

# Sustainability Best Practice and Lessons Learnt Case Study

## Sustainable supply chains

Network Rail spends £7 billion pounds per annum on works, services and goods bought in. We have over 11,000 listed suppliers of which 50% of our total expenditure is with our top 20 suppliers.

With increasing demands for more sustainable practices and legislation becoming increasingly stringent the market for greener, ethical and more sustainable supply chains is greater than ever.

For Network Rail our large and diverse supplier base offers a significant opportunity to work collaboratively with our supply chain partners to deliver our sustainability commitments.

On the Thameslink Programme we recognised this opportunity and in 2012 we rolled out our first Responsible Sourcing Policy across our supply chain to deliver our sustainability objectives and promote responsible business practices. This case study sets out our best practice and lessons learnt in delivering responsible sourcing practices in major infrastructure projects.



### The importance of sustainable supply chains in Infrastructure Projects

Network Rail (NR) is responsible for delivering £4.5 billion of enhancement and renewal works to live operational infrastructure every year and to deliver this Network Rail has engaged with over 6000 suppliers generating £17.3 billion of work for our supply chain (between 2009 and 2013).

As a supplier dependant business NR recognises that to continue to successfully deliver a major programme of infrastructure projects safely, with improved performance whilst also demonstrating value for money transforming our relationships with our supply chain is key. As part of this transformation Infrastructure Projects (IP) has recognised the importance of integrating and developing sustainability dimensions into very we do.

Increasing legislation and a growing focus on environmental and sustainability requirements have stressed the need for more responsible practices across all industries but especially in infrastructure and construction. Stakeholder expectations are growing putting the infrastructure and construction sector under increasing pressure to both manage risk in the supply chain as well as demonstrating that they are environmentally, socially and economically responsible organisations. In NR IP when we design and build iconic new stations, signalling upgrades, electrification, track renewals and bridges the supply chain decisions we make can have a significant effect on reducing the risk in our supply chain, reducing our environmental and social impacts and enhancing our reputation as a responsible business.

To meet this growing demand for responsible practices NR IP has incorporated a 5% tender weighting for sustainability and launched a Sustainability Charter in 2014 committing our suppliers to challenging environmental and social sustainability targets thus promoting responsible business practices throughout the rail industry supply chain. This charter covers a variety of sustainability principles including health, safety and wellbeing; sustainable employment, diverse and inclusive supply chains; ethics and labour standards; access; communities; heritage; energy and carbon; network resilience and adaptation to climate change; waste; water; biodiversity and ecology and pollution.

#### Did you know...

CIRIA and Action Sustainability have produced the world's first sustainable procurement guide BS8903 - *Sustainable Procurement in Construction* which illustrates the key sustainability opportunities and challenges faced in construction procurement and provides a practical step-by-step approach to managing sustainable procurement across construction projects.

## A sustainable Thameslink Programme

The Thameslink Programme (TLP) will transform travel north to south through London. When Thameslink completes in 2018 journeys and connections will be improved giving customers better travel options to more destinations than ever before and modern track and trains will make journeys more reliable.

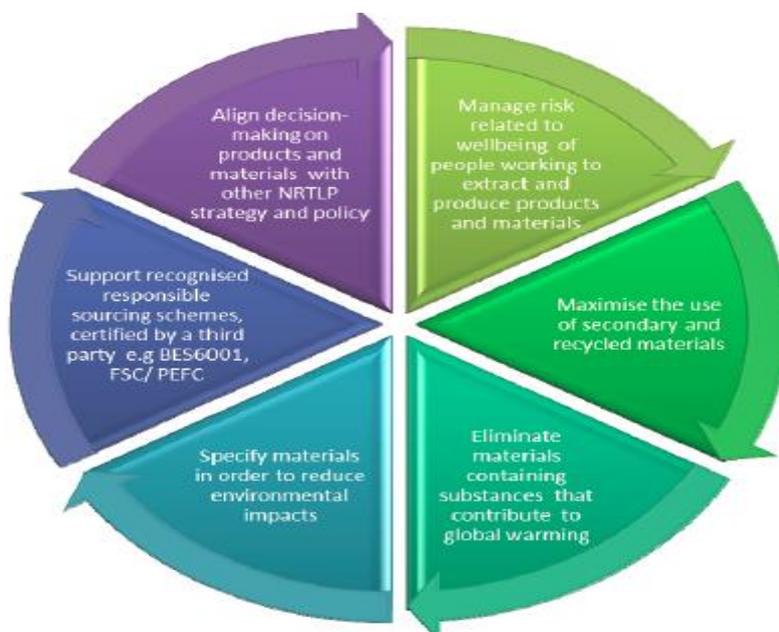
Sustainability is right at the heart of the Thameslink Programme and our vision is to **'deliver transport benefits to budget that represents value for money and creates an overall positive impact on the community and the environment'**. To do this we're working to ensure that not only do we achieve the highest standards in sustainability, but we uphold this principle on all fronts.

As part of our vision the TLP has committed to **"increase the life of materials and reduce the consumption of virgin and unsustainable sources of materials"** as one of our key sustainability impacts and opportunities was the procurement and use of construction materials and products. We set out to achieve this through **"identifying key materials and products and procuring in line with TLP's Responsible Sourcing Policy and Procedure"**.

In 2015 the TLP reported that it is now successfully delivering on its sustainable materials objective as a result of several years of collaborative work between NR TLP project teams and suppliers. This case study summarises how we achieved this.

## TLP Responsible Sourcing Policy

The TLP committed to responsibly source its key products and materials through delivering the following aims;



At the time of developing and releasing the TLP Responsible Sourcing policy there was no responsible sourcing guidelines with NR and the concept of responsible sourcing was still evolving in the construction industry. The TLP therefore decided to take a risk based approach by assessing its top 10 construction materials and products against a number of responsible sourcing requirements developed by the TLP.

Top 10 materials and products included concrete, aggregate, structural materials (e.g. steel), timber and timber related products, brick, block, paving's, dry lining materials, glass, insulation, ceiling tiles and associated materials, gypsum & plasterboard, floor and wall finishes, roofing and roof tiles, drainage and pipework, materials and products containing cadmium, hexavalent chromium, lead, mercury, PVC, formaldehyde and other substances damaging to health and environment, refrigerants and products that require high levels of energy in use.

The objective was not to eliminate construction materials and products but to identify high risk materials and products in our supply chain and to fully evaluate their sustainability impacts and risks and where possible give preference to procuring construction materials and products which complied with TLP's responsible sourcing requirements and/or recognised responsible sourcing schemes.

As part of our policy TLP instructed each key supplier to develop a material use plan for its top 10 construction

materials and products and to assess those materials and products against the TLP responsible sourcing requirements.

The TLP responsible sourcing requirements were split into two stages. Firstly materials and products would be screened against a number of questions to identify any risks within the supply chain. Questions included;

- **Whether the product or material complied with any recognised responsible sourcing schemes certified by a third party**
- **Whether the material or product was harmful to the environment or to health in extraction, manufacture, use or disposal**
- **Whether extraction or manufacture of a material or product had a track-record of workplace risks, related to labour standards and/or safety and wellbeing of workforce**
- **Whether the material or product came from the UK or Europe and was supported by EU legislation and/or standards**
- **Or whether the material or product came from a country or region with a reputation for labour practices or unstable political regimes and if so were there standards that could be adopted to manage or mitigate any social risk**
- **Whether the material or product compromised achievement of other TLP policies and/or strategies.**

Any materials and products that were identified as being of high environmental and/or social risk were then subsequently further assessed by the TLP Consents, Sustainability and Property team and TLP project team.

The second stage was to assess materials and products against the TLP sustainable materials targets which included;

- **Specifying a minimum 15% (stretch of 25%) reused or recycled content by value of new construction products and materials**
- **Specifying a minimum 25% recycled content in aggregate selection and use by weight**
- **Specifying materials to reduce environmental impact by using WRAP Construction Material Guidance and BRE Green Guide to Specification (no worse than B rating)**
- **100% of new timber to be FSC or PEFC certified**
- **Procuring construction products that comply with BES6001; 'excellent' or 'very good' ratings**
- **Eliminating the use of insulation and other materials containing substances known to contribute to stratospheric ozone depletion and climate change**
- **Reducing embodied carbon of key materials such as concrete and steel**
- **Reducing waste in design & construction**
- **Identifying potential for reuse of products or materials within the project and via the NR National Supply Chain**
- **Designing our structures to reduce future product and/or material use in maintenance and replacement and to accommodate future retrofits by increasing durability, reuse potential in deconstruction**
- **Supporting Life Cycle Analysis to evaluate the environmental impact of key or major purchases of products and materials**

## Top tips and lessons for embedding sustainability in supply chains

**Reflecting on past successes and lessons** – in the early stage of TLP sustainable materials objectives and targets were in place but we did not have a clear delivery framework therefore delivery was piecemeal across the programme. Our major projects such as Farringdon and Blackfriars delivered a number of targets but our other projects such as Railway Systems struggled to influence the supply chain. As a result the TLP partially delivered its sustainable material objective.

Our CEEQUAL process also highlighted that responsible sourcing was our weakest area therefore as we moved into the next phase of TLP we strengthened our strategies, management system and procurement processes to successfully deliver our sustainable materials objective across the entire programme.

**Focusing on our key impacts** – like our approach to carbon we decided to focus on our key impacts which were construction materials and products. We realised that to be successful in incorporating sustainable materials into the design, construction and operation of TLP we needed to identify our top materials and products and procure these as responsibly as we could.

**Setting clear objectives, targets, policies and procedures** – as a client we have the power and opportunity to drive our supply chain to be more sustainable. To do this it is important that we clearly state what we want to achieve and how we want to achieve this. TLP initially achieved this through setting a sustainable materials objective and targets however our supply chain was unsure how to deliver this. We then decided to go one step further by developing a specific policy and procedure which clearly explained what we expected from our suppliers.

**Engaging our contract and procurement process** – On TLP we worked closely with our contract and procurement team to include sustainability into our tender process and to embed our responsible sourcing requirements into our contracts. This ensured that sustainability was incorporated from the outset and cascaded across our supply chain.

**Collaborating with our suppliers** – each project was required to develop a material use plan which identified its top 10 materials and products and how these meet TLP's responsible sourcing requirements. On TLP we encouraged our project teams to develop these plans in collaboration with our procurement teams and suppliers so that all sustainability risks and opportunities could be identified early in the project. The plans were reviewed and updated throughout the project lifecycle so that we could continually monitor progress.

**Challenging the status quo and encouraging innovation** – as a business we are governed by various design standards and/or contracts in relation to materials. At times these requirements do not support the business's sustainability commitments. On TLP we encouraged our suppliers to challenge our standards and to work with the industry to innovate with different materials and products.

**Monitoring our suppliers** – each quarter we assessed our supplier's performance through our quarterly sustainability reviews. For a number of years our sustainable materials targets were slow to progress so in 2014 we decided to undertake an internal audit of our responsible sourcing requirements. This enabled us to understand how our suppliers were performing and to identify and fix any blockers to achieving our objective. Since this audit the TLP has successfully delivered its sustainable materials objectives and continues to make good progress.

**Stop, Start, Continue, Improve** – At Farringdon the project team held a sustainable procurement workshop to identify the opportunities, best practice and lessons learnt across the key supply chain members and to transfer this learning to other projects to improve future project performance. The workshop focused on a number of key sustainability aspects such as of recycled content, embodied energy, packaging, energy efficient technology, reducing transport, pre-fabrication, local sourcing and worker conditions.

The workshop culminated in a "Stop, Start, Continue, Improve" communication technique for fostering ideas and opinions. This process allowed all parties to communicate honestly and give direct and specific feedback on the workshop. This approach identified some key successes and learning for the TLP.

#### **STOP**

- Suppliers should not be isolated from the design phase, instead involved at the earliest opportunity
- Don't ignore suppliers advice - they should be recognised as experts in understanding their products and should be consulted through the design and build stages
- Stop focusing on project cost instead of value

#### **START**

- Sustainable procurement should be driven from the top down based on setting clear smart sustainability targets prior to the start of the project
- Create a standardised and streamlined approach to sustainable design
- Where possible the client should challenge standards
- Initial project designs need to incorporate more sustainable solutions
- The client will be more flexible and willing to consider sustainability solutions
- Start thinking about the whole life cycle of procured items and work in combination with supplier to minimise the negative environmental impacts
- The client, where possible, should allow time for the incorporation of sustainable design
- Implement a tool to capture the environmental impacts or supply chain items using the whole life cycle

#### **CONTINUE**

- Continuation of workshops and presentations that promote sustainable procurement along the supply chain
- Continue creating case studies and best practice guidelines to facilitate design sustainability
- Supply chain should be educated through involvement
- Client to continually review standards and encourage sustainable and innovative ideas where possible
- Maintain strong communications across the supply chain

## IMPROVE

- Improve communication across all levels of the supply chain
- Encourage improved supplier responsibility e.g. waste packaging removed after delivery
- Early involvement of suppliers in the design process will improve project deliverability, reduce unnecessary costs and promote sustainability through the supply chain
- Improve procurement awareness whole life cycle cost
- Where possible allow sufficient time to encourage the adoption of sustainable ideas into the design
- Review the materials approval process and seek to make it more flexible to innovation
- Encourage suppliers to improve environmental responsibility through their contracts

The benefits of taking this approach meant the Farringdon team was able to;

- Identify opportunities for best practice in design and construction
- Better engage with the supply chain to clearly communicate client requirements to improve project delivery
- Better understand the supplier's sustainability baseline in terms of their capabilities and performance which assisted in setting future benchmarks and targets
- Minimised the risk that could be generated through sourcing unsustainably, and, at least, to understand where materials are coming from geographically and ethically
- Raise the standards and awareness across the entire construction industry

### Did you know...

The Supply Chain School, launched in 2012, is a multi-award winning initiative which represents a common approach to addressing sustainability within supply chains. With more than 14,000 members, the School provides free practical support in the form of e-learning modules, tailored self-assessment and action plans, sustainability training and networking opportunities.

## Sustainable supply chains – best practice

### Farringdon and Blackfriars Stations

In the early stages of TLP we had a sustainable materials objectives but no underlying delivery framework. Despite this our projects worked collaboratively with their suppliers to deliver some impressive results.

At Blackfriars the NR and Balfour Beatty team set itself a target to procure at least 50% (by value) of major materials from recognised responsible sourcing schemes. To achieve this the team identified and prioritised key materials which were sourced and produced under a set of internationally or nationally acceptable responsible sourcing schemes such as FSC and PEFC for timber products, CARES for steel reinforcement, and BES:6001 and BS:8902 for all other construction products. Through this approach the team procured **61%** of major materials from recognised responsible sourcing schemes.

At Farringdon the NR and Costain team established a material use plan to assess the key materials against a comprehensive set of 20 sustainability criteria. Further to the material use plan TLP requested that Costain undertook sustainable sourcing supply chain audits of its key materials (stone, zinc, pre-cast concrete) to enable the project to make informed choices when purchasing materials.

The review considered several aspects such as:

- Environmental certification – e.g. ISO14001, BES6001 which looks at the environmental systems utilised.
- Sourcing & manufacturing locations, preference given to locally sourced materials.
- Recycled content – e.g. concrete containing recycled aggregates or pulverised fly ash used in preference to virgin aggregates. Reinforced steel used in the project is 100% recycled.
- Ease of recycling – how easily materials can be recycled when disassembled.
- Embodied carbon – the total amount of carbon used to make the product, bringing it to market and disposing of it.
- Volatile Organic Compound content – the quantity of chemical compounds that evaporate easily and can pollute the environment and affect human health.
- Sustainable transport measures & carbon foot printing – looking at whether materials can be transported by barge or other sustainable modes of transport.
- Audits on the working conditions from mineral extraction (taken from Defra's Ethical Procurement Policy) – i.e. is employment freely chosen, is child labour eliminated, are working hours reasonable, do wages meet national legal standards and is training for workers provided.
- Best practice – this varies from material to material

## Depots and Stabling

As we moved into the second phase of TLP we had a more robust and transparent approach to our responsible sourcing framework enabling our projects to deliver some major wins. These included;

For our depots and stabling portfolio the NR and Carillion team developed a material use plan which prioritised the use of sustainable and locally sourced materials. The plan provided a framework for successfully tracking the key materials such as concrete aggregates and rebar used during construction. To meet the target of using 25% recycled content in aggregates the team re-used and recycled waste as viable construction materials and sourced recycled materials. Through sourcing and using materials in a more sustainable way the project reduced carbon emissions by 210 tonnes and saved £102,000.

At the Outer Areas Peterborough site Carillion were successful in;

- Off-site crushing of 500 tonnes of limestone
- Reusing 1,305 tonnes of soil and stones to raise levels around new TOC accommodation saving £10,000 and reducing transport related emissions by 1 tonne
- Exceeding the 25% target by achieving 28% recycled content in aggregates
- Leveraging the waste hierarchy to achieve an overall diversion from landfill rate of 99% for the project
- Minimising the impact on the local community by removing traffic movements from local roads.
- Installing 3,400 concrete sleepers sourced from Network Rail's National Supply Chain with 90% classified as serviceable (pre-used) spares. Reusing these sleepers saved the project £92,000 and helped avoid 209 tonnes of embodied carbon.



**Serviceable sleepers**

## Ethical supply chain mapping

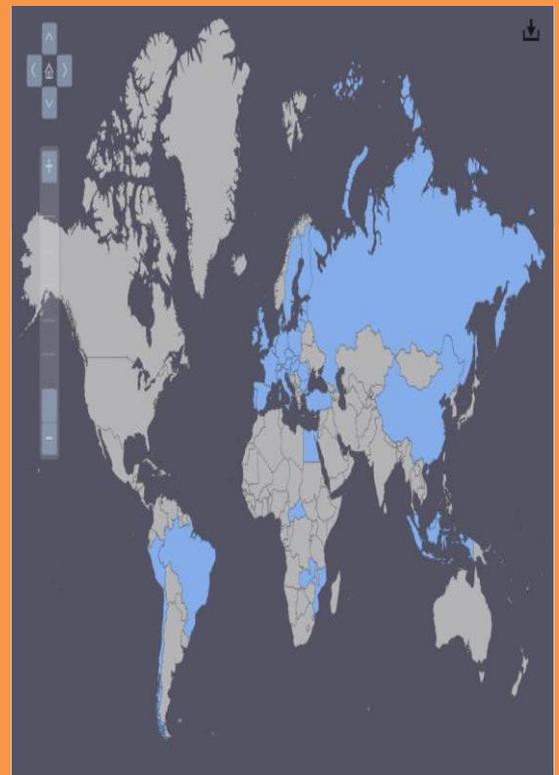
Siemens Rail Automation (SRA) who deliver TLP's Signalling portfolio will purchase and install over 920,000 meters of cable for TLP (signalling and power varieties) of which over 90% of these cables will be supplied by Cleveland Cable.

SRA worked together with Cleveland Cable to understand and determine the source countries of cable raw components (copper, tin, aluminium, armoured steel, various plastics,) to meet TLP's responsible sourcing requirements,

- *to investigate into materials being sourced from countries or regions with a reputation for poor labour practices or unstable political regimes and*
- *to assess whether the health and wellbeing of people may be at risk if they are involved in the mining, extraction, manufacture and disposal of the project and materials, because of the poor business practise of the organisation within the supply chain, possibly supported by weak labour market regulation or compliance with a country or region.*

The study identified that the suppliers sourced raw materials from all across the globe including locations such as Portugal and Turkey for PVC and polyethylene, Spain, Turkey, Italy, Egypt, UK, Germany and Belgium for copper, Mozambique for aluminium and China for steel. Copper is mined in Chile, Peru, Central African Republic, Zambia and Indonesia. Tin is mined in China, Malaysia, Indonesia, Brazil and Peru. PE is sourced from the North Sea. PVC and sheath PE and is sourced from within the Europe or China. Rat tape (woven glass) is sourced from Europe or Russia. Aluminium is mined in Europe, Turkey and China.

Through mapping the supply chain SRA were able to concisely convey the complex supply chain information, identify risks and opportunities in the cable supply chain and demonstrate the potential for reputational, financial and operational vulnerabilities in an international procurement chain as complex as that of TLP.



**Cable materials source countries**

### London Bridge's approach to responsible sourcing

At London Bridge the NR and WSP and Costain team also developed a material use plan to examine the most frequently used materials, their impacts against 20 sustainability criteria and to look at alternate products or improvements that could be undertaken.

The information logged in the MUP provided details about the product manufacture, how it is transported to site, recycled content and disposal. Various specifications of concrete and steel are some of the primary materials that have been evaluated against the 20 sustainability criteria in order to review the material and supply chain performance.

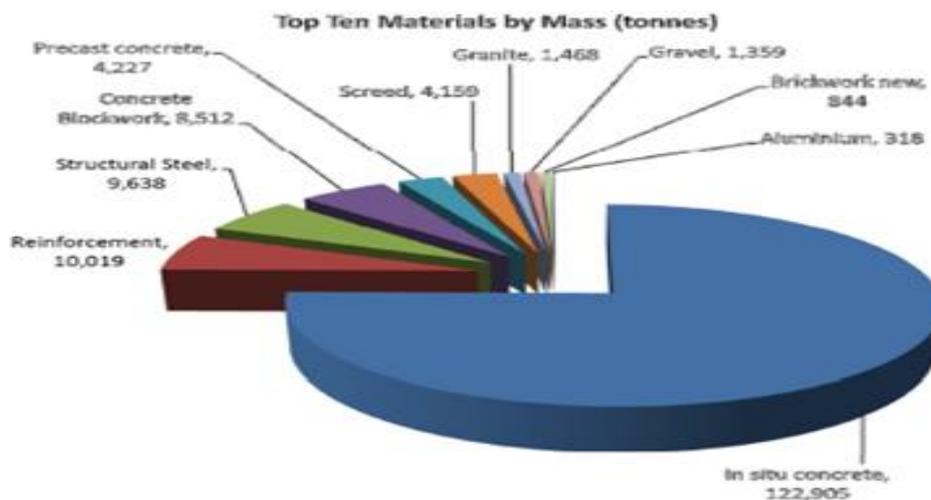
The material use plan was a valuable framework to the team as it enabled London Bridge to;

- identify materials with the most impact and provide guidance and opportunities for material use improvements
- Allowed contractor input to supply additional information and alternate products
- Identified opportunities in reducing supply chain environmental impact by allowing changes in procurement choice.

Working with the procurement team and our supply chain enabled London Bridge to update the material use plan with all major materials used on site and through using the data within the plan identify ways in which the project can reduce its environmental impact.

Frequent material use plan meetings are held between procurement managers and designers to discuss any forthcoming activities where material use plan information needed to be provided or any issues that had arisen regarding the materials performance. These minutes are then recorded and an action plan is developed.

The material use plan summary showed that as of 2014 52% of the materials recorded were evaluated as complying with TLP's responsible sourcing requirements.



### The challenges of cement replacement

At London Bridge the Costain team set a target to deliver 40% cement replacement within recycled material. It was envisaged at an early stage that this would be achieved using Ground Granulated Blast-furnace Slag (GGBS), which is a by-product of the steel production industry. The maximum rate of replacement for GGBS, whilst still exhibiting the same strength gain characteristics as Ordinary Portland Cement (OPC), is 50%. However, it was identified at the early design stage that GGBS was not a standard product from the preferred supplier within the London Area and is not readily available in the south east of England. This material therefore required sourcing via a broker in Purfleet from Port Talbot in South Wales, Gent in Belgium, and Teesside in England, which added a great deal of haulage to the delivery of the product and partially offsetting the environmental benefit of the product. As the GGBS was considered a special order it also attracted a higher premium for its supply.

As an alternative replacement for the GGBS Pulverised Fuel Ash (PFA), a by-product of the coal fired power station industry was sourced for use within the project main station and western structures. This recycled product can only provide 25% replacement therefore limiting the projects ability to achieve an average replacement of 40%. This product is readily available from a preferred supplier with the raw material being provided from Drax Power Station in Yorkshire.

To compensate for this the delivery and design team are identifying structural elements that do not require high early strengths and can therefore utilise higher replacement rates than normal, enabling the team to deliver the most sustainable product possible to the end user.

## With Thanks

The Thameslink Programme would like to thank the following Network Rail project and suppliers

- London Bridge Station Redevelopment team and WSP and Costain
- Blackfriars Station project team and Balfour Beatty
- Farringdon Station project team and Costain
- Signalling project team and Siemens
- Outer Areas project team and Carillion



Balfour Beatty



SIEMENS



## Further information

For further information on the Thameslink programme please see below;

Thameslink Programme <http://www.thameslinkprogramme.co.uk/>

Thameslink Sustainable Development Policy <http://www.thameslinkprogramme.co.uk/approach>

Network Rail Sustainability Charter <https://www.networkrail.co.uk/CDF/>

Supply Chain School <http://www.supplychainschool.co.uk/>

Network Rail Sustainable Development Strategy

<http://www.networkrail.co.uk/browse%20documents/strategicbusinessplan/cp5/supporting%20documents/transforming%20network%20rail/sustainable%20development%20strategy.pdf>