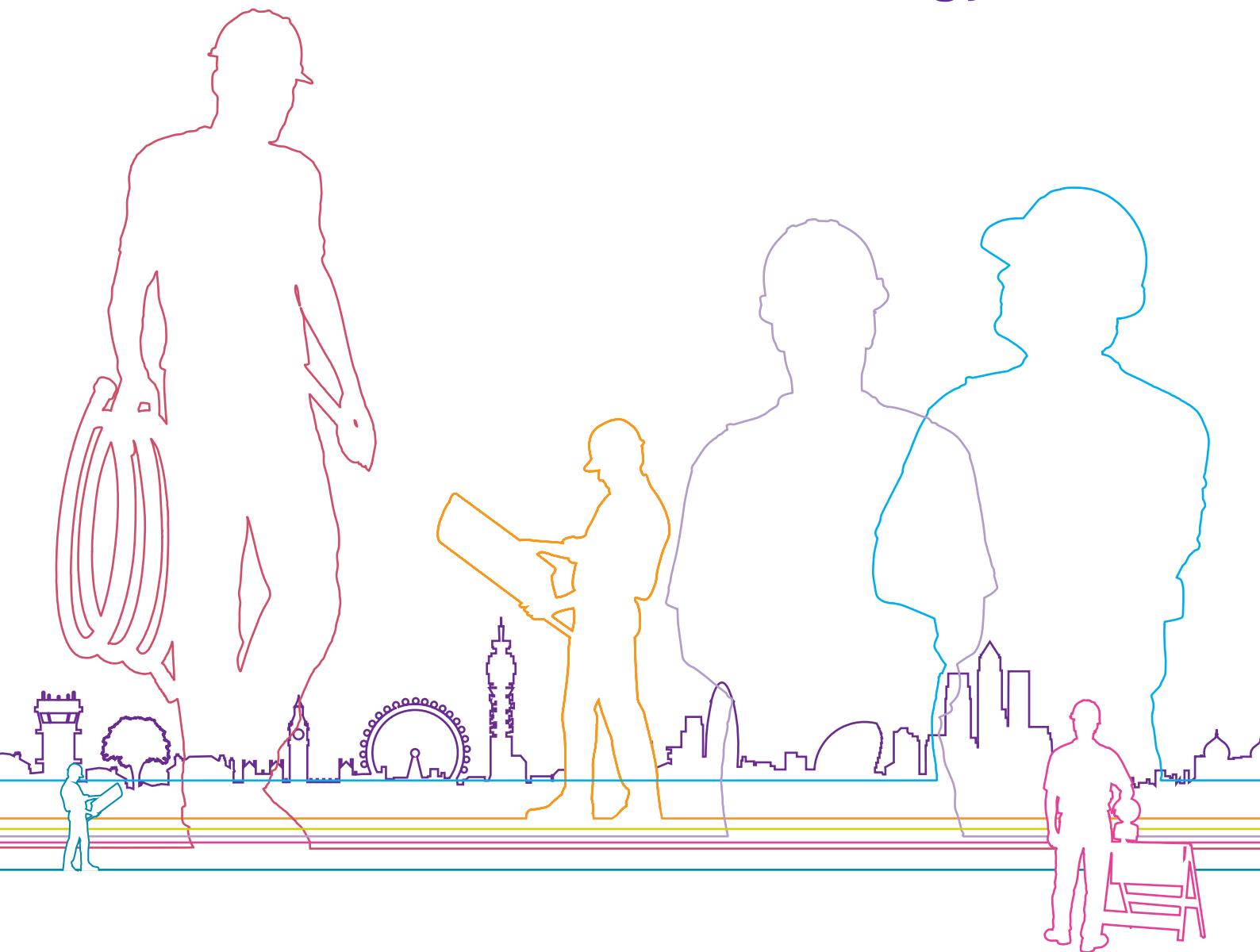




Skills And Employment Strategy



July 2010



Aims And Context

Introduction	04
Skills Issues For Crossrail	05
Crossrail's Skills Requirements	07

Making It Happen

CRL's Internal Skills Development	09
CRL's Approach	10
Crossrail Skills Objectives	11
Maintaining Safety	12
Inspiring Future Talent	16
Supporting Local Labour	20
Revitalising The Skills Base	22
Governance And Partnerships	25
Next Steps	25

CONTENTS

Foreword

I am proud to be **Chairman of Crossrail Limited** at this exciting time. We have all worked hard to turn this programme into a reality – and now we are entering a new and challenging phase.



We aim to deliver a world-class, affordable railway. One that will run 118.5km (74 miles) in total, transport millions of passengers to and from the Capital, and bring economic benefits to the people of London, the South East and the entire country.

But to do this, we need the right people, the right skills and the right priorities.

Safety, as always, comes first. That is why we are working with all members of the Crossrail family to deliver Health and Safety excellence.

This is more than just a policy – we are working together to build a Target Zero Culture. Because everybody has a right to go home safely at the end of the day.

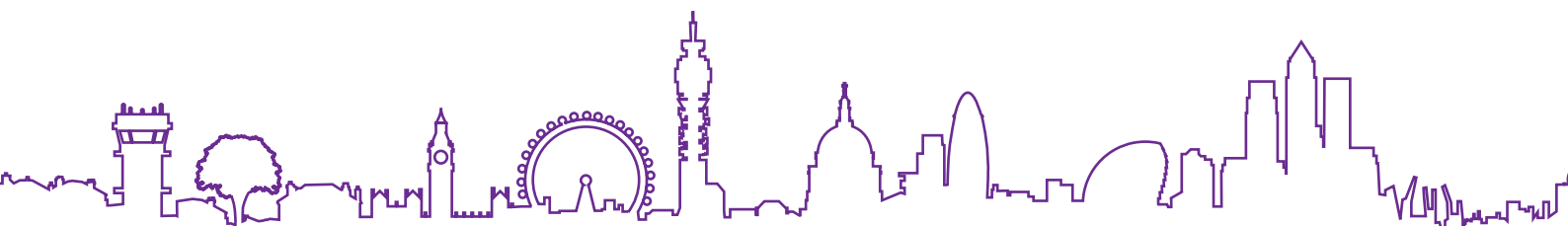
Then there is the matter of education and training. Having started my career as an apprentice, CRL's commitment to deliver

400 Apprenticeships over the lifetime of the project is particularly close to my heart. And the establishment of the Tunnelling and Underground Construction Academy will be a vital step to revitalising the skills base. Which can only be a good thing for Crossrail now – and for UK industry in the future.

With the Young Crossrail programme, we can work with young people to develop the next generation of tunnellers, pilers and engineers – creating a legacy that will last long after the programme has been completed.

By bringing all of these strands together in a single skills strategy, we can all work towards the day the first Crossrail train makes its inaugural journey.

Terry Morgan,
Chairman, Crossrail Ltd



Introduction

After years of planning and promoting, Crossrail became a reality with Royal Assent of the Crossrail Act in 2008. Since then much work has been done to get from outline approval to the stage where main construction work begins in earnest in late 2010. As well as detailed design work, getting approval of planning details and developing the contracting strategy, it is vital that the Crossrail programme has a skills strategy in place to ensure that we have the right skills in the right place at the right time and can deliver the programme. This document sets out the ways in which skills and resources can be marshalled to ensure that Crossrail's vision of 'Delivering a world-class affordable railway safely through effective partnerships' can become a reality.

Through the strategy the Crossrail programme will make a substantial contribution to a range of key government targets including:

- Supporting young people
- Skills for Life, NVQ Level 2/3 and ESOL targets
- Promoting the skills that matter for economic prosperity in modern Britain

The strategy focuses on four objectives:

- Maintaining safety
- Inspiring future talent
- Supporting local labour
- Revitalising our tunnelling skills base

Throughout this document, 'Crossrail' refers to the Crossrail programme as a whole, whereas 'CRL' refers to Crossrail Ltd as delivery agent.



Skills Issues For Crossrail

- Ageing workforce

Across the construction and engineering fields there is an ageing workforce and young people have not seen these industries as an attractive career option.

The age profile of Registered Engineers has been rising steadily for 20 years. Now approximately half of all Registered Engineers are either already past retirement age, or will reach legal

retirement age within 10 years¹. In London, the issue is particularly stark with 38 per cent of the engineering workforce aged 45-64, and only 10 per cent aged 16-24².

Despite 20 per cent growth in the construction workforce since the early 1990s, the expansion has been uneven across different age groups. The number of older workers (aged 60 and over) in the industry has doubled over this time period, while those aged 24 and under has fallen by 27 per cent³.

- Skills gaps within construction and engineering

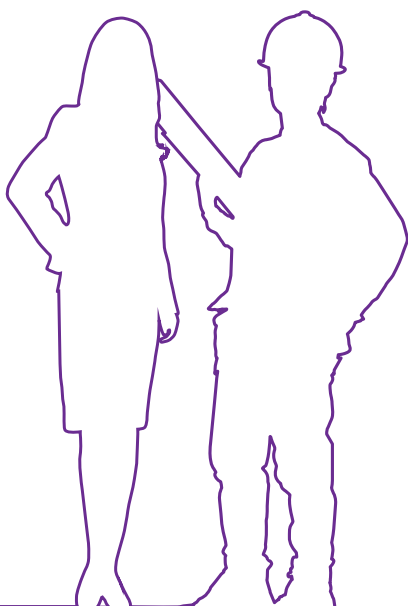
There are also skills gaps across the fields of construction and engineering – from engineers through project managers to site supervisors and tradesmen. For example, Project Brunel, an industry study that examined skills shortages within the transport planning, road and rail sectors, found that the current shortfall

of 9,500 between supply and demand could potentially almost quadruple to over 35,000 by 2012⁴.

- Underground construction skills gaps

Skilled tunnellers are of vital importance for the delivery of Crossrail. However, over the last 30 years the underground construction industry has suffered from cyclical peaks and troughs of work which have meant that it has been unable to maintain a large experienced workforce due to the lack of continuity of employment.

In addition to Crossrail, there are a number of major schemes in the London area, such as a number of National Grid tunnels (2009-2016), Thames Water tunnels – Thames Tunnel (2012-2020) and Lea Tunnel (2009-2014), and London Underground (LU) line upgrades from 2010 onwards. On an international level, there is the £2.5bn expansion of the Copenhagen Metro, and the €3bn Dublin Metro will be



delivered between 2009 and 2018. Although no labour estimates are available for these projects, their funding levels indicate that they will require a substantial labour force.

The planned peak workload is unprecedented and has been the subject of much discussion between the British Tunnelling Society and CRL. The combined effect of these projects will be to create a tunnelling skills shortage that can only be overcome by training a substantial number of new underground construction workers.

- **Logistics training needs**

Building Crossrail and the digging of new tunnels inevitably means that there

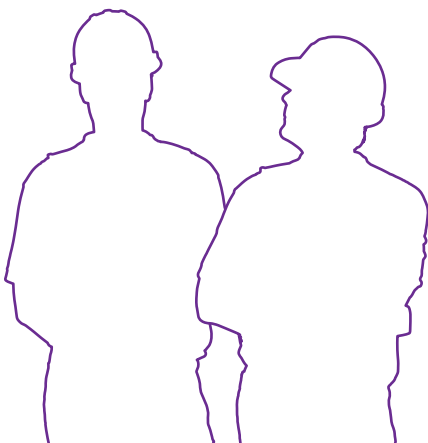
will be a need to remove excavated material. While it is planned that much of this will be by rail and barge, there will also be a need for some removal by road, and the delivery of materials to the station sites. CRL is liaising closely with all Local Authorities and will follow best practice guidelines to minimise disruption. In addition, CRL has given a specific undertaking to carry out site induction procedures and training for lorry drivers that will include a module on cycle awareness.

- **Economic outlook**

In recent years, the construction industry has faced a sharp decline with engineering facing

similar difficulties and severe job losses.

However, both construction and engineering remain critical to the competitiveness of the British economy. Maintaining skills and developing the next generation are crucial to the UK's ongoing competitiveness and productivity. Inspiring and training the next generation of engineers and construction workers may continue to be a challenge, but because of the timescales involved in large construction and engineering projects such as Crossrail, it is vital. Projects being planned now will be staffed by people who are currently in school or college or retraining from other sectors or other parts of the construction industry.



Crossrail's Skills Requirements

A large and varied skills base is needed to build a programme of the size and complexity of Crossrail.

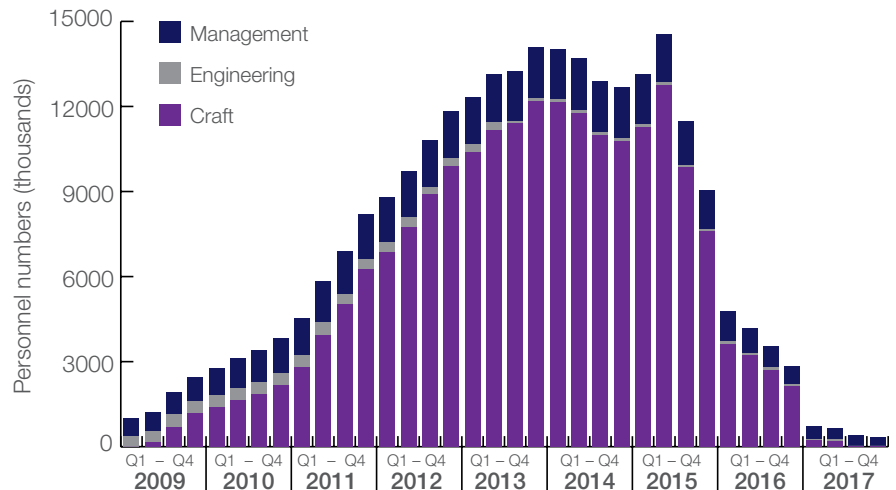
As an integrated delivery team CRL and its Programme Partner, Transcend, will remain a relatively small organisation. Currently around 400 staff are employed in the integrated delivery team.

Instead, the majority of people will be employed through the supply chain and the main contractors rather than by CRL directly. Indeed, it is believed that much of the contractors' workforce will be composed of their current staff, rather than new posts.

- **Management, engineering and craft numbers**

The following projections are for the personnel levels needed by the Crossrail programme through its supply chain for civils work. In addition, relatively small

Figure 1 Personnel requirements broken down by management, engineering & craft, by year



numbers will be needed for logistics work, as well as a large number of regular drivers and more detail of these numbers can be found on page 8. They have been calculated with the best information available, but are subject to change as we move into the detailed design and construction phases.

Figure 1 above shows the estimate of the total personnel requirements over the lifetime of the programme.

The figure shows the gradual increase in staffing levels between 2009 and Q1 2011, before the steep increase as construction ramps up, leading to peaks in personnel requirements in early 2014 and late 2015. Some contractors will be on site for a number of years, with others working for a shorter period, or returning a number of times. In total, up to 70,000 people will work on Crossrail over the full life of the programme.

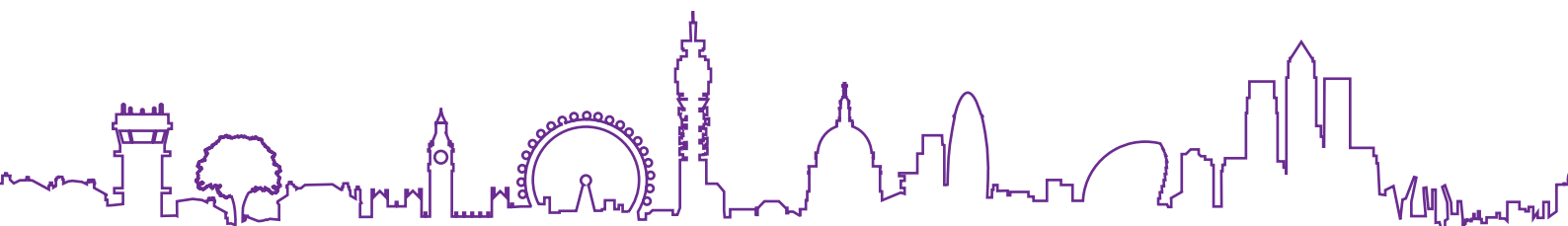
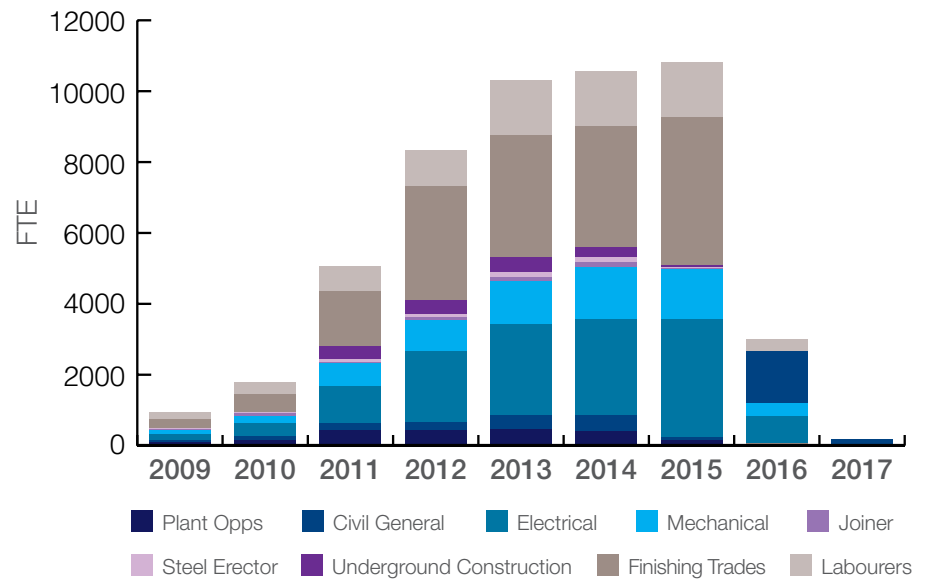


Figure 1 also shows the breakdown of that staffing requirement in three categories – management, engineering and craft – over the lifetime of the programme. From Q4 2009 until Q4 2016, the vast majority of personnel requirements fall into the craft category, with around 12,000 full-time equivalent (FTE) at the height of construction.

Figure 2 gives a further breakdown of the craft category, outlining the key skillsets that will be required at what times over the life of the programme.

This figure illustrates the variety of skills needed, and also the large demand for electrical and finishing trades such as tilers, plasterers and painters. A relatively small, but vital, group are the underground construction operatives – peaking at just over 500 FTE in 2013.

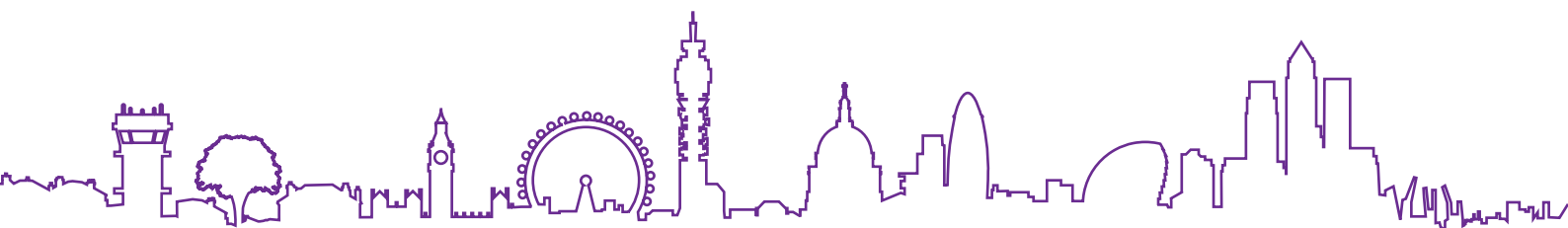
Figure 2 Craft full-time equivalent (FTE), by year



• **Logistics numbers**

In addition to the large numbers of people needed to work on civils, Crossrail also requires logistics skills. In terms of the breakdown of these skills, the great majority will be drivers. We anticipate that there will be around 3,500 frequent lorry

drivers. In addition to these drivers, there will also be a small number (around 25) of operatives at consolidation centres, around 60 people with logistics skills at site operations and around 20 at lorry holding areas and central control.



CRL's Internal Skills Development

Although the majority of those working on the programme will not be employed directly, CRL is committed to ensuring that those who do work directly for the programme are working as an effective delivery team, and that staff have excellent learning opportunities. Two key documents, the Organisation Development Plan (ODP) and the Learning and Development Plan (LDP) set out CRL's plans in this area.

The ODP aims to transform the existing organisation into a high-calibre delivery team with a well-defined and effective organisational structure, clear roles and responsibilities and the requisite skills and experience. In doing so the ODP will achieve the following outcomes:

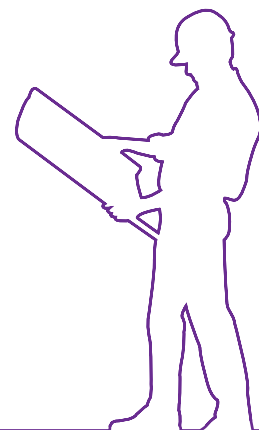
- An organisation with a healthy 'delivery culture' which places safety, cost management and risk management at the heart of everything that everybody does.

- Proper integration of our delivery partners and a Crossrail family that really does work as one high-performing team.
- Robust and successful interfaces between CRL, our industry partners and other key stakeholders.
- Top quartile levels of employee engagement and advocacy.

The aim of the LDP is to facilitate individuals and teams to excel by providing access to the highest quality learning opportunities. To achieve this, the LDP aims to empower individuals to take control of their own development. The Learning and Development team offer:

- Internal support and advice for all aspects of learning and development.
- A suite of technical training courses such as:
 - Risk management
 - Contract management
 - Project management

- Safety management
- IT training for CRL's bespoke systems.
- Facilitation of team development and team working initiatives.
- Coaching and mentoring development for line managers.
- Self-directed personal development planning.
- A suite of leadership and personal development events based around Crossrail's corporate values.
- A resource centre for learning containing actual and virtual personal development and engineering libraries, an e-knowledge centre, video streaming, e-learning, DVDs and any new media technologies that can be used for learning.



CRL's Approach

In order to provide the skilled personnel throughout our supply chain, CRL intends to adopt the following four Es approach to skills:

- Evidence-based decision making

We will continue to ensure that our decisions are based on the best available data and evidence, and add greater granularity to our plans.

- Exploiting buying power

As a large-scale publicly-funded programme, we need to ensure that we get best value for money, and are in the best position to exploit the enhanced buying power that the economies of scale provide to us and our supply chain.

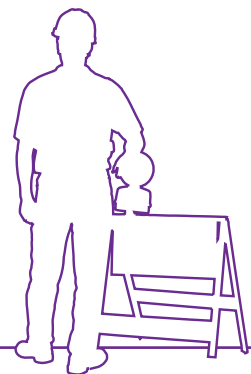
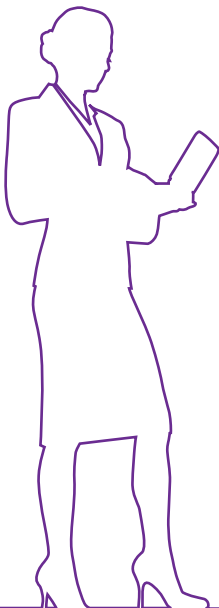
- Effective partnering

Much of the programme delivery is dependent on our

relationships with the supply chain and so without excellent communication and effective partnering, this delivery is at risk. CRL will foster strong working relationships with partners and sponsors to ensure delivery.

- Engagement with stakeholders and communities

CRL will continue to build on the strong stakeholder engagement that has been in place throughout the development of the programme. With regard to skills specifically, we will work with government, industry, and the third sector to ensure that all parties are fully aware of the opportunities and challenges that face the programme.



Crossrail Skills Objectives

Crossrail is a very large programme, but it has strict parameters and a limited budget that means that we can do anything, but we cannot do everything. CRL is committed to ensuring that the public investment in the programme leaves a lasting skills and employment legacy beyond the construction of the new railway. Therefore, CRL is focussing on four strategic skills objectives:

Maintaining safety – mainstreaming safety and ensuring it is at the heart of all aspects of work.

Inspiring future talent – motivating young people, students and local people to pursue careers in construction and engineering, and better prepare young people for work in the construction, rail and engineering industries.

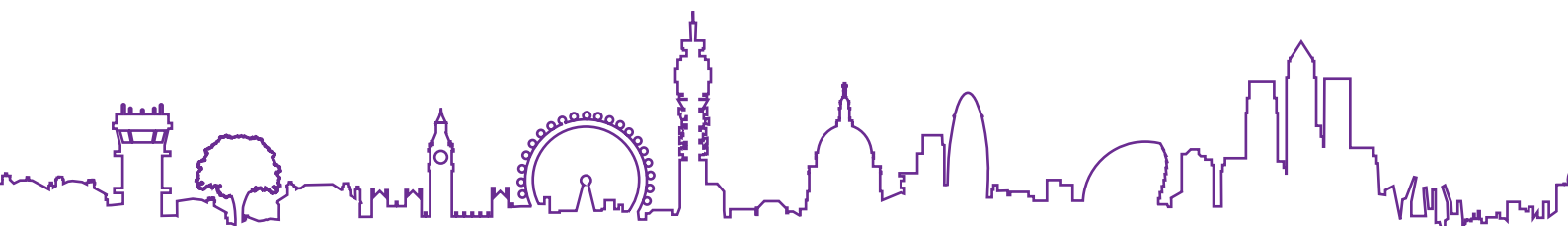
Supporting local labour – developing the skills of local people to enable them to gain employment within the Crossrail programme and to attain sustainable skills, qualifications and experience.

Revitalising the skills base – promoting the compelling benefits of CRL developing a Tunnelling and Underground Construction Academy (TUCA) for the industry in order to build tunnelling and allied skills capability for organisations and individuals in construction.

Achievement of these four strategic objectives will only happen by working closely with a large number of different groups including: employers and contractors; intermediaries; educators; and Local Authorities and agencies.

We will continue to develop relationships with a range of key stakeholders including Further Education (FE) colleges, training providers, academia and other underground construction clients – such as EDF, TfL, Thames Water and National Grid. To date, we have spoken to a number of universities and institutions including: Imperial and University College London, Birmingham, Cambridge, City, East London, Loughborough, York, Southampton and Warwick Universities, and the Institution of Civil Engineers.

CRL will work with funding bodies such as the Department for Work and Pensions and the Skills Funding Agency (SFA), training providers and Sector Skills Councils and their key stakeholders to access funding and develop and deliver appropriate accredited programmes that respond to employers' needs.



Maintaining Safety

Maintaining safety is critical to the success of the programme and CRL recognises the importance of raising standards and changing behaviours to deliver its Target Zero programme. However, the theme of Maintaining Safety is broader than simple Health & Safety (H&S) training. Having a positive state of mind for workers and managers alike is the key to our success.

We must change the attitudes and mindset of the general construction workforce to eliminate unsafe behaviours and tolerance of unsafe conditions. CRL aims to engender a learning culture across the supply chain and a lasting legacy of skills improvement to the skill pool

– leaving people better trained than when they started work on the programme.

- Ensure safety modules are included in all training, where relevant, from induction onwards

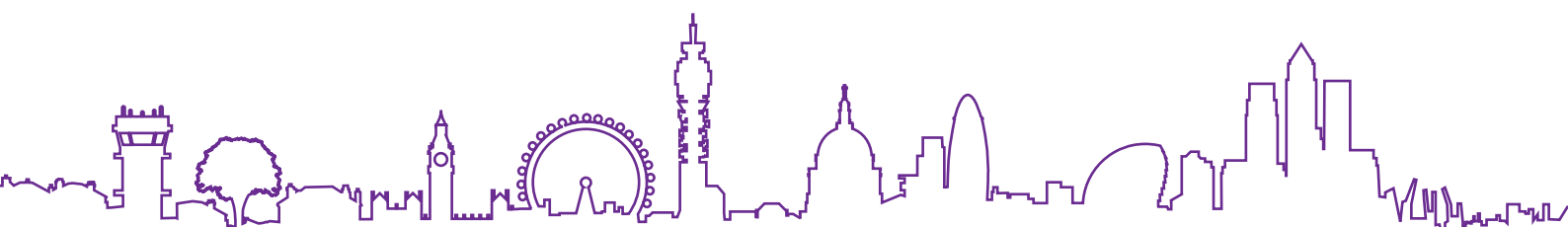
Training will be structured on a modular basis with different modules available for different risk profiles and levels of seniority. All staff will have an induction and then the appropriate modules to reflect the risk in their working environment and their H&S management responsibilities. The modules have been designed to meet nationally recognised H&S knowledge requirements. In addition, refresher training will be identified and included in the overall training programme.

- Make sure incidents are reported, investigated and communicated

In order to ensure safety is maintained, CRL has systems to allow incidents (which include near misses) to be reported and investigated thoroughly, with resultant training as an action where appropriate. This ensures that recommendations can be acted upon and thus prevent reoccurrences. CRL also issues and receives safety alerts from/to other companies which have an interface with us.

- Promote site safety through certification

The Construction Skills Certification Scheme (CSCS) is a construction industry



skills scheme that requires operatives to have appropriate skills for their jobs and to pass an H&S knowledge test before they receive a safety card. The scheme has been running for many years, but in response to a challenge to improve the industry's H&S performance from the then Deputy Prime Minister, John Prescott, the UK Contractors' Group (UKCG) set themselves a target of having a 100 per cent carded workforce. In pursuit of our Target Zero vision, CRL has adopted the same standard - that everyone on a Crossrail site will have a CSCS, or equivalent, card. Additionally, all people working underground will be required to achieve the Underground Safety Passport before working on any Crossrail site. This certification

will be delivered via TUCA – see page 21.

- Provide occupational health and hygiene provision

The Health & Safety Executive advises that the UK construction industry suffers a high incidence of occupational ill health. In 2007 there were a 172m working days lost at a cost of £13bn. To mitigate this, CRL have set a standard which all contractors must meet in their provision of occupational health (OH). CRL will provide contractors with a choice of two OH providers and contractors will manage and pay for the provision. CRL will monitor contractors to ensure that they meet these standards.

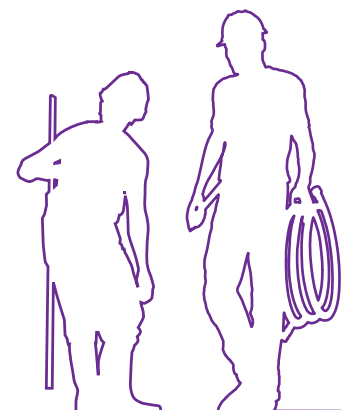
- Assess Personal Protective Equipment (PPE) needs

All PPE needs will be assessed and provided to relevant employees. Employees will be trained in the use and maintenance of the equipment so that they can carry out their various tasks in a safe manner.

- Provide hazard awareness training and desktop scenarios

CRL will develop training which involves having a specific room set up with hazards for all those taking the training to identify and assess.

In the event of a serious incident, how we interface with other organisations such as the British Transport Police, utilities, London Fire and Emergency Planning Authority and Local Authorities is crucial so that we can minimise loss.



- **Provide driver training**

CRL has given a specific undertaking to carry out training for lorry and van drivers working on the programme, including a module on cycle awareness. A course has been developed based on an updated version of a programme developed for TfL's Freight Operator Recognition Scheme (FORS). It is designed for frequent lorry drivers who work on the Crossrail programme and in particular any LGV driver. It focuses heavily upon the lorry drivers' awareness of 'sharing London's roads with vulnerable road users'. The content has been developed to include specific

Crossrail vehicle routes the major causes of collisions with cyclists, driver fatigue and well being and the law covering the impact of drugs, alcohol and mobile phone usage. Specialist input from the Centre for the Protection of National Infrastructure is being used to develop this area. The effectiveness of CRL's Lorry Driver Induction Training will be monitored and reviewed constantly. If the need to include practical safety-based training for lorry drivers is required in addition to induction training then this will be introduced.

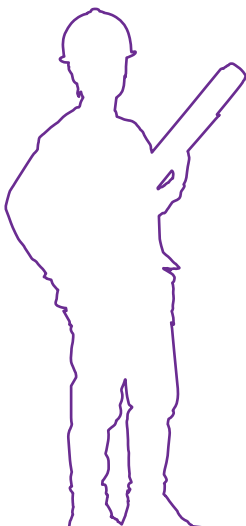
CRL requires all contractors and sub-contractors providing transport services

to register under TfL's FORS, or equivalent, and achieve bronze (or equivalent) membership level within two months of being awarded a Crossrail contract.

This demonstrates a commitment to sustainable distribution operations and best practice. CRL also expects all contractors to work towards silver and gold membership of the FORS scheme (or the equivalent level).

- **Maintain H&S training system**

All CRL managers will receive appropriate H&S training in order for them to deal with the H&S issues that arise



in their workplace. A matrix has been developed linking recognised Institution of Occupational Safety and Health (IOSH) training courses with the TfL Group HSE Competence Framework and linked to each band of management. Introducing Crossrail (the induction process), and CSCS will also be included on this matrix.

- **Set the standard for first aid**

CRL will set the standard for our contractors and ensure that first aid training will be provided to meet business requirements. Appropriate numbers of people will be trained and retrained as First Aiders and Appointed Persons using accredited training providers and programmes.

- **Support the key role of industrial relations**

CRL has developed an Industrial Relations (IR) Strategy together with the Programme Delivery Partner to drive the safety message forward. Key objectives of the IR Strategy include developing a culture, structure and arrangements that:

- Enable the programme to be delivered safely; eliminate accidents and work-related ill health.
- Raise the skill-base of the workforce in a way that improves productivity and equips those involved in the programme for work post-Crossrail.
- Establish and maintain productive industrial relations.



Inspiring Future Talent

It is vital both for the programme and for industry as a whole that young people continue to choose construction and engineering career paths.

CRL will seek to encourage and inspire young people, as well as offering concrete opportunities in the form of work placements and Apprenticeships through its supply chain.

- Continue the Young Crossrail Programme

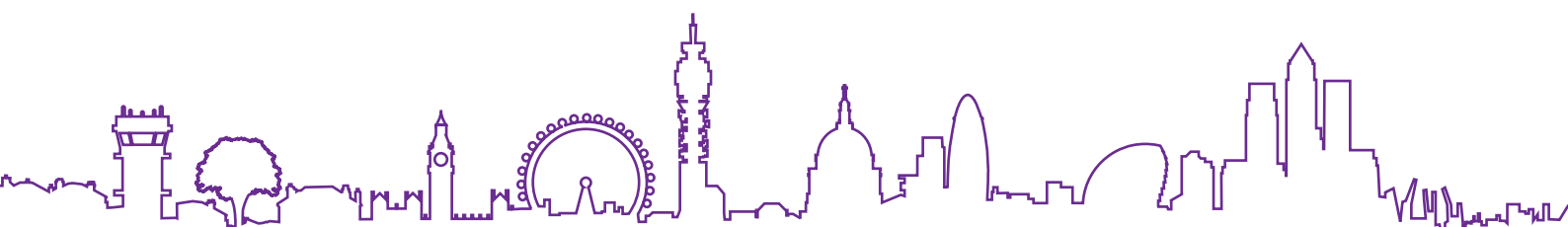
Young Crossrail was established in 2003 to engage with young people, and through them their family members, along the proposed route. The programme's two broad objectives were education about Crossrail through presentation of accurate programme information, and education through Crossrail as a context to support the learning process and existing government initiatives. As we

are now in the delivery phase of the programme, Young Crossrail has been reviewed and the focus for Young Crossrail moving forward is to:

- support education
- stimulate interest in careers in transport, engineering, construction and rail infrastructure
- inform and educate about the Crossrail programme

Table 1 Young Crossrail themes

Pre-School to Year 2 4-7 yr olds	Juniors Yr 3-Yr 6 8-11 yr olds	Young People 12-13 yr olds	Older teens 14-19 yr olds
Environmental issues - animals, plants, community			
Early learning			
Competition - stories - creative writing fact/fiction			
	Safety and security		
	Awards and prize giving for schools		
		Young Crossrail Ambassador programme	
		Design and technology	
			Entrepreneurial skills
			Business acumen
			Marketing



The programme will continue to work with all primary and secondary schools within one mile of the route in order to focus on the young people and their families that will be most directly affected by the programme. However, Young Crossrail will differentiate the messages and channels to each group under the themes outlined in **Table 1** on page 15. Young Crossrail will continue to work with schools and extend its engagement to the 16-19 age group.

As Crossrail is a programme of national significance, it can provide unrivalled case study benefits to any student with an interest in the transport, engineering or construction industries. Young Crossrail therefore plans to have an additional offering through a dedicated website and downloadable

web resources. This way, resources are available to all students, teachers and families throughout the UK, and further afield.

Ensuring each other's health, safety and wellbeing is the number one priority and key value of the Crossrail programme. This value applies to every single person involved in the project whether they are working on the programme or living or working near Crossrail sites. Because the Crossrail route passes through many dense urban areas there are a high number of schools in close proximity to Crossrail worksites or on key lorry routes.

We are developing a series of resources to communicate the potential dangers around worksites

or on busy lorry routes to all students at schools along the Crossrail route in order to consistently meet the Crossrail's Target Zero programme for safety.

Enterprise capability – the ability to respond to change and to generate and implement new ideas – is a skill set which is vital to the future of the construction and engineering industries. This is why entrepreneurial and business skills have been chosen as a potential key focus of the Young Crossrail programme for the 14-19 age group (Key stage 4).



We will be developing a Young Crossrail Ambassador programme in partnership with STEMNET (The Science Technology, Engineering and Mathematics Network). Each Ambassador will be registered, trained and CRB checked by STEMNET.

We will continue to feed into relevant third party events and link with others' websites where appropriate.

- Facilitate work placements

We will support 14-19 Diplomas, Young Apprenticeships, and wider vocational programmes through the supply chain, encouraging suppliers to offer placements through the procurement process. Through contractual

requirements with suppliers, CRL will aim to offer a minimum of 350 placements between 2011 and 2017.

CRL will work with partners to act as broker between our contractors and schools/colleges to find students suitable work placements. We will develop a reporting structure to track and monitor placements.

- Facilitate graduate work placements

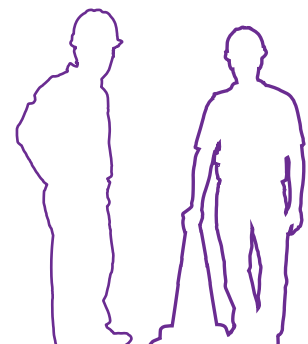
Crossrail will launch a professional placement programme in June 2010.

The aim of the programme is to provide graduate trainees with the opportunity to gain practical experience of working with the largest construction project in Europe.

The programme will provide the opportunity for those engaged on a professional development scheme with one of CRL's programme or industry partners (e.g. TfL, Network Rail, Crossrail Central, Transcend) to gain structured experience within CRL's Finance, HR or Engineering disciplines for between three and 12 months.

- Offer industry updating for teachers/educators

Where appropriate, CRL will offer work placements for teachers in schools along the Crossrail route, exposing them to, and allowing them to experience, contemporary projects. It is important that teachers are able to keep



up-to-date with current industry skills, techniques and thinking. Work placements would provide longer-term benefits as teachers will be able to enthuse about their experiences on site, helping to increase student interest and motivation.

- Provide 400 Apprenticeships

The Crossrail programme will provide 400 Apprenticeships, through the supply chain. The Apprenticeships offered, amongst others, will be:

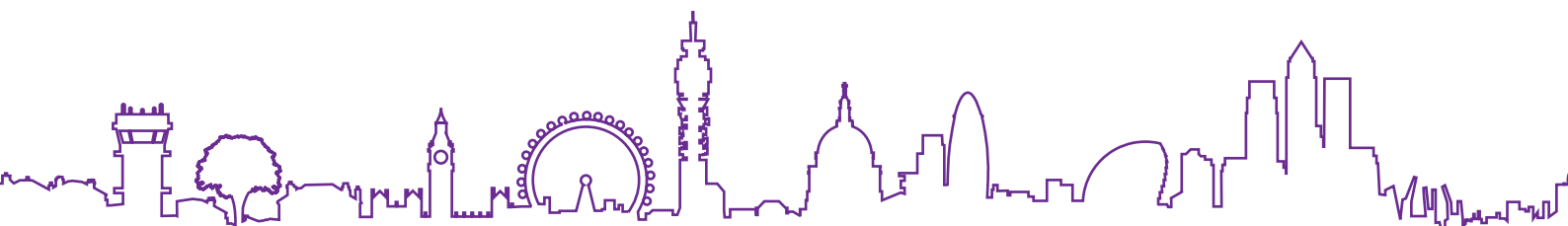
- Electrical
- Mechanical
- Finishing Trades
- Tunnelling (working with ConstructionSkills to develop specialist

Apprenticeships in tunnelling operations which will be delivered via the new Underground Construction Academy).

Contractors will be under obligation to employ apprentices and support their learning via contractual requirements. All Apprenticeships will be to a minimum NVQ Level 2 and be offered within a Qualifications and Curriculum Authority (QCA) framework. Where appropriate, Level 3 Apprenticeships will also be delivered, supporting the government aspirations for 70 per cent of under 30s to attain a Level 3 qualification.

CRL is able to take advantage of the lessons

learned from similar projects such as the Olympic Park, with an Apprentice Manager being appointed to oversee all learners, liaising with job brokerage agents, contractors, training providers and funding bodies to ensure the best outcome for the learner, the employer and CRL. We will work closely with a range of bodies particularly the National Apprenticeship Service (NAS), to develop robust models for identifying, monitoring and offering Apprenticeships.



Supporting Local Labour

CRL is in an excellent position to learn from other large projects and organisations such as the Olympic Delivery Authority. CRL will work with partners such as Jobcentre Plus (JCP), Greater London Authority (GLA) and SFA to ensure that local people are given the opportunities to find work and training through our contractors, suppliers and service providers.

CRL wishes to work with as broad a spectrum of the local community as possible in order to offer job and training opportunities to local people. CRL and industry partners will work with the communities in London boroughs and along the route.

With the opportunity to gain qualifications, local people working on the Crossrail programme will more easily be able to gain further employment on future construction projects.

Through CRL's approach to responsible procurement, we will require contractors, suppliers and service providers to provide strategic labour needs training (SLNT) benefits with 50 per cent of these benefits orientated around worklessness, the local community and Apprenticeships.

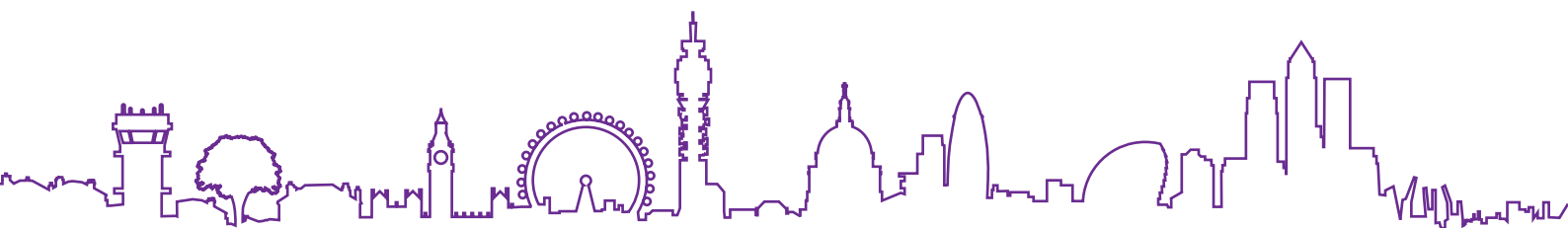
- **Facilitate job and skills brokerages**

CRL will require all contractors in its supply chain to communicate training and employment opportunities to local residents. To support this, CRL has established a job brokerage service – working with JCP and through them local brokerages. This will provide a service which acts as a conduit for all relevant contractor staff vacancies to ensure that such vacancies are advertised as widely as possible and that the local

community can participate fully in recruitment by contractors.

For those looking to work on the Crossrail programme, JCP will work with other local brokerages and local JCP centres to provide a one-stop shop, giving out information about job vacancies as well as getting candidates job ready, and signposting them to training opportunities. They will work with those furthest from labour market (including people from disadvantaged groups) to develop the skills people need to make them job ready for the Crossrail programme.

CRL will seek to work with providers and funding bodies to access pre-employment training opportunities for local residents, ensuring candidates are job ready for upcoming vacancies.



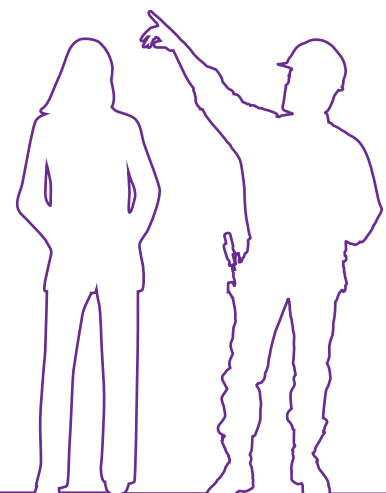
- Require contractors to sign the Crossrail Skills Pledge and provide a formal training plan

CRL has developed a Skill Pledge and will require all contractors, suppliers and service providers, where appropriate, to sign it. The contractor will be expected to sign the Crossrail's Skills Pledge and in signing it sign on behalf of their subcontractors.

CRL will require its contractors, suppliers and service providers, where appropriate, to have a formal training plan in place for the development of their workforce and their delivery of SLNT targets.

The training and skills plan is expected to cover:

- How the contractor will deliver on skills outputs such as Apprentices, NVQs and Skills for Life, as set by CRL. These deliverables will be determined by the value of the contract.
- Information that satisfies CRL that the contractor has suitably skilled and trained people in their workforce (including the workforce's literacy, numeracy and English for Speakers of Other Languages) or a plan for how they will build these skills.
- How they will utilise the structured arrangements CRL has put in place for skills training (e.g. the Tunnelling and Underground Construction Academy)
- Jobs – sustainable jobs of a minimum of 26 weeks.



Revitalising The Skills Base

The establishment of the Tunnelling and Underground Construction Academy is central to both CRL's delivery plans, and its legacy to the industry. Whilst the UK has tunnelling expertise and knowledge there is not a purpose-built training facility in the UK that is a focal point for the industry. We have researched current underground construction training provision in the UK and have concluded that it does not meet the needs of the Crossrail programme's workforce either in terms of capacity or specialisms. Furthermore, the nearest sites which offer some of the training we require are in Norfolk and the Midlands and are therefore not practical in terms of location.

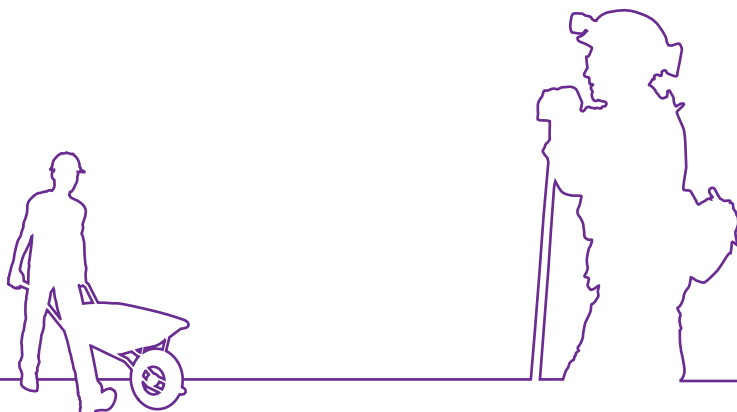
- **Work in partnership**

By building and establishing a specialist Tunnelling and Underground Construction Academy (TUCA), CRL will broker relationships and promote training across the industry. In doing so, CRL will be contributing to the development of new qualifications and the improvement of H&S standards across the industry.

CRL sees its role as the developer of TUCA, working closely with the SFA, ConstructionSkills and TunnelSkills, industry bodies such as the British Tunnelling Society and other key tunnelling clients such as LU, Thames Water, National Grid and EDF. Through these partnerships, we will ensure

that industry gains maximum benefit from TUCA and its legacy continues beyond the life of the Crossrail programme.

There are no other underground construction academies in the UK, and the only other similar facility in Europe is the Hagerbach Test Gallery in Switzerland. The test gallery provides research and development in underground construction and is home to the international Centre for Geotechnics and Underground Construction (CUC) and the International Centre for Safety in Tunnels (ICST). Although Hagerbach does not have facilities of a type, or on a scale to meet the training needs of the Crossrail programme, developing a partnership with



Hagerbach would ensure there was an opportunity to offer complementary training between the two establishments – Hagerbach’s focus being on hard-rock tunnelling and TUCA on soft-rock tunnelling skills. Both facilities would offer world-class training in a world-class environment to tunnelling contractors from across Europe.

- **Design and build of TUCA**

The design of TUCA is being developed in conjunction with key stakeholders from the industry, Crossrail programme partners and academic/ education institutions. Following a competitive tendering process, the contract for Design to RIBA Stage E was awarded

in July 2009. The build specifications will focus on the high demand for particular tunnel training to support the Crossrail construction phase and be flexible enough to accommodate the needs of future underground construction projects, TUCA will include facilities for simulating spray concrete lining and the operation of a tunnel boring machine.

One of the key aims of the design is for TUCA to be an inspirational learning environment for all who come through its doors. By incorporating amenity and learning space as well as educational and exhibition space, TUCA will seek to increase understanding of the industry and in doing so, attract and retain newcomers.

- **Develop and deliver the curriculum**

TUCA's curriculum is being developed primarily to address the skills shortages in the industry which relate to the needs of the Crossrail programme and future similar projects. It is being developed in partnership with industry experts whose agreement to the finished framework will be critical to ensure the legacy of the programmes offered.

Working with its contractors, CRL will expect all personnel working underground, irrelevant of experience, to attain the Underground Safety Passport through TUCA. This will ensure all personnel have a standard level of competence which is consistent across the programme and meets CRL's H&S requirements.



Revitalising The Skills Base

In addition to safety passport training, other underground construction specific courses will be made available to contractors through TUCA to enable them to upskill their workforce, ensuring they are able to deliver on programme requirements.

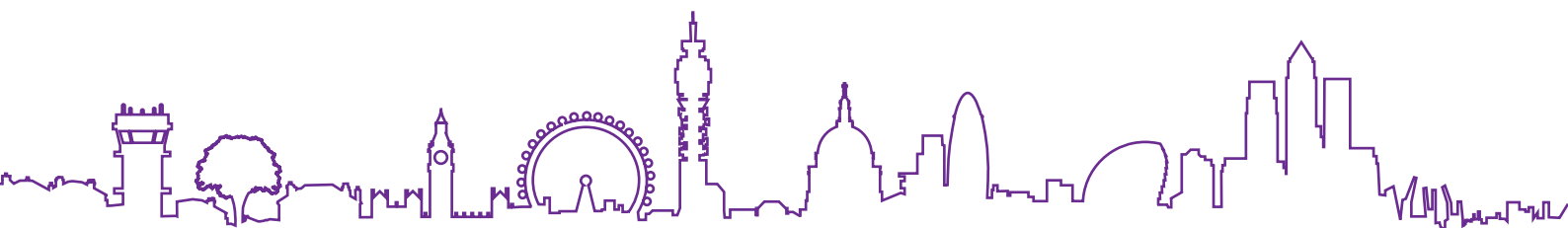
CRL will require contractors to work towards the achievement of NVQ Level 2 in Tunnel Skills by all underground workers within a year of commencement of their role. The NVQ will be delivered via TUCA. Through ConstructionSkills and TunnelSkills, CRL is developing an NVQ Level 3 in Tunnel Supervisory Skills ready for launch to the

industry in 2011. NVQ Level 2 and 3 training in a range of construction skills, including joinery, finishing trades, and scaffolding will be offered via TUCA and in partnership with other construction skills providers. It is expected that TUCA will partner with local FE colleges to provide Skills for Life and ESOL training to complement the provision of NVQ qualifications.

- **Provide a skills legacy**

It is expected that the industry will use TUCA to train and develop workers for a wide variety of planned tunnelling projects, many of them in and around the South East of the UK. CRL will establish TUCA as an independent

facility with the ability to be self-supportive in terms of finance and governance. This will not only leave a legacy for the industry, but importantly will continue to provide a specialist learning centre able to offer formal qualifications including Apprenticeships. Key to this success will be maintaining a strong relationship with TunnelSkills and tunnelling contractors, and reacting positively to changes in underground construction methods and skills gaps. CRL will continue to engage with universities as part of the TUCA operating model, and hopes to offer both research and Masters study opportunities.



Governance And Partnerships

The Crossrail Skills and Employment Committee was established in October 2009. The Committee is chaired by Terry Morgan and the Vice Chair is Valerie Todd, Talent and Resource Director of CRL. Members include representatives from the GLA, London Development Agency (LDA), JCP, SFA, NAS and ConstructionSkills. Main contractors will also be invited to meetings once appointed.

The responsibility of the Committee is to advise on and ensure the delivery of

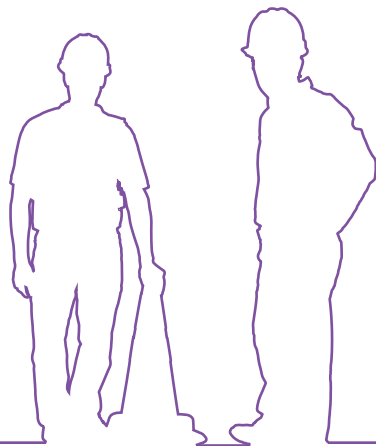
the Skills and Employment Strategy. It will work to achieve the four key objectives of the Crossrail Skills and Employment Strategy and their associated milestones.

The Committee will meet at least four times a year.

CRL will work in partnership with the member organisations as well as other organisations including DWP, Sector Skills Councils, provider networks, key employers, schools and Local Authorities.

Next Steps

Delivery plans, including timeframes, for each of the workstreams are currently being developed to provide more detail on the purpose, method, deliverables, costs and partners for the work.



Endnotes

¹*Engineering UK 2008 - p98* December 2008

The Engineering and Technology Board (ETB)

http://www.etechnology.co.uk/research/engineering_uk.cfm

²*SEMTA: Engineering Skills Balance Sheet (London) – Executive Summary* August 2008

The Sector Skills Council for Science, Engineering and Manufacturing Technologies (SEMTA)

http://www.semta.org.uk/public_bodies/research/engineering_balance_sheets.aspx

³*Skills Update - Construction industry warnings on 'workforce time bomb'* July 2008

ConstructionSkills

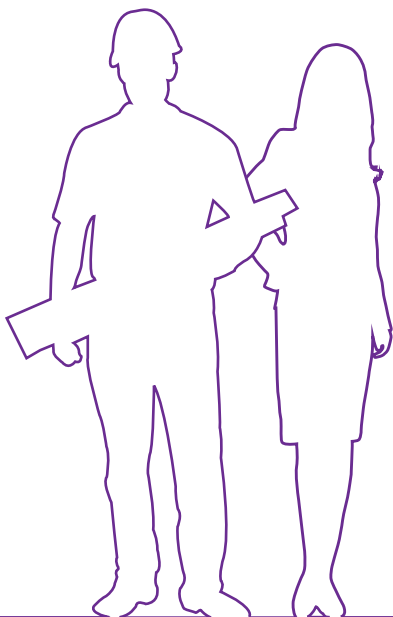
<http://www.constructionskills.net/news/skillsupdate/200807-constructionindustrywarnings.asp>

⁴*Project Brunel: Transport Industry Resources Study - p15* April 2009

Disclaimer

This strategy is based on certain assumptions and forecasts. There can be no assurance that these assumptions are correct. It is CRL's intention to periodically revise the strategy to account for changing assumptions and forecasts.

All information contained within the strategy was collected for indicative purposes and we cannot give any warranty to as to its suitability for any other purpose. We have sought to ensure the information is accurate and complete, but we accept no liability or responsibility for any errors or omissions or for any damage or loss arising to any person acting or refraining from action as a result of it.







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Write to:
FREEPOST CROSSRAIL
(no postage or address required)

Helpdesk: 0345 602 3813 (24-hours, 7-days a week)

e: helpdesk@crossrail.co.uk

w: www.crossrail.co.uk

