

In fact, it's still the heart of our sewerage infrastructure, even today. But London is a far bigger city now than it was in Victorian times and it's time to ensure future generations of London can enjoy a cleaner, healthier River Thames.

Originally designed for four million residents, the system would overflow into the river only after a bad storm, maybe once or twice a year. Now, about eight million people live in London and overspills are happening just about every week. In 2013, the sewage overflow topped 55 million tonnes. This is way above the average annual figure of 39 million tonnes and the same as eight billion toilets being flushed directly into the Thames.

Thames Tideway Tunnel is the major new sewer that will help prevent increasing pollution in the Thames.

The £4.2bn, 25km (15 mile) super-sewer is the deepest ar longest ever constructed in London. During construction there'll be 24 construction sites, from Acton in the west to Abbey Mills in Stratford in the east.

Between 2015 and 2023, construction work here will create thousands of job opportunities – especially for local residents Working on the project is your chance to be part of a cleaner, healthier future, for both the river and those who enjoy travelling, working or living nearby.

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Sir Joseph Bazalgette was to behind London's sewerage following the 'Great Stink' of the river just about brought

behind London's sewerage system. He designed the sewers following the 'Great Stink' of 1858 when the stench from the river just about brought London to a standstill. His sewers are made up of 318 million bricks, all laid by hand.



Next time you walk down the Embankment, see if you can find the memorial to Sir Joseph, overlooking the Thames near the new Golden Jubilee bridges.

Thames Tideway Tunnel will build on Sir Joseph's great legacy, protecting the Thames for the next 100 years.





The same of the sa

Our cleaner river, your great opportunity

Construction work on Thames Tideway Tunnel has committed to:

- Achieve excellent standards of health, safety and well-being on sites.
- Ensure a suitable workforce with the right skills is available to deliver the project.
- Give opportunities to local and under-represented groups.
- Promote education and construction careers through its science, technology, engineering and maths programme.

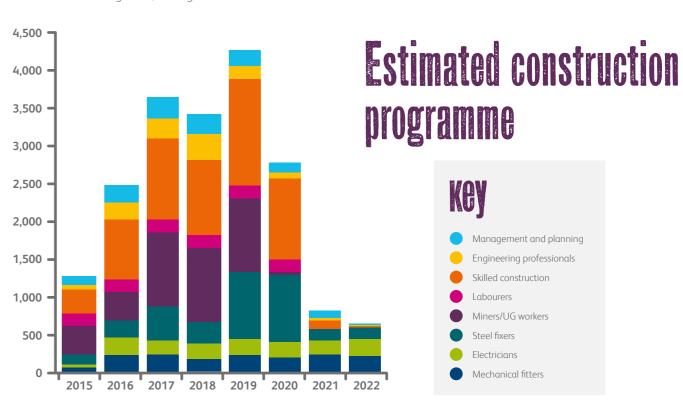
Tunnel your way to a career in construction

Thames Tideway Tunnel is part of a huge programme of construction in London that will last for the next few decades. Work on the tunnel will generate more than 9,000 jobs overall, with most roles being available from 2016. Thousands of these will be construction-related roles. The opportunities for you could be immense. Above ground, underground and on the river...

You have the skills we need

There are so many ways for you to get involved and be part of London's history. These projects have roles for all sorts of construction workers including; construction design and management staff, skilled construction workers, plant operatives, underground workers, piling operatives and site engineers.

Over the coming decades, there's going to be a huge demand for construction jobs in London and throughout the UK. A role on Thames Tideway Tunnel could be your stepping stone to a rewarding career for life.



Thames Tideway Tuppel is the biggest

Thames Tideway Tunnel is the biggest infrastructure project ever undertaken by the UK water industry

- There are 24 construction sites on Thames Tideway Tunnel, 11 of which are located on the river.
- Constructed by world-class contractors, the tunnel will adopt ground-breaking and innovative techniques using the most sustainable and cost-effective methods of construction.
- At 25km long, up to 65 metres deep and seven metres in diameter, you could fit three London double decker buses inside it – side by side!
- Technology and design skills are crucial to construction projects. Innovative engineering has been able to reduce the tunnel from the initial 32km down to 25km, and the number of construction sites needed from 45 to 24.
- The tunnel will generally follow the route of the River Thames, so 4.2 million tonnes of waste will be moved by barges on the river. This is why environmental and planning skills are vital to make construction works more sustainable.

What is a tunnel boring machine?

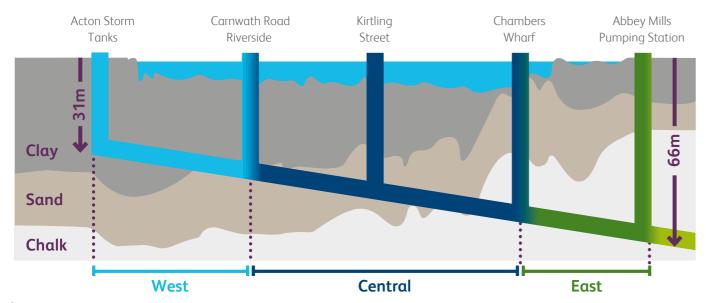
Tunnel boring machines are huge, underground diggers that use rotating cutters to make circular tunnels. Tunnel boring machine operators are very skilled and have a lot of responsibility. Most start their careers

by helping to remove the waste before working up to operate the machines.

Tunnel operatives can work all over the world but to do the job you need to be able to work in a confined environment for a long time.



The route and the tunnel





- There will be three major 'drive sites' where tunnel boring machines are lowered into the ground and driven below the river bed to construct the tunnel from east, west and central locations. These sites will be operational for six to seven years, much longer than other sites.
- Main tunnel reception sites, such as Acton Storm Tanks, will be operational for about three years. Acton receives the tunnel from Chambers Wharf and connects the main tunnel to the Lee Tunnel, which will transfer sewage flows to Beckton Sewage Treatment Works.
- Blackfriars Bridge Foreshore is a Combined Sewer Overflow (CSO) site. Work here includes reclaiming land above ground, while underground, it will intercept the existing local CSO. Along with works at Victoria Embankment Foreshore and Chelsea Embankment Foreshore, mean that we do not need additional sites to intercept ten CSOs between Battersea Bridge and Blackfriars Bridge. Work here should take about four years.

- Short connection tunnel drive sites are where underground structures connect CSOs to a shaft that will transfer sewage flows from the CSO to the main tunnel.
- Long connection tunnel drive sites at Greenwich Pumping Station and Dormay Street are longer tunnels which may connect several CSOs to the main tunnel. The Greenwich connection tunnel, joins the CSOs at Greenwich Pumping Station, Deptford Church Street and Earl Pumping Station to the main tunnel at Chambers Wharf. Work on these sites should be about four years.
- System modification sites include Beckton Sewage Treatment
 Works where work is needed to allow the additional storm
 flows from the main tunnel, arriving via the Lee Tunnel,
 to be pumped out and transferred for treatment. System
 modification sites can be operational for between one to five
 years, depending on the work being done.

Gonstructing Vous Future

Thousands of jobs on Thames Tideway Tunnel will be construction related. And as most will be available from 2016-2023, there's plenty of time to get training so you're ready when roles become available. See page 11 for information about training.

Starting your career on Thames Tideway Tunnel will build your experience and reputation. It could lead you to construction jobs all over the UK or even across the world. Construction is a career for life.



▲ Traditional **Apprenticeships**

Combining studying at college (or with a training provider) and on-site experience, you will take about two to three years to get an NVQ or SVQ qualification.

▲ Higher Apprenticeships

The Higher Apprenticeship provides broad-based training and a structured career path for a range of technical, supervision and management roles. This helps apprentices to progress to higher level jobs using Further and Higher Education. It can develop the skills and knowledge required by construction managers at senior levels to be of a nationally consistent specification and standard.

▲ Specialist Apprenticeships

Specialists' work often needs a flexible learning arrangement so these Specialist Apprentice Programmes (SAPs) allow apprentices to learn mostly while on the job. The programme is open to learners of all ages who build up enough skills to gain a construction industry recognised N/SVQ qualification, usually over two years.

Right time, right people

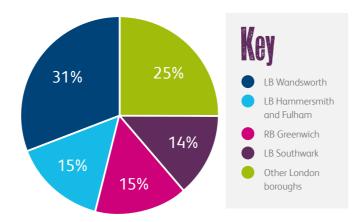
Because of the skills needed on the project, Thames Tideway Tunnel and CITB have committed to helping make sure people are trained up and ready with the right skills in the right area, at the right time.

Maybe it's because you're a Londoner...

Living in London might help you get ahead, even when you're underground.

- Thames Tideway Tunnel is working towards ensuring that at least 20% of employees live in the boroughs of Hammersmith and Fulham, Wandsworth, Southwark and Greenwich.
- It also has an overall target that at least 25% of employees will live in the 14 local boroughs.
- Targets will be set to employ local unemployed people.
- Local businesses will be given the chance to benefit from spending on goods and services.

Estimated jobs by borough



Plant Operatives and Crane Operators

Labourers (including Traffic Marshalls, Banks Persons, etc.)

Groundworkers and **Piling Operatives**

Formworkers

Steel Fixers

Concreters

Scaffolders

Construction Management

Professional/ **Technical Services**

Wood Trades and Interior Fit Out

Non Construction/ **Non Construction Operatives**

Electrical Trades

External Envelope

Site Services

Tunnelling and **Underground Workers**

• D-wall Support Crane Operator

the occupations we need... keep an

eye on contractors' websites and

www.thamestidewaytunnel.co.uk



Earn and learn on an Apprenticeship

Apprenticeships are a fantastic opportunity to earn, learn and kick start a career in construction. So if any of these roles look good to you, find out more at www.citb.co.uk/bconstructive and keep your eye on university and further education colleges, as well as www.thamestidewaytunnel.co.uk for details. Once they've been appointed in 2015, contractors will be advertising their Apprenticeship opportunities from 2016 onwards.

Civil engineer apprentices

For civil engineer apprentices there's no typical day but you will normally work a 40-hour week, Monday to Friday, and one of these days will be at further education college. Engineers do a huge range of jobs, with different teams and on different sites, so the aim of the Apprenticeship is to give you a broad understanding of the skills you need and the options open to you to progress in your chosen field. As working on site often involves a lot of travel, you'll need to stay away from home

Starting pay for an engineering apprentice is around £15,000. Once qualified, you can expect to earn between £17,000 and £25,000 per year.

Tunnelling operations apprentices

As a tunnelling operations apprentice you will work on the ground and underground.
You start on the surface doing general labouring and learning the skills etc.

The job means working outdoors in all weathers, as well as underground. When underground, tunnelling operations apprentices work behind the Tunnel Boring Machine (see page 6) as it excavates the tunnel.

There are lots of specialist skills involved like positioning the concrete tunnel segments. With commitment and ambition, apprentices can go on to become tunnel boring machine pilots, in charge of a complex machine.

Starting pay for a trainee is between £10,000 and £12,000 per year, increasing to £15,000 once you achieve a Level 2 NVQ in tunnelling operations. Experienced pilots can earn up to £80,000 per year and work all over the world.

Marine apprentices

Tunnel Boring Machine

Depending on the tides, a marine apprentice's working day varies but it's nearly always an early start. Trainee deckhands work under a qualified mate and in overall charge is the skipper. Mostly, apprentices do rope and wire handling, cargo loading and unloading and operating winches and other deck gear.

On the Apprenticeship, with the boat and classwork, the pay is between £10,000-£15,000 a year. Qualified mates go up to about £24,000. Skippers have a Boatmasters' Licence and earn over £30,000 a year.

If you think this might be the job for you, check out the 64ths website at **http://64ths.co.uk** or the Company of Watermen and Lightermen at

www.watermenshall.org which both offer Apprenticeship routes to become a Boatmaster.

Apprenticeships – questions answered, see page 18.

Equality

Thames Tideway Tunnel is committed to equality, ensuring access to opportunities for groups under-represented in the workforce in terms of their ethnicity, gender and disability.

Get involved

If you'd like to be part of building Britain's future, there are lots of opportunities, no matter what experience you have

With so many great projects under way or planned, there has never been a better time to work in construction. Thames Tideway Tunnel alone will create thousands of job opportunities in or around London. With lots of training and support available it's up to you to take the first step to a great career.



Looking at construction for the first time?

If you've been inspired by Thames Tideway Tunnel and the amount of construction work coming up that will need skilled and professional workers, that's great.

We want to help you make the most of these chances and are here to help. Construction companies are working closely with colleges throughout London and beyond to make sure students get the skills they need.

Find out more at www.citb.co.uk/careers

If you already work in construction

Your skills will undoubtedly be needed on Thames Tideway Tunnel but remember, the majority of work will be from 2016.

In the meantime, keep your eyes open for opportunities as they arise. Many will be advertised through Jobcentre Plus and other local employment sites, as well as through the companies that win contracts to work on the tunnel.

No matter how much experience you have, you will still need to show you are up to date with your training. You will also need to have passed the latest tests including: CITB Health, Safety & Environment test, on-site drugs and alcohol test and others, depending on where you work and what you do.

Getting back into construction

If you like the look of the opportunities we've outlined and want to get back into construction after a break, we couldn't be happier.

Your experience and skills, in and out of the industry, will be really useful. There is so much construction work going on throughout the UK, we know the current workforce can't meet the demand. The more skilled people available, the better.

The exact training and qualification requirements for you will depend on your role but you can find out what these are at www.citb.co.uk/pathways

Just left the Armed Forces?

Bring your skills, experience and ability to work as part of a team to Thames Tideway Tunnel. Employers will welcome the transferable and valuable skills you bring with you but you may need to do some retraining first, including CITB Health, Safety & Environment test.

For a breakdown of the roles and the qualifications needed to do them, look at **www.citb.co.uk/military**

Ready for a career change?

If you're looking to change career, construction is the place to be.

If you want to do a craft, apply your knowledge and management skills in a different environment, be outdoors – or indoors – or just want to be part of something really big, construction is the place for you.

There is a wide range of training available that can help you change your skills set, including leadership and management qualifications.

Find out more at www.citb.co.uk/careers

Developing training, accrediting providers and working with employers, the Construction Industry Training Board (CITB) is the industry training board for the UK construction industry.

The Tunnelling and Underground Construction Academy (TUCA) is a purpose-built facility providing training in the key skills required to work in tunnel excavation and underground construction.

Visit www.citb.co.uk/tuca

If you want to know more about what training is available, what qualifications you might need or what opportunities there are that could be right for you, check out www.citb.co.uk

GITB is the UK's industry training board

A day in the life of a steel-fixer apprentice

Working as a steel fixer is a great job.

I am responsible for positioning and securing the steel bars and mesh that are used in reinforced concrete on construction projects. I get to cut, bend and fix steel using mechanical tools, working from planned specifications.

Sometimes I work at night and although a normal week is about 40 hours, I can also get offered overtime to meet deadlines. I started by fetching and carrying tools on site and being taught how to use tools and tie steel. I'm working towards my NVQ that will show I'm competent at the tasks that are needed.

and £16,000 per year, but when I'm experienced I'll earn between £17,000 and £27,000.

One thing I'd say about my career is that it's good to be cheerful and positive. I'm happy to follow instructions from the supervisor.

12 13

Science, technology, engineering, maths (STEM) in action

Like any major construction project, Thames Tideway Tunnel has roles to offer professionals as well as skilled and semi-skilled workers. Here are some we've identified will be in demand on the tunnel sites

Civil engineer Project manager **Planner Scientist** Cost engineer

Sustainability engineer

Communication

Civil engineer

Civil engineers build and design structures like bridges, roads and tunnels, as well as tall buildings like London's Shard and Wembley Stadium. There are so many specialisms within civil engineering – qualified people work with water resources designing pipelines and drainage facilities that help the environment or designing roads or airports to help our transport network.

It's a fascinating area that can involve site and/or office work, an ability to meet deadlines and work with other professionals such as architects or building contractors. You'll also need excellent Maths and IT skills and a good level of English and science.

Once graduated, you can expect to earn between £17,000-£25,000, with experienced engineers earning more.

See 'A day in the life of a construction project manager' below.

Construction site supervisor

On Thames Tideway Tunnel, construction site supervisors mostly work on the tunnel construction site but some off-site meetings are also needed sometimes. Day to day you are responsible

for supervising the programme of work at a particular location, making sure everything and everyone is working efficiently. Site safety is an important part of the role. You will need to ensure contractors follow procedures and, in turn, you will report to a senior supervisor, who may oversee a number of locations.

If you like working outside and are happy with meeting deadlines and sorting problems out as they arise, you could be ideally suited to this type of construction work.

You can take qualifications, but you'll also need skills and experience. In return, you can expect to earn between £20,000 and £30,000 a year.

Logistics engineer

Logistics engineers are responsible for getting the right materials, people and equipment to the right place at the right time to get the job done.

You would normally have a degree level qualification – usually civil engineering – but you can also qualify through Apprenticeships and relevant HNDs or BTECs.

Equality

We are committed to equality, which means that Thames Tideway Tunnel works to ensure access to opportunities for all. If you've got the aptitude and are ready to learn the skills, why not give it a go?

A day in the life of a construction project manager

I trained as a civil engineer and now work as a construction project manager, qualified to work in a wide range of specialist roles in design, planning and construction work. That means time in the office and on site, which suits me down to the ground. I work with other professionals, like surveyors, construction contractors, architects and so on, working together to help plan and then deliver complex projects like Thames Tideway Tunnel. Working throughout the project, I manage different stages and make sure that work is on time and on budget.

My week is usually about 40 hours with a lot of travel around different sites and projects, managing people and solving problems when they arise. I'd say one skill you really need to do my job is to be good at communicating with people. You get to listen and talk a lot in my job, so being a positive person who likes a challenge is perfect.

I did a degree in civil engineering at university but it's not essential. I meet other qualified civil engineers who came through Apprenticeships or did relevant HNDs and BTECs. Starting pay is about £25,000 a year but with experience, you can earn up to £50,000 and a senior chartered engineer would earn more than that.

I'd really encourage people to look at engineering as a career. The pay is good, there's a great sense of teamwork and you get to work on creating things that really matter. 🏻 🌉 🌉

4 15

Duild your career in Constitution of the Const

Here are just four of the projects that, together with Thames Tideway Tunnel, are working to make construction a sustainable career choice for your future

Crossrail

Crossrail is one of Europe's largest railway and infrastructure construction projects. Work started in May 2009 and there are currently more than 10,000 people working across more than 40 construction sites. It's a £15bn, 118km (73 mile) railway line in London linking Reading and Heathrow in the west to Shenfield and Abbey Wood in the east. The middle part of the line, a tunnel under central London, is expected to open in 2018.

Interested? Find out more at www.crossrail.co.uk/careers/

New nuclear power stations

The UK Government has committed to building 12 new nuclear reactors at sites around the UK over the next two decades. Together, they'll generate enough electricity to replace many of our older power stations.

Building the plants is a huge operation, creating 25,000 construction opportunities – including experts in almost every construction trade – starting in 2015. The work doesn't involve handling nuclear materials at the build stage but every site comes under the Office for Nuclear Regulation. This means working to the highest standards of safety and security, experience that will benefit workers throughout their careers. If you've ever fancied working overseas, the nuclear power industry could be your ticket.

Interested? Find out more at www.citb.co.uk/careers

Vauxhall Nine Elms

Up to 22,000 construction jobs – including 1,000 Apprenticeship places – are being created on London's South Bank between now and 2022 as part of the Vauxhall Nine Elms redevelopment. Employment opportunities are being targeted at local residents to make sure they are among the first to benefit.

This is an ambitious project to recreate Vauxhall as a living town centre, with new walkways lined with shops, more jobs, a variety and choice of new homes and places for people to enjoy, just 10 minutes walk from the Houses of Parliament.

Interested? Find out more at www.nineelmslondon.com/category/opportunities

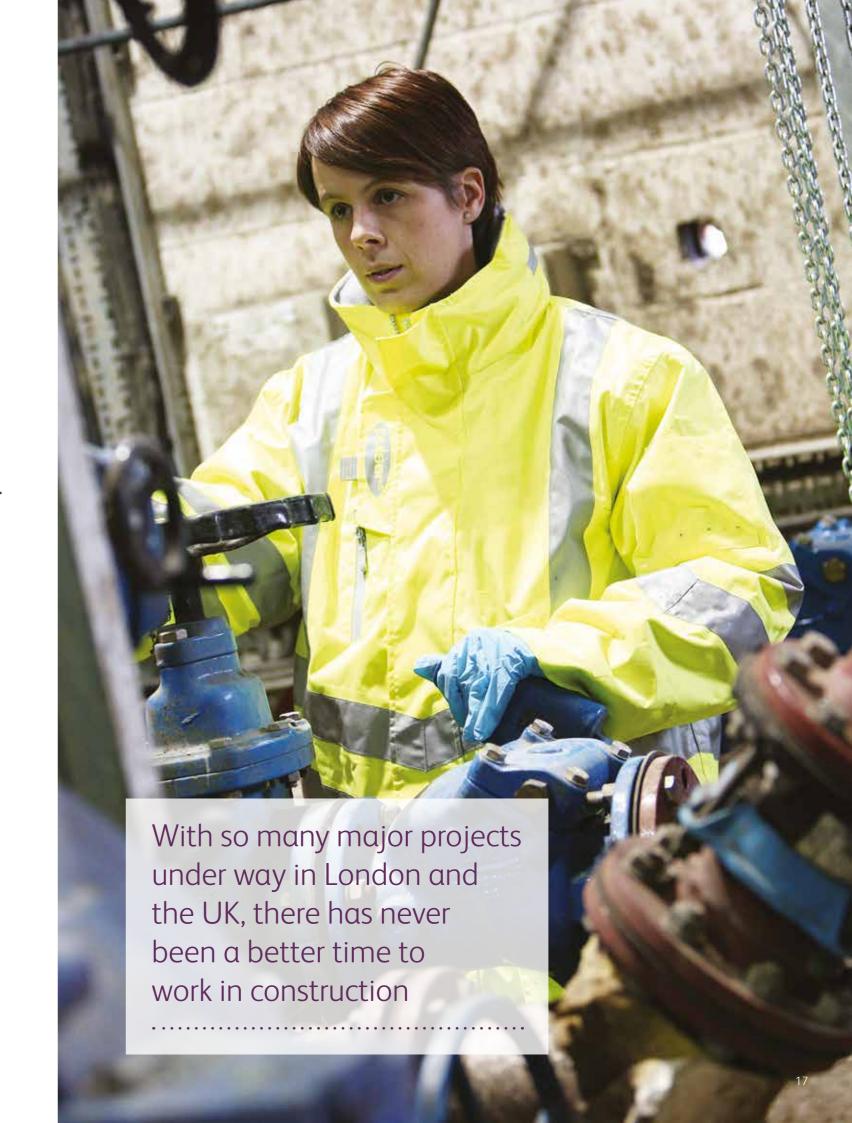
HS2

High Speed Two is the Government plan for a new railway between London and Birmingham and then to Manchester and Leeds, carrying 400m-long trains, running at up to 250mph – faster than any trains currently operating in Europe.

Intermediate stations in the East Midlands and South Yorkshire are also planned.

If approved in 2015, construction on the London-West Midlands phase should begin around 2017 and the line open in 2026. This will create 9,000 roles in construction alone.

The onward legs to Manchester and Leeds could start being built in the middle of the next decade, with the line open by 2032-33.





Can tunnelling give me a long-term career or just a job on Thames Tideway Tunnel?

There are lots of opportunities available to tunnellers in the UK and elsewhere. Experienced tunnelling engineers can build successful careers working all over the world.

The tunnel runs 65m underground. How safe will it be?

Thames Tideway Tunnel is committed to achieving exemplary and transformational standards of health and safety and well-being.

Do you need any special qualifications or training to work on the project?

No. This is a world-leading project but, to get involved, you just need the qualifications that you would for any other construction role.

How can I be sure that there are equal opportunities for everyone on Thames Tideway Tunnel?

If you have the skills, training and aptitude, you can be sure of an equal chance for a role. Thames Tideway Tunnel is committed to ensuring access to opportunities for groups under-represented in the workforce in terms of their ethnicity, gender and disability.

I already work in construction, where will jobs be advertised?

A single jobs portal will be created once contractors have been appointed to deliver Thames Tideway Tunnel. All jobs available on the project will be advertised here first.

The jobs portal will be at

www.thamestidewaytunnel.co.uk/about-us/jobs from 2015 when the contractors are appointed.

How old do I have to be to start an Apprenticeship?

You need to be at least 16 years old to start a CITB Apprenticeship in England and Wales, and 15 in Scotland.

As an apprentice, will I get paid for my training?

Yes. You get paid by your employer so you will earn while you learn.

What qualifications do I need to do an Apprenticeship?

For a craft role, you will need a good basic education to GCSE/ Scottish Standard level or equivalent. Maths and English will be helpful.

To follow a technical route, like a surveyor, civil engineer, architect or estimator, then you will need four good GCSE/Scottish Standard grades, A-Levels/Scottish Highers or equivalent grades.



What qualifications do I need to do a degree in Construction and the Built Environment?

It depends on what course you are interested in and where you want to study.

You will usually need a minimum of two A-Levels/Scottish Highers or equivalent qualifications eg BTEC National Diploma/ Access course. Some courses will also prefer a science or maths based background.

Visit **www.ucas.com** to find out more about construction courses and requirements, or have a look through some university and college prospectuses.

I am planning to study a construction-related degree – what funding is currently available?

You may be eligible for an Inspire Scholarship if you are looking to enter the industry at technical or professional level.

It aims to provide sponsorship to undergraduates who want to work in the contracting sector of the industry.

Find out about the Inspire Scholarship

www.citb.co.uk/careers

Is it more difficult for women to make it in the industry?

The Construction and Built Environment sector is working really hard to overcome traditional stereotypes and achieve a workforce which fully represents our society.

How can I use my current experience within the construction industry to get qualified?

If you have experience of working on-site and are in employment, the best way to get qualified may be by taking the On-Site Assessment and Training (OSAT) scheme. OSAT helps experienced workers get the qualifications to prove they can do the job. It turns their existing skills and experience into a nationally recognised qualification such as an NVQ or SVQ. Having these qualifications also helps qualify you for a Construction Skills Certification Scheme (CSCS) card. The whole process is carried out on site.

Another option, if you have a minimum of five years' experience and don't need any further training, is to take the Experienced Worker Practical Assessment (EWPA). It combines the key criteria of the NVQ into one practical assessment, together with work-based evidence and employer endorsement that must be completed within an allotted time.

What is CSCS?

Construction Skills Certification Scheme (CSCS) cards are increasingly demanded as proof of occupational competence and health and safety awareness. To obtain a CSCS card you will need to take the Health, Safety & Environment test. Once you have passed this test and know which card you need to apply for, you should complete and return an application form with the necessary documents.

How can I apply to take my Health, Safety & Environment test?

You can book a CITB Health, Safety & Environment test at **www.citb.co.uk/hsandetest.** Alternatively, you can call the Information and Booking Line on 0344 994 4488. The cost of the test is £17.50.

Want to know more?

There's more information online about construction careers and Thames Tideway Tunnel.

www.citb.co.uk/careers

Information about construction careers in general, how to get into the industry, finding training and developing your skills.

www.thamestidewaytunnel.co.uk

All about the project, why it's needed and more about the engineering and opportunities that it will provide.

www.semta.org.uk

SEMTA is the sector skills council for the engineering industry, with lots of information about engineering careers.

www.citb.co.uk/bconstructive

All about construction Apprenticeships – what they are and how to apply.

www.apprenticeships.org.uk

National Apprentice Service

www.nationalcareersservice.direct.gov.uk

National Careers Service

Thames Tideway Tunnel

Thames Tideway Tunnel is London's deepest tunnel, a major new sewer designed to help tackle the problem of overflows from the capital's Victorian sewers and protect the River Thames.

It will improve the environment, ecology, public health appearance, reputation and long-term economy of London, offering thousands of skilled jobs and hundreds of Apprenticeships.

www.thamestidewaytunnel.co.uk

The Construction Industry Training Board – CITB – works to give competitive advantage to the construction industry in the UK.

We work on behalf of the industry and for the individuals in the industry, making a difference to how they operate.

www.citb.co.uk

