



Improving infrastructure performance and efficiency through integrated Green Infrastructure (GI)

BACKGROUND

Effective planning and management of Green Infrastructure (GI) along rail, highway, water and energy networks can enhance performance, efficiency and resilience of these assets. This can reduce whole life costs and deliver ecosystem services for wider environmental, economic and social benefits.

CIRIA released *C771 Delivering green infrastructure along linear assets - Scoping study* (phase 1) authored by Arup, in autumn 2017. This explores and identifies good practice to support integration of GI into linear assets, critical success factors and lessons learnt from project case studies. This proposal (phase 2) sets out to develop practical guidance and advice to facilitate wider uptake of sustainable and resilient approaches to infrastructure planning. It aims inform the creation of multifunctional networks of GI, underpinned by evidence-led, quantified benefits on planning and construction processes, and asset performance.

JUSTIFICATION

The UK is experiencing unpredictable climate change extremes, from winter flooding to summer drought. This, alongside a growing population and increased urbanisation means that energy, transport and water infrastructure sectors face challenges to reduce vulnerability, whilst maintaining good service performance and operational resilience.

The main drivers, opportunities and challenges for this phase 2 proposal are spelt out in the Scoping Study Chapters 3 and 4. These primarily are supported by the UK government's 25 year plan for the environment, its National Infrastructure Assessment, and National Infrastructure Delivery Plan. The work will further be informed by and feed into the emerging government review of the NPPF, the national flood resilience review and national infrastructure funding cycles.

Linear asset owners and managers are primarily concerned with the efficiency of their infrastructure. In order to reduce whole life costs of existing linear assets and develop new networks, suitable adaptation measures and long term sustainability should be considered as an integral part of projects from the outset. Delivering GI can mean that growth opportunities are realised, but not at the expense of the environment. Infrastructure assets can still be delivered within budgets, operating costs and programmes, whilst maintaining the asset lifecycle and future growth potential.

The production of guidance, including extended case studies will steer service providers on good practice, and innovation in implementing GI along the linear infrastructure network and in doing so will share good practice between different sectors and drive improvement and thought leadership across the industry.

OBJECTIVES

The guide aims to influence a perceptual and cultural transformation in delivery of GI. It will be a technical and evidence based good practice document that will be used to support mainstreaming of delivery of GI along linear assets. The guide will:

- Provide practical guidance on delivery mechanisms to achieve successful GI that provides multiple benefits along linear assets
- Raise awareness of opportunities for GI to provide multiple functions, improve resilience, efficiency, operation and performance of the asset

- Provide support and advice to a range of stakeholders involved in the design, management and maintenance of linear assets such as road, rail, water, energy and associated networks
- Help to encourage and facilitate the development of new and better partnerships with links across disciplines and stakeholders
- Illustrate successful detailed case studies with additional supporting evidence on quantified benefits
- Support the case to mainstream a GI approach to linear assets, developing a robust, persuasive and accessible narrative that facilitates delivery.

TARGET AUDIENCE

The guide will be aimed at the following audience groups:

- Client/commissioning organisations responsible for linear asset high-level strategy, procurement, delivery and management, in particular for road, rail, energy and water asset infrastructures.
- Delivery organisations, local authorities, statutory organisations and consultants tasked with approving, planning, designing and implementing linear assets.

The phase 2 guide will:

- Communicate to decision makers and use language that can be understood by infrastructure providers, operators, contractors and project managers, for example framing benefits in terms of efficiency, risk, cost and value, and setting out how interventions can help to deliver on operational and statutory duties and remits
- Use the language of natural capital to enable outputs to be understood by decision makers and funders, while covering additional benefits
- Assuming some reader technical knowledge, but communicated simply to wider audiences.

APPROACH

The Guide will extend on the scoping study by:

- reviewing Phase One Scoping Study recommendations and outputs
- re-examining case studies, and scoping additional new case studies
- defining motives, challenges and objectives to deliver and manage strategic infrastructure assets
- identifying particular challenges for delivery of strategic linear road, rail, water and energy infrastructure assets; the differences and commonalities between a range of infrastructure networks; technical solutions ;and specifically how GI might improve performance
- identifying links between typical delivery aims, incentives, responsibilities and user benefits for different audiences and differentiating between public and private benefits
- promoting the objectives of GI to become the first approach solution for the challenges posed early in the planning process.

OUTPUTS

The Guide will consider how an integrated GI approach can help to deliver these objectives by:

- drawing together, complementing and signposting to existing evidence and case studies
- developing a business case approach for delivering GI, focusing on infrastructure performance benefits and differentiating between direct benefits and wider (soft) benefits
- using benefits and opportunities that meet the needs of different stakeholders in delivering and managing infrastructure and GI
- incorporating a decision-making processes to show why organisations might take an integrated GI approach and who it would involve
- using ‘myth-busters’, for example on realistic costs and maintenance needs with cost examples of GI interventions (focusing on reducing risk and improving efficiencies)
- providing illustrative material linking opportunities and considerations to specific stages of work, from planning and design, to construction, maintenance and monitoring

- using risk analysis or matrices for design and cost considerations and how to manage risks
- identifying and illustrating typical GI interventions, treatments and standards with a hierarchy of functions that could be adapted to a variety of contexts
- illustrating the interface between different scales of GI for linear assets
- reevaluating the phase 1 list of case studies, expanding on critical success factors, lessons learnt, economic benefits and cost savings from case studies where possible
- promoting measures of performance and success to support the scoping study, including available metrics that promote evaluation and a growing evidence base and to influence frameworks and policies
- promoting steps to harness education and capacity building to capture opportunities of GI approaches
- concluding with data, illustrations, lists, and a hierarchy of what good quality GI interventions look like.

The guide will use existing valuation and delivery methods with reference to additional sources of information, specifically Natural Capital and Biodiversity Net Gain. It will not develop new methodologies.

PROJECT TEAM

CIRIA

The project will be managed by CIRIA, who will control the quality, objectivity, independence and relevance of the guidance to industry stakeholders and the intended audience. CIRIA will provide secretariat to the Project Steering Group and will ensure quality objectives of the project are delivered on time. CIRIA will coordinate consultation and engagement activities, and ensure appropriate engagement and interaction with complementary organisations and projects.

Contractor

A contractor with extensive experience in planning and design of green infrastructure along linear assets will be appointed to work on the phase 2 guide.

Project Steering Group (PSG)

The independently chaired PSG will be established by CIRIA and include representatives of the funding and contributing organisations. The role of the PSG will be to oversee the development of the guidance and provide advice based on their experience. They will also be instrumental in representing the needs of the target audience and championing the final outputs.

BENEFITS OF INVOLVEMENT

Funding the project provides opportunities to be represented on the Project Steering Group. This gives exclusive early access to emerging good practice from the project and enables you to influence and steer the independently chaired group. Involvement in the PSG also provides an opportunity to network with peers and raise your profile and promote your organisation's commitment to good practice amongst peers and construction clients (through inclusion of logo on outputs).

COST

It is anticipated that the project will last for 18 months, costing approximately £115,000.

Phase 2 Guidance: £105,000

Phase 3 Outputs and dissemination: £10,000

FURTHER INFORMATION

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C771 Delivering green infrastructure along linear assets -phase 1 outputs, including Executive

Summary and Scoping Study can be downloaded from CIRIA's Website on www.ciria.org/C771