

# **The Value of Design to UK Rail Infrastructure**







'The Value of Design to UK Rail Infrastructure'  
was commissioned by Network Rail

#### About Design Council

Design Council's mission is to make life better by design. We work with people to create better places, better products and better processes, all of which lead to better performance. We commission pioneering evidence-based research, develop ground-breaking programmes and deliver influencing and policy work to demonstrate the power of design and how it impacts three key areas of the economy: business innovation, places and public services. We bring together non-designers and designers – from grassroots to government – and share with them our design expertise to transform the way they work.

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# Executive Summary

The United Kingdom's rail infrastructure has the potential to play a significant role in the country's social and economic recovery from the impacts of COVID-19, and in its transition to net-zero by 2050. In this report we outline how upfront and continuous investment in design increases the positive social, economic and environmental impact of rail infrastructure assets. We used a mixed-methods approach drawing on current literature on the value of design; two deliberative workshops with senior stakeholders in the rail industry; and six in-depth case-studies. From these we developed a theory of change showing how investment in design realises these added benefits, and identified key recommendations for maximizing the impact of rail infrastructure through design investment.

Image Credit: London Bridge Station, Grimshaw, © Paul Rafferty.



## Key insights

**Good design adds significant social, environmental and economic value to rail infrastructure which is presently missed in current investment strategies and evaluation of rail assets.**

Recent national policies highlight the importance for the rail sector to innovate in order to achieve net-zero emissions, drive economic growth, and for greater social and regional well-being. There is an established and growing evidence base that demonstrates the social, economic and environmental value-add of good design. Well-designed rail assets contribute to local and national economic growth and regeneration; increase passenger numbers and revenue; and improve passenger experience and inclusion. They increase local wellbeing by encouraging greater use of greener transport, reducing crime, and boosting civic pride. Good design improves environmental performance, from integrating sustainable materials and reducing waste, to lowering energy requirements, and even – as seen in new standardised station proposals by architects 7N – integrating on-site green energy production.<sup>1</sup> Despite this, the long-term benefits of design are too often insufficiently considered when factoring upfront design costs. Consequently, opportunities to maximise the value of rail assets through design are missed.

**There is a need to develop a consistent approach to impact assessment for evaluating the added value of good design to rail infrastructure.**

There is a significant body of theoretical literature demonstrating the value of design, and many case-studies that identify the benefits design brings in particular instances. However, there is a lack of consistent empirical data collected to demonstrate the return-on-investment for design costs, as we discovered in developing the case-studies within this report. This is particularly acute when looking at the long-term impact good design has on a rail asset throughout its lifespan and use. To help build this evidence base, we recommend that a national design for rail impact assessment framework be created for use during project development, and post-occupancy. This would both help to demonstrate the return-on-investment for design, and act as a learning tool to guide best practice.

<sup>1</sup> Press release, Network Rail Website: ['Winning design to improve smaller stations'](#), May 11, 2021.

**Design champions help to increase understanding and awareness of design's value but are not yet represented at board level in the industry.**

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Whilst there has been a growing use of 'design champions' in the rail sector – experts who advocate for and support good design – there remains a lack of visibility for design at senior leadership level in the industry, and hence a lack of wider understanding across relevant decision makers and project managers of how investment in design activities leads to increased social, environmental and economic benefits. Embedding design at leadership level will also help to drive organisational culture that is committed to high-quality design, which our research found to be a key component of achieving better designed outcomes. We believe appointing design champions at board and regional level, as recommended by the National Infrastructure Commission, will help to maximise impact-led investment in design.

**Despite established design activities, such as design advice panels, demonstrably increasing the added value of rail infrastructure they are still unevenly used.**

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The case studies in our report demonstrate that strategic use of tried-and-tested design support activities leads to better infrastructure. These include design guidance, the use of design champions, design review panels, civic consultation methods, as well as internal training to build in-house design capability to manage project delivery and procurement of designers and architects. We learnt that design advice panels, where a group of experts give feedback and advice on a new project in development, were commonly used and effective.<sup>2</sup> Whilst Network Rail and other public sector bodies have design advice panels, these are unevenly used across the industry as a whole. We believe that supporting and incentivizing greater use of these established methods will help to maximise good design and bring added benefits to new rail assets.

**Levels of accessibility remain inconsistent across UK rail infrastructure. There is a need for greater adoption of good design standards and guidance to create inclusive, accessible and welcoming spaces for all people.**

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The fundamental purpose of a railway is to provide access to travel: they are a gateway to the rest of the United Kingdom and beyond. Too often, however, passenger-facing assets like railway stations are not themselves accessible, thereby limiting already marginalised people in their ability to benefit from the opportunities and pleasure that rail travel can provide. The Station Situation Review says the UK's stations provide "a footprint in many communities as a gateway to accessibility, as a symbol of connectivity, as a community amenity and in many contexts as a focus of identity and location. Stations can be generators of economic, commercial and social value and all bear a cost."<sup>3</sup> Good design is inclusive and considers the needs of everyone, making it a crucial determining part of the development and management of infrastructure assets.

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<sup>2</sup> Place Alliance, 2020. Research National Housing Audit.

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<sup>3</sup> Stations Situation Review for Rail Delivery Group. Steer, 2021.



# Summary of Recommendations

## 1

**Embed design champions at board level to improve understanding of design and its value with senior leaders and decision makers within Network Rail.**

Building wider organizational commitment and understanding to the value of design requires greater awareness of the benefits that design investment can bring at senior level. Whilst Network Rail has a design champion network in place to advise on design quality for particular projects and to support design advice panels, it currently lacks board-level and regional representation of design champions. We believe introduction of these would help to drive strategic design investment, and foster greater organizational commitment to high-quality design.

## 4

**At the start of new projects, invest in identifying which benefits and impacts are important to those people most affected by change.**

Early stakeholder engagement on the primary benefits they wish to see realized through new infrastructure is important to ensuring they achieve positive benefits for passengers, affected communities and local economies. A design that is informed by the aspirations of stakeholders is more likely to lead to a proposal which fits with their expectations and to gain their support. This upfront investment can also reduce the risk of significant procurement development and planning costs due to negative backlash and lack of public support.

## 2

**Increase the adoption of design advice panels across the rail industry.**

Good design processes found across our report often used tried-and-tested methods and activities. The case studies demonstrate that design advice panels in particular improve the design quality of infrastructure assets. Despite this, their use is still uneven and inconsistent across different organisations, projects and asset-types within the rail industry.

## 5

**Adopt a ‘total-value’ approach to impact assessment and business-case development for design projects.**

Recent national policies highlight the importance for transport, including rail infrastructure, to innovate to achieve net-zero and greater regional equality. However, there is a lack of empirical data to demonstrate the social and environmental value-add that good design brings to rail-infrastructure. Building on guidance from the HM Treasury Green book and current best-practice in value-assessment, we believe Network Rail has an opportunity to undertake a more holistic approach to the business case for new design, reporting and evaluation.

## 3

**Establish and embed a consistent approach to impact assessment in the design and management of rail infrastructure assets across Network Rail.**

Whilst there is a wealth of theoretical literature on the value of design to infrastructure, there is a lack of standardized empirical evidence of the impact good design has across different rail assets. As a result, design is too often considered an unnecessary expenditure and not factored into project budgets at the outset. We believe Network Rail could play a key role in creating this evidence base through developing a consistent design evaluation framework and data-collection strategy.

## 6

**Invest upfront in building a shared vision and commitment to design excellence with local people, passengers and the project team to maximise the long-term positive impact of a project.**

The Rail Delivery Group notes that successful regeneration of complex stations and the surrounding area relies on stakeholders developing a shared vision of high-quality design. Co-developing a shared vision within a project team can help to manage tensions and conflicts between stakeholders and drive the delivery of a final asset. Engaging passengers and stakeholders from the outset is also key to ensuring that the project is informed by the aspirations, strengths and needs of wider stakeholders.<sup>4</sup>

<sup>4</sup> Rail Delivery Group, 2017. Regenerating Britain's railway stations: a six-point plan.



# Research questions

Our research project was guided by the following research questions:

- 1 What value does design add to UK rail infrastructure?
- 2 How does upfront and continuous investment in design lead to realising greater value?
- 3 Can the additional value-add of design to rail infrastructure be measured?

Our approach was structured around the following high-level hypothesis:

## A good design process

(supported by certain enabling conditions)

## A good design proposal

## A well-designed asset

## More value for society

## Research methodology

### Stage 1

#### Discover

Rapid review and horizon-scan of current literature on value-based evaluation, and the value of design to the built environment.

### Stage 2

#### Define

Deliberative workshops to identify priority values for rail-infrastructure and barriers and enablers to realising a good design process.

### Stage 3

#### Develop

Developing evidence on how design adds value through in-depth case-studies, developed through interviews and desk-research into publicly available data.

### Stage 4

#### Deliver

Synthesizing insights to produce a theory of change that models a hypothesis on how good design processes lead to additional value in the final rail asset.

To answer these research questions, we adopted a mixed-methods approach, using literature review, horizon-scanning, interviews and deliberative workshops. The methodology was structured using a four-stage approach, based on the Design Council's *Framework for Innovation*<sup>5</sup> and is discussed in more depth in Chapter Two of this report.

<sup>5</sup> [Design Council website, feature article: What is the Framework for Innovation? Design Council's evolved Double Diamond.](#)

## Structure of the report

The structure of our report follows the research journey we undertook for this study. Chapter One summarises the current developments in value-led decision making and assessment that have informed our research, as well as relevant recent developments in the rail industry. Chapter Two outlines the definitions of design and value that have informed our report, drawing on a rapid literature review and horizon-scan, as well as presenting our research methodology. Chapter Three presents a theory of change for how design adds value to UK rail infrastructure: a model for conceptualising the way upfront and continuous investment in good design leads to better outcomes in the final rail asset. Chapters Four and Five outline the value-add good design brings to rail infrastructure, and the necessary conditions for good design found through our analysis of a selection of exemplar case-studies. Chapter Six presents those case-studies in full, showcasing how design has led to increased benefits in each case. Our recommendations from this study are included in full in the conclusion.



## Case studies

The case studies examined in our research were selected to provide examples of where a good design process has led to an increase in the value realised in the final rail asset. The six examples presented in this report were selected from a long list of 74 potential projects which can be found in Appendix 2. They illustrate lessons on effective client leadership, community engagement, upfront investment and design-led approaches that achieve better outcomes. The projects discussed include Hackney Wick, London Bridge, Colin Connect, Bat and Ball, Koge Nord Bridge and Green Furniture.

Image Credit:  
Køge Norde Station, Cobe,  
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# Introduction and context for this research





The United Kingdom's rail infrastructure has been at the forefront of recent national discussions on the role the built environment can play in the nation's recovery from the social and economic impacts of COVID-19, and in addressing government targets to achieve net-zero by 2050. Our rail network enables greater connectivity and local economic growth as the UK government aims to 'level-up' the nation. It consumes and embeds less carbon than any other motorised transport mode and current strategies to increase electrification of the railway set to improve this even further<sup>6</sup>, making it well-placed to help support the UK's transition to a sustainable future<sup>7</sup>. The provision of greater access to rail transport has also been shown to have a positive impact on people's health and social well-being.

6 Rail travel consumes and embeds less carbon than almost any other form of transport, comprising only 0.5% of the UK's total CO2 emissions. See ORR Data Portal: Rail Emissions 2019-20 and Network Rail, 2020. Traction Decarbonisation Strategy for more information.

7 Network Rail, 2020. Traction Decarbonisation Strategy

The rail network provides over 710,000 jobs and directly contributes over £43bn in gross value added (GVA) each year, with every £1 invested in rail leading to £2.50 in increased income<sup>8</sup>. The future of UK rail infrastructure has been in the centre-stage of recent national policy, from announced investment in public transport as part of the UK government's commitment to 'build back better' to plans to integrate the management of train and track announced this year<sup>9</sup>.

Our report aims to demonstrate how continuous and upfront investment in design adds value to UK rail infrastructure. Whilst there is an established and growing evidence base of the value good design adds to the built environment<sup>10</sup>, there is limited understanding of *how* good design processes and activities lead to those benefits, particularly with respect to passenger-facing infrastructure assets such as stations, bridges, furniture and level-crossings. This means that design is rarely sufficiently factored-in to investment strategies, project budgets, or decision-making on the development and maintenance of structural rail assets. In the context of today's significant challenges, there is a need to ensure that investment is used wisely: failing to consider the value of design risks narrowing decision-making at the expense of innovation, missing opportunities to maximise the value realised through new projects, and failing to address the complex and systemic challenges we face within and beyond.

8 Oxford Economics, 2021. The Economic Contribution of UK Rail

9 Department for Transport and Williams Rail Review, 2021. Great British Railways: The Williams-Shapps Plan for Rail.

10 See the bibliography for a list of key literature consulted in developing this report.

## A shift in how we understand 'value'

Value refers to something derived from the benefits experienced or the harms reduced by a structure, good or service. The values that rail infrastructure realises can include economic benefits such as increased revenue, and environmental impacts on local biodiversity. The purpose of our report is to demonstrate how investment in good design leads to an increased return of multiple desired benefits in the final asset.

Since the introduction of the Social Value Act in 2012, wider ranges of economic, social and environmental value have played a role in public procurement and decision-making. The predominant framework and guide for establishing the overall value of public investment based on economic, social and environmental value is the HM Treasury's Green Book. It continues to set the standards and evidence needed to justify the use of public resources in commissioning new projects. The Green Book adopts a 'social return on investment approach', providing guidance on translating a range of social and environmental benefits (such as reduction in air-pollution, or civic pride) and converting them into monetary values to ensure sufficient return-on-investment with public funding. Having a single monetary 'value' means that different types of value deriving from a service, product, or place can be compared and aggregated to establish its overall 'return-on-investment'.

However, in recent years there has been a shift in policymaking and impact assessment within the built environment to consider those values beyond the commercial or economic, and which also allow for more specific and relevant Social Return On Investment (SROI) calculations than those commonly used in other sectors. In addition to new international frameworks such as the UN Sustainable Development Goals, the result has been a surge of sector-specific frameworks developed to support evidence-led development in the built environment, such as Arup's Total Value Framework<sup>11</sup> and the Construction and Innovation Hub's Total Value Toolkit<sup>12</sup>. These frameworks factor in the often hidden and indirect social, environmental, and economic impact that infrastructure creates.

11 ARUP. Making the Total Value Case for Investment in Infrastructure and the Built Environment.

12 Construction Innovation Hub, 2021. Value Toolkit.

This is particularly significant for rail infrastructure, which has a direct and clear impact on our planet, urban areas, countryside, people, and the economy. Too often, these significant and diverse value domains are not formally recognised in impact assessment frameworks, leading to blinkered decision-making and missed opportunities.

Network Rail have already made significant steps to include these broader values in the evaluation and delivery of their projects and programmes. In 2020, Network Rail published a new series of Principles of Good Design and a suite of design guidance manuals<sup>13</sup>, which foreground the value-add that good design can bring, ranging from social impact on local communities to embedding sustainability within the design of new assets. Their new social value framework, which draws on guidelines established in the UK Green Book<sup>14</sup>, has been developed to help project teams deliver work that has positive impact on people. In addition, their latest Environmental Sustainability Strategy outlines commitments to collect data on biodiversity impact, air-quality monitoring and a review of existing materials and products to help transition to a more circular economy<sup>15</sup>. As the case-studies in our report show, well-designed rail infrastructure is a significant value-creator, not only from a narrow economic sense, but also with respect to broader social and environmental values.

Whilst our report does not explicitly address the values and benefits outlined in these strategies, it should be noted that the 'value-add' of design noted in the following sections can be largely aligned to these key frameworks.

### UN Sustainable Development Goals



<sup>13</sup> Network Rail. Principles of Good Design.  
<sup>14</sup> NetworkRail.co.uk, Safety Central: Social Performance. Accessed August 2021.  
<sup>15</sup> Network Rail, 2020. Environmental Sustainability Strategy 2020-2050.

## Why do we need to understand the value of design to UK rail infrastructure now?

Design, as a critical enabler of innovation and a user-centred approach to creative problem-solving, is well-placed to help maximise the value of rail stations, bridges and other structural assets. From Project SPEED to the recent announcement of Great British Railways, national policy has identified the need for rail to adopt an innovative, efficient and cost-effective approach to the country's recovery post-pandemic.

COVID-19 has also presented a significant challenge for rail-travel in the short-term, with passenger numbers dropping to five per cent of original levels during the first national lock-down between April and June 20<sup>16</sup>. However, the UK government's commitment to reach net-zero by 2050 also provides a long-term opportunity for well-designed rail infrastructure. Investment in good design now can help to make rail an attractive, accessible and sustainable option for passengers and secure the future for railways.

<sup>16</sup> Office for Road and Rail, November 2020. Press Release: Regulator's rail finance report highlights impact of pandemic.

## Scope and limitations of this report

Our report aims to understand how investment in good design processes leads to increased value in well-designed structural assets, specifically those that are passenger-facing. Our research is about developing a robust hypothesis of the causal relationship between taking a design-led approach and process and achieving high-quality assets. We have represented this through a theory of change. Through this project, we have been able to demonstrate that this hypothesis is based on evidence. This model can serve as the basis for future research, in particular to develop methodologies for assessing how much value is added.

It should also be noted that theories of change are simplified representations of what we hypothesise might happen. Reality is always messier. The design process is also dynamic and iterative, so it varies on a case-by-case basis. This causal model is deliberately high-level, focusing on conditions and activities that happen across multiple instances, but it is not exhaustive.

The case study approach helped us to quantify the value of design by providing real world examples of where thoughtful design has resulted in economic benefits. It allowed us to understand exactly how and why those benefits came about. While a weakness of the methodology is that the results from the case studies cannot be readily generalised, this approach has helped us to identify some lessons which can be used to inform a broader view of design investment and the wider value it generates.<sup>17</sup>

The biggest limitation of our report is the lack of post-occupancy surveys and evaluations for major rail infrastructure assets, which was discovered through our research process. This meant that we were reliant on client and design team testimonials to understand how process related causally to value, hence taking the case study approach. More data needs to be captured throughout project inception, delivery, and post-occupancy of assets, to enable comparisons between poor and high-quality design.

<sup>17</sup> See the National Infrastructure Commission's definition in the Design Principles for National Infrastructure, available here.





# 2

## **Design, value, our hypothesis and methodology**

Design is an approach to solving problems and creating assets that will maximise a broad range of benefits over their entire life-cycle.<sup>18</sup> Design contributes value by adopting a creative process to expand thinking, consider user needs, and to improving the form and function of places and things for people and the planet. Given its scale and impact, designing well is especially important for infrastructure. As the National Infrastructure Commission has observed: *“Projects shape the landscape for decades, even centuries. Generations of people will see them, use them and be affected by them every day”*.

<sup>18</sup> See the National Infrastructure Commission’s definition in the Design Principles for National Infrastructure, available here.

## What is design?

**“Design is about more than aesthetics and architecture it is about effective problem-solving from the outset, making infrastructure human-scale and user-friendly, enhancing the environment and improving quality of life.”**

National Infrastructure Commission, 2018

Design is a methodical and deliberate activity that results in change. It encompasses the design process (the activity of designing) and design outputs (the thing designed). Design is both an activity and set of outcomes that are produced as a result of going through the design process.

The primary role of the design process is to understand the needs of its potential and future users in meeting a particular challenge and to then develop ideas that meet those needs, while also considering the social and environmental impacts. Today, we need design to be ‘planet-centred’ as well as ‘user-centred’.

Design Council defines design as a mindset and skillset that combines critical thinking and creativity. Good design in infrastructure requires the technical ability to visualise and conceptualise the intangible, an informed understanding of consequences across diverse value domains, and a strong impulse to collaborate.

When brought in at the very beginning of a project, design brings clarity to an asset’s purpose, requirements, and outcomes. It continually corrects and adjusts to create something that is universally easy and pleasurable to use.

## Who does the designing?

Although designing is often seen as the exclusive domain of designers, it is the result of many people’s time, expertise and effort. The design process brings together practitioners from across sectors and backgrounds to develop and deliver infrastructure projects that improve the lives of people who use them. Too often, project delivery is siloed between the different partners. Lack of cooperation limits the potential of assets, as there is no ‘joined up thinking’ or shared vision to help the project teams understand what they want to achieve. This narrow conception of what each project team member can contribute to projects tends to lead to poorer quality design that does not satisfy its users.

By contrast, a collaborative, multi-disciplinary approach means involving all members in the design process from the beginning, and taking on board a more diverse range of opinions and recommendations as a result. The reward – a finished asset that functions better for everyone. The recommendations section shows what effective collaboration looks like.

The considerations that go into informing design are necessarily wide-ranging and benefit from multiple perspectives. From assessing the likely long-term cumulative consequences of a proposed design for future users and communities, to understanding and mitigating risk, to planning for the easy maintenance and management of an asset to keep it performing well for successive generations, there is a burden of consideration that designers cannot undertake alone. Neither should they, even if only because the positive benefits of effective decision-making do not accrue to the designers alone. Conversely, designers do not exclusively experience the harmful consequences of, nor bear the cost of rectifying, poor design decisions. Every person working with an asset should take responsibility for making it the best it can be, see design as part of their role, and be empowered to use it to inform their decision-making.



## What is value?

For our purposes, 'value' is something derived from benefits experienced, or harms reduced by a good or service. Direct value is that which is accrued solely to the investor or intended beneficiary and can be calculated through return-on-investment (ROI) or cost-benefit analysis, whilst indirect value captures the externalities and other secondary effects created by an asset, such as social and environmental impact. This can be captured through social return on investment (SROI), or by using any number of frameworks that can be found in the appendix or discussed in the previous section.

We use 'value-add' to refer to how the way in which something is undertaken (specifically here, the design process) can either enhance benefits or reduce risks and costs. So, when we say that 'design adds value', we mean that 'working in a design-led way has increased the total benefit of a good or service or has reduced its risks and/or costs'.

We have identified six broad types of value that are relevant to infrastructure. These are based on CABE's Value Handbook<sup>19</sup> and HM Treasury's Green Book.<sup>20</sup>

<sup>19</sup> CABE, 2006. The Value Handbook

<sup>20</sup> HM Treasury, 2020. The Green Book

## What do we already know about the value of design?

That good design creates value is not in question. There is a wealth of evidence, stretching back decades, on the value created by design.<sup>21</sup>

### Design is a driver of business innovation and growth

Design has been shown to add value across many value domains. Successive Design Economy reports have assessed the generous gross value added (GVA) of design to the UK economy, with £85.2bn in GVA to the UK Economy in 2018<sup>22</sup>. Research by McKinsey shows that the best design performers increase their revenues and shareholder returns at nearly twice the rate of their industry counterparts<sup>23</sup>. The Design Value Index independently found that good design drives shareholder value<sup>24</sup>. The McKinsey report highlights that:

**“Design flourishes best in environments that encourage learning, testing, and iterating with users—practices that boost the odds of creating breakthrough products and services while simultaneously reducing the risk of big, costly misses.”**

They identified four key indicators of good design practice in businesses:

- 1 analytical leadership that measures and drives design performance with the same rigour as revenue and costs
- 2 cross-functional talent that makes user-centred design everyone's responsibility not a siloed function
- 3 continuous development that de-risks development by continually listening, testing, and iterating with users and
- 4 user experience or, to put it in Network Rail's language, 'Putting Passengers First' with every business decision

<sup>21</sup> See our literature review completed as part of this research.

<sup>22</sup> Design Council, 2018. Design Economy.

<sup>23</sup> McKinsey, 2018. The Business Value of Design.

<sup>24</sup> Design Management Institute, 2017: Commentary on the Design Value Index

## Types of value: Designed assets

### 1 Monetary Value

The asset as a commodity to be traded, whose commercial value is measured by the price that the market is willing to pay. For the owner, this is the 'book value', for the developer the return on capital and profitability. Also covers issues such as ease of letting and disposability.

#### How is it measured?

Book value; market price; return on investment; rental yield; opportunity cost (consider also asset maintenance and depreciation).

### 2 Use Value

Contribution of an asset or systems to organisational outcomes: productivity, profitability, competitiveness and repeat business. Arises from a working environment and processes that are safe to use, that promote staff health, well-being and job satisfaction, that encourages teamwork and communication, and enhances recruitment and retention while reducing absenteeism.

#### How is it measured?

Measures associated with use, such as reduced risk and improved safety (for everyone); satisfaction and accessibility (for passengers); measures of productivity (for staff) and profitability (for tenants).

### 3 Image Value

Contribution of design to corporate identity, prestige, vision and reputation, demonstrating commitment to design excellence or to innovation, to openness, or as part of a brand image.

#### How is it measured?

Public relations opportunities; Brand awareness and prestige; Recognition and 'wow' factors.

### 4 Social Value

Assets and developments that make connections between people, creating or enhancing opportunities for positive social interaction, reinforcing social identity and civic pride, encouraging social inclusion and contributing towards improved social health, prosperity, morale, goodwill, neighbourly behaviour, safety and security, while reducing vandalism and crime.

#### How is it measured?

Place making; Sense of community, civic pride and neighbourly behaviour; Reduced crime and vandalism.

### 5 Environmental Value

The added value arising from a concern for intergenerational equity, the protection of biodiversity and the precautionary principle in relation to consumption of finite resources and climate change.

The principles include adaptability and/or flexibility, robustness and low maintenance, and the application of a whole life cost approach. Benefits include local health, biodiversity, and reduced emissions.

#### How is it measured?

Environmental impact; Whole-life assessments; CO2e emissions, energy efficiency, The Natural Capital Approach and Framework.

### 6 Cultural Value

This is a measure of a development's contribution to the rich tapestry of a town or city, how it relates to its location and context, and to broader patterns of historical development and a sense of place. Cultural value may include consideration of highly intangible issues like symbolism, inspiration and aesthetics.

#### How is it measured?

Critical opinions and reviews; Press coverage; Awards; Planning.



Good design also helps other business and work-related domains. Productivity, for example, has been shown to improve in well-designed spaces. A case study in CABE's 2001 *The Value of Good Design* showed that following the award-winning design for an arts and craft studio in Des Moines, Iowa, the company which occupied it enjoyed a 20 per cent increase in output and a reduction in the time required for handling and transporting products. Employee satisfaction also improves. A survey undertaken for the University of Nottingham of 10 major companies that had invested in high quality bespoke corporate buildings in the UK, including British Airways, Boots and Capital One, found that 'employee satisfaction' and 'functional quality' were the highest rated drivers for investment.<sup>25</sup>

### Design improves passenger experience

User-centred design focuses on having a deep understanding of users, including: what they need, what they value, their abilities, and also their limitations/ challenges. This understanding of the user, guides design decisions and is critical to improving all passengers' experiences. A designer will undertake participatory research and co-design approaches with diverse users to deeply understand these needs. It follows that a design-led rail asset is far more likely to meet passenger and staff needs than an approach that does not consider passengers' and/or staff's comfort, safety, wellbeing and access.

ThinkStation started with user needs to generate more imaginative and focused briefs, which are more likely to result in station design submissions that work for everyone<sup>26</sup>. Designing for passengers and staff is called inclusive design. The introduction to the Department for Transport's *Design Standards for Accessible Railway Stations* states that "*designing more accessible railway stations...is not only the right thing to do, it also makes good business sense*".<sup>27</sup> This guidance makes clear the crucial role design plays in creating spaces that are inclusive and accessible for all passengers, employees, and members of the public. Their detailed guidance goes beyond step-free access and articulates both the level of detailed planning

25 CABE, 2001. *The Value of Good Design*.

26 Design Council, 2020. ThinkStation summary report.

27 Department for Transport and Transport Scotland, 2015. *Design Standards for Accessible Railway Stations*.

and holistic imagination that is required in designing and managing an asset that meets everyone's needs. Designing accessibility in *from the start* is imperative, as errors or oversights can be costly or difficult to correct. As the guidance says: "*Signs are not a substitute for good station design...stations should be laid out in a logical way, so that finding a particular facility is partly intuitive*".<sup>28</sup>

### Design enhances social and environmental outcomes

Design enhances social and environmental outcomes, and there is a widely cited estimate that 80 per cent of an asset's impact is determined in the design phase.<sup>29,30</sup> As a result, adopting a design process has become part of the EU's sustainable product policy.<sup>31</sup> Designers exercise a specific range of skills in designing, which might contribute more or less to generating social and environmental value.

The wider social and environmental benefits that are derived from good design have been highlighted by the National Infrastructure Commission (NIC) in the publication of its design principles, and we know that bad design can entrench inequalities and contribute to the climate crisis. The NIC's four principles for infrastructure design – that it works to improve climate, people, places and value – indicate that design can and should deliver against social and environmental outcomes<sup>32</sup>. Indeed, many of Network Rail's own design principles seek to maximise beneficial externalities including environment, heritage and communities.

Much of CABE's research portfolio points to the value of design in effective, healthy and sustainable place-making. As early as 2001, *The Value of Urban Design* was making the economic, social and environmental case for investing in design:

28 Ibid.

29 McAloone and Bey, 2009; Politowicz and Earley, 2009

30 According to international architect Norman Foster when considering the average financial costs of a building over a 25-year period, the physical envelope of the building comprises only 5.5 percent of the total cost whereby the costs of occupying the building represent 86 percent of the total cost. His experience highlights that a small investment in design quality can quickly make a significant impact on this much larger percentage. From CABE, 2001. *The Value of Good Design*.

31 European Union, 2018

32 French (France) National Infrastructure Commission. *Design Principles*.

**"Good urban design added economic value in the form of better value for money, higher asset exchange value and better lifecycle value. It suggested that good urban design could confer social and environmental value and provide long-term economic spin-offs in the wider economy from regenerative effects."**<sup>33</sup>

Research conducted by Design Council and the Institute for Innovation and Public Purpose sought to understand the role that design has to play in radical and emerging conceptions of value and growth that place wellbeing and sustainability – rather than GDP – at their centre.<sup>34</sup>

### Design improves places

Finally, we know that design improves places. For over twenty years, CABE published research into the role and value of design in the improvement of places for people. Across its publications, it found that good urban design adds economic, social and environmental value to places, making them more equitable, healthier, and more accessible. For this reason, the National Planning Policy Framework has embedded high-quality design at the heart of its guidance and recommended the independent design review process as a means of achieving it<sup>35</sup>. The Place Alliance Housing Design Audit found that design reviews are one of the most effective ways of improving design, at a local and national level<sup>36</sup>.

There are wide-ranging recommendations and guidance on how to invest in and embed better design into places, buildings, practices, processes, strategies and organisations – and in the results that such investment could generate. While there are specific activities that constitute designing, and formalised principles and codes that underpin the practice, there is less research on showing the causal link between design and value. We hope that this report can provide a reasonable cause-and-effect account of the relationship between design and value.

33 CABE, 2001. *The Value of Urban Design*.

34 Design Council, 2020. *Moving beyond financial value*.

35 Ministry of Housing, Communities & Local Government, 2019. *National Planning Policy Framework*

36 Place Alliance, 2020. *Research National Housing Audit*.

# Our hypothesis

For this report, we hypothesised that the design process and the principles that underpin it generate value. We articulated our hypothesis in the form of a logic model, which is a way of visually communicating the cause-and-effect relationship within a theory of change:

A theory of change, simply put, is a way of showing what type of change happens as the result of something like a process, a service or an intervention. We call this a 'logic model' because it should also show *how* that change comes about, logically. In our simple example above, our theory of how change (change here means: 'more value for society') happens is through a good design process, generating a good proposition or plan, which is realised in a well-designed asset.

In this hypothesis, we have two assumptions: (1) that the design process and its activities, and the enabling conditions necessary to support good design, will require upfront and continuous resourcing. We contend that investing in design at both an organisational and a project level will both mitigate risk and minimise costly corrections in the short-term and accrue cumulative social benefits in the long-term. And (2) that good design, which maximises function, form, and material through a methodical process, can neither be 'added-on' nor can it be satisfactorily isolated from other activities like engineering, procurement, or management either in project delivery or in post-occupancy evaluation. This is because good design, embedded from the start of the process, works with all delivery partners to come to a shared vision and commitment to a well-designed final asset. Both of our assumptions were borne out in the interviews with clients and design teams on high-quality design projects.

## A good design process

(supported by certain enabling conditions)

## A good design proposal

## A well-designed asset

## More value for society

# Our methodology

We first undertook a rapid evidence review and horizon scan to generate a hypothesis for how design adds value and to identify likely indicators of good design. We wanted to understand what value well-designed infrastructure assets add, and how designing causes that value. From there we could start to develop a theory of change. That is what is covered in this report. This theory of change provides a framework that can be tested and underpins a methodology for measuring how much value design adds in subsequent research.

We undertook two deliberative workshops with Network Rail employees to understand the process by which good design is helped and hindered at a project level, and what the barriers to good design are for rail infrastructure at an organisational level. Given Network Rail prioritises passenger experience, we decided to limit the scope of our research to the design of passenger-facing assets. For objectivity, we focused on discussing designed assets that had been independently assessed and awarded for high-quality design.<sup>37</sup> For comparability, we also excluded designed intangible assets, such as guidance documents or processes.

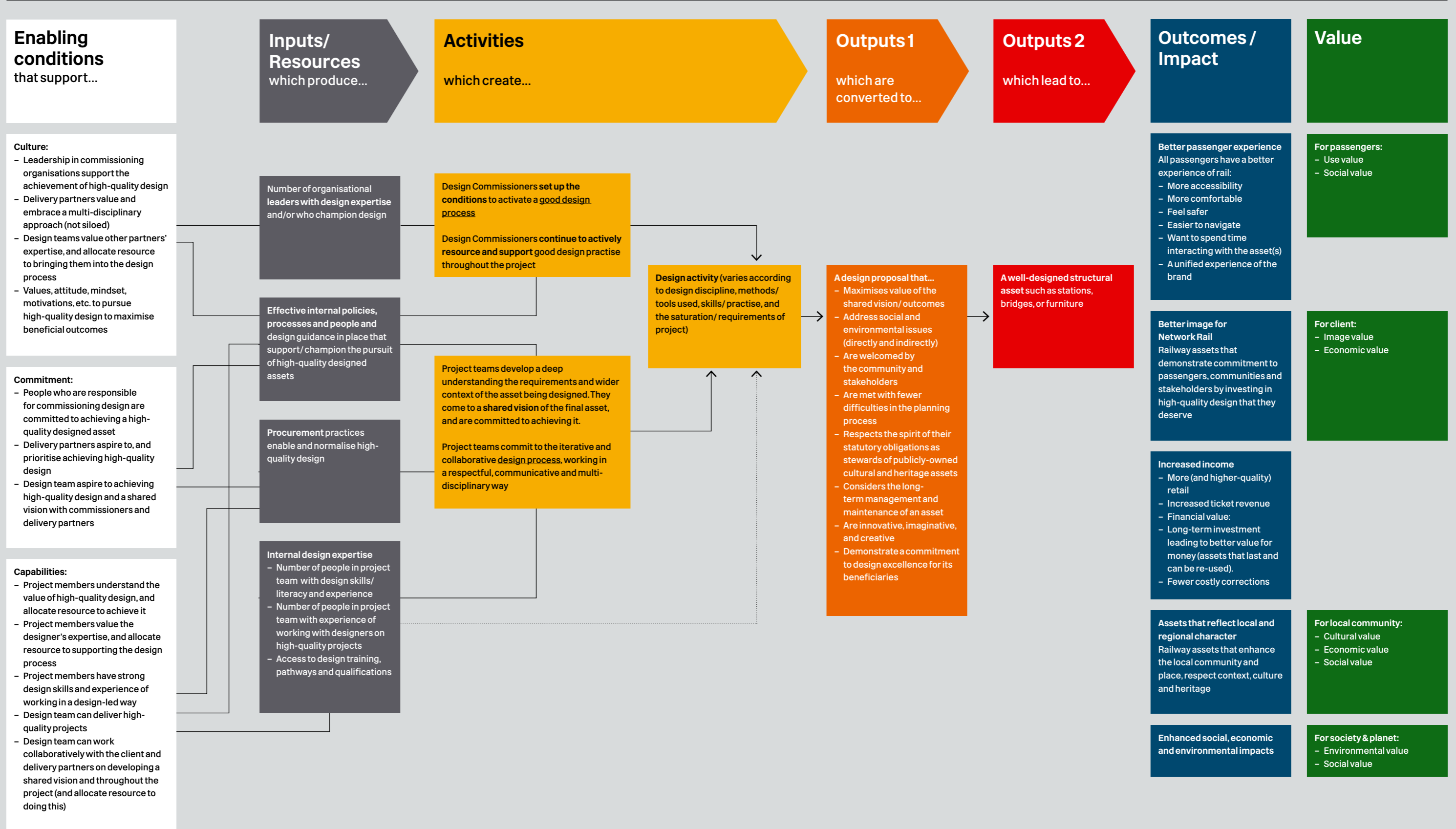
We interviewed the design teams for eight award-winning projects and conducted follow-up interviews with six of those projects' clients. All interviews were semi-structured and covered three main topic areas: (1) the brief and project context; (2) the design process and relationships with delivery partners, and (3) the direct and indirect value that the project created. At the close of each interview, we asked interviewees to supply post-occupancy evidence to confirm their claims.

The content of all interviews was analysed, which informed the development of the theory of change. Six projects were written up as case studies, each telling the story of design's role in maximising a specific value domain. These are summarised as:

Case	Client and design team	Place	Budget	Timeline	Impact (Value domain)
Hackney Wick	Landolt Brown, for LLDC	London, UK	£28 million	2017–2018	Social Value
London Bridge	Grimshaw, for Network Rail	London, UK	£1 billion	2012–2018	Economic Value
Colin Connect	Hall McKnight	Belfast, UK	£2.382 million	2017–2019	Social and Image Value
Bat and Ball	Theis + Khan, for Sevenoaks Council	Sevenoaks, UK	£1 million	2018–2019	Social and Heritage Value
Koge Nord Bridge	Cobe and Dissing and Wietting	Copenhagen, Denmark	N/A	2014–2019	Social Value
Green Furniture	Green Furniture Concept, for Jernhusen	Waiting rooms across London	Estimated £1.3 million	2019–2020	Environmental Value



# Overarching Theory of Change



# 3

# Introducing the theory of change

**The theory of change on the previous page shows our theory of how good design creates positive change, namely by generating positive social, environmental and economic outcomes. More specifically, it illustrates the cause-and-effect between each element of the diagram (from enabling conditions to inputs, from inputs to activities, etc.).**

In general the logic model approach specifically illustrates the cause-and-effect between each element of the diagram (from enabling conditions to inputs, from inputs to activities, etc), and how they logically link together. In general, theories of change do not reflect what organisations are currently doing. Instead, they work backwards from the outcomes they want to hold themselves accountable for achieving, then to identifying the necessary activities, resources, capabilities, and culture required to achieve those outcomes.

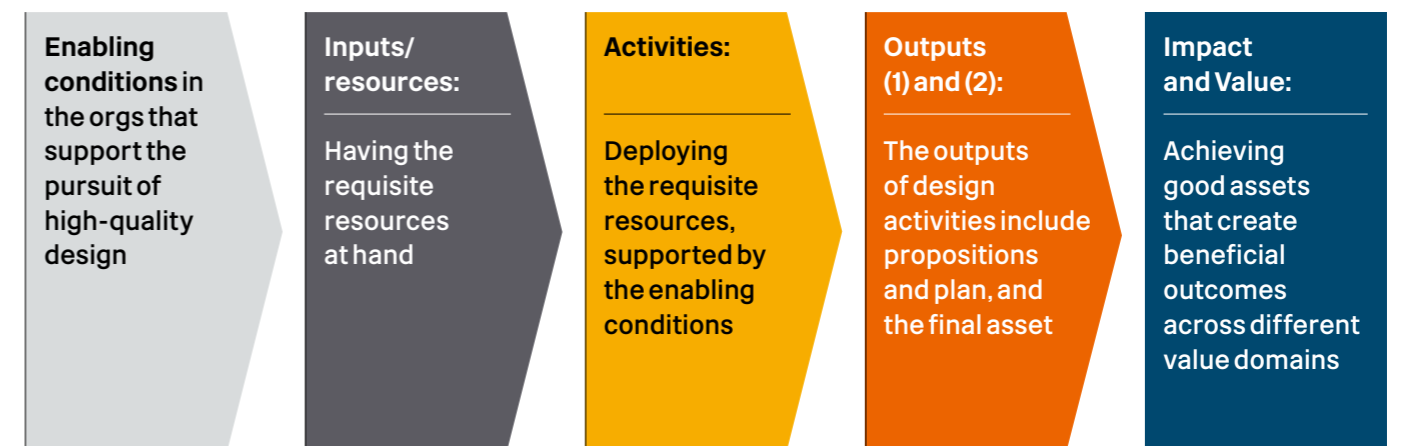
This theory of change builds on the one developed by Professor Lucy Kimbell and Dr Jocelyn Bailey as a part of Design Council's Design Economy 2021 research into the value of design<sup>38</sup>. It has been further developed through interviews with design teams and clients, whose work has resulted in passenger-facing rail infrastructure assets that have been independently assessed as representing 'high-quality

design'. It also builds on extensive evidence on the value of design, references to which can be found in our bibliography. However, to our knowledge this is the first example of a theory of change proposing how good design is enabled and supported in rail infrastructure.

We want to caveat that this theory of change is based on a limited number of interviews, and therefore should not be read as a definitive or best practice guide. Our objective was not to provide a user manual for commissioning design, but rather to propose a strong hypothesis for what enabling conditions are most likely to precipitate good design activities, and how these activities – supported by the design process and the well-managed deployment of resources and capabilities across organisations and delivery partners – result in well-designed assets and maximised outcomes.

Instead, it should be read as a high-level illustration showing the ideal culture and conditions likely to set in motion a good design process and achieve well-designed assets that deliver across the board. The theory of change also provides a framework on which concrete indicators and metrics can be identified and assessed across the design, construction, and maintenance of a new rail asset. It can be used to underpin process and impact evaluations, including economic analyses and post-occupancy evaluations.

The model comprises seven elements, which follow on from one another, left to right: enabling conditions, inputs/ resources, activities, outputs (1), outputs (2), outcomes/ impact, and value.



<sup>38</sup> Kimbell, L., Bailey, J. (2021). Design Economy 2021 Scoping Project: Paper 4: Public Sector Understanding and Use of Design and Design Skills. London: Design Council



# 4

## The added value of well-designed assets

As mentioned above, design is a methodical and deliberative process that, when done well, improves both how an asset is experienced (its form) and the outcomes we want from it (its function).

We define a 'well-designed asset' as one that:

- 1 has gone through a collaborative and iterative design process
- 2 performs well – across a range of value domains, and for a long time
- 3 fulfils its clearly understood and co-defined function and
- 4 is pleasing and easy to interact with by diverse users

However, there are many kinds of practices and disciplines encompassed in the word 'design', which makes coming to more concrete and specific indicators difficult. For that reason, we decided to limit the scope of our research and focus on identifying the value of design for passenger-facing structural infrastructure assets. This means we were able to refine our definition, and its key indicators, to whether those assets fulfil their function, as well as being pleasing and easy to interact with *for all passengers*.

These assets all went through a user-centred design process, in which an understanding of passenger needs and local context informed the project from the outset, and which supported collaborative and iterative working across the entire project team.

# What is a well-designed asset?

Through our rapid evidence review, we found that design is used to improve the way that a thing looks, feels and is used (its form), and to improve the outcomes we want from it (its function). It achieves this by understanding the needs of the asset and its users and its broader context, and using this knowledge to define a clear brief for the project. Deeply understanding from the outset what an asset's outcomes and function should be leads to a well-designed asset (one that performs well and fulfils its function, and which is also pleasing to interact with). The design process, therefore, needs to be embedded from the start of every project in order to achieve high-performing assets.

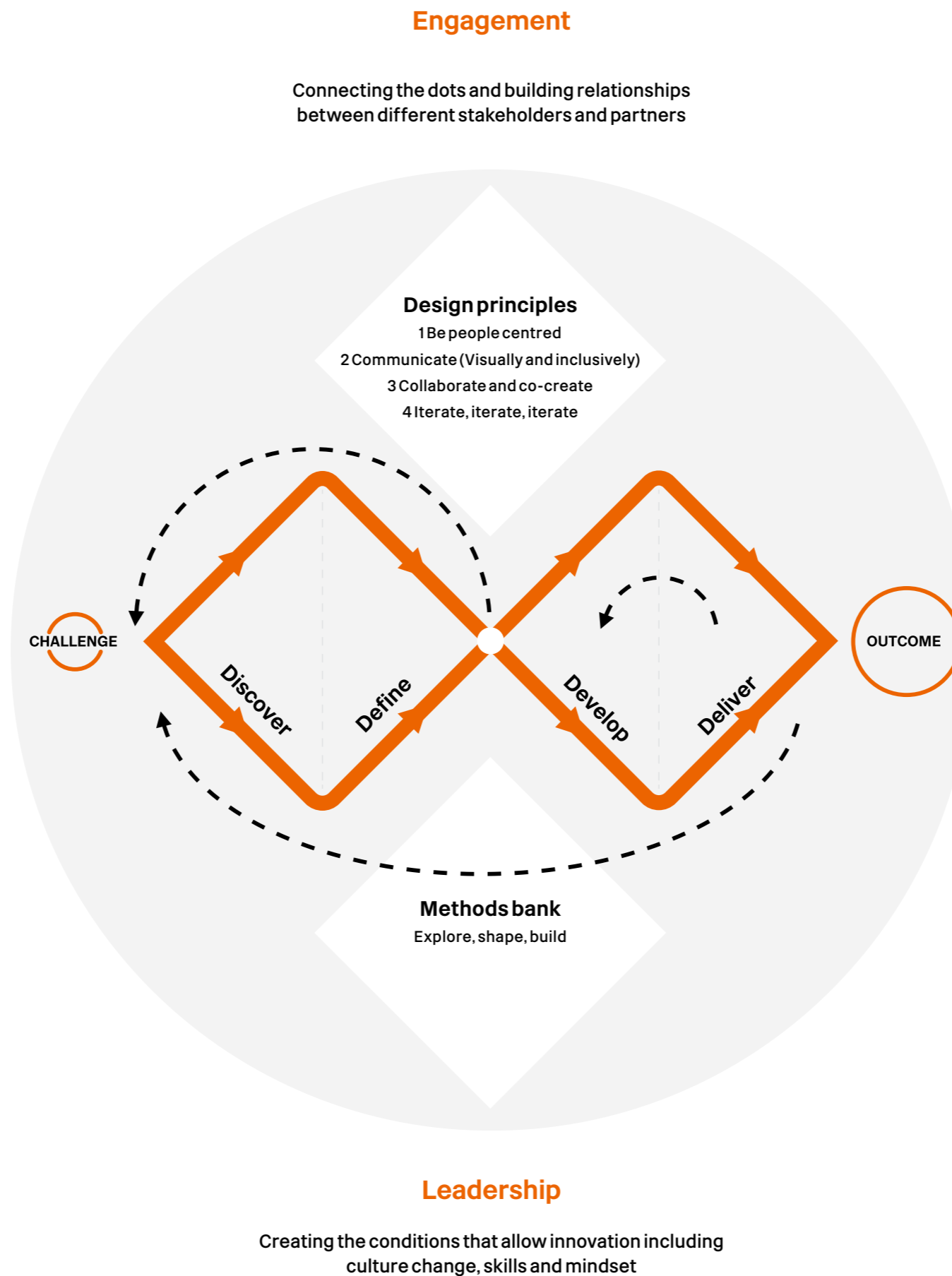
Function and form cannot be readily isolated: a thing that is not comfortable, easy, or delightful to use will not be able to fulfil its function as much as it otherwise could. Likewise, something that is aesthetically pleasing, but whose purpose is unclear or whose internal infrastructure is convoluted, is next to useless. A well-designed asset is one in which form complements function, creating a virtuous circle where one improves the other.

Designed infrastructure assets are not exclusively 'physical'; they can include conceptual and intangible things too. The diagram below gives examples of types of railway infrastructure assets:

## Asset type examples

Structural Assets	Intangible Assets
Stations	Systems
Bridges	Procedures
Level-Crossings	Policies
Train Sheds	Design Principles
Furniture	Innovation frameworks
Ticket Barriers	Evaluation and Impact
Platforms	Assessment Toolkits

The types of asset that are most pertinent to our research however, which focuses on passenger-facing railway infrastructure, are structural.



## The Design Process

Design Council's Double Diamond<sup>39</sup> clearly conveys a design process. The two diamonds represent a process of exploring an issue more widely or deeply (divergent thinking) and then taking focused action (convergent thinking). The process is not linear, as each stage can reveal insights that send you back through different stages of the process.

At the very beginning of a project, design is able to bring clarity. This is echoed in the Rail Delivery Group's six-point plan to regenerate Britain's railways, the first recommendation of which is to "have a clear idea of the role the station should play in the local community".<sup>40</sup>

When design is considered throughout the project lifecycle, it can continually correct, adjust, and iterate to create something that is universally easy and pleasurable to use; that maximises its functional potential and longevity; and minimises the harm it causes local communities and the planet. 'Universal Design' or 'Design for All', as advocated by BSI in their accessibility guidance<sup>41</sup> emphasises that assets should be designed and developed with consideration given to the widest range of abilities and characteristics to ensure universal usability. The Rail Delivery Group also suggest that design considerations should take into account a wide range of user needs and experience and that many stakeholders should shape these ambitions. They recommend: "align[ing] the benefits of a better station with those who will gain most from it... wider benefits are the result of a collective and shared ambition to deliver more than 'just a station'".<sup>42</sup>

<sup>39</sup> Design Council, 2019. Framework for Innovation.

<sup>40</sup> Rail Delivery Group, 2017. Regenerating Britain's railway stations: a six-point plan.

<sup>41</sup> France (France) BSI Standards Publication, BS EN 17210:2021. March 2021. Accessibility and usability of the built environment — Functional requirements. P18 and p. 22-27.

<sup>42</sup> Rail Delivery Group, 2017. Regenerating Britain's railway stations: a six-point plan.



# The added value of design for passengers

## The Form of the Designed Asset

The **form** of an asset refers to its look and feel, and to the ambiance that it creates for passengers. These come together to create a pleasing, comfortable and intuitive experience for all users. The outcome of an asset that has a good 'form' is that more people, and more diverse people, are attracted to use it. This might be because the form reduces harms, such as creating spaces that naturally deter crime, or because the asset increases benefits, such as creating spaces that are comfortable, beautiful, and inclusive. Form also refers to the materials used, and how they perform over time and for different generations of users. Materials that are long-lasting and chosen to reflect local character can demonstrate a long-term commitment to local communities. Whilst renewable and natural materials that are hard-wearing and easy to maintain can minimise the cost of upkeep and also meet social and environmental design goals.

## The Function of the Designed Asset

The **function** of an asset is its purpose, and improved functionality means that it is easier to fulfil its purpose. For passenger-facing assets, this might look like improved navigability and accessibility. Functionality is not just about improving physical layouts, it also includes behavioural cues by facilitating decision-making through, for example, consistent and clear signage and anticipating passenger needs at different points in their journey.

Another thing to bear in mind is that function and form are not separate considerations but inextricably linked. A well-designed asset should unite *pleasing form* with *considered function*. The subject of this chapter is how good function combines with form to create value in a well-designed asset.

One further caveat is that good design is, by its definition, embedded and inextricable from the construction, engineering and management of assets. This is because good design is a deeply collaborative process that informs the asset's development and management by bringing in everyone with a stake in the project's success, such as the delivery partners. This means that any 'value-add' of design can be described causally but cannot be completely isolated and quantified.

Here, we will look at the value that is accrued to different stakeholders: passengers (and non-passengers) interacting with the assets; Network Rail and those who manage the assets; and indirect beneficiaries through social and environmental impact.

The domains of value that are discussed, and the way that design contributed to them, are based on a very limited and unrepresentative sample. These should not be read as an exhaustive list, but as the results of studying a small selection of well-designed passenger-facing assets. From these, however, we can start to evidence that design does play a role in adding value across the value domains identified in the literature review, and how it does so: primarily by improving their form and function, from the perspective of users and – increasingly – by considering an asset's wider social and environmental impact.

First, we will consider how design improves an asset's function and form for passengers.

The main function of a passenger-facing rail infrastructure asset is to be used by passengers. Of course, there will likely be different types of functions, some of which are more important than others. In stations, for example, the defining function is to facilitate travel, while secondary functions include providing shelter, safety, and sustenance. The fact remains, however, that if an asset is not being used by passengers, it is not fulfilling its function.

Passengers deserve a welcoming, hospitable, and inclusive station environment in which they feel independent, safe and secure.<sup>43</sup> As Britain's demographics change, especially with an ageing population, so will their requirements. Technology is also playing an increasingly pivotal role in travelling and accessibility, and its appropriate application should be integrated not only at the station level but throughout the passenger's entire journey experience.

## Attracting more passengers to rail

Footfall and ticket revenue indicate the number of passengers using an asset and can help us assess its functionality. To interpret these data, we should compare them against the anticipated passenger numbers for the asset, complemented by local surveys to provide useful context. Post-occupancy studies reveal how spaces are being used, and by whom, and would be a useful resource to understand whether assets are fulfilling both their function and their potential.

For example, after its redevelopment by architecture firm Theis + Khan, Bat and Ball station in Kent:

- saw a dramatic 25.9 per cent increase in passenger journeys in the year of its redevelopment (2017/18)
- saw a 12.6 per cent passenger increase in 2019/20 on the previous year, despite COVID-19
- a quarter of commuters surveyed said they would now travel more frequently to and/or from

the station, with the main reason given that 'the station is more attractive'

- passengers commented that the café, increased safety, and station toilets also contributed to their desire to use the station more

Following an award-winning redevelopment in 2018, Hackney Wick overground station:

- saw a 27 per cent increase in passenger numbers
- was used for 2.8 million passenger journeys between 2019 and 2020, almost double its use five years before, despite the impact of COVID-19<sup>44</sup>

While correlation does not imply causation, the significant increase in footfall following the redevelopment, in addition to the positive reception from the local community, local government, and the design sector makes Hackney Wick a particularly impressive example.

Passenger numbers are not the only indicator of success: Koge Nord bridge in Copenhagen functions not only as a way of getting from one place to another, but more importantly as a signal to shift behaviour. Seen by more than 100,000 motorists every day, its impressive and attractive façade acts like a beacon encouraging people to turn off the motorway, use the park and ride facility, and take the train into Copenhagen instead. Despite the impact of COVID-19, the high utilisation of the parking spaces indicates that not only are passenger numbers on the increase but the mode-shift, the primary reason for this winning design proposal, is working.

<sup>43</sup> Rail Delivery Group, 2017. Regenerating Britain's railway stations: a six-point plan.

<sup>44</sup> Railway Data Centre website. Station Overview: Hackney Wick. Accessed September 2021: <http://www.railwaydata.co.uk/stations/overview/?TLC=HKW>

## Improving capacity and passenger flow

An already busy station, like London Bridge, does not necessarily need to demonstrate an increase in passenger use to indicate that it is well-designed and attractive to passengers. The functionality of the space is shown in other ways:

- its ability to effectively control passenger flow and create as seamless and stress-free an experience for as many passengers as possible
- fewer columns on the platform improved passenger flow at the concourse level and also added visual interest and focus within the concourse
- passengers enjoy this station more than any other nationwide, with an overall satisfaction score of 90.4 per cent<sup>45</sup>

Passenger flow is critical to the feel and functionality of a station but is not only down to effective architecture. Green Furniture, which has now been installed in six Network Rail-managed stations, is a modular curving wooden bench that can be designed and installed to any station specification. Some of its benefits include:

- being able to control speed and direction of flow – designers carefully consider the placement and curvature of benches to maximise the station's usage by passengers
- in London stations, it has increased seating capacity by more than 100 per cent
- an adaptable range of seating – including 'perches' in high traffic, short-wait areas, or recliners to attract people to less used areas – distributes passengers more effectively across the station

## Improved passenger satisfaction

Furniture can greatly improve the passenger experience, and seating is one of passengers' main priorities at stations:

- Green furniture installed in London Victoria contributed to increased passenger seating satisfaction by 57 points, rising from 23 per cent to 80 per cent<sup>46</sup>
- London Bridge saw an increase in satisfaction, from 36 to 80 per cent after installation of Green Furniture

The 'wow' factor created by the interior landscaping leads to increased satisfaction, brand loyalty and receptivity, according to a consumer report from Airports Council International.<sup>47</sup> This research found that 'ambiance' was by far the biggest driver of passenger satisfaction, and – given the evidence linking satisfaction with spending – the biggest driver of an airport's revenue.<sup>48</sup> Ambiance refers to the look and feel of a space, how easy it is to navigate, and the overall quality of experience that it can give you. Passengers are more likely to spend time and money in a place with a nice ambiance and a lot of retail choice.<sup>49</sup> Research carried out by *INTU Shopping Malls* shows that for every extra five minutes of dwell time, there was a five per cent increase in retail spending.

Jernhusen manage Sweden's entire station network and has installed Green Furniture in every station. It believes it creates a strong brand identity, showcases its commitment to investment in the passenger experience and to the environment, and that it 'works' in stations both historic and modern.

<sup>46</sup> Green Furniture, 2019. London Victoria Station case study. Accessed September 2021.

<sup>47</sup> ACI Insights website, feature article, March 2020. Defining customer experience: How airports can own the passenger journey. Accessed August 2021

<sup>48</sup> ACI Insights website. Airport Service Quality. Accessed August 2021.

<sup>49</sup> Business Insider website. Blog article, 2015. This is the science behind how shopping centres make Britons spend £55 million in one minute. Accessed September 2021.

Consistency is not only important across stations, but also within stations. When King's Cross station was being redesigned it was important to consider the signage of the Tube, National Rail, Southern, Greater Anglia, and Thameslink Train Operating Companies. Design was important in bringing together all the brands to understand the best way to facilitate the passenger experience and bring a sense of coherence to the station.

## Welcoming for everyone

Good design considers not only existing passengers but also future generations of passengers; those who are not currently attracted by or able to access the railway; and those who will use it for secondary purposes such as for its amenities or events. A well-designed asset, therefore, will not only improve the experience for existing passengers, but considers how to expand its potential and be welcoming to everyone.

This is because not everyone who interacts with a passenger-facing asset, whether it is a station, a bridge, or a bench, will be a passenger. Anecdotally we know that stations with high-quality retail and hospitality are destinations in their own right. Other station users are rail and support staff, friends and family of travellers, retailers, and the general public. The Colin Connect Transport Hub has been described by grateful bus drivers as an 'inspiring' and comfortable place to rest between their shifts. Designing spaces that are easy to navigate and pleasing to spend time in will attract not only people who *have* to be there to catch a train, but also attracting more people who might just *want* to be there.

## Safety

Safety, both in terms of increasing a passenger's feeling of safety and the reduction of actual crime, is another critical consideration in the design of a station and other infrastructure assets. London Bridge's expanded concourse, which allowed more passengers to remain within the station rather than wait on the platforms, created passive natural surveillance both on the concourse itself and at street-level. This deterred anti-social behaviour and reduced the reports of passengers feeling threatened.

The high-quality design of Colin Connect also reduced the rates of anti-social behaviour and crime reported, as did the redevelopments of both King's Cross and Bat and Ball station, both of which had previously been gateways to areas that were felt to be unsafe.

## Accessibility

Accessibility is one of the most important considerations when it comes to passenger use. The Department for Transport's Design Standards for Accessible Railway Stations covers in detail the considerations and requirements when designing for those with disabilities.<sup>50</sup> In our research, all briefs prioritised accessibility. For example:

- Colin Connect transport hub has only one level and no steps, including in the public square, so all users can interact with it equally
- Green Furniture Concept considers diverse user needs, with a variety of integrated seating that ensures no unintentional segregation

The WISP Accessibility Strategy has identified barriers to travel for non-rail users and 'pain points' for its current rail users living with disabilities<sup>51</sup>. For infrequent or non-users with disabilities, a main barrier to travel was local stations being inaccessible, both in terms of travelling to the station (the so-called 'last mile') and entering, moving around, and exiting the station building itself. The concerns of existing users with disabilities were feeling unsafe and like a second-class citizen, with one passenger being quoted as saying: "the

<sup>50</sup> Department for Transport and Transport Scotland, 2015. Design Standards for Accessible Railway Stations.

<sup>51</sup> WISP Accessibility Strategy – High Level Outline

<sup>45</sup> ThameslinkProgramme.co.uk, Learning Legacy portal: South East stations see biggest increase nationwide in passenger satisfaction.



needs of disabled passengers are an afterthought". The 2021 BSI Standards Publication on Accessibility refers to 'Universal Design' and 'Design for All' in its guidance, stating: "Accessibility and usability for everyone is achieved by considering the diversity of human abilities and their associated functional requirements as a basis of design."<sup>52</sup> The document emphasises that assets should be designed and developed with consideration given to the widest range of abilities and characteristics to ensure universal usability. Not only does accessibility contribute to usability and safety for all end users, it also improves health and wellbeing and creates economic and social benefits.<sup>53</sup> As Baroness Kramer says in her foreword to the Department for Transport's Design Standards:

**"It doesn't need to be a big deal or a big cost to a project. It just needs careful thought and designing in from the start – see it as an opportunity, not a problem."**

52 French (France) BSI Standards Publication, BS EN 17210:2021. March 2021. Accessibility and usability of the built environment – Functional requirements. P.18 and p. 22-27.

53 Ibid. P.20-21.

## The added value of design for the railway sector



**It is important to remember that good design is not only realised in the immediate unveiling of an asset. It also needs to continue functioning for successive generations of passengers and people who manage the assets. This means that value is more fully realised over the long-term. This includes the value of design in mitigating risks and minimising avoidable costs in building assets that are unfit for the future, that are short-sighted and require expensive corrections, or that become unmanageable. In addition to an asset's value in accruing positive outcomes for current and future passengers, and its cumulative social and environmental impacts.**

This section will cover the direct benefits of good design to Network Rail and the railway sector more broadly. In our research, we have found that an investment in design can potentially add great value by generating greater returns on investment – both financial and social – than projects driven by short-term cost efficiencies. To understand this better, we need the evidence from post-occupancy evaluations, which should be built into a project's costs from the outset. Design can also improve the efficiency of how a thing or place can be cleaned and maintained. Finally, good design creates opportunities for greater revenue, both for Network Rail and for retailers on its managed sites.

## Achieving strategic objectives for stations and passengers

Network Rail's Vision for Stations is supported by nine principles that were co-defined with the industry and which include customer focus, reflecting local needs and opportunities, and an entrepreneurial spirit<sup>54</sup>. Given the close parallels between these principles and the values of good design – being user-centred, considering outcomes broadly and holistically, and a commitment to iterating and improving – embedding design at an organisational level would naturally realise these principles.

The Williams-Shapps review emphasises the need for a culture that puts customers first, and encourages a move to improve customer service, maintain safety and attract new people to rail<sup>55</sup>. This follows years of compounded distrust and frustrations from passengers that saw the lowest passenger satisfaction ratings in decades. A renewed focus on passengers – reflected in Network Rail's principle 'Putting Passengers First' – wants to see a shift in mindset across the organisation and sector to becoming easier to engage and work with. A mindset that is collaborative, entrepreneurial and service-oriented is part of the design mindset. We have referenced how design improves passengers' experience and drives business innovation in Chapter Two. Design, at its heart, is about taking a user (or passenger)-centred approach, and so effortlessly aligns with Network Rail's ambitions for a Passenger First culture.

54 Rail Delivery Group. Vision for Stations: Nine Principles for the future of Britain's Stations

55 Department for Transport and Williams Review, 2021, Great British Railways: Williams-Shapps plan for rail. Accessed September 2021.

## A greener and more sustainable railway by design

Putting Passengers First is not the only mindset shift that the railway sector wants to achieve; so too is the move towards meeting net zero targets and a focus on ensuring that the railways are part of the holistic solution to the climate crisis<sup>56</sup>. This does not simply involve finding innovative and effective ways to cut emissions. It means planning a climate-resilient railway infrastructure that strengthens communities without further entrenching regional and social inequalities; which enhances lineside habitats; and limits the impact of waste and pollution. Designing with natural, sustainable and locally-sourced materials that are ‘made to last’, such as those that were used in our case studies *Colin Connect* and *Green Furniture Concept*, is a design-led way to both enhance public realm and create more resilient and long-lasting infrastructure. It can also contribute positively to local character and support regional economies and supply chains.

## Value for money

Value for money is often conflated with creating ‘cost efficiencies’ in the development and delivery of a project. Due to the lack of post-occupancy or process evaluations, it is difficult to compare the financial and social return between projects that have invested more in the planning and development phase of a project and those that have invested less. As the Williams Review points out there are considerable inefficiencies in the delivery of Britain’s railways and an aversion to implementing innovative solutions that require more upfront investment, time, and thought.<sup>57</sup> Decisions are made without having the relevant data, evidence, or passenger insights. Without this knowledge it is challenging for leaders to make informed decisions about how to spend in a way that will maximise long-term outcomes. These leaders are still accountable for their choices, and so many decisions are taken that *can* demonstrate immediate ‘value for money’, i.e. cost efficiencies in project procurement, construction, and maintenance. Design requires upfront investment at a project level, and continual investment at an organisational level, in order to reduce uncertainties, mitigate risks, innovate effectively, and generate more impactful, longer lasting and more targeted return on investments.<sup>58</sup> Design is rarely sufficiently invested in, because decision-makers lack the evidence and the measurement tools to inform and justify their spend. They are also not required to forecast SROIs or make appraisal against different proposals that consider broad forms of value when deciding between designs.

When considering value for money, HM Treasury’s Green Book advises thinking about the following when making appraisals:<sup>59</sup>

“By how much can benefits fall short of expectations if a proposal is to remain Value for Money?”

“What will be the impact on benefits if costs are constrained?”

<sup>57</sup> Department for Transport and Williams Rail Review, 2021. Great British Railways: The Williams-Shapps Plan for Rail.

<sup>58</sup> Design aligns with the Project Speed approach, which seeks to streamline decision-making, implement more intelligent and flexible ways of working, and build the ambition, capacity and innovative mindsets across the rail sector.

<sup>59</sup> HM Treasury, 2020. The Green Book

Considering benefits before Value for Money, as seen in the first piece of advice, should be a Network Rail mindset shift that would greatly benefit all future assets: considering the impacts that cost constraint will have on the environment, local communities, the economy, and on all rail passengers should be built into all project proposals and idea development.

Given that infrastructure involves significant investment in physical assets, their long-term impact on the economy, communities and the environment need to be considered. It is no good accounting only for the immediate or short-term impact of benefits when delivering an asset that will be used for decades (if not longer) by generations of people. Evaluations are required to better understand the long-term benefits of well-funded projects, which – if shown to generate better return on investment and therefore better value for money – can be used to justify resourcing the intelligence, planning and development phases of projects, where design can deliver the most benefits.

## Maintenance and management

A well-designed asset should be easy to maintain and manage. London Bridge, for example, was designed with a large internal concourse at street level, partly to reduce the number of passengers waiting for trains on the platforms. Because the concourse was made more attractive – less exposed to the elements, with comfortable seating, space, natural surveillance and dedicated ticket-side retail – less investment was required upfront to provide amenities, seating and waiting rooms at the platform level. This means over time, fewer hours will be spent on maintenance, and less money spent on repairs and replacements.

As part of its commitment to environmental sustainability, Green Furniture has been designed to be long-lasting, easy to maintain, and easy to disinfect. It offers a buy-back scheme that allows seating to be repaired and re-deployed to different stations, all within the same contract with the supplier. This offers significant value for money – and even better value for the planet – compared to the non-circular practice of disposing and replacing assets at the end of their lifecycle.

## Increased revenue

Increased capacity and greater passenger numbers leads to greater ticket revenue, which is the most obvious way that designing more attractive and functional assets has a direct financial value to Network Rail. London Bridge’s redevelopment saw the station usage capacity increase from nine terminating trains and six through, to nine through and six terminating – which means a dramatic increase in the potential number of transfer passengers who could spend their money in the paid-side concourse. Footfall (which includes non-passengers) increased from 90 to 105 million in a year. Ticketed entries and exits also increased on the previous years to over 63 million in 2019, from 48 million in 2018.<sup>60</sup>

Well-designed assets also generate financial value for Network Rail through increased revenue from rental yields from vendors or other uses of the asset, such as for hosting events. Bat and Ball station can be hired for private and public events, another income stream for the owner.

Since the design-led redevelopment, in which the concourse was greatly opened up, London Bridge now boasts the largest paid-side retail offer in the UK, which means transfer passengers are more able to spend time and money. The increased revenue for vendors will attract higher-quality retailers in future. As mentioned above, well-designed spaces encourage greater spend and dwell time through managing customer flow, distribution and behaviour. They also create a high-grade look and feel for passengers, which attracts a higher-quality vendor and creates a competitive market for leases. King’s Cross saw a dramatic shift in the quantity and quality of vendors after its redevelopment. Its extensive high-end retail has made it a destination in its own right.

<sup>56</sup> Network Rail, 2020. Environmental Sustainability Strategy 2020-2050.

<sup>60</sup> ORR Data Portal. *Estimates of Station Usage 2017-18 and Estimates of Station Usage 2019-20*. Accessed September 2021.



The 2018 Steer report on the Local Economic Benefits of Station Investment singles out Manchester Piccadilly Station. The creation of 2000 square metres of retail space and an improved and well-designed concourse and public realm space generated quantifiable benefits. Not least a Gross Value Added (GVA) uplift of £1.3m to the local area, and 40 per cent higher retail spend in the station than the national average.<sup>61</sup>

A study shared by CABI in its *Value of Good Design* report highlights the impact of 'good' architecture on rental rates for commercial offices. Architecturally award-winning buildings were found to command a significant rental premium that could not be explained by other factors. A similar study identified over a hundred well-designed high grade office buildings across the United States, and the research again found a positive correlation between design quality and market rents.

#### Improved image value

Image value refers to brand perceptions and user satisfaction. In 2018, passenger satisfaction was at its lowest in 10 years and distrust in train travel increased three per cent from 2018 to 2019. As mentioned above, greater satisfaction leads to greater revenue, both in terms of ticket sales and spend in retail.

Green Furniture Concept was used by Swedish station management body, Jernhusen, to create a sense of familiarity and consistency across the network. The furniture's timeless design fits into historic and modern stations equally well and the 'wow' factor it inspires has been linked to increased brand loyalty and increased satisfaction. Hackney Wick and Colin Connect have won awards recognising the quality of their design, which signal to the surrounding communities – both historically disenfranchised areas – that they are being listened to and invested in. Colin Connect in particular was received very positively by the community, and it increased people's sense of pride and connection to their area.

Not all assets need to 'wow', win architectural awards, or be iconic landmarks to increase passenger satisfaction. Considering the passenger experience and making decisions that seek to improve the form and function of assets across the network generally, will lead to greater levels of satisfaction, brand loyalty and receptivity.

## The added value of design for communities and the planet

There are several value domains to which a well-designed asset can contribute, which can be both measured and monetised. Less easy is isolating each form of value, given the interactive nature of many social outcomes. The theory of change outlined above shows the cause-and-effect relationship between good design and maximised outcomes for an asset. Design is not the only factor, but it can be a powerful contributor.

The following outlines wider economic, social and environmental value realised through good designing, however it should be noted that these values are inter-connected and inter-dependent. For example, the creation of new jobs (economic value) also has an impact on local health and well-being (social value).

## Economic value

Economic value is that which creates value for the economy, rather than that which accrues to individuals or institutions. Under the category, we might include (for example): the benefits created for local economies through increased land value and development, improved job opportunities, and increased tourism and leisure spending. Railway infrastructure provides people with a gateway to the rail network and the communities they serve, which is an essential driver of local and national economic growth and opportunities.

#### Regeneration and setting high standards for design

**"First impressions count, and it is the station that people notice when they visit or leave an area. Investment in regeneration of a station can, in turn, increase confidence by providing a focus for development. Improvements to stations can deliver wider benefits, fostering an entrepreneurial spirit, and innovation, as set out in the principles behind the Rail Delivery Group's Vision for Stations (2015)."**<sup>62</sup>

There is significant evidence demonstrating the economic benefits of high-quality development and regeneration around railway stations.<sup>63</sup> The Rail Delivery Group undertook investigations into a number of stations recently redeveloped and noted that a poor-quality station that relates badly to the surrounding area inhibits people's enjoyment of place, and disincentivises private or public sector investment. This inevitably means that the inadequacy of the station becomes a barrier to effective regeneration. When this effect persists over time, it creates a legacy of under-investment which sees the station and its surrounding public realm suffer.<sup>64</sup>

Transport for London has released an evaluation on land value that supports the idea that the benefits of transport schemes, alongside placemaking interventions, are capitalised into higher land values.<sup>65</sup> There is also evidence of a 'transport premium' that increases property value by 10.5 per cent around Tube and rail stations in London. It is not the mere existence of a transport hub that creates the value uplift, however. Transport projects need to be part

<sup>61</sup> Steer Davies Gleave, 2018. Local Economic Benefits of Station Investment.

<sup>62</sup> Rail Delivery Group. Regenerating Britain's railway stations: a six-point plan.

<sup>63</sup> Steer Davies Gleave, 2018. Local Economic Benefits of Station Investment.

<sup>64</sup> Rail Delivery Group. Regenerating Britain's railway stations: a six-point plan.

<sup>65</sup> Transport for London, 2017. Land Value Capture: Final report executive summary.

# Social value

of wider regeneration programmes, with planning and investments directed at *improving the quality of places*. The higher the quality of regeneration, the higher the land value uplift, resulting in a greater positive impact on the local economy.

This need for better quality places, of which good transport infrastructure is integral, motivated the London Legacy Development Corporation to take a design-led approach to the regeneration of Hackney Wick. The station was the first part of the regeneration and in order to 'set the bar' for high-quality design throughout the entire wider scheme, the client ensured that the design process for the station was appropriately resourced and used their in-house design expertise to set up best practice policies and processes to support and champion the entire project team.

The heritage-driven redevelopment of King's Cross station, alongside St Pancras station and Coal Drop Yard, was an integral part of creating a strong sense of identity and placemaking for the wider regeneration of the Kings Cross area. Colin Connect Transport Hub in Belfast was also the first step in a wider regeneration plan and received a generous budget and encouragement to design something 'iconic'. This acted as a signal to the local community, in a deprived and under-invested part of Belfast, that they deserved something beautiful and long-lasting that they could feel proud of. The overwhelmingly positive feedback from the local community is that the project has made a real difference – and the people of Colin feel valued. The masterplan continues to be built out with a new park, which must meet the high design ambitions set by the transport hub.

For an accurate understanding of the economic impact that investing in high-quality assets has for local communities, representative surveying would be required. The sense of belonging 'in a good neighbourhood' has been valued at £1,747 per person per year by the Housing Associations' Charitable Trust (HACT).<sup>66</sup> The redevelopment of Bat and Ball station was part of a commitment made by Sevenoaks Town Council to regenerate the area, which also included a new £3m community and conference centre, which had also been designed by Theis + Khan. The civic

66 HACT. 2014. Measuring the Social Impact of Community Investment.

pride that the redevelopment of the station has in part contributed to is potentially up to £2.4m.<sup>67</sup>

## Attracting leisure passengers

While it is likely that rates of passenger commuting will be lower than before the pandemic, there is encouraging growth in the rates of leisure passengers. This passenger type has increased by 10 per cent since lockdown restrictions eased in July 2021, and now represents 65 per cent of all Network Rail journeys<sup>68</sup>. A recent marketing campaign has recently been launched, encouraging the two-thirds of Britons vacationing in the UK to travel by train. The economic benefits of leisure and tourism for local areas can be profound, and railways play a great role in supporting these economies, both in moving people across the country and in generating multiplying effects. Design can contribute to this by creating alternatives that are attractive and easy to use. As the bridge at Koge Nord shows, a well-designed landmark can shift behaviours, resulting in more rail passengers and fewer motorists.

Leisure travel creates jobs. For Bat and Ball station, 90,563 visits to the station were projected in the business plan, of which 15 per cent were anticipated to be day visitors, attracted to the area to attend events and activities at the station. These visitors are likely to spend £360k every year, supporting or creating a further 13 jobs.<sup>69</sup>

## Job creation

The redevelopment of Bat and Ball station boosted the local economy by creating 19 FTE construction jobs and 25 additional net jobs, contributing approximately £1.2m of Gross Value Add. Clearly not all of this is attributable to design, however we can reasonably assume that the scale of ambition and appetite for high quality design driven by the client created more jobs than the minimum viable alternative.

67 Heritage Lottery Fund. 2019. Bat and Ball Station redevelopment Evaluation report.

68 Network Rail press release: Train companies launch campaign to get leisure travellers back on track, 16 August 2021.

69 Ibid.

## Safety

The Bat and Ball station, and the immediate area around it, was seen by many as a place to avoid at night. There was poor lighting, and drug dealing took place near the station. For those living in the Bat and Ball area, the increased perceptions of safety in the area have created a measurable social benefit. An evaluation by the Heritage Lottery Fund found that the economic benefits from reduced crime at Bat and Ball station are £32,400 per year. This shows how good design, by elevating the look and feel of an asset, improves not only the passenger experience but the experience of the whole local community. Crime reduction was also seen following the redevelopment of Kings Cross and London Bridge, and people who lived near Colin Connect felt a greater sense of safety that came from better lighting and the openness of the public square.

## Investing in local communities and creating new public spaces

The Joseph Rowntree Foundation has published research demonstrating the **social value of public spaces** and the vital role they play in the social life of communities.<sup>70</sup> In research carried out for CABI, 85 per cent of people surveyed felt that the quality of public space and the built environment had a **direct impact on their lives and on the way they felt**.<sup>71</sup> It found that not only did high quality public space increase property prices and boost commercial trading, it also created considerable positive **impact on local residents' physical and mental health**. Local environments have a significant effect on the health and wellbeing of individuals, and this link between quality of public space and quality of life was established more than a decade ago.

In 2017, HACT came up with a set of measures to monetise the value associated with improving local areas. Resolutions of problems with road conditions, pavements, and street furniture were valued at £595 per person per year and resolution of problems with 'scruffy garden landscaping' at £695 per person per year.<sup>72</sup>

70 Joseph Rowntree Foundation. The social value of public spaces

71 CABI. The Value of Public Space: How high quality parks and public spaces create economic, social and environmental value.

72 HACT. 2017. Valuing Housing and Local Environment Improvements using the

The appointed architects for Hackney Wick station, Landolt Brown, worked with an artist from the outset with the intention of developing a design approach that "*expressed the character of the place*", while working with the multi-disciplinary design team including those who had been developing the civil engineering and buildability proposals. The new station, described by the designers as intentionally "*gritty and non-corporate*" connects people to the heritage of their area, as much as it connects them to the rest of London. It purposefully reflects recent history and context, instead of creating an asset that will drive gentrification or erase the identity of Hackney Wick and the people who live there. This was recognised by the community, who wrote letters of support to the architects and artist, and by industry who gave the station a Community Benefit award at the ICE London Civil Engineering Awards 2019.

The Colin Connect Transport Hub was warmly welcomed by residents in the surrounding area, one of historic underinvestment, and taken as recognition that this once neglected community was deserving of something beautiful and enviable. The materials used are long-wearing and durable, speaking to its intention to stand as an integral part of the Colin landscape for generations. Grimshaw Architects, who developed London Bridge Station, spoke similarly about Londoners and how they 'deserved' a quality civic space, like an 'urban meeting room'. The architects wanted to embrace the 'South London' urban character and moved most of the station down to street level, creating a large open-plan concourse that intentionally blurs the boundary between station and street. This makes the station feel more open, public and accessible to everyone.

This intentional 'blurring' has resulted in the creation of new community assets, such as the large public squares at Colin Connect and Kings Cross, and the expanded public space around London Bridge. These new open and welcoming spaces encourage human interaction, are places for rest and enjoyment, act as natural surveillance, and are used for public activities like festivals, open-air markets, and exhibitions.

Wellbeing Valuation Method and the English Housing Survey



## Environmental value

Rail transport already consumes and embeds less carbon than other long-range travel modes, making it one of the greenest forms of travel. Increasing electrification of the railway is set to improve this even more. Design's role in reducing carbon emissions for the rail industry is to create products and places that are more circular and sustainable, as well as attracting more people to use rail. These benefits will be felt cumulatively, generationally, and across diverse species. The longer something lasts, and the more often it can be re-used or re-furnished, the better for the environment. This dual role of design in creating a more sustainable future – in creating better things, and in changing behaviours – are covered by two of our case studies.

Koge Nord's bridge is a behaviour nudge, encouraging drivers to park their personal vehicles in the park and ride and instead take the high-speed train into Copenhagen. Fewer motorists, and more people travelling by train, is a clear way to reduce carbon emissions across the population. Great design and innovation can attract more people to use the railway, by creating a seamless, enjoyable, accessible and convenient user experience that can compete with travelling in private vehicles.

Colin Connect also employs materials that were selected on the basis that they would both reflect local character, and would weather well to create longevity and resilience in a building that will 'stand the test of time'.

To achieve its sustainability objectives, Network Rail will need to consider shifting its procurement from outright purchasing to service and rental business models. This is because materials are finite, and even those that use renewable materials require processing and constructing in ways that emit carbon. By moving to a more circular model of replacing amenity – rather than disposing and replacing with new like-for-like – Network Rail can clearly demonstrate how it is making the changes that its passengers and stakeholders expect from it, in order to achieve its environmental sustainability objectives<sup>73</sup>.

<sup>73</sup> [Network Rail, 2020, Environmental Sustainability Strategy 2020-2050.](#)

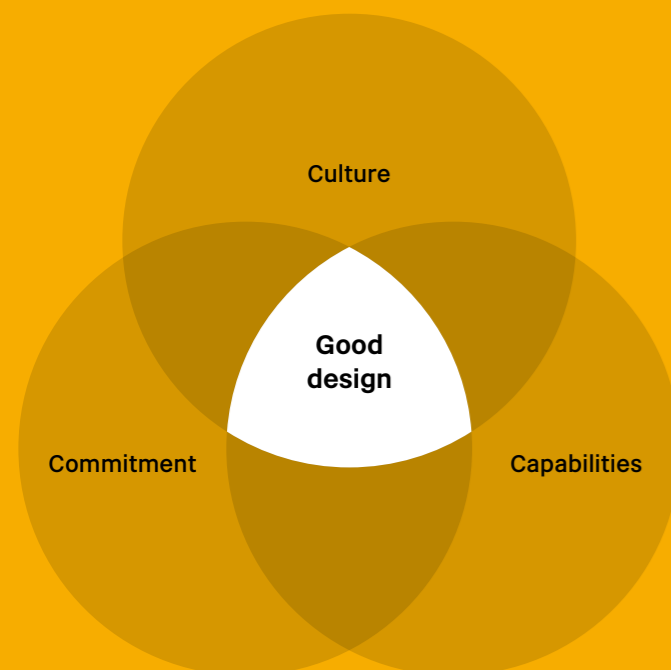


# The enabling conditions, resources and inputs

# Culture, Commitment, and Capabilities

Through the interviews, we found that there are some general conditions that determine the effectiveness of the design process and the quality of the resulting proposal and asset. We have called these the ‘enabling conditions’ for good design. Without these conditions in place, effective and efficient design is more difficult to achieve, innovation and creativity are hampered, and collaboration is stymied. These enabling conditions are: culture, commitment, and capabilities. The effect of these enabling conditions is to support anyone who is responsible for commissioning high-quality design to be able to do so.

Three Enabling Conditions to Good Design



## Culture

Culture refers to an organisation’s openness to design and is indicated by leadership who prioritise and support the achievement of high-quality design. It also refers to the values, attitudes and motivations that exist within an organisation that enable it to pursue creating long-term benefits across a range of value domains. This can be driven as much by factors external to an organisation, like government policy and stakeholder priorities, as by factors internal to an organisation, like strategic objectives or the diversity of the workforce. Regardless of what is driving the cultural conditions, however, there are several indicators of what a good design culture looks like:

- leadership in commissioning organisations proactively support the achievement of high-quality design
- entrepreneurial spirit that maximises opportunities for inward investment in passenger-facing infrastructure by attracting third party investment
- delivery partners value and embrace a multidisciplinary approach (not siloed)<sup>74</sup>
- design teams value other partners’ expertise, and allocate resource to bringing them into the design process
- the adoption of design guidance and principles by an organisation and project team

Unlike culture, which drives the general principles of achieving good design at a strategic level, commitment and capabilities are enabling factors at a project-level.

<sup>74</sup> Delivery partners refers to anyone who is working on the project who is not part of the design team, e.g., architects, or the commissioners of design (or clients). This includes engineers, contractors, and project consultants. The project team, on the other hand, is everyone who is involved in the project including the client and the design team.

# Project Team

## Commitment

On high-quality design projects, the client, delivery partners, and design team are all committed to achieving a final asset that is well-designed and maximises outcomes. Moreover, everyone involved is on the same page, understanding the project’s needs, parameters, and scope. Through discussion and compromise, successful project teams come to a shared vision that they are all equally committed to delivering. Commitment to a project’s success will be indicated by projects that follow effective policies and processes to ensure that the right conditions are in place to activate and resource good design throughout its lifecycle.

## Capabilities

Capabilities refer to the specific design expertise that a project team has internally. It also means that everyone involved understands the value of good design and is ready to deploy the resources and time needed, alongside an organisational culture that supports this. That delivery partners and the design team feel mutual respect for each other’s expertise is also crucial to effective communication and allowing them to come to a shared vision of the asset that everyone buys in to. Perhaps most obvious of all, capabilities include the design team’s expertise and experience in delivering high-quality projects.

## Culture

We would expect to see a number of leaders with design expertise who champion design and its value throughout the organisation by putting policies, principles, processes and people in place that support the pursuit of high-quality designed assets.

## Commitment

From commissioners of design, commitment to a project’s success includes procurement practices that prioritise achieving high standards of design, and which work over the long-term to normalise this approach over a value-engineering or cost-savings approach.

The Rail Delivery Group notes that successful regeneration of complex stations and wider area critically depended on stakeholders developing a shared vision of high-quality design and outwardly committing to that vision in the face of sizeable challenges.<sup>75</sup> Going ‘beyond the red line of the station boundary’ is regularly reiterated in station regeneration and accessibility literature, and the commitment to reach out to wider stakeholders for their views and support is vital in achieving integrated planning and well-coordinated developments in the public realm, such as multi-modal interchanges and new developments.

Co-developing a vision of good design and committing to it as a team also helps to manage tensions and conflict between stakeholders. Work undertaken on live station projects has found that there is consensus between delivery partners that conflicts are best managed through the development of a shared vision at the outset, and that delivery risk was best mitigated through the clear delineation of key project elements by the appropriate delivery agency (eg, Network Rail, TOC, local authority, developer) so that dependencies are mitigated.

## Capabilities

Strong capabilities are indicated by the number of employees with design literacy and skills

<sup>75</sup> Rail Delivery Group, 2017. Regenerating Britain’s railway stations: a six-point plan.



within the project team. This will be supported at an organisational level by people's exposure to design training and qualifications which point to an organisation's appreciation of design and designers. We also found that projects with a strong multidisciplinary project team were often made up of people who had previous experience of working on projects that achieved high-quality design, and were therefore more open to working in a design-led, collaborative and iterative way.

Such resources and inputs that are indicative of the requisite enabling conditions being in place don't come for free. The design process requires a considerable amount of upfront cost, both before and after setting the brief.

Good design is achieved through understanding what a project needs to accomplish and how the asset needs to perform. This means that the brief itself needs to be informed by user insights and evidence; the activities required to gather this data will require both time and money. In fact, at every stage of the project lifecycle, from brief-setting to post-occupancy evaluation, there will be a requirement to invest in design. Consultations and advice, like the design advice panel, will effectively mitigate risk and ensure organisations get the most from a design team and delivery partners. The contracted design team bring their expertise and creativity to a project that, as an infrastructure asset, will impact on people and planet for generations. Then resource and time is needed by the internal team to activate good designing and collaboration throughout, setting high standards and supporting the effective unfolding of the design process.

It is difficult to quantify (let alone monetise) the long-term and cumulative societal benefits of properly resourced design, because there is not enough post-occupancy data to analyse and compare. However, our case studies show that having enabling conditions of strong culture, commitment to achieving good design and outcomes alongside strong design skills, experience and capabilities results in high-quality design assets. These high-quality assets themselves generate the value that we discussed above.

# Commissioner of Design

## Culture

The organisational culture in which the commissioner of design (the client, or responsible officer) works will have a great deal of influence over the effectiveness of the design process, and the quality of the final asset. A reticence to resource design will lead to poor design. A design-enabling culture in the client's organisation features:

- organisation-wide openness to innovation and diversity
- funding opportunities for training and professional development that works towards certified competencies in regard to station management, design and operation<sup>76</sup>
- leadership that prioritises achieving high standards of design
- values, mindsets, and motivations that demonstrate a commitment to maximising outcomes
- leadership that ensures the organisation has what it needs to attract people who can activate, support and champion good design
- leadership that ensures best practice in processes and policies across the organisation, and empowers people to use these
- leaders committed to monitoring and evaluating the organisation's work, and to learning and improving

<sup>76</sup> Recommendation from: Steer, 2021. Station Situation Review for Rail Delivery Review.

## Capabilities

There are two main activities that commissioners will be responsible for throughout the design process. The first is setting up the conditions that will activate good design. This includes stakeholder engagement, procurement, and setting the conditions for coming to a shared vision for the project between the project team. The second is supporting good design practice, iteration and collaboration throughout the process. Effective internal policies and processes that support good design implementation include those that enable and prioritise passenger engagement, and adequately resource gathering of representative feedback and insight. Design commissioners should have the capability to scope and write an effective brief based on: (1) understanding the value they want to derive from a high-quality designed asset, (2) the needs and wants of passengers and local communities, and (3) creativity and innovative solutions. They will need to understand the design process and how to effectively manage it, which may require investment in continuous professional development. Building the design capabilities for commissioners and project managers will also increase the likelihood that contracts are allocated based on the proposed quality of design and a teams' experience, rather than cost saving.

Commissioners should feel confident and capable talking to designers and to key decisionmakers in the organisation about design. This requires design training, as well as experience of working with designers.

Design Commissioners should continue to actively resource and support good design throughout the project. This includes ensuring that the project is benefitting from regular, independent, and rigorous design reviews that will help the team to iterate their proposals. Ongoing project management involves making sure that the project team all understand the needs of the project, are communicating regularly, and have come to a shared vision of the final asset and its outcomes. The client should be an active part of the process, leading the team in taking a collaborative and multi-disciplinary approach.

## Commitment

Committing to a project's success means engaging passengers and stakeholders from the start. Not only is this the right thing to do, it can also create value downstream. Firstly, a design that has been informed by the needs and wants of local people is more likely to lead to a proposal that fits in with their expectations, and will be something that they can support. The redevelopment of Bat and Ball station received strong public backing, most notably through the Bat and Ball Station Friends Group. The group has gone on to create and maintain a community garden next to the station building, installed a community notice board and helped to introduce a new bus service to the station. Planning applications with strong public support are more likely to get through the planning process smoothly than those that receive negative backlash. There are considerable cost implications associated with going through procurement, development and planning again to correct mistakes that would have been mitigated by listening to the people who are likely to use the asset in the first place.

Contracting the right delivery partners is equally as important. Landolt Brown and Mott Macdonald were able to collaborate and achieve award-winning design and engineering in Hackney Wick through mutual respect, regular communication, shared vision, and taking a multi-disciplinary approach. The client is responsible for setting and maintaining high standards of design and ensuring a shared commitment to maximising the project's potential. The client should find a design champion specific to the project, who can advocate for it at a strategic level, as well providing guidance and advice to the project team.



# Delivery Partners and the Design Team

## Culture

In its report 'The Economic Contribution of UK Rail', Oxford Economics published a case study on the Central Rail Systems Alliance in which it identified the multidisciplinary 'one team' approach in which everyone working together throughout the life cycle of the project was a critical factor for the success of many high-profile projects<sup>77</sup>

Both delivery partners and designers should also be committed to developing a deep understanding of the requirements and wider context of the asset being designed. Either by actively participating in consultations with, or directly implementing the insights from early passenger engagement and early stakeholder engagement. Through this process, the project team should come to a shared understanding of insights and context, and use this knowledge to co-define the project's scope, parameters, and required outcomes. From here, the team can more easily develop their shared vision of, and collaborative commitment to delivering a well-designed asset. To do this well, the commissioning organisation needs to set the tone for its contracted parties, by allocating enough time, space and money to support all members of the project team through the design process. If the process, and the positive results it produces, are valued and resourced by the client, the process is more likely to be implemented and valued by the team. Nevertheless, each part of the delivery team should be able to demonstrate project management policies and processes that will enable collaborative working across disciplines and organisations.

## Capabilities

The capabilities of the delivery partners and the design team are, obviously, different. While the delivery partners will benefit greatly from having some design expertise in-house, or history of working closely with designers, a design team's skills, ideas and experience are their most important qualification. However, that is not to say that all designers are good designers. Choosing a design team that is values-led, and who have experience in producing high-quality assets that intentionally maximise social and environmental impact is clearly crucial to the quality of the final design proposition, and eventually the asset. They should be able to explain how their design could lead to maximised outcomes, and be able to communicate the value of their design approach to the wider team and key decision-makers.

## Commitment

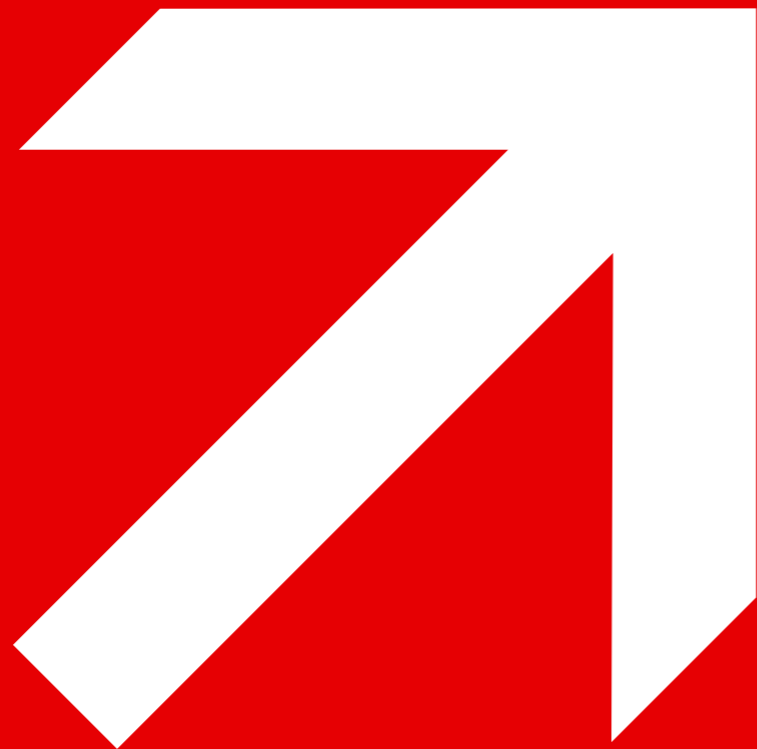
Like the client and the delivery partners, the design team should commit to working in a mutually respectful and collaborative way. They should seek the relevant expertise of different delivery partners to inform their designs and communicate these insights and resultant iterations across the team. This stakeholder management will require upfront and ongoing resourcing. The design team should also work well with design champions and with the design review process, and demonstrate a commitment to achieving what is best for the project, its outcomes, and the needs of its users.



<sup>77</sup> Oxford Economics, 2021. The Economic Contribution of UK Rail



# Conclusion and Recommendations



The evidence in this report demonstrates how upfront and continuous investment in design adds value to UK rail infrastructure and can help enable it to play an even greater role in the country's social and economic recovery post-COVID-19, and in its transition to net-zero by 2050.

Design ensures that new infrastructure responds to user needs and delivers an improved passenger experience. It enhances the social and environmental impact of new assets through using sustainable materials, novel construction processes, and by factoring the wider impact on local economies and places. It preserves heritage and enhances cultural significance. It can lead to significant cost-savings and economic growth: from anticipating risks and challenges, to maximizing revenue opportunities for stations and local economies.

The theory of change included in this report proposes the causal logic from design activities and processes that leads to increased value. Our stakeholder engagement and deliberative workshops found that while there is a strong body of literature demonstrating the value of design from a social, environmental and economic perspective, understanding of this was uneven throughout the industry. This means that design is not sufficiently factored into investment strategies, project budgets, and decision-making. Failing to consider the value of design risks narrowing decision-making at the expense of innovation; missing opportunities to maximise the value realised through new projects; and failing to address the complex and systemic challenges we face.

To address this, we have sought to build understanding of how design investment, which is often seen as cost-prohibitive or unnecessary, leads to the reduction of costs further down-stream and the realisation of greater return-on-investment. However, the research that underpins this model also highlights several challenges to realising the potential value-add of design. These include: lack of awareness of design with senior leaders in rail infrastructure; inconsistent empirical evidence to demonstrate the value of good design; and uneven use of effective design support activities such as design advice panels.

The following recommendations outline actions for Network Rail and the wider rail infrastructure sector to realise the potential added-value of design and to address some of these challenges.

# Recommendations

## 1

### Embed design champions at board level to improve understanding of design and its value with senior leaders and decision makers within Network Rail.

Building wider organizational commitment to and understanding of the value of design requires greater awareness of the benefits that design investment can bring at senior level. Whilst Network Rail has a design champion network in place to advise on design quality for particular projects and to support design advice panels, it currently lacks board-level and regional representation of design champions. Introducing these would help to drive strategic design investment, and foster greater organizational commitment to high-quality design.

- Building on recommendations from the National Infrastructure Assessment<sup>78</sup>, appoint a design champion at board level with a remit to provide leadership, motivation and incentive to ensure the organization as a whole embraces design.
- Appoint senior strategic design champions at regional level with responsibility for ensuring consistent design quality and buy-in at a regional and local level.
- Improve understanding of design's positive impact and return on investment across the organisation, especially those areas that are less traditionally aware of or knowledgeable about design – such as finance. This will facilitate buy-in across programmes of work and external procurement.

<sup>78</sup> National Infrastructure Commission, 2018. [National Infrastructure Assessment](#).

## 2

### Increase the adoption of design advice panels across the rail industry.

Good design processes found across this report often used tried-and-tested methods and activities. Design advice panels in particular have been demonstrated in the case studies to improve the design quality of infrastructure assets. Despite this, their use is still uneven and inconsistent across different organisations, projects and asset-types within the rail industry. Increased and consistent adoption of design advice panels across the rail sector would create added value for rail infrastructure and could be supported through:

- The creation of national guidance and standards for best practice in using design advisory panels for rail infrastructure assets, and ensuring that these are understood and used consistently.
- Ensuring design advisory panels are built into project life-cycles at an early stage of their development and factored into programme costs from the outset.
- Providing design awareness training to project sponsors to ensure that projects are correctly referred to design advice panel services when required.

## 3

### Establish a consistent approach to impact assessment in the design and management of rail infrastructure assets across Network Rail.

Despite a wealth of theoretical literature on the value of design to infrastructure, there is less empirical quantified evidence of good design's impact across different rail assets. This means that design's advocates lack the evidence they need to counter common claims that design represents unnecessary expenditure. Consequently, the resources and time that high-quality holistic design needs are rarely factored into project budgets at the outset. Network Rail could play a key role in creating this evidence base by developing a design evaluation framework and data-collection strategy, including post-occupancy surveys. This would provide empirical evidence to make the business-case for design and help the organisation to gain insight into which design approaches are most impactful.

- Produce a design impact evaluation framework and data-collection strategy that identifies key benefits Network Rail wishes to see maximised by design investment.
- Build evaluation into the design and management processes of all new tangible rail assets, including completion of post-occupancy evaluation at regular intervals after completion, to assess long-term benefits.
- Align design evaluation with existing principles, impact and evaluation strategies, for example Network Rail's Design Principles, the Passenger Survey, and explore involvement with the upcoming Network Rail Environmental Impact Framework.
- Place greater emphasis on benefit identification, measurement and evaluation. Develop and grow the evidence base around how different types of rail investment can lead to a range of different social, environmental and economic outcomes.

## 4

### Invest in identifying which benefits and impacts are important to people affected by new or existing rail infrastructure at the start of new projects.

Early stakeholder engagement on the primary benefits they wish to see realized through new infrastructure is important to ensuring benefits for passengers, affected communities and local economies. A design that is informed by the aspirations of stakeholders is more likely to lead to a proposal which fits with their expectations and to gain their support. This upfront investment can also reduce the risk of significant procurement development and planning costs due to negative backlash and lack of public support. Using this to inform the design and management of infrastructure will establish clear aims, reduce the risk of 'scope-creep' and can help secure buy-in with partners. The shift from the eight-stage Governance for Railway Investment Projects (GRIP) process to Project Acceleration in a Controlled Environment (PACE) provides an opportunity to improve practice in defining desired impacts at the outset of new projects. This could be aligned with an evaluation of design's value-add across the lifecycle, as recommended above.

- Appoint project designers who are sensitive to the local issues and context of a new project.
- Build in provision at the initiation stage of design project life cycles to involve diverse communities and key project stakeholders in consultation and deliberation on the impacts and benefits they want to see included in the project design brief.
- At the same time as designing and developing the infrastructure asset, plan improvements to the surrounding area to maximise the multimodal connections, attract business, and create a safe, inclusive and pleasing public space.

# 5

## Adopt a holistic approach to impact assessment and business-case development for design projects which factors in total value.

Recent national policies highlight the importance for transport, including rail infrastructure, to innovate to achieve net zero and greater regional equality. However, there is a lack of data to demonstrate the social and environmental value-add that good design brings to rail infrastructure. Building on guidance from the HM Treasury Green book and current best-practice in value-assessment, Network Rail has an opportunity to undertake a more holistic approach to the business case for new design, and reporting and evaluation. This will not only lead to more informed decisions but will help build the evidence base for the role good design in rail infrastructure can play to meet national priorities.

- Integrate social and environmental impact assessment into new infrastructure projects and develop frameworks and guidance for project teams to deliver this.
- Set environmental and social impact targets for all new projects and require project teams to be accountable for these throughout project delivery.
- Build minimum requirements and assessment into procurement frameworks to ensure potential contractors have clear strategies in place to reduce their environmental impact and improve social benefits through their work.

# 6

## Invest early in creating a shared vision of high-quality design with project teams, local stakeholders and passengers to drive delivery of the final asset.

The Rail Delivery Group notes that successful regeneration of complex stations and the surrounding area relies on stakeholders developing a shared vision of high-quality design. Co-developing a shared vision within a project team can help to manage tensions and conflicts between stakeholders and drive the delivery of a final asset. Engaging passengers and stakeholders from the outset is also key to ensuring that the project is informed by the aspirations, strengths and needs of wider stakeholders. The case-studies in our report demonstrate how upfront investment in strong community involvement not only helps with more efficient planning and public buy-in, but creates safer, more inclusive and financially sustainable assets in the long-term.

- Develop and implement design guidance and design principles to support project teams to realise good design.
- Involve community stakeholders when defining the brief for a project in order to create shared understanding of the ambitions of a new asset, and to get buy-in.

# Proposed Next Steps for Assessing the Value of Design to UK Rail Infrastructure

**This report provides a theory of change for how good design adds value to UK rail infrastructure and identifies current frameworks for measuring the impact of design. The next stage for this research would be to undertake a programme of impact assessment and evaluation to demonstrate how much value good design adds to UK rail infrastructure.**

Due to the current lack of standardised data for infrastructure assets across the sector, we recommend adopting a case-study approach to develop a rigorous quantitative and qualitative account of the value-add good design has in particular instances. The approach we would recommend is a counter-factual approach: comparing two similar assets where only one has invested in good design activities and processes, to see what that investment in design realized in terms of increased benefits. A total value impact assessment would not only demonstrate the economic value of design, but also address social and environmental value and speak directly to Network Rail priorities.

This research would provide robust evidence to make the case for investment in design. In addition, we recommend that an impact assessment framework and guidance be developed through this process, for subsequent adoption by Network Rail across its design portfolio. This would provide a foundation from which to build a more comprehensive evidence base.

To ensure that this kind of quantifiable research and value-measurement is achievable in future, we recommend that Network Rail invest in a long-term evaluation strategy. This should assess the value of design from project inception to post-occupancy and measure: the effectiveness of the process; efficiencies and innovations derived from a design-led approach; and the resultant economic, social and environmental outcomes. When evaluation is implemented consistently and robustly, an aggregated understanding of the wider benefits from a well-designed rail network and assets can be more readily communicated and understood. It will also provide an evidence base and blueprint for other related industries to assess the value of taking a more nuanced, considered and long-term approach to designing infrastructure, to the greater benefit of our current and future population.



# Case studies





## Bat &amp; Ball Station

# Using design to leverage the social value of historic rail assets

Asset Type	Station
Location	Sevenoaks, Kent, UK
Client	Sevenoaks Town Council
Architects	Theis & Khan Architects
Start-Completion Dates	2018 – 2019.
Level of Intervention	Refurbished Station
Awards	Architecture Journal Retrofit Award Winner (2019), AJ Architecture Awards Shortlisted (2019), RIBA Regional Awards Shortlisted (2019).
Cost	£1m
Image Credit:	Nick Kane



**Across the UK's rail infrastructure there are 1,650 listed buildings and structures<sup>79</sup>, some of which are 200 years old. They form part of our national heritage and it's crucial to ensure these have the resources needed to be maintained and managed for future prosperity.**

There are various ways to do so. They can be fully retained within Network Rail's responsibility in terms of use and maintenance, or that responsibility can be shared or relinquished to third party entities, such as train operating companies, developers or the local authority.

Grade II listed Bat & Ball Station dates back to 1862. Its refurbishment and modernisation is an example of how a local authority can lead the inception as well as implementation of a project to return a derelict Victorian station back in to use for a variety of social value benefits.

The station and the station building were managed by a train operating company, Southeastern, and owned by Network Rail. Located in an area with crime problems, the station building was subject to vandalism. The local authority, Sevenoaks Town Council took the decision to acquire it from Network Rail after it failed to secure adequate interest from third party investors and developers, despite being on the market for a year and a half.

<sup>79</sup> Railway Heritage Trust link to:  
<http://railwayheritagetrust.co.uk/what-is-the-rht/>





Sevenoaks Town Council has been working for several years to improve the local area through investment, including a revitalised neighbourhood community facility, the Bat & Ball Centre, delivered principally through Community Infrastructure Levy and Public Works Loan Board. The relationship between the community facility and the station was crucial to ensuring they worked together to benefit the neighbourhood.

The council appointed an architect-led design team from Theis and Khan Architects for the community facility through a design competition. Having worked closely with it on the community facility, the council decided to use the same architects for the station building, initially commissioning it to undertake a feasibility study, then retaining it through to project completion.

A project budget that Sevenoaks Town Council felt could harness the potential of the building to tackle some of the key problems faced in the neighbourhood was then established. During stakeholder engagement the local community voiced concerns about feeling unsafe in and around the station, especially in the evenings. They also felt there was a lack of interest in the history of the station or its setting. The council recognised the opportunity to deliver improved essential amenities for the 75,000 passengers who already used the station. It was also understood that Sevenoaks station, the next station along the same route, provided an alternative facility with better amenities and most likely attracted passengers away from Bat & Ball.

The architects responded to the site by retaining the historic character of the building while refurbishing it with contemporary amenities and integrating in a community space, wi-fi and a café. The design ambition was to retain and help communicate the historical character and significance of the station to passengers and local communities.



The completed refurbishment project of Bat & Ball Station was met with overwhelming positivity and support. Sevenoaks Town Council's decision to 'aim high' design-wise to create local pride in the station has no doubt resulted in the successful outcome which can be measured across at least four metrics. Passenger numbers have steadily risen above local trends (some 20 per cent above Sevenoaks Station). Local crime has reduced by 80 per cent and the station building is no longer subject to vandalism (£32,400 per year benefits). Sense of safety has increased (£540,000 per year benefits). Local economic impact has been measured at £1.2m GVA per year. Station users continue to voice their pride in their local station's heritage (£2.4m per year benefits), and the new facilities now on offer. Skilful design delivery has unlocked these principally social value benefits.

#### How did it achieve a good design process?

- strong client vision with high design ambition
- selection of designers with commitment and sensitivity to the local area
- sustained project management by the client that adopted a design-focused collaboration
- funding sources such as the Heritage Lottery Fund mandated high-quality design interventions

#### Value-add of the station

- celebration of local heritage through reinstatement of one of the few Victorian Grade II listed buildings in Sevenoaks
- sense of pride estimated to bring £2.4m per year in benefits
- reduction in local crime by 80 per cent, bringing £32,400 per year benefits
- increased sense of safety, bringing £540,000 per year benefits
- increased passenger numbers<sup>80</sup>

#### Recommendations:

- don't underestimate the power of heritage and history to unlock wider value
- appoint designers who demonstrate knowledge of and sensitivity to local issues
- empower people who are most passionate about the local area to lead the project

<sup>80</sup> Heritage Lottery Fund, 2019, Evaluation Report for Bat and Ball Station.



## Hackney Wick Station

# Using design to overcome engineering constraints to maximise value for the local community

Asset Type:	Station
Location:	Hackney Wick, London, UK
Site Area:	600 m <sup>2</sup> (internal area only)
Client:	London Legacy Development Corporation, Network Rail supported by Greater London Authority, London Borough of Hackney, London Borough of Tower Hamlets
Architects:	Landolt & Brown Architects
Start-Completion Dates:	2017 – 2018
Level of Intervention:	New Station
Awards:	RIBA London award (2019), ICE Award for Community Benefit (2019)
Cost:	£28m
Users:	2,837,224 entries and exits in 2019-2020
Image Credit:	Landolt + Brown Architects and Wendy Hardie collaborating artist



**Railway stations are highly constrained and dominated by civil engineering drivers – the fact that tracks and trackside systems require engineering focus colours the way they are designed and built. However, this does not mean that they should be designed without experts who bring many other considerations into how a station will perform.**

Stations always have an obligation to directly engage their existing and future local communities. How this is achieved can vary from station to station and project to project. At Hackney Wick, the appointed architects were selected through a design competition. They engaged an artist at the outset and together developed a design approach that “expressed the character of the place”, while working with the multi-disciplinary design team including those who had been developing the civil engineering and buildability proposals.

Hackney Wick Station is an Overground station on the Transport for London system and provides a key access point for the Olympics Park. It reopened in 2018 following replacement of the footbridge with a tunnel that provides a cycle and pedestrian link connecting the communities on either side of the railway. The redevelopment also included modernising station entrances and tickets halls with improved access to the raised platforms above. The design reflects the industrial heritage and waterways of the area and features coloured concrete walls and illuminated glass, which transform the user experience. The new public route is an integral part of the local area regeneration plans that aim to connect Hackney and Tower Hamlets.





Hackney Wick is one of the most deprived wards within Hackney, itself one of the most deprived boroughs of London. Crime reduction has been a continuous endeavour for the local authority and the Mayoral development organisation, the London Legacy Development Corporation, which has been leading the regeneration efforts of the area.

David Goldstone, Chief Executive of the London Legacy Development Corporation said: "Improving connections in Hackney Wick is vital to support the regeneration of the area and is a key feature of the Hackney Wick masterplan. The new subway will help to open up the area for local people and support the businesses that are moving here. The much needed improvements to the station come just as new homes start to be built at East Wick and Sweetwater and more jobs are created at Here East and in the surrounding area."

The architects wanted to tackle the lack of interest in the station from the local communities, identified during early consultations, by developing a design narrative that captured the rich history of its surroundings. The new building has been informed by the industrial buildings and canals in the area. The result is a series of new spaces with qualities that generate interest and inspire, as evidenced in the feedback from local school children who have taken note of the artwork embedded throughout the completed station.

There has been a 27 per cent increase in passenger numbers since the station redevelopment, in part due to the growing population locally but also testament to the quality of its design.



### How did it achieve a good design process?

- selection of strong designers who demonstrated how they support the local area
- sustained local authority design management focus
- strong local authority vision for high design ambition

### Value add of the station

- improved community engagement and created sense of pride in local station
- celebration of local character, in particular of industrial and blue infrastructure
- reduced local crime and increased sense of safety
- supported local area regeneration by creating better urban connections

### Recommendations

- appoint designers sensitive to local issues who can draw out local character, ideally working with artists from the outset
- ensure impacts on built environment fundamentally support inclusive local growth
- consider social value impacts beyond civil engineering constraints and buildability sensitivities when making design decisions



## Colin Connect Transport Hub

# Using design to create beautiful places for social and economic value

Asset Type:	Transport Hub
Location:	Dunmurray, Belfast, Northern Ireland
Site Area:	2250 m <sup>2</sup> (including public realm works)
Client:	Department for Infrastructure, Urban Villages Initiative, Colin Neighbourhood Partnership and Translink
Developer:	MEY (Project Manager/Structural Engineer/Landscape) BR Design (Mechanical Engineer) and FORRME (Contractor)
Architects:	Hall McKnight (Architect)
Start-Completion Dates:	2017 – 2019
Level of Intervention:	New Transport Hub
Awards:	RSUA Northern Ireland Building of the Year (2019)
Cost:	£2.382m
Image Credit:	Donal McCann Photography, Urban Villages Initiative



**Growing cities require transport infrastructure to expand, but not all new projects will deliver as elegantly and ambitiously as Belfast's extended bus rapid transit system where there has been a concerted effort to achieve something special for the communities it serves. Colin Connect offers a curious contrast with the opposite end of the line at Dundonald, where a very different building has been delivered.**

Despite the modest scale of the building, the Colin Town Transport Hub has delivered a remarkable impact on the suburban landscape, through the use of a highly sculptured form designed by an award-winning architectural practice. Loaded with meaning by the architects, whilst some of the messages may seem obscure, the result is emphatically beautiful. It has delivered an important step change in a neglected, under invested area with significant anti-social behaviour problems.

The clients included a particularly strong voice from the local community group, Colin Neighbourhood Partnership (CNP), who wanted an iconic building that would signal to their community and beyond that this was a critical initial step towards change for a better future. A masterplan had been prepared involving the same architects, which set the role of the transport hub within the local regeneration agenda. Indeed, the hub would set the level of ambition and design standard for the rest of the masterplan. A key next stage involves the building of a larger community building whose design specification is expected to match the ambition realised in the transport building.





The project budget has been reported as being unusually generous for a building of its size, but it is clearly designed to last with double concrete skin clad in granite. Such focus requires not just effort and commitment by the designers, but also championing from those sitting at the top client and stakeholder table. Specifically, it was the CNP that supported the intention of the designers.

CNP's interest in the design covered the entire building and supported the architect's interior proposals including high quality toilets, as well as its multi-purpose space which was put to great use during the COVID-19 vaccination efforts. The last piece of the jigsaw is the tenancy occupation of the café which remains the Strategic Investment Board's (SIB's) responsibility to secure.

The overwhelmingly positive feedback from the local community is that the project has made a real difference – and the people of Colin feel valued. A survey of 117 hub users following completion found that 98 per cent now feel safe in the area, with 76 per cent reporting an increased sense of community pride<sup>81</sup>. After completion, the Police Service of Northern Ireland reported a marked reduction in

<sup>81</sup> Data provided by CNP.

anti-social behaviour. The masterplan continues to be built out with a new park and school as well as the new major community hub all secured in the pipeline. Crucially, they must all now meet the high design ambitions set by the transport hub.



### How did it achieve good design?

- strong community vision for high design ambition: to create 'something special'
- high anticipation of transformative building in an area of deprivation
- design parameters set and adhered to during earlier masterplan phase of local area

### Value add of the station

- improved community engagement and delivered a feeling of care for local people
- reduced local crime and increased sense of safety
- design standard for rest of wider masterplan raised and set by the transport hub building

### Recommendations

- if expected by local communities, create the condition to allow designers to respond to local sensitivities with 'something special', not just a station
- an uplift to standard costs will be justified if designed to last, especially for a 'gateway' building



## London Bridge Station

# Using design to generate commercial value under significant programme and risk mitigation pressures

Asset Type:	Station
Location:	London Bridge, London, UK
Site Area:	24,000 m <sup>2</sup>
Client:	Network Rail
Developer:	Costain, Arcasis WSP Join Venture
Architects:	Grimshaw Architects
Start-Completion Dates:	2012 – 2018
Level of intervention:	New Station
Awards:	RIBA London Award 2019, RIBA London Building of the Year Award 2019, RIBA National Award 2019, RIBA Stirling Prize shortlist, Architects' Journal Building of the Year 2019, ICE greatest contribution to London award, New London Architecture Awards, overall winner Transport and Infrastructure (sustainability category)
Cost:	£1bn
Users:	63 million entries and exits per year
Image Credit:	Paul Rafferty



The modernisation of London Bridge Station is a large-scale project, within which considerations, complexities and constraints are all scaled up when compared with more modest endeavours.

Such projects require many project management processes to not just be deployed but synchronised across the overall project, including the selection of designers. In the case of London Bridge this was carried out through a commercially-oriented tender process that sought to minimise costs as a priority. The decision is important not just in terms of *what* gets built, but also *how* – the ability to sustain a high level of design ambition throughout the project's design and construction period must come from the design team, working in partnership with the client and stakeholders over a long period.





It would be easy for a project like London Bridge to be consumed by the sheer complexity of the engineering and construction considerations, reducing the focus on other matters such as architectural and experience design. Indeed, a typical anecdote that is heard from such large-scale projects is that architectural design is only a small proportion of the overall engineering endeavour, certainly in terms of construction cost, if not also design time. At London Bridge station, however, it was a design-led decision-making process that resulted in the adoption of the central Y columns holding up the new railway viaduct section, which is an example of the integrated, cross-disciplinary, design approach evident in the completed work. The architects suggested that by adopting the Y (and thereby reducing the number of viaduct columns) the concourse would be easier for passengers to move around without bumping in to one another. They reported that the construction programme was consequently improved, but crucially, they have added visual interest and focus within the generously sized concourse.

The architects recall several similar occasions when aesthetic considerations were not always enough to justify and influence design decision making. Instead designers were obliged to emphasise practical benefits that were likely to be supported and ultimately adopted for construction. While this has led to a successful outcome, a lesson for future projects is to question whether something should be done about the design decision making process that would require architectural design “by stealth” even for the most established of design organisations. How would a more modest, less experienced, designer cope under such pressures?

The effort to increase commercial values has resulted in the creation of the largest retail area of any UK station within the ‘paid-side’ environment – the area contained by the ticket barriers. Coupled with the much simplified and reduced interchange movement for passengers already within the station’s paid-side, the designers report the creation of substantial value from retail revenue. The project has also delivered notable social values especially through the reduction of crime on the station’s perimeter, achieved by the activation of surrounding streets designed into the proposals.



An observation from discussing the project with the architect is that more collaboration could have been possible between the designers of the station and adjacent commercial development, The Shard, had its developer not objected to the station’s planning application. This relationship will have contributed to the way the station and the development now relate with each other as well as the wider neighbouring area. As areas around stations continue to develop and grow, the importance of co-generation of masterplans of the wider station context will intensify. Efforts to build collaborative relationships will therefore become increasingly vital to the successful station projects of the future.



### How did it achieve good design?

- established design organisation (Grimshaw) selected through a commercially oriented competitive tender
- Network Rail acted as strong design client and leader on the project
- high expectations from both client and stakeholders
- clear aim to maximise retail opportunities, especially paid-side retail, by creating large concourses and passageways

### Value add of the station

- increase in commercial revenue: 64 million retail customers across 8,500 m2 of retail space in 2018
- decrease in interchange times for passengers
- activation of surrounding streets

### Recommendations

- consider level of retail-led commercialisation opportunities on paid-side that could be scaled in a station asset with high passenger movement
- allow engineering proposals to be affected by architectural strategies to create positive experiences for customers and other users of the asset



## Køge Nord Station

# Using design to reduce cost and increase connectivity

Location	Køge, Denmark
Owner/ client	Banedanmark
Contractor:	Bladt Industries
Architect:	Cobe
Co-architect:	Dissing+Weitling
Engineering:	COWI
Site area: Station building:	2,250 m <sup>2</sup> . Forecourts and surroundings: 32,000 m <sup>2</sup>
Start-Completion Dates:	2014 – 2019
Awards:	International Association for Bridge and Structural Engineering (IABSE), The Construction Award (2019), Prix Versailles World Finale 2020, Special prize Exterior Passenger Stations (2020), Mies van der Rohe Award nominee (2022)
Users per year:	454,348 in 2020
Image Credit:	Rasmus Hjortshøj – COAST



Infrastructure, especially in the form of civic structures, often directly impacts more people than most buildings. Stations and bridges serve many people every day, adding up to millions over the life of the structure. And yet such impacts, especially those that affect the experience of people, attract less scrutiny through local planning controls.<sup>82</sup>

<sup>82</sup> if they are covered by permitted development rights or, more formally, *Town and Country Planning (General Permitted Development) Orders*. These powers are granted by Parliament and not by the local authority, who can, for any other development plans, whether private or public, require the developers to go through their town planning approval processes including design quality checks.

Køge Nord Station is an example of a structure categorised as a “a bridge”, meaning it did not need to follow typical planning approval processes, nor be subject to the usual design quality scrutiny that such processes usually attract. As a building that straddles the busiest motorway in Denmark, with 100,000 vehicles passing daily on top of the thousands of those using the new Copenhagen-Ringsted line, this ‘non-building’ is surely a more notable part of many people’s lives than any ‘normal’ building in the high street, which would be expected to navigate a comprehensive planning process to get built anew.

A textbook realisation of a multi-award winning structure, Køge Nord bridge provides an inspirational benchmark for any infrastructural intervention whether a building or non-building, and demonstrates the value that can be harnessed by design excellence.





The completed station was born out of a concept design competition. This is not a common route for Danish Railways to select a design team, and demonstrates the importance placed on the project by both Danish Railways and Koge Municipality. Once chosen, the design was then realised very quickly, due to its non-building status with limited opportunities for post-concept changes. The pressures of cost constraint were nevertheless constantly felt. The focus on cost control was evident from the outset – during the competition stage designers were required to demonstrate how their design proposals would meet three incrementally rising levels of brief compliance; from basic to vision to optional levels of requirements. This helped to clarify the compromises which could be taken should the project face serious funding challenges. In the end, however, the full intentions behind the designers' concept were realised in the finished station which opened in 2019.

Despite the impact of COVID-19, the high utilisation of the parking spaces (as part of the park & ride system that is served by the station) would indicate not only are passenger numbers on the increase but modal shift, a foundational tenet for the project, is happening. Furthermore, the wider development of the Koge Nord area is continuing, clearly facilitated by the success of the station, operationally and experientially. Not bad for a non-building.



#### How did it achieve good design?

- clear link made by client between good design and best outcomes (encouraging modal shift through physical and visual impact)
- use of design competition to identify architects, despite not being required
- architects within Danish Rail promoted good designers for the project

#### Value add of the station

- increased modal shift (parking at park & ride is always full)
- connection between communities severed by road and rail
- supported development and growth in vicinity of station

#### Recommendations

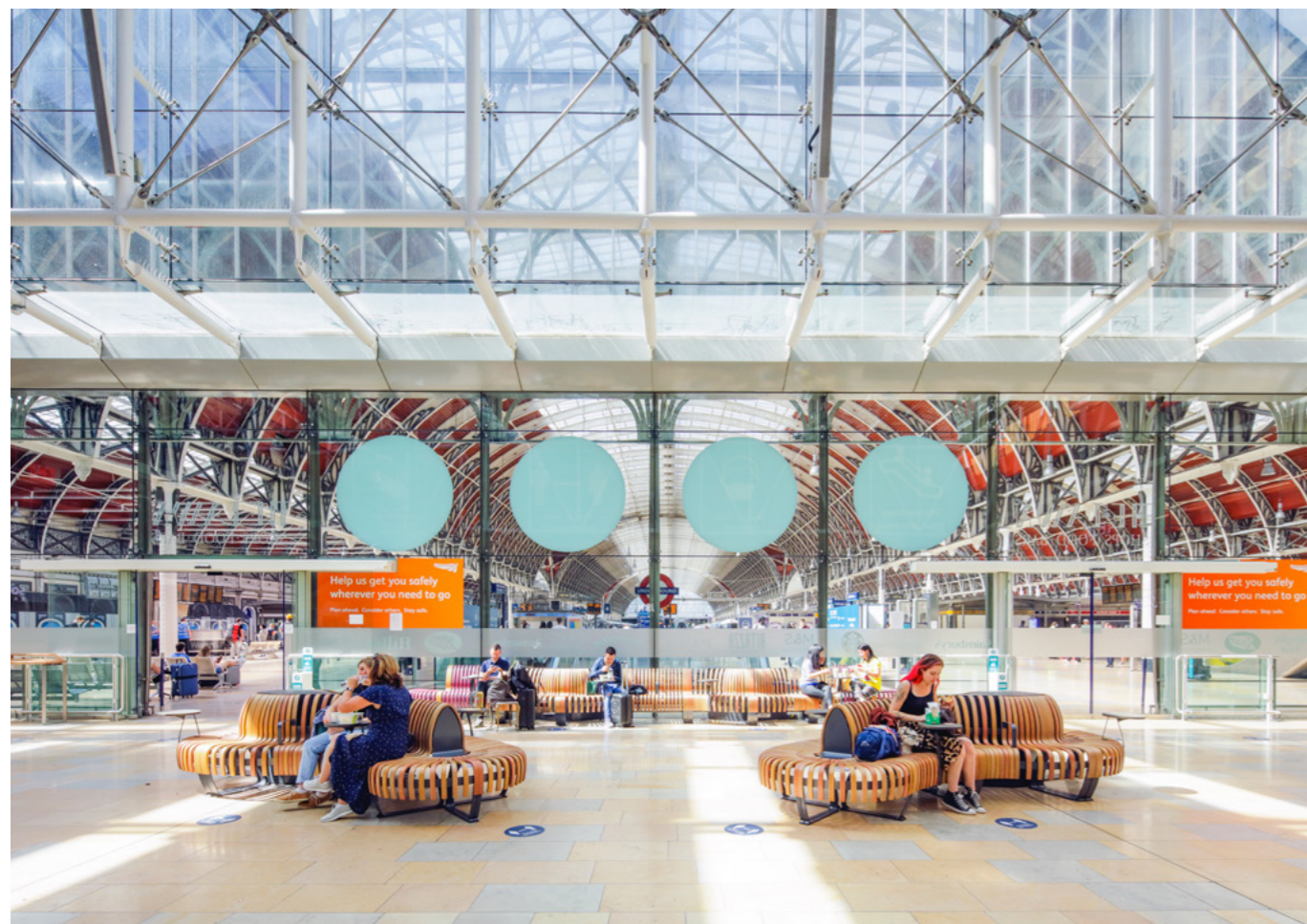
- maximise visual as well as physical impact of good design
- do not accept “ok” but aim for excellence in order to make real change



## Green Furniture

# Using design to create more sustainable rail infrastructure assets.

Asset Type	Station furniture
Location	Six Network Rail-managed stations
Client	Network Rail
Designers:	Green Furniture Concept
Level of intervention:	Amenity
Cost:	Estimated at £1.3m
Capacity:	Increased seating capacity by 30-50 per cent, and more than 100 per cent in larger stations like London Victoria, Waterloo, and Liverpool Street
Image Credit:	Green Furniture



**Stations are hives of activity, connecting places and people to each other. From the 1840s, at the height of the golden era of railway station design, competing network owners would build grander, more ornate, and more innovative stations to win over passengers and secure further investment. ‘Railway Mania’, as it was known, gave us awe-inspiring and long-lasting architecture that still serves passengers today. It is both the desire for beauty and passenger satisfaction, and the impulse to create something sustainable that lasts for generations, that inspires the designers at Green Furniture Concept.**

Network Rail chose Green Furniture to replace metal row benches in six of their London stations. Passenger surveys taken before and after the installation of 269 seats in London Victoria showed an increase in passenger satisfaction from 23 per cent to 80 per cent, while simultaneously increasing capacity by over 100 per cent.

The natural materials are biophilic, which means that humans respond to them as we do in nature: our heart rates slow, our anxiety levels decrease, and we feel more at ease in our surroundings. For railway stations, which can have high volumes of moving people, delayed trains, and other stressors, anything that can improve passenger’s wellbeing is a great benefit. The wood also acts as a natural sound absorber, softening the acoustics in the station. The attractive, inviting and sustainably sourced wooden furniture is also hard-wearing, easy to maintain and clean. Its design is modular and flexible, which means that it can be built to fit the station and works equally well in modern and historic spaces. This was the key consideration of Swedish station management body, Jernhusen. It wanted to create a coherent identity across the network and did so through the installation of every station – even paying for benches in stations it didn’t own.



The furniture stays as new over time, is highly resistant to public wear, and is more maintainable than the steel seating it replaced as, unlike hard-waxed wood, scratches in painted metal cannot be removed. And unlike its predecessors, the wooden benches are fully renewable and use the highest possible percentage of recycled and upcycled content. It is also climate-positive with a tree planted for every piece of furniture installed, which aligns with Network Rail's own strategic mission towards achieving net zero.



#### How did it achieve good design?

- designer's expertise helped visually translate client's ideas and needs, and offer more creative ideas based on experience in other sectors, like shopping centres and airports
- designers brought new considerations to client, explaining how design affects behaviour, and can manage passenger flow
- by creating an equal and collaborative dialogue, Green Furniture and Jehursen now have a long-term ongoing relationship, raising internal standards and expectations around the passenger experience

#### Value add of the station

- more sustainable furniture: climate-positive, circular, re-use of materials, built to last
- increased passenger satisfaction
- 'wow' factor created by interior landscaping – something distinct to the Network Rail brand

#### Recommendations

- work with companies who put sustainability front and centre of their business plan, to show passengers you are committed to making a positive impact on the planet
- include long-term benefits in evaluations for value for money – don't be put off by new ways of contracting services and products such as the circular 'buy-back' business model
- think about the lifecycle of all your products, including how effectively they can be refurbished or re-used





## Glossary

**Design:** is a methodical and deliberate activity that results in change by producing plans, visualisations and proto-types of things, in this case rail assets like stations, bridges and level-crossings. It refers to both the design process (the activity) and the design outputs (the thing designed). Design is here understood as a mindset and skillset that combines critical thinking and creativity. It involves the technical ability to visualise things that don't yet exist and the skills and technical abilities to turn them into buildings, products and places that are beneficial for people and planet.

**Designed asset:** in this report we refer to well-designed assets as assets which have been developed through a design process, perform their function effectively, and are pleasing and easy to interact with by diverse users.

**Externality:** An externality is a cost or benefit that is created by a good or service that is incurred by a third party without their agreement. An example of a negative externality is environmental pollution, which is a cost to society not compensated for by either the producers or consumers of carbon emitting entities.

**Logic Model:** A specific and visual type of *theory of change*, used to interrogate cause and effect between different parts. See '*theory of change*'.

**Social Return on Investment:** a framework for measuring and accounting for a broader concept of value, which includes reduction of inequalities and environmental degradation, and improving wellbeing by incorporating social, environmental and economic costs and benefits. The change is measured in social, environmental and economic outcomes and uses monetary values to represent them. This enables a ratio of benefits to costs to be calculated. For example, where an investment of £1 delivers £3 of social value.<sup>83</sup>

**Theory of change:** A hypothesis of how certain activities and conditions lead to certain outcomes. In this report, we use a logic model diagram to illustrate the cause-and-effect relation between different activities and resources, and how they link together to generate outcomes.

**Value:** Value is something derived from *benefits experienced*, or *harms reduced* by a good or service. We will distinguish between *direct value*, which accrues to the investor almost exclusively and includes exchange, use and image value; and *indirect value*, which is value accrued to external stakeholders in social, environmental and cultural domains.

**Social Value:** the measure of the relevant importance that people place on the changes they experience in their lives. In the context of rail infrastructure, it is created when that infrastructure improves people's quality of life.

**Environmental Value:** is the measure of environmental benefits or costs derived from a product, service or system that relate to the planet, non-human life-forms, and eco-systems. Benefits that fall under this category include increases in biodiversity, carbon capture or reduced emissions, and reduced waste.

**Economic Value:** is the measure of economic benefits that are accrued to the economy as a whole, rather than to individuals or institutions. Benefits that fall under this category include national GVA, increased land-value and development, and improved job opportunities.

**Value-Add:** refers to how the way in which something is done can either enhance benefits or reduce risks or costs. In this report, we focus on how design adds value, or, how working in a design-led way either increases or decreases the total benefits that a rail asset realises (such as the revenue it generates, or the quality of passenger experience it provides).

## Further Reading and Resources

### 1 Report

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WISP Accessibility Strategy – High Level Outline

## 2 Data on case studies

Railway Data Centre website. Station Overview: Bat and Ball.

Railway Data Centre website. Station Overview: Hackney Wick.

ThameslinkProgramme.co.uk, Learning Legacy portal: South East stations see biggest increase nationwide in passenger satisfaction.

Heritage Lottery Fund, 2019, Evaluation Report for Bat and Ball Station.

Heritage Lottery Fund, 2019. Bat and Ball Station redevelopment Evaluation report.

## 3 Frameworks

### a Measuring value, general

Cabinet Office, 2021. Public Services (Social Value) Act

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The B Impact Score.

### b Infrastructure

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### c Social Value

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Environmental Valuation Reference Inventory website

Scottish Forestry, Woodland Valuation Tool

UN Sustainable Development Goals

Life Cycle Assessment (LCA)

GIIN tools (like IRIS)

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CEEQUAL Version 6

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Historic England, Public Value Framework

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## 4 Literature Review and Horizon Scan

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Place Alliance. Research National Housing Audit.



## Appendix 2: Longlist of case studies

### Short list

#### Footbridge

Koge Nord station  
Curving Wood and Steel Bridge  
The High Line

#### Station

Hackney Wick station  
Edinburgh Haymarket station  
London Bridge station  
London King's Cross station  
Bat and Ball station

#### Operational buildings

Jubilee Line Depot

#### Public realm and amenity

Colin Connect  
Green Furniture

### Longlist

#### Footbridge

Chiswick Park footbridge  
NR standardised footbridges  
(including Flow)

#### Track infrastructure (incl. signals, bridges, etc.)

Ordsall Chord  
Sea wall at Dawlish

#### Station

Abbey Wood station  
West Hampstead Thameslink  
station  
White Hart Lane station  
Reading station  
Blackfriars station  
Dartford station  
Dundee station  
Barneveld Nord station  
Lightrail, The Hague  
Crystal Palace, Overground  
Tulse Hill station

#### Operational buildings

West Croydon Bus Depot  
Three Bridges Depot

#### Public realm and amenity

YOTEL Wayfinding  
Legible London  
CityMapper

## Appendix 3: Case study interviewees

#### Hackney Wick

**Design Team:** Adam Brown,  
Landolt Brown, Partner

**Client Team,** Peter Maxwell, LLDC

#### Green Furniture

**Design Team:** Johan Berhin, Green  
Furniture Concept, Co-Founder

**Client Team:** Carina Krovnall,  
Jernhusen Sweden, Director of  
Station Services

#### King's Cross St Pancras

**Design Team:** Katherine Watts,  
John McAslan and Partners,  
Architect

#### Colin Connect Transport Hub

**Design Team:** Alastair Hall, Hall  
McKnight, Partner

**Client Team:** Annie Armstrong,  
Colin Neighbourhood Partnership

#### Bat and Ball

**Design Team:** Simon Sharpe, Theis  
and Khan, Associate

**Client Team:** Linda Larter,  
Sevenoaks District Council, CEO

#### Supershed

**Design Team:** Jim Eyre, Wilkinson  
Eyre, Partner

#### London Bridge

**Design Team:** Mark Middleton,  
Grimshaw Architects, Partner

#### Koge Nord

**Design Team:** Rune Boserup, Cobe.

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