Cleve Hill Solar Farm, North Kent Coast
- Otterpool Park Garden Town, Folkestone and Hythe, Kent
- Chilmington Garden Village, Ashford, Kent
- Mountfield Park, Canterbury, Kent
- Dunton Hills Garden Village, Brentwood, Essex
- Gilston Park Estate, Harlow, Essex
- Purfleet on Thames Regeneration, Thurrock
- Newhaven Enterprise Zone, East Sussex

Core and Significant Projects

Mace have compiled a map showing the geographical locations of the following projects. This is not an exhaustive list of projects in the area, and the list of projects are subject to change due to consents and planning. This report should be viewed as a starting point for setting out the scale and challenge of skills demand across a number of major projects.

Energy
1 Clever Hill Solar Farm
2 Bradwell B Power Station

Garden Communities
3 Ebbsfleet Garden City
4 Dunton Hills Garden Village
5 Gilston Park Estate
6 Otterpool Park Garden Town
7 Chilmington Garden Village
8 Mountfield Park

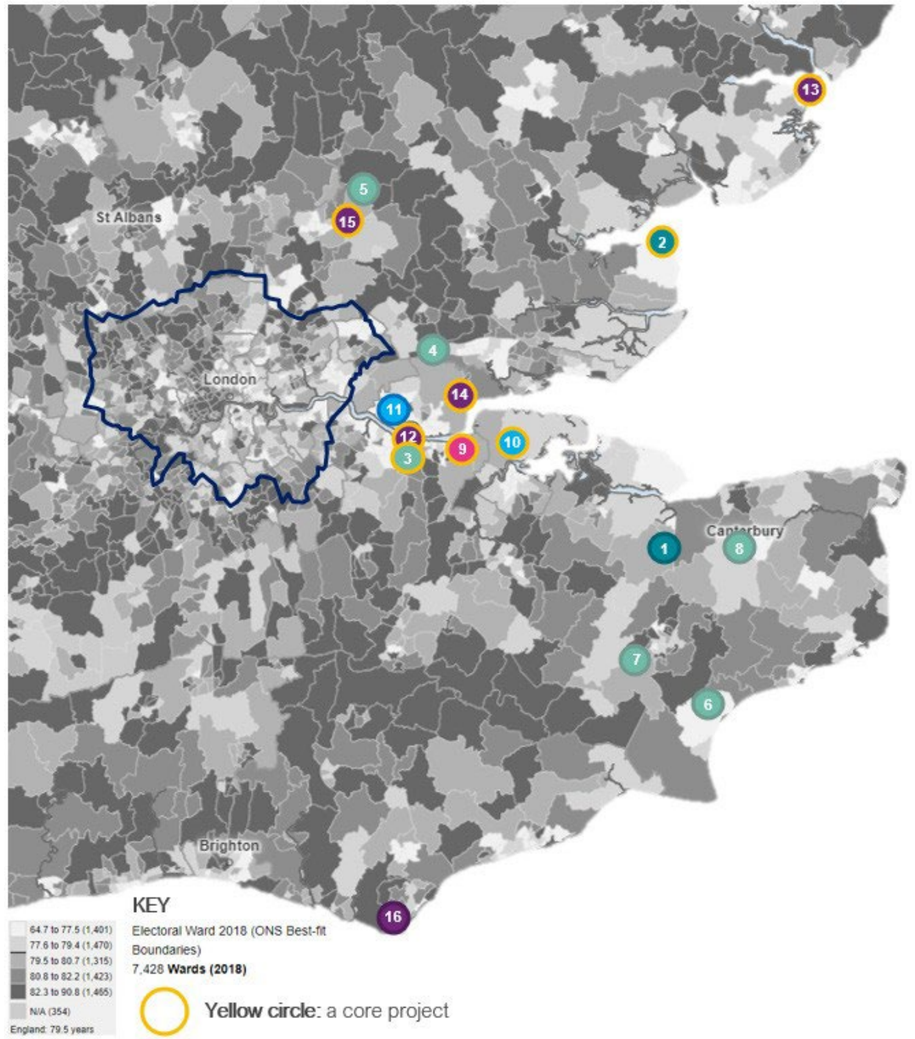
Transport
9 Lower Thames Crossing

Regeneration and Housing
10 Hoo Peninsula Housing Development
11 Purfleet on Thames Regeneration

Commercial and Business
12 The London Resort
13 Freeport East - Felixstowe and Harwich
14 Thames Freeport
15 UK Health Security Agency (UKHSA)
16 Newhaven Enterprise Zone

Please see Appendix 2 for a schedule of figures and tables included within this report.

Figure 1: Project Map



Demographics of the SELEP Area

Table 1 is a profile of the working age population in the SELEP geography.

The total population of SELEP in 2020 was 4.3 million people, with over 2.5 million of working age. There are some notable areas of deprivation, however the overall economic activity rate is above the England average.

Due to COVID-19 there has been a large increase in figures for those receiving benefits, and supporting people into work is a definite area in which the projects could add value.

The skill levels across SELEP are improving but are below the national average, with disparity across the area, so the projects could support an improvement in skill levels.

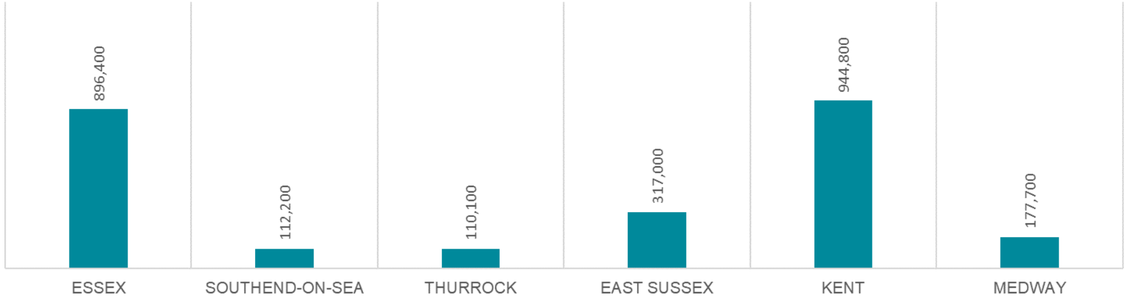
Figure 2 shows the working age population for SELEP by local authority in 2020, outlining that Kent and Essex hold the largest proportions of the population, and Thurrock holds the smallest.

Table 1: Demographic comparisons SELEP vs England

	SELEP	England
Population (age 16 to 64)	2,558,100	34,869,000
White	91.5%	83.8%
Ethnic minority	8.4%	16.2%
EA Core or work limiting disability	21.3%	21.3%
Economically active	80.4%	79.4%
In employment	77.0%	75.6%
Employees	64.8%	65.2%
Self-employed	12.0%	10.1%
Unemployment rate	4.2%	4.9%
Economically Inactive	19.6%	20.6%
No qualifications	5.8%	6.2%
Level 1 qualifications	12.1%	9.9%
Level 2 qualifications	18.3%	15.5%
With trade apprenticeship	3.2%	2.7%
Level 3 qualifications	18.2%	17.1%
Level 4 qualifications & above	37.3%	42.8%
Other qualifications	5.0%	5.9%

Source: Annual Population Survey, 2020

Figure 2: **Population (age 16 to 64)**



Source: Annual Population Survey, 2020

Figure 3: **Population by age**

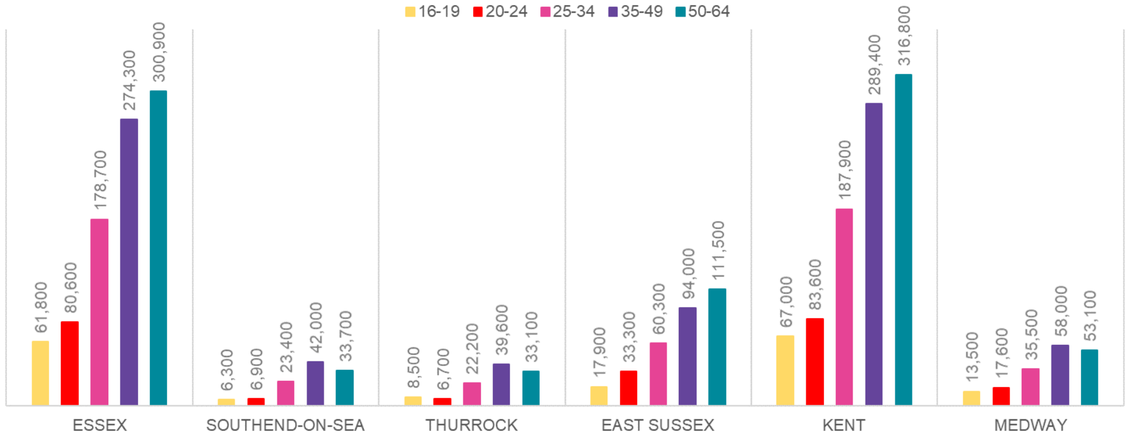
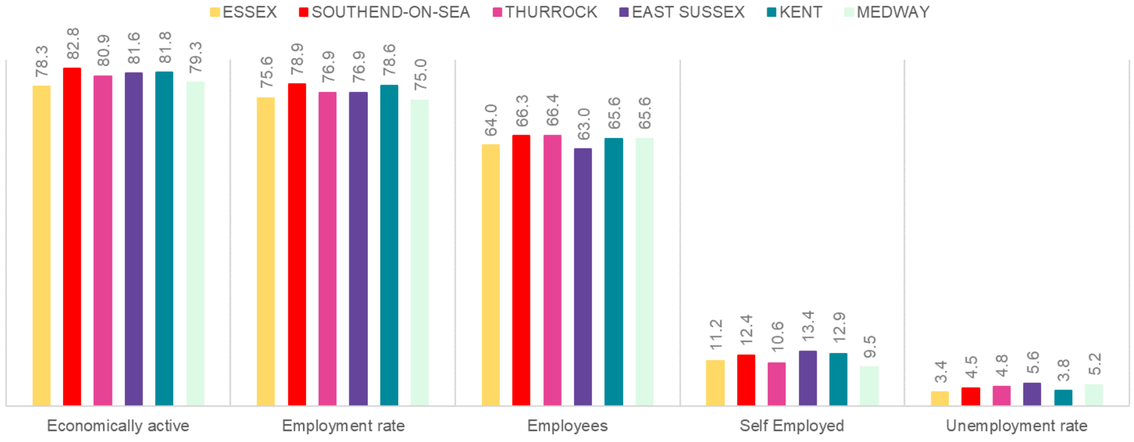


Figure 4: **Economic Activity Rates (percentage of population age 16 to 64)**



Source: Annual Population Survey, 2020

Methodology

Assumptions and Limitations

The analysis contained within this report is unavoidably subject to several limitations, and assumptions have been made where required information is not available or does not exist at this stage of the development process.

It is important to note that, as is often the case with major infrastructure projects, many aspects such as timescales and cost can change as the project progresses. Therefore, those cited in this report may be subject to change. It is possible that some of the projects analysed will be delayed or cancelled, whilst other projects may emerge.

The Mace team have forecasted jobs and skills across different parts of the UK and various sectors for a number of years, including Essex County Council, Salford City Council, North West region (in relation to the development of a clean renewable energy programme) and The River Severn Partnership region. We utilise a range of industry standard toolkits including CITB measures to assess jobs and skills requirements on various types of projects, including extensive work across the nuclear sector.

Where data from the projects has not been made available, data has been extracted from published, publicly available and verifiable sources, including the Office for National Statistics (ONS), Government departments and bodies such as Public Health England. The most recent release for each dataset has been used, though inevitably there are some minor inconsistencies in data vintages because of differences in release calendars and update cycles between organisations.

Available data is subject to limitations as it is specific to defined areas and regions and designated by authority. It is acknowledged that the impacts identified will be 'spread' across local and regional boundaries and into other adjacent authorities.

A degree of professional judgement has also been applied.

Skills Demand

Mace have followed the approach below in forecasting skills demand. We have:

- Reviewed each of the 16 projects in terms of estimated construction costs and delivery programme. The core major projects have been informed by stakeholder meetings combined with additional desk-based research by Mace, from recently published information and, where possible, from sources close to or local to the project
- Produced greater depth of analysis on selected major projects
- Reviewed each project for the type of construction/ project value and delivery timescale pre-construction/ operation
- Identified the key skill sets required at each stage of the project
- Used industry metrics to estimate the job numbers of each type on each project
- Produced a desktop skills review of each project
- Summarised the skills required by year in the short/medium/long term
- Separated the projects into SELEP's federated areas to help facilitate more local skills matching

Mace have reviewed the following, to arrive at conclusions and recommendations for matching the skills demand with supply:

- The untapped workforce
- Higher Education skills provision for the required skills
- Further Education skills provision for the required skills
- Other training organisation skills provision for the required skills
- Implications of the Post-16 Skills Bill
- The skills implications of new technology

Projects Reviewed and Stakeholder Engagement

Major Projects Reviewed

Mace have undertaken an intensive review of eight major projects taking place in the SELEP area. These are:

The London Resort, Kent
This is a proposed leisure-based theme park, comprising a range of event spaces, themed rides and attractions, entertainment venues, theatres and cinemas. It is estimated at a construction cost of £2bn. It is estimated that once planning consent is granted work will commence immediately with Gate One opening in late 2024 and the first full year of operation being in 2025, while Gate Two will open in 2029.

The Lower Thames Crossing Kent, Thurrock and London
A proposed new road connecting Kent, Thurrock, Essex and Havering through the longest road tunnel in the UK beneath the River Thames. It is estimated at a construction cost of between £6.4bn and £8.2bn. Construction is expected to start in 2024 and take around six years, with the road opening in 2029/2030.

Housing and town centre development at the Hoo Peninsula, Medway
This will involve the construction of 12,000 homes, a new school, retail, a rail link and a pedestrian-friendly green infrastructure network. It is estimated at a construction cost of £2bn, commencing in 2023 and to be completed in phases until 2037.

Ebbsfleet Garden City, Kent
Since 2015, there have been 2,543 homes completed and there will be a total of 15,000 homes by 2035. It includes facilities for new businesses, three primary schools and one secondary school, a health centre, leisure and entertainment venues, hotels and restaurants. Other facilities include seven parks, a water sports centre, community centres, arts and culture facilities, intergenerational spaces, retail, a health and wellbeing hub, commercial space, plus all the infrastructure required for a new town. It is estimated at a construction cost of £4.5bn, with work already underway and to be completed in phases until 2035. We have looked at the potential high-level scope of works anticipated on the garden city between now and 2035 and applied our best reasonable estimate of capital cost in terms of public and private sector investment.

Bradwell B Nuclear Power Station, Essex
This is a proposed new nuclear power station located at Bradwell on Sea and next to the existing decommissioned Bradwell power station. One of four joint ventures in the UK between CGN and EDF, Bradwell will follow the Sizewell C project in Suffolk. The project is currently at the planning consultation stage. Once construction commences it is estimated to take between 9-12 years.

Thames Freeport, Essex
This is the creation of a new Freeport Zone within the existing site at Tilbury, with DP World, Forth Ports, Port of London Authority and Ford. It will have a focus on the future of mobility, hydrogen innovation and manufacturing. It attracts £400m of port investment and £4.5bn of new public/private investment. It is estimated that this will create over 21,000 jobs. It will feature extensive logistics/storage. We estimate it will consist of c.600 acres of tax site(s) and 400 acres of primary and secondary customs sites, with construction commencing in 2022 to be completed in 2025. Initial estimates of Freeport construction costs are £1.6bn.

UK Health Security Agency relocation (Previously known as Public Health England)
Creating a public health science campus at Harlow, Essex. This involves the construction and development of a world-leading national Science Hub, bringing together key public health science and research capabilities. With the UKHSA superseding Public Health England, its strategy will continue to develop over the coming months and as the UK looks to put the pandemic behind us. Harlow's place in that strategy, and how the future site will work with the wider organisation, will be assessed and assured but under current plans the first staff are scheduled to move in the 2026/2027 financial year.

Freeport East, Felixstowe, Suffolk and Harwich, Essex
The total Freeport area extends out from the twin ports of Felixstowe and Harwich, covering Britain's busiest container port, two major ferry ports and located close to the East Coast. It will include the creation of a Green Energy Hub—which includes manufacturing, assembly, operations and maintenance—and a Green Hydrogen Hub, working with Ryse and EDF to develop new applications to power port

equipment and other freight operations. The Freeport is estimated to create over 13,500 new jobs. Initial estimates of Freeport construction costs are £1.6bn.

Mace have also analysed a further eight major projects in less detail in order to establish the short, medium and longer term job requirements of a larger portfolio of projects.

The rationale for adding in analysis of a further eight "large" projects to the eight core "major" projects is to set the jobs and skills demand for the core formal major projects into a slightly wider context. It felt important to do this so that we could portray that the SELEP geography did not have simply a "business as usual" volume of work and then just eight major projects, which alone will drive up jobs and skills demand; contrarily, whilst we simply selected eight additional projects to model, the totality of major projects across the geography which will ultimately influence job and skills demand is significantly greater. Only the restrictions on the scale of the commission and timescales for completion of the assessment drove the decision to include a further eight sample projects across housing and commercial.

Why did we choose these eight projects?
The majority are housing based and this is to reflect the over-arching housing growth numbers across the South East which are significant – somewhere in the region of 1million new homes are forecast to be needed to meet demand. These figures are based on the Thames Estuary 2050 Growth Commission conclusions on what would be needed by 2050 and it should be noted that the figures include East London and only part of the SELEP area.

We also felt we should highlight the shift to renewable energy, hence including Cleve Park Solar Farm. The final project selected placed a small focus on wider commercial growth issues and looked at Newhaven. The final rationale for the choice of projects was to offer out a range of localities across the geography which would help explore the context of supply and provide coverage to all four sub-regional areas identified.

Cleve Hill Solar Farm, North Kent Coast
This is estimated at a construction cost of £450m, commencing immediately and to be completed in 2025.

Otterpool Park Garden Town, Folkstone, Kent
This is estimated at a construction cost of £2bn, commencing in 2023 and to be completed in phases until 2053.

Chilmington Garden Village, Ashford, Kent
This is estimated at a construction cost of £1.2bn, commencing in 2023 and to be completed in phases until 2043.

Mountfield Park, Canterbury, Kent
This is estimated at a construction cost of £1bn, commencing in 2024 and to be completed in phases until 2036.

Dunton Hills Garden Village, Brentwood, Essex
This is estimated at a construction cost of £800m, commencing in 2023 and to be completed in phases until 2038.

Gilston Park Estate, Harlow, Essex
This is estimated at a construction cost of £1.2bn, commencing in 2023 and to be completed in phases until 2038.

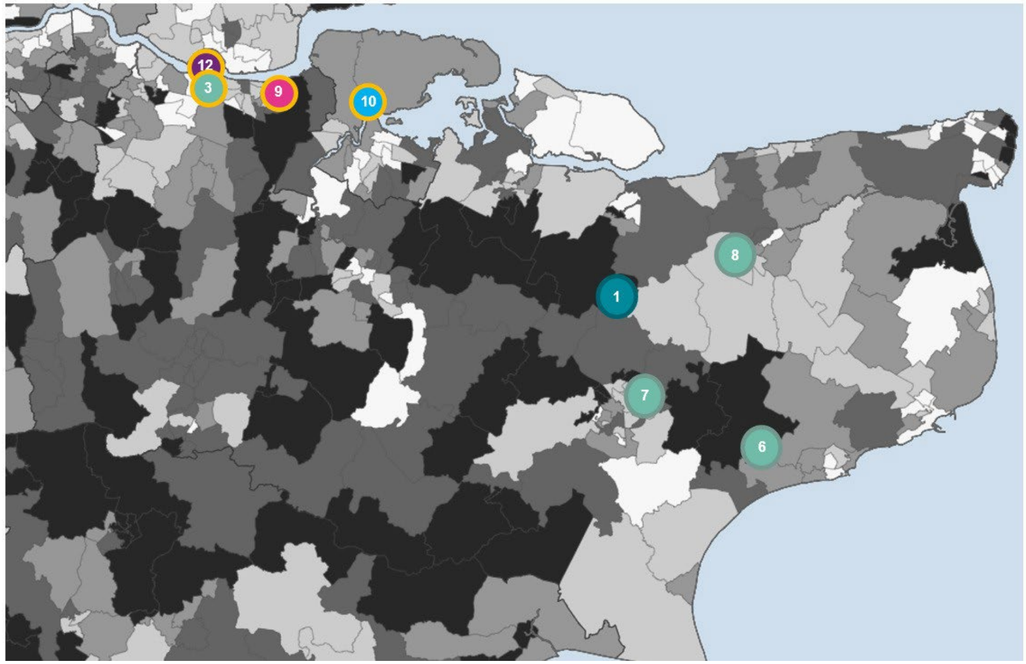
Purfleet on Thames Regeneration, Thurrock
This is estimated at a construction cost of £800m, commenced in 2021 and to be completed in 2023.

Newhaven Enterprise Zone, East Sussex
This is estimated at a construction cost of £100m, commencing in 2023 and to be completed in phases until 2027.

The combined projects are significant as they will require extensive additional skills requirements in addition to the workforce required to deliver "business as usual" construction projects in these areas.

Location of the Projects

Figure 5: Kent and Medway Project Map



Energy
1 Cleve Hill Solar Farm

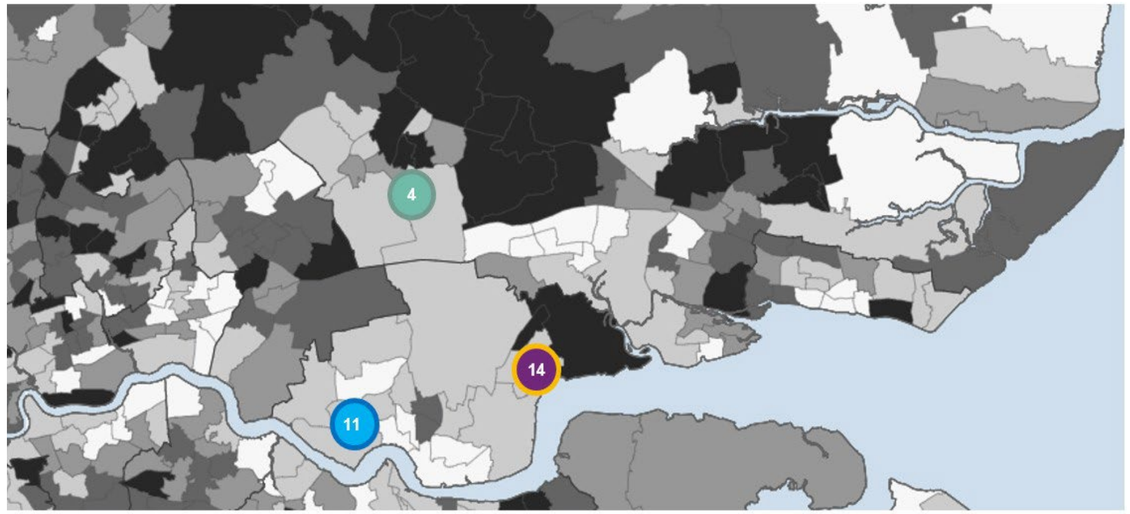
Regeneration and Housing
10 Hoo Peninsula Housing Development

Garden Communities
3 Ebbsfleet Garden City
6 Otterpool Park Garden Town
7 Chilmington Garden Village
8 Mountfield Park

Commercial and Business
12 The London Resort

Transport
9 Lower Thames Crossing
(Kent, Thurrock, Essex and Havering)

Figure 6: South Essex, Southend-on-Sea and Thurrock Project Map



Garden Communities
4 Dunton Hills Garden Village

Regeneration and Housing
11 Purfleet on Thames Regeneration

Commercial and Business
14 Thames Freeport

Electoral Ward 2018 (ONS Best-fit Boundaries)
7,428 **Wards (2018)**

= Core Project

64.7 to 77.5 (1,401)
77.6 to 79.4 (1,470)
79.5 to 80.7 (1,315)
80.8 to 82.2 (1,423)
82.3 to 90.8 (1,465)
N/A (354)
England: 79.5 years

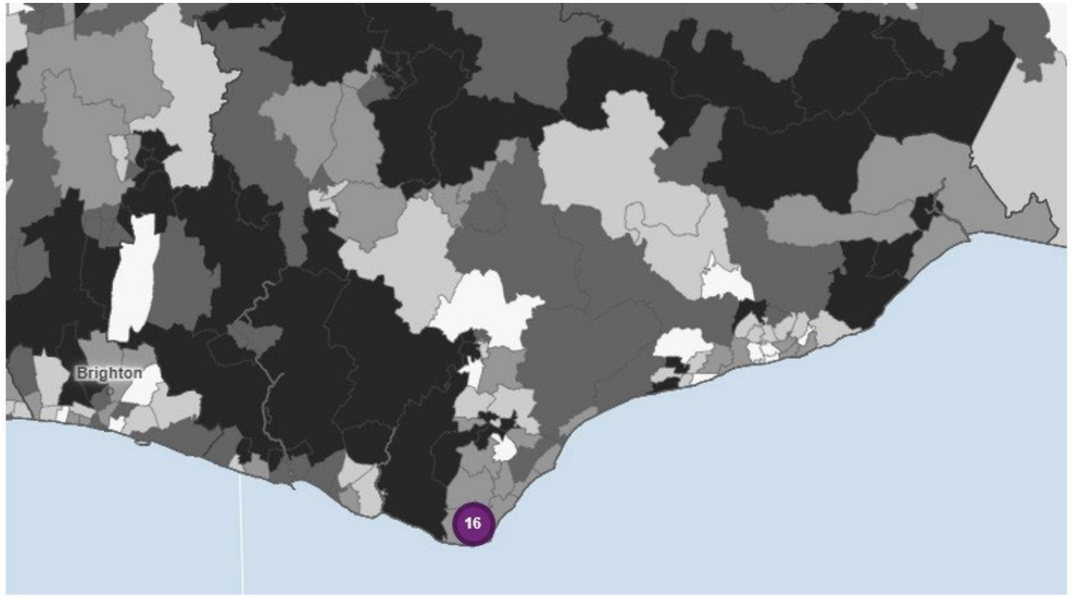
Figure 7: North Essex Project Map

Energy
2 Bradwell B Power Station

Garden Communities
5 Gilston Park Estate

Commercial and Business
13 Freeport East
15 UKHSA

Figure 8: East Sussex Project Map



Commercial and Business
16 Newhaven Enterprise Zone

Stakeholder Engagement

Specific meetings with stakeholders were held on:

- The London Resort: 21st April 2021
- Thames Freeport: 10th May 2021
- Lower Thames Crossing: 6th May 2021
- Freeport East - Felixstowe and Harwich: 6th May 2021
- Ebbsfleet Development Corporation: 19th April 2021
- Bradwell B Power Station: 25th May 2021

Forecast Skills Demand

Lower Thames Crossing: confirmed route

There is currently a UK wide skills shortage. Recruitment organisation Manpower Group recently reported that the boom in hiring means the UK, in many skill sets, is now facing an acute talent shortage. Pre-COVID, there was already a skills shortage which has now been exacerbated. Demand is surging in niche skills, such as nuclear engineering, and challenges for the construction sector are outlined in the introduction as being acute. The existing workforce as set out above could represent some opportunity, for example those currently in other sectors where opportunities are declining may move to the sector. Harnessing transferable skills will be important.

In June 2021 the Construction Industry Training board (CITB) Construction Skills network estimated that the UK construction skills gap is over 200,000 workers. A large proportion of this is likely to be in the South East, given the scale of growth and existing shortages.

A detailed list of skilled jobs is outlined on pages 28-31.

SELEP, through its Skills Advisory Panel and Skills Working Group, is highly proactive in looking at skills and has recently produced a Skills Report – June 2021. This sets out the broader skills needs across key sectors locally, including construction, engineering, digital, health, logistics, education, care and creative. The needs in these sectors obviously have an impact on roles that will be created once assets built by the projects are operational, such as healthcare workers, teachers and carers. The report also highlights the importance of the construction sector, which employs 112,000 people across the SELEP area, the largest employment area. The Skills Report also provides an excellent insight into a range of related themes including:

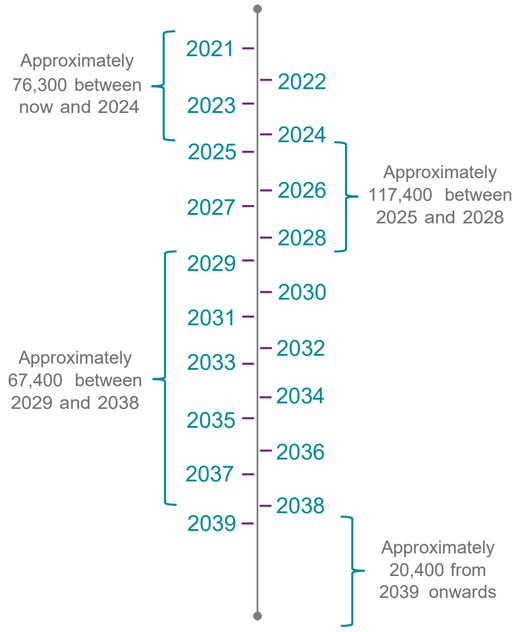
- Employment levels skills demand
- Job vacancies
- Apprenticeships
- Sector growth forecasts
- Graduate retention levels
- Destination of Further Education leavers

SELEP has also taken forward a range of work to address some of the existing barriers and skills shortages locally, including a tutor programme (www.becomealecturer.org), a website with key information (www.southeastskills.org.uk), shaping European Social Fund priorities, virtual careers events, a magazine showcasing the major projects and putting in place a COVID-19 Recovery Fund. To complement this valuable work of the SELEP, Mace have considered some additional conclusions and potential actions that would bring enhanced skills benefits relating to the 16 projects analysed.

Artist's impression of Ebbsfleet Central in Ebbsfleet Garden City

Forecast Total Workforce of the combined 16 projects

We have estimated the total required workforce of the 16 projects will be:



Localised Forecast Summary

To provide some granularity in terms of the location of those jobs (to inform local workforce planning) these are shown below:

NB. The figures have been rounded in the summary to illustrate the imprecise nature of the forecasting due to the many variables involved.

Kent and Medway – eight projects
Approximately 51,300 between now and 2024
Approximately 66,500 between 2025 and 2028
Approximately 48,600 between 2029 and 2038
Approximately 17,300 from 2039 onwards.

East Sussex – one project
Approximately 400 between now and 2024
Approximately 1,600 between 2025 and 2028
Approximately 2,000 between 2029 and 2038
Approximately 2,500 from 2039 onwards.

South Essex, Southend-on-Sea and Thurrock – three projects
Approximately 2,700 between now and 2024
Approximately 23,600 between 2025 and 2028
Approximately 11,300 between 2029 and 2038
Approximately 600 from 2039 onwards.

North Essex – three projects
Approximately 21,800 between now and 2024
Approximately 25,700 between 2025 and 2028
Approximately 5,500 between 2029 and 2038
Approximately 20 from 2039 onwards.

Skills types across the 16 projects reviewed:

A defined list of which sectors will experience skills shortages can be found in the conclusion section of this report.The following tables outline the skills demand across the 16 projects.

Table 2: Employees required per skills type for South Essex, Southend-on-Sea and Thurrock

1. Dunton Hills Garden Village, Brentwood: £800m, 2023 – 2038
2. Purfleet on Thames Regeneration, Thurrock: £800m, 2021 – 2023
3. Thames Freeport, Essex: £1.6bn, 2022 – 2025

	2021-2024	2025- 2028	2029-2038	2039 +
Tradespeople		3,850	5,350	
Engineers (Civil/ structural/M&E/Highways /Drainage - Requiring people with digital design skills)	490	180	260	130
Maintenance (building/engineering)		30	1,100	400
Landscape gardening	25	25	30	10
Plant Operators	140	170	300	0
Hotel				
Shop workers		10		10
Hospitality	10	60		
Architects (Requiring people with digital design skills)	1,665		170	
QS	117	30	12	
Project Managers	235	5	28	
Research and Development		100		
Teachers and Support Staff			20	80
Healthcare			10	10
Fitness			10	
Boat operators				
Security		20		
Logistics		8,500	4,000	
Manufacturing B2		8,500		
Storage workers B8		2,000		
Shipping	10			
Customs	5	50		
IT workers	5	25		
Total	**2,702**	**23,555**	**11,290**	**640**

Table 3: Employees required per skills type for Kent and Medway

1. Cleve Hill Solar Farm, North Kent Coast: £450m, 2021 - 2025
2. Ebbsfleet Garden City: £4.5bn, 2021 - 2035
3. Otterpool Park Garden Town, Folkstone: £2bn, 2023 - 2053
4. Chilmington Garden Village, Ashford, Kent: £1.2bn: 2023- 2043
5. Mountfield Park, Canterbury, Kent: £1bn: 2024 - 2036
6. The London Resort, Kent: £2bn, G1 2022- 2025, G2 2025 - 2029
7. Hoo Peninsula, Kent: £2bn, 2023 - 2037
8. The Lower Thames Crossing: £6.4-£8.2bn, 2024 - 2029/30

	2021-2024	2025- 2028	2029-2038	2039 +
Tradespeople	24,300	38,100	33,100	15,200
Workforce for Lower Thames Crossing	8,500	13,500		
Engineers (Civil/structural/M&E/Highways/Drainage- Requiring people with digital design skills)	1,690	790	440	250
Maintenance (building/engineering)		1,120	2,370	400
Landscape gardening	403	543	113	120
Plant Operators	134	134	274	300
Hotel		20	40	
Hotel (seasonal)		1,500	1,500	
Shop workers		98	158	60
Shop workers (seasonal)		700	700	
Hospitality		68	113	60
Hospitality(seasonal)		70	70	
Theme Park Operatives (seasonal)		9,000	9,000	
Teachers		200	90	340
Architects (Requiring people with digital design skills)	950	500	500	500
QS	197	50	50	
Project Managers	194	27	67	
Cinema Staff			10	
Healthcare		10	10	20
E Sport Software /manufacture		100		
Solar Specilalists	10			
IT/office support	15,000	20		
Total :	**51,378**	**66,550**	**48,605**	**17,250**

Table 4: Employees required per skills type for North Essex

1. Freeport East - Felixstowe and Harwich: £1.6bn, 2022 - 2025
2. Gilston Park Estate, Harlow: £1.2bn, 2023 – 2038
3. UKHSA Relocation to Harlow: £1,143m, 2022/23 - 2026/7
4. Bradwell B Nuclear Power Station: cost undefined, estimated to be between 9-12 years

	2021-2024	2025- 2028	2029-2038	2039 +
Tradespeole	20,200	5,750	750	
Engineers (Civil/ structural/ M&E /Highways /Drainage - Requiring peoplewith digital design skills)	910	180	20	
Maintenance (building/engineering)	40	120	515	
Landscape gardening	2	15		
Plant Operators	130	200	100	
Hotel				
Shop workers		10		10
Hospitality			30	
Architects (Requiring people with digital design skills)	135	75		
QS	63	40	12	
Project Managers	215	25	25	
Research and Development		100		
Teachers and Support Staff			60	
Healthcare				
Fitness			10	
Boat operators			10	10
Security		30		
Logistics		8,500	4,000	
Manufacturing B2		8,500		
Storage workers B8		2,000		
Shipping	10			
Customs	5	50		
IT workers	15	25	10	
Marketing and comms	26	6		
Construction workers focused on mainly engineering construction		2,500*	1,500*	
Nuclear Specialists	30	50		
Total	**21,781**	**25,676**	**5,542**	**20**

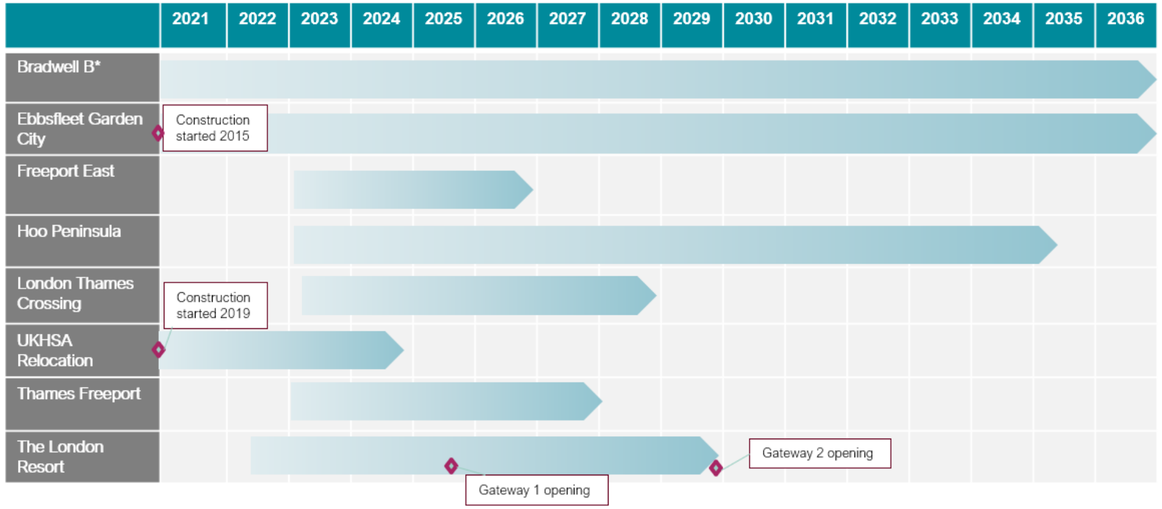
Table 5: Employees required per skills type for East Sussex

1. Newhaven Enterprise Zone, East Sussex: £100m, 2023 - 2027

	2021-2024	2025- 2028	2029-2038	2039 +
Tradespeople		550	200	
Engineers (Civil/ structural/ M&E /Highways /Drainage - Requiring people with digital design skills)	60	700	300	
Maintenance (building/engineering)			150	1,250
Landscape gardening		30	30	10
Plant Operators		200	100	50
Shop workers			10	10
Hospitality		10	20	
Architects (Requiring people with digital design skills)	100			
QS	50			
Project Managers	100			
Research and Development			25	25
Manufacturing			1,000	1,000
Office/IT support	20	15	100	100
Logistics	10			
Security		10	50	50
Shipping Specialists	30			
Customs	10	50		
Marine engineers		30		
Marketing and Communications	10			
Total	**390**	**1,595**	**1,985**	**2,495**

Figure 9: Forecast Skills Profile on the SELEP eight core major projects

Core projects programme from planning up to operating phase

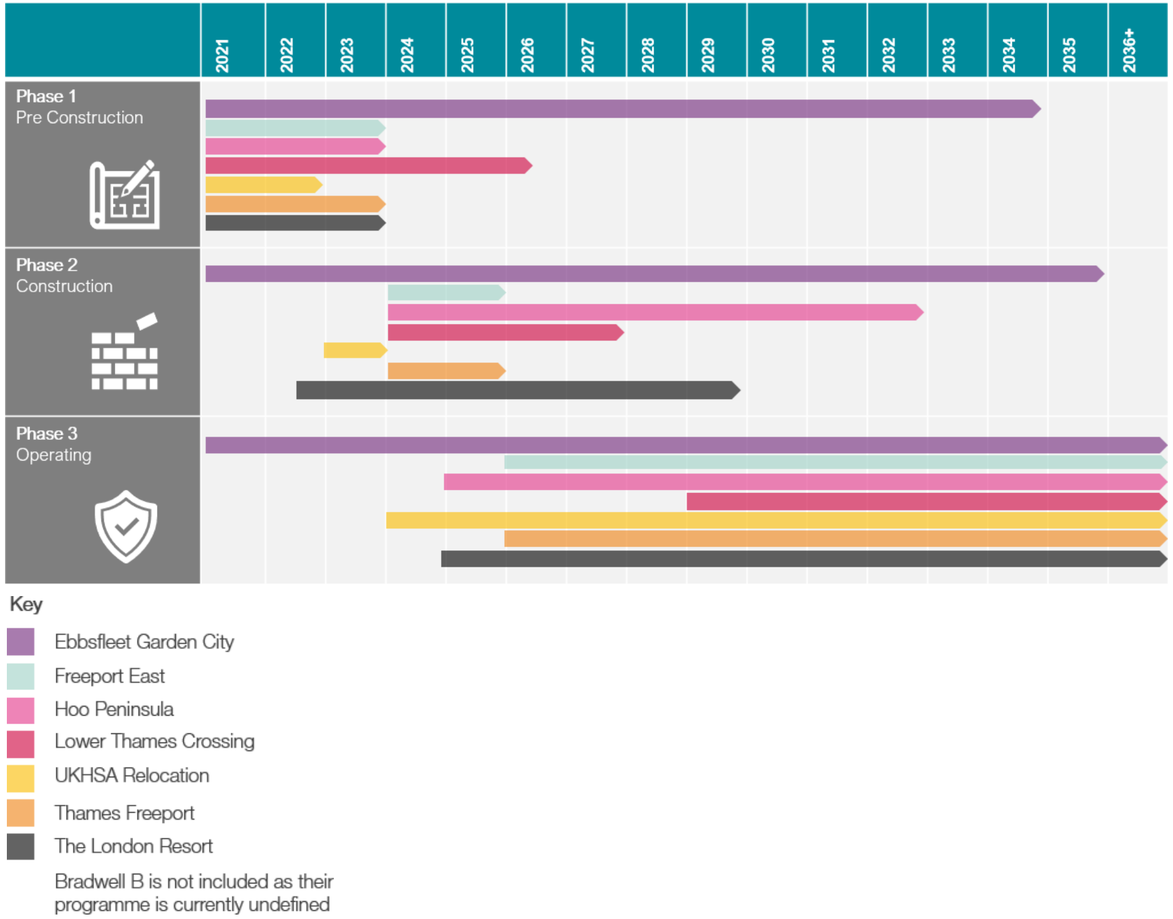


** Bradwell B's timeline is currently undefined, it is included for illustrative purpose*

Thames Freeport illustration

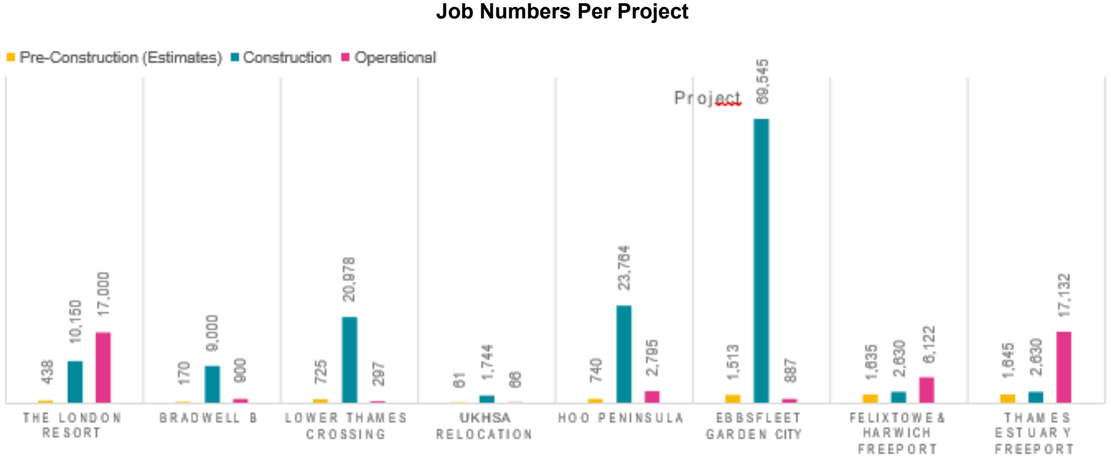
Figure 10: Detailed Review of the Core Eight Projects

Figure 10 below graphic outlines the 8 core projects as per pre-construction, construction and operational timelines. Pre- construction is based on Mace's own estimations as an indication of pre-construction work. All the identified projects are based on the project phases starting from 2021 onwards and do not include data on phases that began previous to this year.



The number of jobs on construction and infrastructure projects can vary significantly. For example, Ebbsfleet will mainly contain traditional construction where high volumes of jobs are likely. However, large engineering project such as Bradwell B will tend to have a much smaller (but a more highly skilled) workforce and much of the manufacture and assembly work will take place off-site (often overseas) and transported to site for installation. The number of operational jobs can vary significantly and must be assessed on a case-by-case basis. In addition, available figures will vary across the projects and be updated over time; at the time of writing some projects had estimates of total jobs whereas others relate to peak employment.

Figure 11:



**Ebbsfleet Garden City includes pre-construction for the phases that are to start in the near future. Our forecast figures are only for work yet to take place.*

Figure 12: Skills Requirements Graphic

The following graphic and tables outline the required skill type, ranked from lower to specialist skills.

Table 6: Skill requirement per area for Kent and Medway

Specialist skills	Skilled	Lower Skilled
• Workforce for Lower Thames Crossing. Incl. tunnelling and high pressure welding another specialist areas • E-sports digital and manufacturers • Ride manufacturers • Solar specialists • GPs	• Tradespeople: Joiners/ carpenters/ bricklayers /roofers /painters /decorators /kitchen fitters /bathroom fitters/ floor layers /pavers / plumbers /scaffolders • Engineers (Civil/ structural/ M&E /Highways/ Drainage • Building and engineering maintenance workers • Welders • Project Managers • Architects • Logistics • Manufacturing • Teachers • Teaching support workers • Healthcare workers	• Labourers • Groundworkers • Landscape gardeners • Plant operators • Theme park ride and activity operatives (seasonal from 2025) • Hotel staff (seasonal) • Shop workers • Hospitality staff (seasonal from 2025) • Manufacturing • Drivers • Hospitality staff (non seasonal) • Hotel staff (non seasonal) • Shop workers (non seasonal)

Cleve Hill Solar Farm

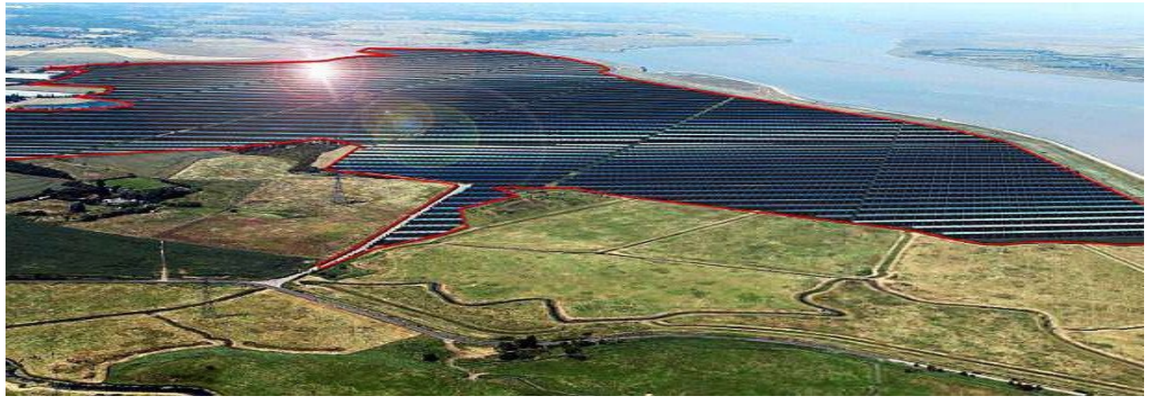


Table 7: Skill requirement per area for East Sussex

Specialist skills	Skilled	Lower Skilled
• Logistics • Marine engineers	• Tradespeople: Joiners/ carpenters/ bricklayers /roofers /painters /decorators /kitchen fitters /bathroom fitters/ floor layers /pavers / plumbers /scaffolders • Engineers (Civil/ structural/ M&E /Highways/ Drainage • Project managers • Manufacturing • Architects • Logistics • Marketing and communications • Building and engineering maintenance workers • Customs officers	• Labourers • Drivers • Plant operators • Security • Landscape gardeners • Groundworkers • Hospitality (canteen)

Newhaven Enterprise Zone

Table 8: Skill requirement per area for South Essex, Southend on Sea and Thurrock

Specialist skills	Skilled	Lower Skilled
• Logistics • Shipping Specialist • Marine Engineers • GPs	• Tradespeople: Joiners/ carpenters/ bricklayers /roofers /painters /decorators /kitchen fitters /bathroom fitters/ floor layers /pavers / plumbers /scaffolders • Building and engineering maintenance workers • Project managers • Architects • Teachers • Teaching support workers • Quantity Surveyors • Research and Development Staff • Healthcare workers • Boat operators • Customs officers • Manufacturing	• Labourers • Drivers • Plant operators • Security • Landscape gardeners • Groundworkers • Hospitality (canteen) • Shop workers

Purfleet on Thames Regeneration

Table 9: Skill requirement per area for North Essex

Specialist skills	Skilled	Lower Skilled
• Shipping specialists • Marine engineers • Workforce for Bradwell B high pressure welding another specialist areas • Nuclear Specialists	• Tradespeople: Joiners/ carpenters/ bricklayers /roofers /painters /decorators /kitchen fitters /bathroom fitters/ floor layers /pavers / plumbers /scaffolders • Engineers (Civil/structural/M&E/Highways/Drainage/utilities/ lighting) • Logistics personnel • Project managers • Architects • Manufacturing workers • Building and engineering maintenance workers • Customs officers	• Labourers • Drivers • Plant operators • Security • Landscape gardeners • Groundworkers • Hospitality

Bradwell B Power Station

As the construction industry revolutionises, new skills in future technologies will also evolve from the above lists. An estimated breakdown of the type of technological skills that will develop are outlined in the conclusion section of this report.

National Context: Gap Analysis

The construction sector contributes almost £100 billion to the UK economy each year and it is predicted that this figure will continue to grow.

Despite the size and scope of the industry, research carried out by The Royal Institute of Chartered Surveyors suggests that the skill shortage within the sector is currently at its highest point since 2007.

Experts have been warning about the potential of a skills shortage within the UK construction sector for over a decade. It is reported that an additional 200,000 skilled workers would be required to close the gap and ensure the industry is able to keep up with the current rate of growth.

The construction industry has long struggled with encouraging young people to choose and pursue a career within the sector. Despite heavy investment and a broad range of opportunities available for school leavers, it remains that construction is often overlooked as a potential career path.

Demand for skilled professionals already outweighs supply and it is estimated that over 20% of construction workers are in their fifties. Therefore, when these experienced construction workers choose to retire, the skills and knowledge they have developed over decades will be lost.

Brexit and the pandemic have further exacerbated the skills shortage as many migrant workers have chosen to return to their home countries in the face of growing uncertainty.

At a basic level, the skills shortage will prevent the UK construction sector from being able to deliver critical infrastructure projects and meet ambitious housing targets – ultimately resulting in the industry shrinking in size.

For employers, the lack of qualified candidates can make it increasingly difficult to find the right people to join their business. With greater competition for experienced candidates, organisations should be prepared to provide increasingly competitive packages for new employees and be prepared to negotiate.

The Construction Index reported that salaries have already started to rise. In 2019 the average salary for a construction worker in the UK rose by almost 10% despite there being fewer vacancies, suggesting that the impact of the skill shortage is already being felt.

With fewer qualified candidates, smaller employers might find it increasingly difficult to compete with larger firms for the best employees.

Impact on the skills gap in the South East

To assess the skills gap in a robust manner, we have sourced the latest skills data available. The most up to date is the CITB Skills report for the South East entitled, "Construction Skills Labour Market Intelligence Report" – 5 Year Outlook 2021 to 2025. It should be noted that Essex, Southend and Thurrock are covered by the equivalent CITB report for the East of England. While in both areas housing and infrastructure are identified as the key drivers of growth, there are of course some differences in the industry and labour market analysis between the two reports. In particular, the level of output growth in the East of England gives an annual average increase of 0.1% in the construction workforce, which is significantly below the UK-wide equivalent of 1.0%, while in the South East it is 1.3%.

The CITB Skills report for the South East concluded as follows:

- There are 16,750 construction workers needed in the South East between 2020 and 2025. Growth will mainly be driven by the housing and infrastructure sectors
- The level of output growth in the South East gives an annual average increase of 1.3% in the construction workforce, which exceeds the UK-wide equivalent at 1.0%. This means that the estimated workforce of 373,400 at the end of 2020 is set to increase to 398,900 by the end of 2025, which exceeds 2019 levels by 3.6%.
- The South East is below the UK on the level of annual average recruitment requirement based on 2020 workforce levels, at 0.9% per year. This means the South East construction industry would have to increase current recruitment by 3,350 new workers each year to deliver the expected work between the end periods of 2020 and 2025.

This report assesses construction output in terms of growth of "business as usual" work.

The 16 South East projects (largely housing and infrastructure based) analysed are supplementary to "business as usual". They have a combined capital value of over £28bn and require approximately a further 76,300 jobs between 2021 and 2024 and 117,400 jobs between 2025 and 2028.

If the additional labour demand requirements on these projects are applied to the CITB findings the South East construction industry would now have to increase current recruitment by approximately further 3,800 new workers each year (i.e. an extra 450 pa from the CITB report).

Emerging media reports also suggests that plugging the skills gap will perhaps become even more of a challenge due to:

- Migrant workers having left the UK due to the pandemic and Brexit, and who have not returned.
- The Government's drive to reduce the UK's dependency on migrant workers, through the introduction of strict new visa entry requirements.
- People in the industry seeking and accepting alternative employment e.g., in Amazon distribution centres.
- Recruitment and retention difficulties of college construction related teaching staff due to better paid alternative employment opportunities in industry, resulting in course closures.

The skills gap is a volatile issue and one that SELEP and partners will be required to closely monitor over the coming months.

Further Education Provision

The national position in terms of construction and national apprenticeship starts is shown below:

Table 10: National Apprenticeship Starts

	2018/19	2019/20	2020/21
Construction Planning and the Built Environment	20,500	19,800	17,800
Engineering and Manufacturing Technologies	50,800	44,500	31,600

This indicates that just under 50,000 students followed this pathway in the most recent year, with the trend being in a worrying downwards direction in both construction and engineering sectors.

This report was not intended to be a detailed and comprehensive analysis of educational course provision. However, in order to inform our skills supply analysis we have taken a sample of six representative (selected by Mace) educational establishments.

- Colchester Institute
- East Sussex College Group
- East Kent College (EKC) Group
- Harlow College
- Mid Kent College
- South Essex College

A summary of cohorts per framework/standards for the above colleges are shown below:

Table 11: Summary of Cohort for Framework/Standards

Framework/Standard	Overall Cohort for selected SELEP colleges
Construction Building	1,030
Plumbing and Heating	910
Engineering Manufacture	950
Electrotechnical	220

The analysis provides the average number of people entering each college and average success rate which are outlined in Table 12.

Table 12: Framework/Standards information per selected colleges in SELEP

Colleges	Framework/Standard	Overall Cohort	Average cohort size	Average achievement rate %
Colchester Institute	Construction Building	250	62.5	48.3
	Plumbing and Heating	260	65.0	67.7
	Engineering Manufacture	140	46.7	76.3
East Sussex College Group	Construction Building	170	42.5	71.7
	Plumbing and Heating	140	46.7	64.8
EKC Group	Construction Building	230	57.5	63.0
	Plumbing and Heating	80	40.0	74.4
	Engineering Manufacture	150	50.0	69.4
Harlow College	Electrotechnical	80	40.0	59.1
Mid-Kent College	Construction Building	150	37.5	68.8
	Plumbing and Heating	100	41.9	67.9
	Engineering Manufacture	80	40.0	64.9
South Essex College	Construction Building	230	46.0	68.7
	Plumbing and Heating	330	47.1	56.2
	Engineering Manufacture	580	96.7	74.1
	Electrotechnical	140	35.0	60.7

Further education establishments in the South East have tended to focus on traditional skills, perhaps due to the high prevalence of small and medium construction enterprises in the area. Yet there are areas of traditional construction where there are skills shortages.

It is difficult to find data that is sufficiently granular in terms of overall FE provision, which tends to provide statistical data in terms of just generic “construction” and “engineering” categories.

Better quality data is available in terms of apprenticeship course provision and achievement and it is this data we have analysed to assess course provision and capacity of skills that are currently in demand.

For this piece of work Mace have analysed the course provision of the 13 colleges in and around the LEP. These are:

- Chelmsford College
- Colchester Institute
- East Sussex College
- Ashford College
- Broadstairs College
- East Kent College
- Harlow College
- MidKent College
- New City College Epping Forest
- North Kent College
- Plumpton College
- South Essex college
- USP College

The data for vocational course provision and achievement shows the following in terms of key in demand and emerging skills (please see table 13).

Table 13: Sample of colleges offering vocational training in emerging skills

Occupation	Number of FE colleges providing training (out of 17 studied).
Traditional Skills	
Multi skills	7
Wood Trades	12
Brickwork	14
Plumbing	12
General Engineering/Civil/Structural	11
Electrical Engineering	13
Painting and Decorating	8
Dry lining/plastering	3
Scaffolding	0
Project Management	0
Mechanical Engineering	3
Welding	6
Procurement and Supply Chain	1
Emerging Skills	
Off-site Construction	1
Computer aided/Advanced manufacture and 3D printing	2
Energy (Solar/Hydrogen/Nuclear)	0
Gas technology related	2
Logistics	0
Robotics	0
Artificial Intelligence	0
Advanced Energy technology related Solar/Hydrogen/Nuclear	0
E-sports	0

Table 13 indicates that most of the colleges are (as can be expected) heavily focussed on traditional skills provision such as wood trades, brickwork and dry liners.

Whilst multi-skilled training is offered, it is still to become mainstream. There is significant anecdotal evidence as the sector evolves and manufacturing methodologies become more mainstream that the demand for multi skilled operatives will increase.

Building multi-skilled construction capacity will also provide greater flexibility to operate in a sector for major projects, where innovation is more prevalent. It also provides opportunity for new entrants to work and develop their skills from a wider skills base and specialise if they choose. Based on an average of 206 students and an average achievement rate of 63%, this will only produce around 900 multi-skilled people per annum.

Where there are defined skills shortages in trades such as plastering and dry-lining due to skills decay, there is opportunity to expand training programmes. However, attraction to these occupations has been in decline and whilst there will continue to be demand in the sector, especially domestic construction, advances in production to construction methodology is having an impact.

Of the colleges analysed, three provide mechanical engineering courses. There is a recognised shortage in this occupation and the demand analysis identifies increased demand across engineering disciplines. Based on an average of 711 students across the three colleges and an average achievement rate of 71%, this will only produce around 500 mechanical engineering people per annum.

However, 11 colleges provide engineering related courses. This is important with many large infrastructure related projects emerging in the South East. Based on an average of 237 students and an average achievement rate of 71%, this will produce around 1,800 engineering people per annum.

None of the featured colleges provide specific courses on project management. Many project managers within the sector develop from other occupations such as quantity surveying, engineering and architecture.

T-Levels

The UK is seeing an increasing overlap between digital route, construction route and the engineering manufacture route. This is because construction and engineering companies have been relatively slow in embracing new technology. However, the use of such technology in design, pre-construction, construction, off-site manufacture and operations is rapidly moving from niche to mainstream.

T-Levels are a new type of technical qualification that were introduced in England last year, and they are set to be one of the main choices for students after completing their GSCEs.

The qualification was launched in 2020 with the intention of attracting more young people into construction and similar fields. They offer a mixture of classroom learning and on-the-job experience through industry placement. This could be invaluable in addressing the barriers the South East face in repositioning construction as a career of choice for young people.

Table 14: Collegesthat currently offer T-Level courses in construction, engineering and manufacturing routes in the SELEP area

T-Level Providers	Region	Construction Route			Engineering and Manufacturing Route
		2020/21	2021/22	2022/23	2022/23
East Sussex College Group	South East	X	X	X	X
EKC Group	South East		X	X	
MidKent College	South East			X	X
North Kent College	South East			X	X
South Essex College	East of England		X	X	X

Higher Education Provision for Emerging Skills

As with further education, universities offer programmes that are aligned to regional and national demands, but unlike FE, HE can develop and accredit its own provision and as such can potentially respond and adapt quicker to align with emerging technologies and skills, at higher levels. Local Higher Education institutions, of which there are nine in the SELEP area, therefore offer opportunity to promote future careers and develop graduates and post-graduates for the sectors that are a valuable resource to the LEP.

As many students will study away from their place of residence and the courses they select to study may be offered outside of the SELEP area, Mace have researched the availability of courses for emerging skills across the UK and examples are set out in table 15.

Table 15: Sample list of universities that offer courses in emerging skills

Subject	University	Course	Years of study
Energy	University of Sussex	Energy and Climate Policy MSc	1
	University of Exeter	BSc Renewable Energy	3
Nuclear engineering	University of Birmingham	Nuclear Engineering MEng	4
	University of Lancaster	Nuclear Engineering BEng Hons	3
	University of Surrey	Nuclear Science and Applications MSc	1
	Imperial College London	MEng Chemical with Nuclear Engineering	4
	University of Cambridge	MPhil in Nuclear Energy	11 months
	Nottingham Trent University	Physics with Nuclear Technology - BSc	3
	University of Bristol	MSc Nuclear Science and Engineering	1
Hydrogen	University of Birmingham	Hydrogen, Fuel Cells and their Applications MRes	1
	University of Nottingham	Sustainable Hydrogen CDT PhD	4
Solar In the absence of a suitable University in the South East SELEP may wish to establish relationships with other universities regarding the Cleve Hill Solar Park.	University of Sheffield	Solar Cell Technology MSc	1
Robotics	University of Essex	BEng Robotic Engineering	3
	University of Sussex	Mechanical Engineering with Robotics MEng	3
E Sports Although not construction related such skills will be increasingly required for theme parks. The London Resort will be one of the first in the Uk to specialise in E Sports	University of Chichester	Esports BA(Hons)	3
	Staffordshire University	Esports BA(Hons)	3
3D Printing	University of Nottingham	Additive Manufacturing and 3D Printing MSc	1
Artificial Intelligence	University of Kent	Artificial Intelligence - BSc (Hons)	3
	University of Essex	MSc Artificial Intelligence	1
Computer aided manufacturing, Advanced manufacture and 3D printing It is envisaged that many of the housing and infrastructure projects described in those report will utilise off- site manufacturing techniques.	Glasgow Caledonian University	BEng (Hons) Computer-Aided Mechanical Engineering	3
	University of Southampton	BEng (Hons) Computer-Aided Mechanical Engineering	3
Logistics	Canterbury Christ Church University	Logistics Management BSc	3
	Solent University	MSc International Shipping and Logistics degree	1
	Middlesex University	Logistics and Supply Chain Management BA	3
	Plymouth University	MSc International Logistics and Supply Chain Management	2

The research appears to show very few courses are offered in the South East LEP area related to emerging technology. The exceptions are robotics and artificial intelligence, where Essex and Kent universities have focused:

- The Essex University Robotics group concerns with the development of various kinds of embedded systems and intelligent robots related to industrial manufacturing, autonomous driving, domestic assistance, healthcare, and search and rescue operations. They have invested over £1 million in equipping this state-of-the-art facility with robotic systems.

- The University of Kent Artificial Intelligence course covers:

    - Introduction to Object-Oriented Programming
    - Human Computer Interaction
    - Programming for Artificial Intelligence
    - Computers and the Cloud
    - Web Development
    - Database Systems
    - AI Systems Implementation
    - Introduction to Intelligent Systems
    - Problem Solving with Algorithms

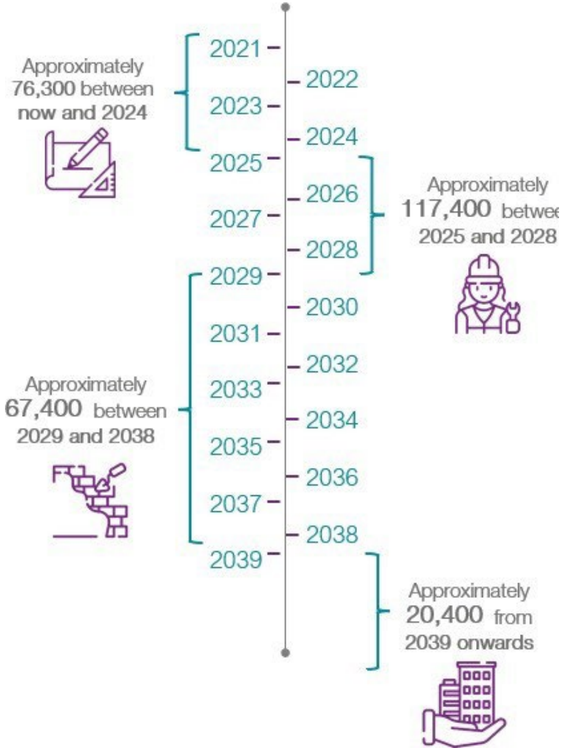
The scale of skills demand highlighted in this report – taken alongside the well-documented historic skills shortages in the construction sectors, and the emerging issues relating to skills shortages in other sectors as we recover from COVID-19 – present a critical issue across the wider economy. Whilst there is provision in the area, without intervention it is unlikely that the current supply will evolve to meet the future demand. For the construction sector, an approach that supports improved productivity and innovation will be the likely solution.

This means increased investment in the development of skills and training that develops the workforce of the future. Whilst traditional occupations will continue to be required, multi-skilled, off site and on-site manufacturing, digital (BIM, DfMA) and other emerging skill sets must be developed to offset. However, it also needs to be considered that any success in addressing the construction skills demand could be at the expense of other sectors similarly experiencing shortages.

The recommendations put forward in the concluding section of this report highlight how collaboration between projects and with schools, FE and HE providers across the SELEP could help to close the skills gap.

The sixteen projects analysed across SELEP have an estimated combined construction value in the region of £28.5bn.

We have estimated the total required workforce of the 16 major projects will be approximately:



The particular skills shortages are likely to occur in the following sectors:

- Engineers (civil/structural/M&E/highways/drainage – where there is already a skills shortage)
- Many construction trades: (which already seem at full capacity) (Joiners, Bricklayers, Roofers, Scaffolders, Welders. Carpenters, Painters, Decorators, Kitchen and Bathroom Fitters, Floor Players, Pavers, Plumbers and Plant Operators)
- Project managers
- Architects
- Logistics
- Teachers and support staff
- Manufacturing
- Healthcare workers (including GPs)

There will be considerable opportunities for people in the lower skilled jobs such as:

- Ground workers
- Labourers
- Plant operators
- Drivers
- Landscape gardeners
- Hospitality and shop workers
- Security
- Seasonal theme park staff (from 2025)

Future skills will evolve in:

- Robotics and visual simulation
- E-sports
- Artificial intelligence
- Computer Aided manufacturing
- 3D printing
- Off-site fabrication techniques (e.g. required on new housing projects nuclear, tunnelling and large buildings)
- Modular construction

In setting out the skills needs, it is important to note that many of the major projects will be using off-site and modular construction, in line with the government's Construction Sector Deal objectives. There will therefore be off-site jobs resulting, which will have different skills requirements to on-site. Although currently only about 10% of output, this is set to increase and could include skills needs such as digital design, off-site manufacturing and on-site placement and assembly.

This is reflected in the emergence of Modern Methods of Construction (MMC) factories, including NU Living in Basildon and Berkeley Modular in Northfleet. A main benefit to modular construction is that the process can be done in any part of the UK where there is an abundance of the required skills. Further benefits include:

- Minimal on-site works
- Accurate procurement reduces material cost and waste
- Enhanced quality
- Improved safety

These sorts of skills will transform the construction process and are already in place in many areas. They do also require data speed, latency and security on site to facilitate data collection.

From a construction perspective, this all suggests that most of the available workforce are fully engaged in helping to deliver "business as usual" type projects. The presence of the sixteen projects listed in this report (plus others not identified in this report) will bring significant challenges in supplying the required skills numbers and quality of workforce for both "business as usual" and major capital projects.

Competition for skilled workers (and labour costs) are therefore expected to become increasingly prevalent as construction employers seek to do all they can to deliver their contractual obligations to meet project deadlines.

We have considered several measures for matching the skills requirement with skills supply and these are covered in the recommendations set out below.

Policies and legislative changes that the Government has or is intending to introduce that support the development of industry driven skills development have also been considered. These include:

- The Post-16 Skills Bill recognises many of the challenges that have been identified in the FE sector, specifically with the current challenge faced by FE and the structural issues associated with addressing sector skills gaps and decay in sectors such as Construction, Manufacturing and the Skilled Trades. The policy objectives of the Bill seek to lay the legislative foundation for FE reform and align to the Skills for Jobs White Paper
- Providing a statutory underpinning for local skills improvement plans as part of the Skills Accelerator, introducing a power for the Secretary of State to designate employer-representative bodies (ERBs) to lead the development of local skills improvement plans with associated duties on providers to co-operate and have regard to local skills improvement plans. This is now being piloted in some areas, including Sussex, Kent and Medway.
- Introducing additional functions to enable Institute for Apprenticeships and Technical Education (IfATE) to define and approve new categories of technical qualifications that relate to employer-led standards; to have an oversight role for the technical education offer in each occupational route, including mechanisms to manage and maintain a streamlined qualifications system. The legislation will also embed consultation and collaboration between the Institute and Ofqual for the approval and regulation of technical qualifications.

- The introduction of flexible apprenticeships in sectors with flexible employment patterns and short-term roles, such as construction and creative sectors

The implications of this in relation to the SELEP projects is that they seek to better align the needs of employers and learners. In this regard we believe construction learning providers need to equip their students with multiple skills. This enhances the value of the student to employers, and also provides employment flexibility when there is a temporary lull in one trade, but a requirement for a skill on another construction task.

A collaborative approach to skills and course development, working with the MPG to understand requirements and time-lines, is likely to drive growth in capability that responds to demand.

SELEP highlights the need to boost productivity, and identifies skills development aligned closely to the needs of employers, as being key to achieving this in the context of growth and technological change.

A related report, 'Construction Growth in Essex 2020-2040' commissioned by Essex County Council, produced a number of recommendations which have been taken into account in this report.

Further information on smaller projects across Kent, Medway and East Sussex is also available in a report produced by the Construction and Industry Training Board. This includes housing developments and shopping centre developments. (https://www.southeastlep.com/app/uploads/2018/08/Kent-East-Sussex-final-construction-sector-report.pdf).

SELEP and the Major Projects Group have already indicated their commitment to developing an action plan to respond to this report and recommendations, which is expected to be produced in short order following publication. This will also enable engagement with the wider skills landscape to deliver against findings and to build on existing work.

Recommendation R1

That Higher Education and Further Education Providers collaborate together and with industry to align their work to the pipeline of job opportunities – building a total talent pipeline from secondary age through to master's degree.

SELEP has existing forums that bring together FE and HE institutions across the area, alongside industry to take a collective view and approach to the skills needed in the labour market. This performs an important function across all key sectors but in the case of major projects, due to their size, scale and the economic impact that this holds for the area, it is vital that the demand and timescales of these projects as a collective is understood so the education sector can plan for and deliver what's needed. Collaboration with schools and school networks is also good, with a strong relationship with partners such as the Careers Enterprise Company and STEM Learning.

The HE and FE providers, including training providers, will have a very significant role in securing the future skills required in the SELEP area, especially the people who will be engaged in the engineering, technology and manufacturing sectors and the potential projects identified in this report.

It is also important to support providers to converting recently trained students to new recruits in the sector. The CITB has estimated that only 27% of trained construction students go into the sector, therefore this could represent a future workforce, with models such as Construction Bootcamps useful to explore.

As part of this and to support wider transition into the sector, providers could seek to offer more flexible training to respond to industry need which does not always require a full qualification (e.g. areas such as dry lining, tiling and flooring are part of a full qualification, but could also be delivered as a short course/training programme).

HE and FE providers will also perform a major role in training people in the areas where future skills will evolve on those projects, ensuring that curriculum is looking to future skills needs as well as current.

There is also a current bid for an Institute of Technology (IoT), which would significantly boost the facilities and capacity of the local FE and HE providers to deliver against industry need and with employer involvement. This would be LEP wide and it will clearly be important for the MPG to work closely with an IoT if this goes ahead.

The career opportunities for young people on these projects are vast. New skills will require transformational change to the teaching provision in schools, FE and HE. An emphasis on science, digital, robotics, augmented reality, automated manufacturing and the engineering disciplines will be essential. This will require close alliances between schools, FE and HE sectors to ensure those skills are tailored to the demands of the projects.

The local skills improvement plans (LSIPs), although only at pilot stage, demonstrate the government's commitment to giving employers a key role in influencing technical education and training. As part of this, providers in the statutory FE sector may be placed under a duty to review their provision against local needs and consider what actions they might take.

This enhances collaboration and cooperation between FE, HE and local enterprise and could support the development of a regional response to the skills and employment opportunities in the SELEP area relating to the development of a workforce in response to increased demand.

The figures earlier in this report indicate a significant requirement for key skills, in particular engineering skills, where there is already a significant shortage across the UK.

It is also important that those trained and entering jobs with the major projects have good access to mental health and pastoral care. In encouraging people into the sector, mentors are also vital, particularly given that many will have no experience of these sectors and jobs. These are the sort of areas where the major projects across the South East could strive to be the best and to develop national leadership. Similarly, there should be an emphasis on high achievement rates and high quality of training which will undoubtedly be enhanced by a supportive approach.

Mace have included a profile of relevant Higher and Further Education providers in the LEP who could have a role in helping to source people, with the right skills to join these major projects as graduate workers or apprentices. These can be found in Appendix 1.

Thames Estuary

Recommendation R2

That the larger long-term employers (such as Bradwell B, the London Resort, Freeports, Lower Thames Crossing) engage with schools (including University Technical Colleges).

Naturally, there may be more intensive engagement with schools in close proximity to projects, but the projects collectively represent a powerful and tangible example of growth to engage schools across the geography in responding to skills needs.

There are also four main UTCs operating within the South East, but an approach that reaches all types of schools will be vital in building the future skills pipeline. Reaching SEND (Special Educational Needs and Disabilities) Schools and Pupil Referral Unit (PRU) Schools will also be important in striving for inclusivity in the sector.

We believe that SELEP can play a strong role in facilitating partnerships between major projects and schools, as well as FE and HE providers with the objectives of:

- Addressing the skills gap – help to build a world-class technical education
- Identify future talent, build lasting relationships and create aspirations for careers in the built environment
- Reducing the cost of recruitment and time-to-productivity - train and assess students before they join their organisation
- Create a knowledgeable talent pool by supporting schools to develop their curriculum to deliver subjects and skills required by employers
- Help students to make informed choices about careers through IAG and careers advice

Recommendation R3

That consideration is given to expanding use of advanced design and manufacturing techniques to help alleviate forecast skills shortages.

The main-streaming of advanced design and manufacture techniques in the construction sector will help to alleviate some of the forecast skills shortages. Increasing amounts of automation are inevitable and will help to both reduce the need for scarce skills and improve efficiency.

Creating a supply chain for digital software, equipment and manufacture, and assembly and installation using robotics will also present substantial opportunities. This would cover MMC and Engineering. It would be important to engage with SMEs locally to develop such supply chains. Local companies in automotive and aerospace, for example, would have the production engineering to pivot into the construction sector.

The skills gap can be alleviated if new technology in the construction of buildings and engineering infrastructure is utilised to a greater extent. By using volumetric manufacture, allied to CAD/CAM and robotics manufacture, this would enable buildings, engineering infrastructure and their associated components to be fully built and delivered to a high level of completion from factories located in the UK where the key skills are present.

We believe such advanced methods can significantly reduce the on-site workforce on many of the projects where engineering equipment is required or new-build houses, factories, shops or hotels are required.

These could have a strong focus in future skills development to ensure that adoption of such techniques is not hampered by a lack of skills.

Recommendation R4

That the tutor shortage issue is addressed collectively, and that teacher and tutor recruitment and training plans align to industry needs.

The stakeholders have identified that there is a considerable shortage of teachers and tutors of technical subjects in the South East already, particularly in subjects such as construction and engineering.

This is a major issue now, and, without some intervention, this will become increasingly problematic and impact on growing skills shortages.

This is also the case for those who are able to teach emerging skills that depart from traditional requirements, and it is anticipated that employers will increasingly require the following skills in emerging and evolving skills relating to new technologies e.g. robotics, solar energy, hydrogen production, carbon storage and autonomous vehicles.

With shortages of technical skills in industry, it is challenging for providers to compete on salary. This could potentially be achieved in part by extending and expanding the successful SELEP Tutor Bursary Scheme and the Become a Lecturer site which features vacancies and videos of the rewarding aspects of working in FE. Or, developing an aligned initiative such as the projects releasing staff for teaching or assisting in the costs of salary and recruitment of industry experts.

However, the issue remains significant, coupled with the growth as forecast, so continued action is essential. The action plan delivering against these recommendations may consider funding individuals from industry to undertake teaching, for example, or project-based teaching where students are set projects by industry with mentor support.

Recommendation R5

That an effective Supply Chain Strategy is developed that aligns to skills availability.

It will be of real benefit to have an effective, collaborative and integrated Supply Chain Strategy aligned to take advantage of the skills and capabilities of the established service, construction, maintenance and manufacturing capability in the area.

It would also be beneficial if the main developers could develop their own Section 106 obligations or social value targets around skills, such as numbers of apprentices employed and training days allocated.

An effective Supply Chain Strategy aligned to optimise the skills and business capacity within the local economy, and also outside where local provision is considered to be nearing full capacity, could:

- potentially have Tier 1, Tier 2 and even Tier 3 companies pooling key skilled staff and apprentices to ensure they are deployed where most needed.
- encourage collaboration with local skills providers.
- include how off-site modern methods of construction, engineering and manufacture can be used to minimise the requirement for local skills that are in short supply.
- build on existing meet the buyer events (underway through the local I-Construct project) for each of the 16 projects reviewed, ideally before any of the Tier 1 contractors have already awarded any subcontract opportunities, so they are viewed as more meaningful to local SMEs.

This will ensure local companies can access opportunities to provide equipment or components relating to the projects, for example theme park equipment for the London Resort, mechanical and electrical equipment for the

Lower Thames Crossing, transportation equipment for the Freeports and kitchen and bathroom fittings and building materials for the numerous new housing projects.

Coordination across the sub-sectors of construction would allow for the development of synergies, offering opportunities for efficiencies, coordinated delivery and collaboration through, for example, adoption of joint platforms or standardisation of components.

This could, in the first instance, create greater clarity to the supply chain through:

- The development of construction sector technology roadmaps at regional level, which would provide a unifying vision for technological advances in order that supply chain firms are better able to understand future opportunities and priority technologies.
- The development of regional construction sector procurement pipelines.
- Feasibility study for the development of a 'Modern Methods of Construction integrator'.
- Defining the potential for MMC on a programme of projects and bringing supply chain partners together to deliver a project.
- Encouraging the adoption of MMC amongst SMEs such as small house builders who would otherwise not be able to invest in manufacturing capacity.

Recommendation R6

That the untapped workforce in the region is harnessed as much as possible in the development of lower skilled jobs.

At the time of writing, there were over 150,000 people claiming out of work benefits in the LEP area. The SELEP has areas of deprivation, many of which align to project locations, where a focus on creating lower-level jobs will benefit the population. These will likely focus on Level 2 opportunities in the construction industry.

The aim should be to focus on sustainable opportunity – the development of the construction and engineering workforce in the South East is sustainable because of skills decay across the sector, and the demand from other major projects across the UK will enhance this. Collaboration with other major projects can position this as an opportunity rather than competition.

We believe there is the potential to set up a joint venture initiative for existing colleges and providers in the LEP to work with the delivery partners of major projects. The aim would be to create an "in time" pipeline of NVQ Level 2 people to be able to take up lower skilled positions within these projects, with the opportunity to progress into apprenticeships and further training.

It would clearly be appropriate to work with existing support, such as that available through European Social Funded projects and to work with Job Centre Plus and other key partners on ensuring that local unemployed individuals benefit from the jobs on offer. This might include site-ready and employability training, so that work-ready individuals are given priority for new jobs in the supply chain. Additionally, it would be positive for projects to be proactive in developing an approach to supporting, for example, ex-offenders into work.

There is also a major opportunity for projects to lead in terms of developing a more diverse workforce in construction and related sectors. Ensuring a shared approach to equal opportunities, supporting vulnerable groups and having good mentors and role models will be essential in this regard.

Summary of Recommendations

Below is a summary of the recommendations made in this report:

Recommendation R1: That Higher Education and Further Education Providers collaborate together and with industry to align their work to the pipeline of job opportunities, building a total talent pipeline from secondary age through master's degree.

Recommendation R2: That the larger long-term employers (such as Bradwell B, the London Resort, Freeports, Lower Thames Crossing) engage with schools (including University Technical Colleges).

Recommendation R3: That consideration is given to expanding use of advanced design and manufacturing techniques to help alleviate forecast skills shortages.

Recommendation R4: That the tutor shortage issue is addressed collectively and that teacher and tutor recruitment and training plans align to industry needs.

Recommendation R5: That an effective Supply Chain Strategy is developed that aligns to skills availability.

Recommendation R6: That the untapped workforce in the region is harnessed as much as possible in the development of lower skilled jobs.

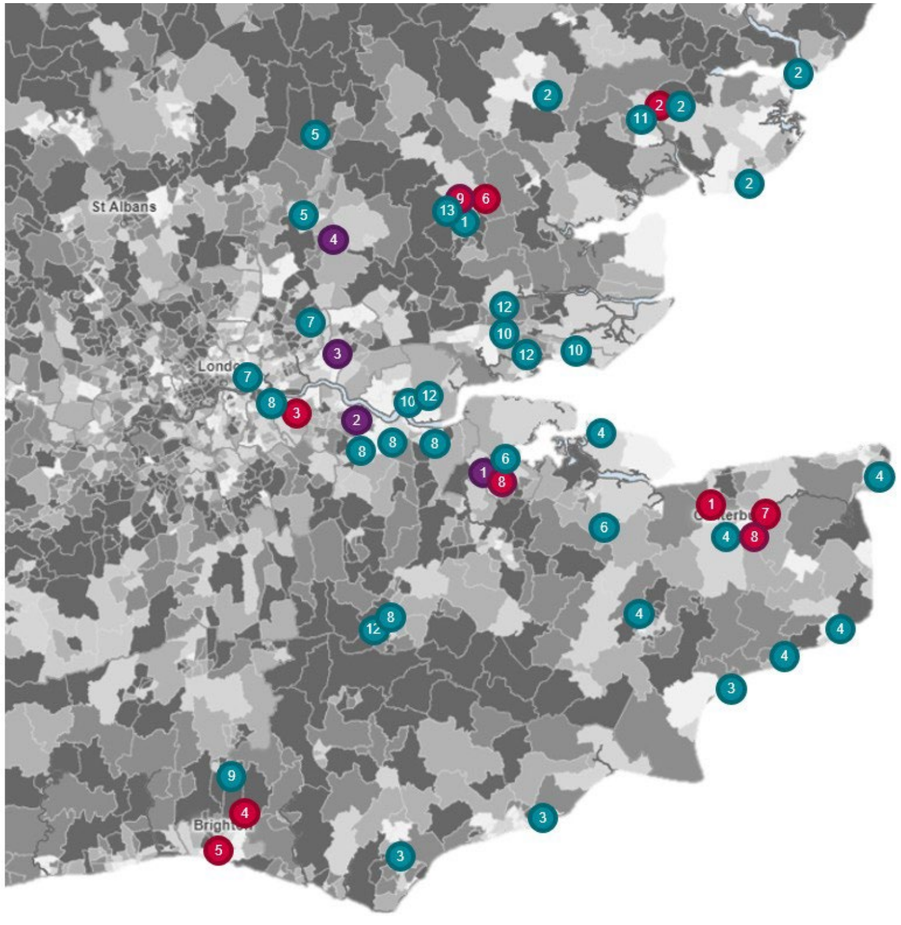
Mace endorses the proposed approach of the MPG and SELEP to develop a shared action plan to respond to these recommendations and to galvanise the wider skills landscape and engage with related work across the area.

Due to the fast-paced nature of change and growing demand, it would also be our recommendation that this report is reviewed in 18 months to assess any updates required or new recommendations.

Appendices

Appendix 1: Education Providers

There are a large number of schools, Further and Higher Education providers across the geography, including colleges, universities and independent training providers. The map below shows some of these, with web links to local networks for further information. The map does not include 270+ Secondary Schools and 1,130+ Primary Schools, which it is clearly important for the projects to also engage with. University Technical Colleges (UTCs) have been included as examples. SELEP has a strong relationship with local education networks.



Colleges

Federation of Essex Colleges:
federationofessexcolleges.org

Kent Further Education:
kentfurthereducation.org

FE Sussex:
fesussex.org.uk

- Chelmsford College
- Colchester Institute – campuses at Colchester, Braintree, Harwich, Clacton
- East Sussex College Group – campuses at Eastbourne,
- EKC Group – campuses at Ashford, Broadstairs, Canterbury, Dover, Folkestone & Sheppey
- Harlow College – campuses at Harlow and Stansted Airport
- Mid Kent College – campuses at Maidstone and Medway
- New City College – campuses at Epping Forest (and London)
- North Kent College – campuses at Dartford, Gravesend, Hadlow, Thameside, Greenwich, Tonbridge
- Plumpton College
- South Essex College – campuses at Southend, Thurrock, Basildon
- The Sixth Form College Colchester
- USP College – campuses at Benfleet, Grays, Canvey Island and Basildon
- Writtle University College (FE and HE)

Universities

- University of Kent
- University of Essex
- University of Greenwich
- University of Sussex
- University of Brighton
- Anglia Ruskin University
- Canterbury Christ Church University
- University for the Creative Arts
- Writtle University College

UTCs

- Waterfront UTC
- The Leigh UTC
- Elutec
- BMAT Stem Academy

The area also has an Adult Community Learning offer with multiple locations through:

- Essex Adult Community Learning
- Thurrock Adult Community College
- Southend Adult Community College
- Kent Adult Education
- Medway Adult Education
- East Sussex Adult Learning

Independent Training Providers (via their consortiums):

- Sussex Council of Training Providers:
  sctp.org.uk
- Kent Association of Training Organisations:
  kato- training.org
- Essex Provider Network:
  essexprovidernetwork.com

Appendix 2: Figures and tables in order of appearance.

Figure	Description	Source
Figure 1	Project map showing location of projects covered within the study	Desktop research on project sites and maps
Figure 2	Population (16+) by region across the SELEP area	Annual Population Survey 2020
Figure 3	Economic activity by age and region across the SELEP area	Annual Population Survey 2020
Figure 4	Numbers of economically active to economically inactive by region across the SELEP area	Annual Population Survey 2020
Figure 5	Project map showing location of additional selected projects covered within the study	Desktop research on project sites and maps
Figure 6	Project map for South Essex, Southend on Sea and Thurrock	Desktop research on project sites and maps
Figure 7	Project map for North Essex	Desktop research on project sites and maps
Figure 8	Project map for Sussex	Desktop research on project sites and maps
Figure 9	Forecast skills profile on the SELEP top eight projects	Information provided by MPG
Figure 10	Pre construction, construction and operational phase timelines for the SELEP top eight projects	Information provided my MPG and desktop research
Figure 11	Forecast job numbers per project for the SELEP top 8 projects	Mace modelling and information from MPG
Figure 12	Skills requirement graphic	Mace estimate based on research and expertise

Table	Description	Source
Table 1	Demographic comparisons in the SELEP area vs England as a whole	Annual Population Survey 2020
Table 2	Employees required per skills type for South Essex South end on Sea and Thurrock projects	Mace estimate based on research and expertise
Table 3	Employees required per skills type for Kent and Medway projects	Mace estimate based on research and expertise
Table 4	Employees required per skills type for North Essex	Mace estimate based on research and expertise
Table 5	Employees required per skills type for East Sussex projects	Mace estimate based on research and expertise
Table 6	Skill requirement for the Kent and Medway area	Mace estimate based on research and expertise
Table 7	Skill requirement for East Sussex area	Mace estimate based on research and expertise
Table 8	Skill requirement for the South Essex, South end on Sea and Thurrock areas	Mace estimate based on research and expertise
Table 9	Skill requirement for the North Essex area	Mace estimate based on research and expertise
Table 10	National numbers of apprentices starting a course in construction or engineering by year	GOV.UK 2018/19
Table 11	Apprenticeship cohort numbers by discipline	Department for Education (DfE) 2018/19
Table 12	Information available on cohort standards by college in the SELEP area	DfE 2018/19
Table 13	Sample of colleges in the SELEP region offering “ in demand” and emerging skills courses	Desktop research
Table 14	College groups that currently offer T Level courses in construction, engineering and manufacturing roles in the SELEP region	GOV.UK 2021
Table 15	Sample list of universities offering courses in emerging skills in the SELEP region	Desktop research

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SOUTH EAST
LOCAL ENTERPRISE
PARTNERSHIP