

Sustainability Best Practice Case Study

CEEQUAL – a tool to drive sustainable design and construction



CEEQUAL (the Civil Engineering Environmental Quality and Assessment Award Scheme) is widely used in civil engineering, infrastructure, landscaping and public realm projects to encourage high levels of environmental and social performance.

The Network Rail Thameslink Programme has been applying CEEQUAL to many of its stations, civils and most recently track and signalling projects to drive sustainable choices in design and construction with resounding success. Aside from being an awards scheme the Thameslink Programme has recognised the value of CEEQUAL in improving sustainability performance supporting both our sustainable development policy and Network Rails Infrastructure Projects sustainability commitments.

This case study sets out how the Thameslink Programme has achieved sustainability best practice through the application of CEEQUAL.

A sustainable Thameslink Programme

The Network Rail (NR) 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 **"use CEEQUAL to help us strike a balance to achieve high standards of environmental and social benefits whilst achieving value for money"**. To date the Thameslink Programme has achieved a CEEQUAL Excellent Whole Project Award for its Blackfriars Station (92.4%), Farringdon Station (90%), Borough Viaduct (77.9%) and Tanners Hill (77.7%) projects as well as achieving a CEEQUAL Outstanding Award for Blackfriars Station in the energy and carbon category and Farringdon Station in the biodiversity and ecology category. TLP has also achieved a CEEQUAL Excellent Design Award for its London Bridge (96.9%) and Bermondsey Dive Under (96.3%) projects and is on track to continue this success through construction.

Recognising the value that CEEQUAL has added to the TLP we have also applied the newer CEEQUAL Term Contracts model to all our track and signalling projects, which is the first application of CEEQUAL to a linear project in NR. Over the last three years we have improved our sustainable design and construction performance from 43% to 58% through the application of CEEQUAL Term Contracts.

Our commitment also supports the NR Sustainable Development Strategy (2013-2024) and the NR Infrastructure Projects (IP) Control period 5 business plan objectives and Sustainability Charter.

CEEQUAL

CEEQUAL is the international evidence-based sustainability assessment, rating and awards scheme for civil engineering, infrastructure, landscaping and works in public spaces. CEEQUAL encourages and promotes the attainment of high economic, environmental and social performance in all forms of civil engineering through identifying and applying best practice.

It aims to assist clients, designers and contractors to deliver improved sustainability performance and strategy in a project or contract, during specification, design and construction. The scheme rewards project and contract teams who go beyond the legal, environmental and social minima to achieve distinctive environmental and social

performance in their work. In addition to its use as a rating system to assess performance, it also provides significant influence to project or contract teams as they develop, design and construct their work, because it encourages them to consider the issues at the most appropriate time.

CEEQUAL Projects has been specifically created for the assessment and rating of civil engineering, infrastructure, landscaping and public realm projects. CEEQUAL Term Contracts has been specifically created for the assessment of civil engineering and public realm works that are undertaken through contracts over a number of years and in a geographical or operational area.

The benefits are primarily the same as for projects assessed using CEEQUAL but the methodology has been amended to suit the way these contracts are procured, managed and delivered. For TLP we applied CEEQUAL projects to all our major stations and civils projects such as Blackfriars, Farringdon, Borough Viaduct, London Bridge and Bermondsey Dive Under. For our track and signalling portfolio we applied CEEQUAL Term Contracts as this was more applicable to the linear and cyclical nature of the works.

CEEQUAL covers nine topics areas including;

- ✓ **Project or client contract strategy** - assesses how the project/client team has related their project/contract to the wider sustainability agenda and their contribution to 'sustainable development'.
- ✓ **Project or contract management** - considers how environmental and sustainability issues are being incorporated into the overall management of the project/contract.
- ✓ **People and Communities** - addresses a wide range of positive and adverse impacts on people affected by the project or contract and/or on the wider communities served by or affected by the scheme.
- ✓ **Land use and landscape** - covers issues affecting land above and below water.
- ✓ **The historic environment** - covers baseline studies and surveys, conservation and enhancement measures to be taken if features are found, and information and public access.
- ✓ **Ecology and biodiversity** - covers impacts on sites of high ecological value, protected species surveys, conservation and enhancement, habitat creation measures, monitoring and maintenance.
- ✓ **Water environment** - covers control of a project or contract's impacts on, and protection of, the water environment, legal requirements, and enhancement of the water environment wherever practical.
- ✓ **Physical resources use and management** - covers the impacts of using the very wide range of physical resources needed for civil engineering projects or contracts.
- ✓ **Transport** - covers location of a project/contract in relation to transport infrastructure, minimising traffic impacts of a project/contract, construction transport, and minimising workforce travel.

The role and benefits of CEEQUAL

Civil engineering provides infrastructure on which we all depend, and shapes and influences the environment in which we live, for the benefit of society. It is aimed at delivering an enhanced quality of life to the community/communities it serves. Modern life is only possible because of the infrastructure provided by engineering clients, designers and contractors. Many civil engineering projects, including railway projects, have the opportunity to intrinsically improve environmental quality and human well-being.

CEEQUAL aims to improve the sustainability performance of civil engineering schemes and provides a wide range of benefits to railway projects including;

- ✓ **Significant improvements to your projects and contracts through adoption of best practice** including whole-life costing, waste minimisation, resource efficiency (materials, water, energy), responses to predicted climate change effects, as well as project management and reduction of complaints and environmental incidents.
- ✓ **Reputation-building and good PR** including verified demonstration of delivery of your environmental, sustainability and/or corporate social responsibility policies.
- ✓ **Cost savings** through CEEQUAL's influencing role. Projects have reported savings ranging from £30,000 on waste minimisation to £5 million (3.3% of total project cost) saved through design changes and alternative materials.
- ✓ **Demonstrating your commitment to the sustainability agenda, and providing public recognition of your work** to clients, to the industry as a whole, and/or to stakeholders and the general public.
- ✓ **Enhanced team spirit** through CEEQUAL's recognition of teams that have "gone the extra mile" and, because using CEEQUAL provides encouragement and a target for your project and contract team to deliver high performance, it helps to develop a positive performance attitude.
- ✓ **Award presentations** celebrating high performance and reinforcing team spirit.

How Thameslink achieved CEEQUAL Excellence

Using our role as client to raise the bar

As client we have the power to set and raise the sustainability performance of our programme and our supply chain and to drive a positive change across our business, supply chain and the industry. To play our part we committed early on to achieve a CEEQUAL Excellent for all our major stations and civils projects. The NR TLP projects teams considered CEEQUAL to be a useful tool for driving sustainability into the early design stages and for measuring sustainability performance through design and construction.

We also reflected regularly on our performance and looked for opportunities to innovate and extend CEEQUAL across the whole of the TLP. For example we identified that our track and signalling projects were typically not suitable for the CEEQUAL Projects model so when Term Contracts were released we worked with CEEQUAL and our project teams to see how we could apply this methodology to our track and signalling portfolios.

Challenging the design and construction process

At the start of the design stage (typically GRIP Stage 4) we held CEEQUAL workshops with our project teams, designers and suppliers to challenge the design and construction process and to identify sustainable design and construction solutions.

At London bridge our NR TLP project team and WSP design team held a series of workshops for sustainability, energy, waste and CEEQUAL to understand and identify risks and opportunities. At the workshops sustainability objectives and targets were agreed and sustainability champions identified to review progress of targets through the design process. The NR TLP and WSP design team also worked with cost consultants to explore in more detail the whole life cost impacts of sustainable design decisions. The sustainability progress and performance of the project was then reported quarterly through NR TLP sustainability meetings.

Managing CEEQUAL through the supply chain

As a client it was important that our design, construction teams and our supply chain were fully aware of our commitment to CEEQUAL. To achieve this we incorporated CEEQUAL into the tender process and embedded our CEEQUAL target into our ISO14001 Environmental Management System and our procurement and contract process. We also regularly monitored CEEQUAL delivery and performance each quarter with our project teams and supply chain to assess how we were progressing towards our CEEQUAL Excellent target.

The value of training

CEEQUAL requires trained assessors therefore we made the decision to invest in training all our environment and sustainability team in CEEQUAL Projects and/or Term contracts so that we had the internal knowledge, experience and qualifications to drive our project teams and supply chain. This also equipped our team with the skills to providing on-going training to our project, design and construction teams.

No evidence, no points!

CEEQUAL requires a lot of evidence and there is a tendency to leave this until end, however if evidence is not collated during the CEEQUAL process it can be lost when suppliers contracts finish and the knowledge leaves the programme. This ultimately means that we cannot collect the CEEQUAL points if the evidence is missing. To address this we used the CEEQUAL progress meetings to assess where we were with evidence collection.

Understanding our strengths and weaknesses

After the first stage (known as Key output 1) of TLP we reviewed our CEEQUAL performance to understand where we scored the highest and lowest across the nine categories. In areas where our performance was lower, for example energy and carbon and responsible sourcing which also held the highest weightings in CEEQUAL, we put in place specific management actions to improve the scoring in these categories as we entered the second stage of the TLP (known as Key output 2). This included developing and issuing a carbon policy and a responsible sourcing policy across our programme and supply chain, reviewing our carbon and sustainable material targets and implementing specific energy/carbon plans and material use plans across all our projects and suppliers.

We also set up an internal CEEQUAL working group to share best practice and lessons learnt across the programme and supply chain and nominated a TLP representative to share our experiences with CEEQUAL as part of their version updates.

Examples of CEEQUAL Excellence – our successes

Project strategy - by its very nature as a sustainable transport project the TLP contributes to wider principles of sustainable development, however as a major infrastructure programme the impacts and sustainability of the TLP have been assessed as part of the Transport and Works Act Order and Environmental Statement.

Whilst the TLP is primarily governed by its legal and planning commitments, which sets a minimum level of sustainability requirements the programme committed to go above its legal compliance. It has and is achieving this through its Sustainable Development Policy, which as a vision to **'deliver transport benefits to budget that represents value for money and creates an overall positive impact on the community and the environment'** and the TLP Sustainability Strategy which sets out the 20 environmental, social and economic sustainability objectives and targets that the programme will deliver.

Project/contract management - the TLP has implemented a robust framework to monitor the delivery of our sustainability commitments. Our Sustainable Development Policy and sustainability objectives and requirements are embedded within our ISO14001 certified Environment Management System and cascaded across our programme and supply chain via our contracts and procurement process.

Each of our TLP projects and suppliers are required to develop and deliver a Sustainability Delivery Statement (SDS's) which sets out how they will meet TLP's sustainability objectives and targets that are relevant to their work scope. NR project teams and suppliers developed their SDS together through collaborative sustainability workshops facilitated by the TLPs Consents, Sustainability and Property (CSP) team. Regular reviews of our sustainability performance are also undertaken with our project teams, suppliers and executive leaders to monitor delivery, compliance and performance and drive continual improvement and best practice. Our CEEQUAL commitment is a specific contract requirement that we have used as a tool to drive and measure our sustainability performance.

People and Communities - The TLP has a number of sustainability commitments in relation to people and communities. Specific examples of best practice under CEEQUAL include;

Noise and nuisance – Our main impact on the TLP is noise and nuisance due to the close proximity of residential and commercial neighbours and the constraints of undertaking works adjacent to or over the railway during night time, weekend engineering hours or during possessions.

Under the TWA order the TLP implemented a range of mitigation measures to manage its noise and nuisance impacts. For example all of TLP project teams and suppliers are required to adhere to TLP's Noise and Vibration Policy, Noise Insulation and Temporary Rehousing Policy and section 61 consent processes and employ best practice at all times. Examples of best practice include;

- Section 61 consents for all noisy works comprised of six-monthly section 61 consent applications to take account of changes to programme
- Noise predictions to identify eligible properties for noise insulation and/or temporary re-housing
- Workshops to collate information required for each section 61 consent application
- Identification and implementation best practicable means (BPM)
- Regular noise and vibration training for Network Rail project teams and suppliers
- Accurate recording, monitoring and investigation of complaints
- Regular reviews of site compliance
- Good communications and working relations with environmental health officers (EHOs), including regular review of site progress, consent compliance, monitoring data and complaints
- Excellent community relations, for example early community forums, timely and accurate pre-notifications of works and management of community consultation and relations for residents eligible for noise insulation and/or temporary re-housing

Through implementing best practice the TLP has been able to gain trust with its local Environmental Health Officers so that timely consent applications are granted. As an indicator of the success of this approach at Farringdon very few complaints were received relating to construction noise.

A Noise and Vibration Specialist was also assigned to the TLPs CSP team to support the project teams and supply chain in meeting the TLPs noise and vibration requirements and to monitor programme compliance and performance.

Example of CEEQUAL Excellence – our successes

Community relations and engagement – Good community relations and engagement are important to the successful delivery of the TLP. On TLP all our projects are required to have stakeholder engagement and community relations plans in place. Our CSP Consents Managers work closely with our Community Relations team to manage our communications, identify and issue timely pre-notifications of works and to manage and respond to complaints. The TLP implemented a specific complaints management procedure as part of its ISO14001 EMS so that we had a robust and universally agreed process for managing our complaints, which has been a contributory factor to our success.

At Farringdon we achieved best practice in communications and community relations through implementing the following measures;

- Introduction of a regular monthly newsletter, which was distributed to ~1000 neighbours. The newsletter gave a look-ahead of the works to be undertaken, particularly to give advanced notice of extended working hours that would cause disturbance. It also served in support of public consultation on the major planning applications.
- Regular community meetings and open evening events, consultation events (in support of major planning applications), and take part (and host) with Crossrail in a community forum, which was chaired by local councillors, and attended by representatives of the key community stakeholders including residents, businesses, and officers.
- Development of the project's community engagement programme.
- Network Rail also marked the successful completion of the project with a public exhibition of 'Farringdon: past, present and future' which celebrates the heritage work and the major improvements to the infrastructure.

At Borough Viaduct, a new twin track viaduct between Metropolitan Junction and Railway Approach linking to the new London bridge station, works were being undertaken within a busy market trading area known as the famous Borough Market. Significant consultation with the local community took place during design and construction to minimise the impact of construction activities to local businesses and traders including restricting deliveries to site on market days.

The historic environment - At Farringdon Station (a Grade II listed building) heritage was the projects most significant impact. The project team managed 300 planning submissions as a result of the TWA Order planning and listed building consents and the subsequent changes to scope, design and temporary works alongside a compressed and challenging programme and delayed design completion. To do this successfully a town planning and heritage specialist was assigned to the projects Consents and Sustainability team to support the Farringdon team and supply chain to meet the TLP heritage requirements. The specialist also collaborated with other railway projects such as the Channel Tunnel Rail Link St Pancras, Crossrail, and Kings Cross to share and implement best practice. Farringdon achieved best practice for the management of its heritage impacts and building recording, which was subsequently incorporated into the governments planning policy statement 5.



Farringdon past and present exhibition



New Borough Market Hall



Viaduct constructed above the Wheatsheaf pub

At Borough Viaduct works were undertaken within the Borough High Street Conservation Area. The alignment of the viaduct, a new structure extending 322 meters running alongside the existing viaduct to double the capacity of the route into London Bridge Station, was carefully selected to minimise the loss of listed buildings. To make way for the new structure a number of buildings were demolished and new buildings were constructed on the footprint of the previous buildings on completion of the viaduct. All buildings were fully recorded and archeologists were employed during all excavations to ensure that the archaeological resource was fully recorded. At Stoney Street, a listed Wheatsheaf public house was retained by removing only the top floor of the building allowing the new structure to oversail the building. A new basement and ground floor rear extension was constructed to enable the building to continue to operate as a pub. Additionally a derelict site in the heart of the conservation area was cleared and brought back into use as a beer garden for the listed Wheatsheaf pub. Two spans of the cast iron Victorian market roof were also dismantled and reinstated following refurbishment. Traditional construction methods were used during the restoration works ensuring that the reinstatement will preserve the historic fabric of the area. The Borough Market has returned to its original trading area and has benefited from increased trading space.

Archaeological work during construction of the new Borough Viaduct also uncovered a wealth of remains from the Roman, Saxon, medieval and more recent periods that provide a fascinating insight into the formation and growth of the ancient settlement at Southwark. Archaeological finds included;

- Traces of early Roman military occupation
- Evidence for the Boudican revolt
- A previously unknown Roman bathhouse under Borough High Street
- Substantial evidence for the Saxon/medieval defences of the settlement
- The remains of townhouses of important medieval clerics and the St. Saviour's/Park Street burial ground

Waste – designing out waste is a key requirement for all our projects. WRAP designing out waste workshops were held for all projects at the design stage to identify waste opportunities and progress was reviewed through design and construction. Examples of designing out waste actions included;

- Modular and pre prefabrication
- Re-use of demolition crush material and site won materials (soils/stones)
- Reducing volume of waste requiring excavation in design
- Recycling hazardous waste
- Recycling plasterboard
- Segregating waste on and off site
- On-site batching plants minimising the amount of waste concrete produced
- Re-use/recycling of specific waste streams such as carpet tiles, windows, glass, kitchen and bathroom fittings
- Contaminated land sampling to minimise disposal of waste as hazardous waste
- Reuse of NR National Supply Chain serviceable spares
- Reuse of heritage bricks from demolition in the construction at Farringdon

The TLP has consistently reported over 95% diversion from landfill rates with 99% rate achieved in 2015/2016. For further examples of our approaching to minimising waste please see the TLP Sustainability Best Practice case study – Reducing Waste, Reducing Cost.

Ecology and Biodiversity - our first brown roof

The impact on ecology and biodiversity from our works in central London was fairly limited as opposed to our other Outer London locations. However, despite this the railway network provides important corridors and stepping stones for London wildlife. To enhance our ecology and biodiversity the Farringdon station project created new habitats by incorporating a brown roof into the new ticket hall building.

The brown roof, 700m², contributes 20% of the Boroughs annual biodiversity action plan target for habitat creation and was £40,000 cheaper than a conventional zinc roof. The main purpose of the roof is to provide habitat for low invertebrates which will in turn provide foraging for low invertebrates black redstarts. It will also make a contribution to the projects SUDs performance.

The brown roof won the CEEQUAL Outstanding Achievement Awards in the category of ecology and biodiversity.

Examples of CEEQUAL Excellence – our challenges

Energy and carbon – Energy and carbon was one of the most challenging areas of the TLP. In the early stages of TLP some of our projects struggled to meet our 20% energy reduction target and/or were unable deliver our requirements such as an energy/carbon assessments to identify energy and carbon interventions at the design stage. Through a lessons learnt we identified this was often due to;

- The unknown or perceived complexity of incorporating energy efficient technologies into the design of assets.
- Uncertainty around who, how and the cost of managing and maintaining such assets in the future.
- The competency of the supply chain to deliver our requirements.
- Lack of investment business case or whole life costing studies. For example such technologies require large capital expenditure by NR IP however all operational savings are realised by the operational part of the NR. This often makes the business case non-financially viable from the outset and therefore relies upon the environment and sustainability professionals selling to the business the concept of 'doing the right thing' as opposed to offering a sustainable business solution.

Despite these challenges the TLP did deliver an iconic solar photovoltaic (PV) project at Blackfriars Station creating the world's largest solar bridge and winning a CEEQUAL Outstanding Achievement Award (see right hand box).

In the later stages of Thameslink the programme responded to these earlier challenges by undertaking a carbon footprint of the project to identify our key carbon hotspots and developing and rolling out a specific TLP Carbon Policy and procedure.

This enabled the TLP to understand where our biggest energy/carbon impacts were (embodied carbon of materials such as concrete and steel, construction energy and operational energy (design/operation)) and to use our role of client to set clear requirements to our supply chain. As a result of our policy all projects and suppliers are required to undertake an energy/carbon assessment in design to identify energy/carbon interventions and to set appropriate reduction targets which they would monitor during both design and construction.

Following this revised approach an early stage energy and carbon analysis was undertaken at London Bridge which identified the key energy consuming systems and processes within the station. An options appraisal proposed a range of operational energy saving measures, which were investigated in terms of feasibility, energy cost savings and carbon emission reduction. The selected measures included:

- Optimising access to natural daylight in the concourse and on the platforms while preventing risk for solar overheating.
- High performance building envelope.
- Natural ventilation and free cooling to the concourse and station accommodation.

World's largest solar bridge

At Blackfriars station over 6000m² of solar photovoltaic (PV) panels have been incorporated onto the new roof making it the worlds largest solar bridge.

The installation is complex, working over a rover next to live overground and underground railways. The roof provides 1.058MW of renewable electricity at its peak (up to 50% of the stations energy) powering lightning, ticket machines, staff accommodation and office facilities and any excess electricity is fed back into the national Grid. The energy generated by the cells will reduce carbon dioxide emissions by 500 tonnes a year, equivalent to flying from London Heathrow to Paris (return passenger trip) approximately 4508 times.



The project took full advantage of its unique location and was able to use barges to remove and deliver materials vis the River Thames.

Over the course of the project 14,000 tonnes of materials were brought to site and 8,000 removed via barge. Using this method approximately 2000 lorries and 9 tonnes of CO₂ were removed from London's roads.

A significant part of the construction power supply was also redesigned to reduce the amount of energy used during construction. The number of generators for tower cranes and site temporary power were reduced from 4 to 3. This saved 2.8 tonnes of CO₂ and £1200 per week of hire costs and reduced fuel movements. To enable construction work to continue on the bridge without the need for multiple generators, a power cable was routed across it. This also reduced fuel movements and associated noise and air quality issues.

Examples of CEEQUAL Excellence – our challenges

- Lighting strategy including efficient luminaires, integration with natural daylight potential and best practice controls.
- Efficient escalator and lift equipment and optimised controls, which in some cases required challenging NR standard specifications.
- Highly efficient supply of cooling via condensing loops.
- Ground-source heating and cooling in the form of a series of energy piles (concourse area) feeding into the condensing loop of the retail.

Furthermore the embodied energy and carbon impact of the materials and components proposed for the station were investigated in detail as part of a project lifecycle energy and carbon analysis. Again this identified the key contributors to the overall carbon footprint and focused attentions on lower impact options.

For further details and examples on how TLP tackled the energy carbon challenge please see our TLP Sustainability Best Practice Case Study – delivering low carbon transport solutions.

Sustainable materials – sustainable materials and sustainable procurement was the second most challenging area of the TLP. In the early stages of the TLP our major station projects such as Blackfriars and Farringdon were successful in implementing sustainable procurement strategies however other parts of the TLP struggled to influence the supply chain. The Blackfriars and Farringdon Station project teams and suppliers Balfour Beatty and Costain developed material use plans to identify their top materials and took action to make more sustainable choices in relation to those materials during the design process. The top materials were assessed against a set of sustainability criteria during the design phase which was integrated into the procurement process. At Farringdon the project team and Costain undertook sustainable procurement supply chain audits of key materials and measured their performance against the British Standard (BS8903) for Sustainable Procurement in Construction.

As TLP entered the latter stages of the programme a Responsible Sourcing Policy and procedure was rolled out across TLP and the supply chain to improve our approach to sustainable materials and sustainable procurement thus increasing our CEEQUAL scores. At London Bridge responsible sourcing issues were considered much earlier in the design phase where the project team and Costain committed to a number of actions;

- Maximising the use of recycled and secondary aggregates in structural concrete
- Use of recycled materials such as ground- granulated furnace slag (GGBS) and fly Ash (PFA) as a replacement for ordinary Portland Cement (OPC) in the structural concrete
- 100% certified timber
- Responsible sourcing of structural steel, reinforcement and concrete
- Specification of materials not containing environmentally harmful

Since implementing these improvements the TLP is now successfully delivering on its sustainable materials and sustainable procurement objective. For further information and examples please see the TLP Sustainability Best Practice case study – Sustainable Supply Chain.

With Thanks and Further Information

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
- Track project team and Balfour Beatty Rail

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>

CEEQUAL <http://www.ceequal.com/>

Network Rail Sustainable Development Strategy

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

August 2016 For further information on our best practice case studies please contact **Amelia Woodley – Thameslink Programme Environment Manager** Amelia.Woodley@networkrail.co.uk