

Buildings and Architecture

Stations and Footbridges...

A Journey by Design

Railfuture
East Anglia

Anthony Dewar
June 2023



Passengers and customers

Network Rail

Board

Chief Executive and Executive Leadership Team

- Passengers
- DFT
- ORR
- National Stakeholders
- Operators
- Funders

Strategic policy unit
Network
Services

Finance
HR
Communications
Technical Authority

Eastern NW & C Scotland's Railway Southern Wales & Western

Strategy

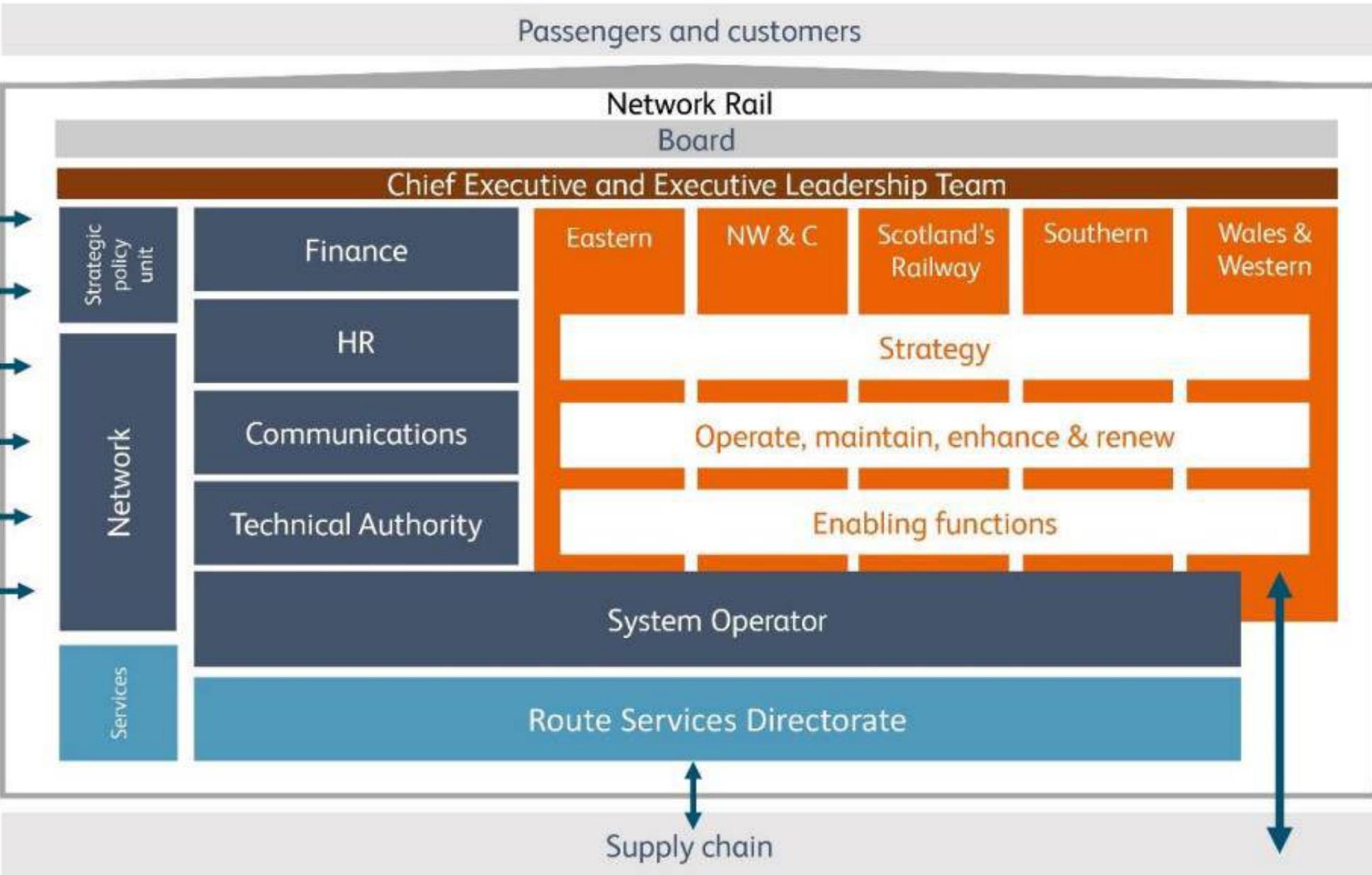
Operate, maintain, enhance & renew

Enabling functions

System Operator

Route Services Directorate

Supply chain



Simplified Organisational Structure



Chief Engineer

Chief Civil Engineer

- Network Technical Head of Structures
- Network Technical Head of Geotechnics
- Network Technical Head of Drainage
- Network Technical Head of Tunnels & Mining
- Network Technical Head of Buildings and Architecture
- Capability Groups
 - Principal Engineers
 - Senior Engineers
 - Engineers



Technical Authority

Technical authority and assurance body. Set the overall direction and corporate strategies for safety, environment, asset management and engineering. Owner of asset policies, standards, risk control frameworks and the innovation / R&D pipelines.

Route Managing Director(s)

Director(s) of Engineering and Asset Management

- Route Asset Manager(s)
(Discipline Specific)
- Senior Asset Engineers
 - Asset Engineers
 - Assistant Asset Engineers

Route Businesses

Owner of route assets with day to day accountability for the safe management of the infrastructure. Plan and deliver inspections, maintenance and renewals of assets in line with corporate policies to achieve agreed objectives.



Network Rail Routes and Regions

- Eastern**
 - 1 Anglia Route
 - 2 East Midlands Route
 - 3 North and East Route
 - 4 East Coast Route
- North West & Central**
 - 5 North West Route
 - 6 Central Route
 - 7 West Coast Mainline South Route
- Scotland's Railway**
 - 8 Scotland Route
- Southern**
 - 9 Kent Route
 - 10 Sussex Route
 - 11 Wessex Route
 - 12 Network Rail High Speed
- Wales & Western**
 - 13 Wales Route
 - 14 Western Route



1825

Stations

We maintain

2,500 stations,

443

of which are listed, and

390

are over 120 years old.

Our maintenance teams respond to

65,000

faults each year, providing

24/7

service to our passengers - that's one call every

7 1/2
minutes

We maintain

400,000m²
of glass roofs, that would glaze

17,000

domestic green houses

Our combined roofs cover

6.3 Million m²,
enough to cover

250

Eden Projects

We maintain

18,000

lineside buildings across

16,000km

of rail, so in total one building every

780m

Footbridges

We manage

1450

footbridges, end to end these would span the English Channel. That's

95,000

steps climbing over

17km

or twice the height of Mt Everest

Lighting & Equipment Columns

We have over

100,000

columns - stacked end on end these would rise

800 km

- that's twice as high as the International Space Station!

Platforms

We have approximately

5500

platforms - laid end to end these stretch

888km

Set off early, at a brisk pace it would take you

24 days

to walk the length!

That's around

740,000

coping stones on the platform edge, if stacked carefully these would fill

16

Olympic Swimming Pools

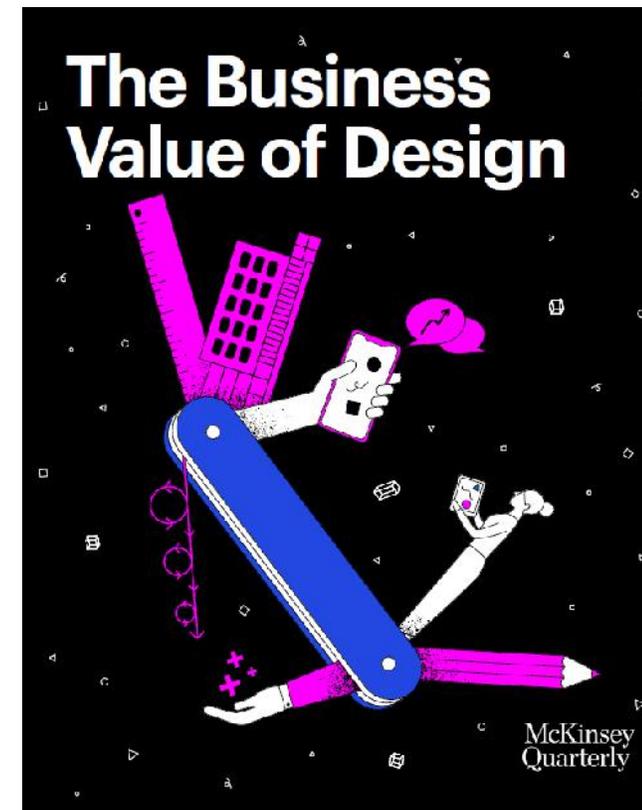
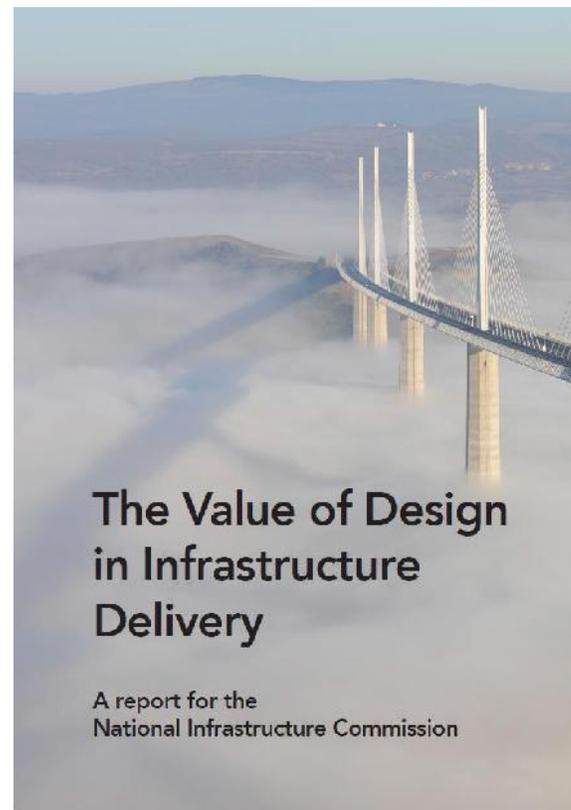
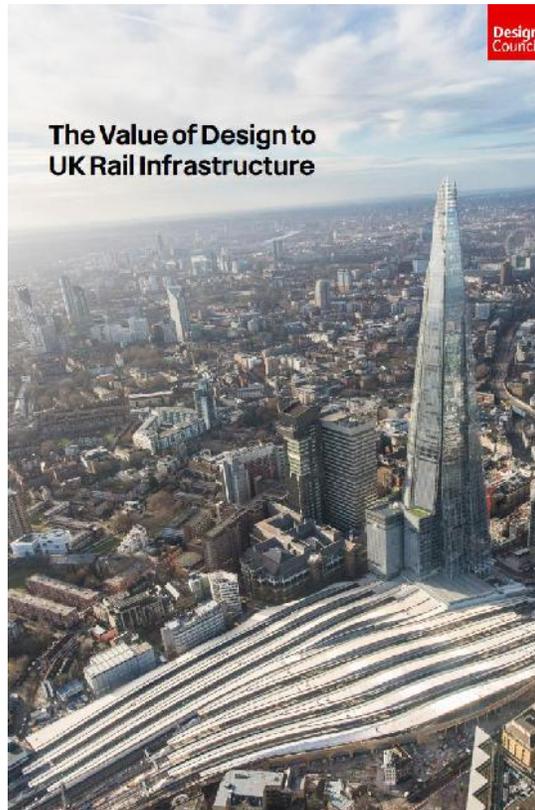
There are

1.4 Million m²
of canopies - this could provide shelter for a line of people

360km long

DESIGN MYTH BUSTING

The Design Task Force has identified confusion among those delivering national infrastructure projects about the meaning of good design and, despite all the evidence to the contrary, a deep-seated perception that good design adds cost and poses risks to delivering projects on time and on budget.



Providing a clear 'Line of Sight' to ensure resilient outcomes



1. Identity
2. Passengers
3. Community Focused
4. Collaborative
5. Inclusive
6. Connected
7. Contextual
8. Enhancing Heritage
9. Innovative
10. Environment

NATIONAL INFRASTRUCTURE ASSESSMENT

The National Infrastructure Assessment

The Commission's plan of action for the UK's infrastructure
over the next 10-30 years

The recommendations included:

- Nationwide full fibre broadband by 2033
- Half of the UK's power provided by renewables by 2030
- Three quarters of plastic packaging recycled by 2030
- £43 billion of stable long term transport funding for regional cities
- Preparing for 100 per cent electric vehicle sales by 2030
- Ensuring resilience to extreme drought
- A national standard of flood resilience for all communities by 2050.

NATIONAL
INFRASTRUCTURE
COMMISSION

July 2018



National Infrastructure Strategy

Fairer, faster, greener



HM Treasury

November 2020

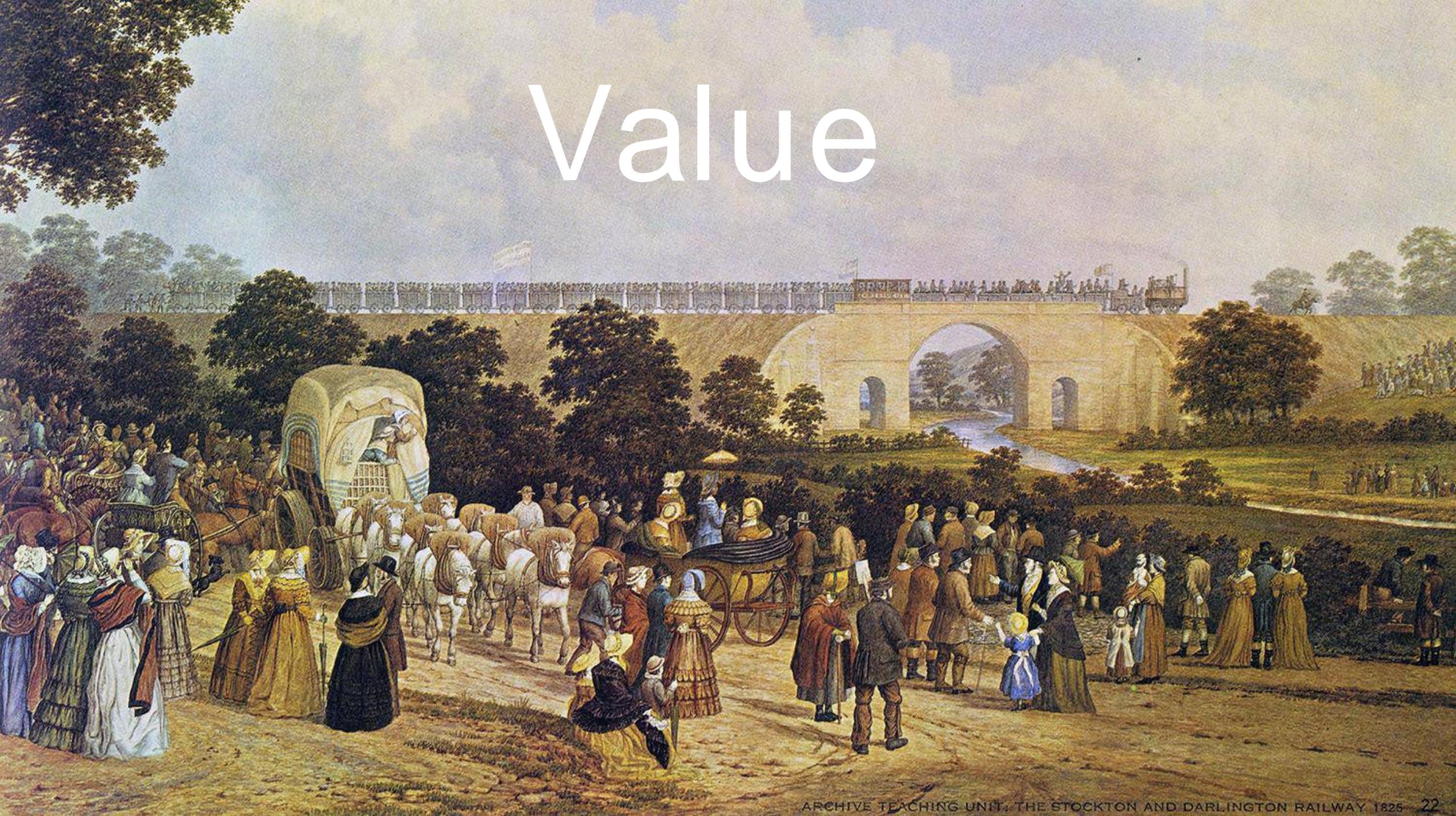
Designing high-performing and beautiful infrastructure

The government wants the planning process to stimulate proposals that are well-designed and will enhance the environment, health and character of local areas. As outlined in *Planning for the Future*, the government wants to better incentivise good design and high-quality homes and infrastructure, which should be a central tenet of the planning system and planning decisions.

Good design is also an essential element in securing high performance of infrastructure from the start. In line with the design principles set out by the National Infrastructure Commission (NIC), **the government is committed to embedding good design in all infrastructure projects through:**

- Local plans which set clear rules rather than general policies for development, so that quality cannot be negotiated away nor can the lived experience of the consumer be ignored too readily;
- A reformed planning system which brings forward a new focus on design and sustainability in national policy and practice, building on the *National Design Guide* published in October last year, with a consultation on the proposed *National Model Design Code* later in 2020; and
- Requiring all infrastructure projects to have a board level design champion in place by the end of 2021 at either the project, programme or organisational level, supported where appropriate by design panels.

Value



WHAT IS THE VALUE OF DESIGN?



Customer Experience
User experience



Social value
Beyond users to
wider community



Placemaking
Identity of place
and wider context



Capital Cost
Investment up to
bringing project into
operation



Whole Life Cost
Maintenance
and operation



Environmental
Carbon footprint
and sustainability

What is Value to a Rail Passenger

- Network Rail own and manage some of Britain's biggest and busiest stations...
- Our 20 managed stations – includes Birmingham New Street, Manchester Piccadilly, Edinburgh Waverley, Glasgow Central, Leeds, Bristol Temple Meads and 11 in London.
- (Pre covid) Over 850 million passengers passed through our managed stations each year...
- Putting that in context:

Countries in the world by population (2018)

This list includes both **countries** and **dependent territories**. Data based on the latest *United Nations Population Division* estimates. Click on the name of the country or dependency for current estimates (live population clock), historical data, and projected figures. See also: [World Population](#)

Search:

#	Country (or dependency)	Population (2018)	Yearly Change	Net Change	Density (P/Km ²)	Land Area (Km ²)	Migrants (net)	Fert. Rate	Med. Age	Urban Pop %	World Share
1	China	1,415,045,928	0.39 %	5,528,531	151	9,388,211	-339,690	1.6	37	58 %	18.54 %
2	India	1,354,051,854	1.11 %	14,871,727	455	2,973,190	-515,643	2.4	27	32 %	17.74 %
3	U.S.	326,766,748	0.71 %	2,307,285	36	9,147,420	900,000	1.9	38	83 %	4.28 %
4	Indonesia	266,794,980	1.06 %	2,803,601	147	1,811,570	-167,000	2.5	28	54 %	3.50 %
5	Brazil	210,867,954	0.75 %	1,579,676	25	8,358,140	3,185	1.8	31	84 %	2.76 %



What do 21st century passengers want?



Access Information Facilities Environment

Maximising Social Value from Infrastructure Projects





“The station includes state of the art facilities which have transformed the customer experience and enabled people to travel”

Pat Cox, Northern Rail



Passenger numbers have increased by **11.5%** yearly since 2014

- Footfall increased by **12%** in the first year after the station redevelopment – this was before the new Todmorden curve service which has further contributed to the increasing passenger numbers
- Across the same period, passenger numbers have fallen yearly by -9.5% at Burnley Central and by -6.2% at Burnley Barracks



Passenger satisfaction improved from an average score of **54%** (2012) to **75%** (2015)

Station satisfaction metrics in Wavelength scored 82% (2019/20)



The increase in car parking from 5 to **50** spaces has resulted in mode shift to rail, with people no longer completing their journeys solely by car

A second phase of work is currently underway to further increase car parking capacity to 70 spaces

The provision of car parking metric in Wavelength scored 87% (2019/20)



Landscaping improvements which included removing Japanese knotweed and creating a community green space



The investment delivered a community room which hosts apprenticeship training and skills training for people of all ages



The station has facilitated the overall regeneration of the town attracting more businesses and raising property prices



9.7% yearly growth in house prices in residential areas within walking distance to the station since 2014

In comparison, across Burnley, there was a yearly increase of 5.1%



3.5% yearly growth in the number of enterprises near the station and town centre since 2014

In comparison, for the same areas pre-investment, there was a yearly decline of -0.4%



3.7% increase in tertiary jobs in the immediate vicinity between 2015 and 2018

In comparison: Across Burnley there was a fall in tertiary jobs of -2.8%



Antisocial behaviour in the immediate area has reduced by **22%** compared to 2015 levels



The works supported an increase in developments in the station catchment: increasing from **3** per annum (2011-2013) to **39** per annum (2014-2016).



Burnley's regeneration and improved accessibility has facilitated the growth of the University of Central Lancashire's second campus in Burnley

Abergavenny



Berney Arms



Berney Arms

Norwich

150231

DESIGN LEGACY...

News Gazette and Herald Columnists Local Wiltshire Sports Awards In Your Town

28th August 2016

New railway station bridge in £3m revamp needs work after just 8 months

Stefan Mackley




Homeowner's fury after two 'monstrous, military-style towers' built at bottom of garden - in the WRONG place

Andy Wells, 37, lives in a flat in Marbury, says the towers loom over his property - part of a new £7.5m residential development in the area.

Share Facebook Twitter LinkedIn YouTube Comments



News Bromley Bexley Greenwich Lewisham Dartford & Swaleley National Business Education

19th September 2014

Network Rail dramatically abandons Grove Park station lift plan after torrent of objections

Mark Chandier @Mark_Chandier deputy news editor



Councillor Suzannah Clarke and Karen Galloway

Free courtesy car and guaranteed repairs with Go Girl car insurance? GET A QUOTE Visit: www.go-girl.co.uk

Most popular Most commented

News Bromley Bexley Greenwich Lewisham Dartford & Swaleley National Business Education

7th April 2015

Network Rail embarrassed as wheelchairs not able to fit inside New Eltham railway station disabled toilet

Jamie Micklethwaite @jamieornick reporter



(3) View gallery

Renault Specialist
"Main dealer experience at a fraction of the cost!"
We can:
• Service and repair your Renault to main dealer
• Minor services from £140

News

10th October 2015

Railway footbridge plans rejected due to "excessive scale"

By Jim Dunlop



Police Say To Carry This
Police say everyone should carry this new safety device that protects against attackers.

Most read Commented

1 13-year-old boy who went missing while on school trip to Moors Valley found

13 comments

Evening Telegraph

Perth station footbridge nominated for carbuncle award

By Evening Telegraph Reporter
19 January 11:20 AM GMT+0



send us a story Sign up to our daily newsletter

SPONSORED: Beware, beware, a whole host of benefits to people of all ages - Evening Telegraph
Uma thought of a gift for older people, built a business to provide the people of 85+... with some useful advice.
Beverly Dwyer, Perth

A footbridge installed as part of a 3.8 million upgrade of Perth railway station has been nominated for a Carbuncle Award.

The structure is in the running for the 'Carbuncle' category, which recognises the worst planning decisions.

LATEST
Ulster set for 'equilibrium' despite not yet out of recession
Korean actor Yoo Ji-tae to be sent to jail
Freak on wheels: Liverpool's perfect pitch for Chelsea
Formerly top national England manager Scotty's a pro-Russia
A meeting will be held to discuss the latest news.

Call for major improvements to Hove Station Footbridge





Architect David Kemp, a range of local businesses and residents is calling for more substantial work on the bridge which has fallen into an appalling condition. An interim scheme designed for the improved footbridge and the Highwood Road of Dover has collected the vote of 10 signatories, calling for funding for a new bridge. The footbridge is the major north-south pedestrian link, but is poorly maintained and in the absence of lifts, other road users find it unusable for wheelchair users, totally inadequate for people with disabilities and grossly inconvenient for people with luggage, heavy shopping trolleys etc.

Sign our petition

No lifts in Ludlow station upgrade. No fully accessible taxi in town. We should stop treating the disabled as second class

Posted on 16 August 2015 by amyhughes



Restored footbridge, Ludlow Station. Work resumed from 10am on 14 July 2015.

Major works are underway at Ludlow station. The scheme is to put a temporary footbridge in place while the old footbridge is repaired along with the steps leading up to it. There are no plans to install lifts for those who are disabled or have limited mobility. A couple of weeks before, Shropshire Council refused a licence for the only fully disabled access taxi in Ludlow because it did not meet the Euro 5 standard. You can't get into a Ludlow Town Council meeting if you have severe mobility problems.

In Shropshire, the disabled remain second-class citizens. We must change this.

Spot the difference...



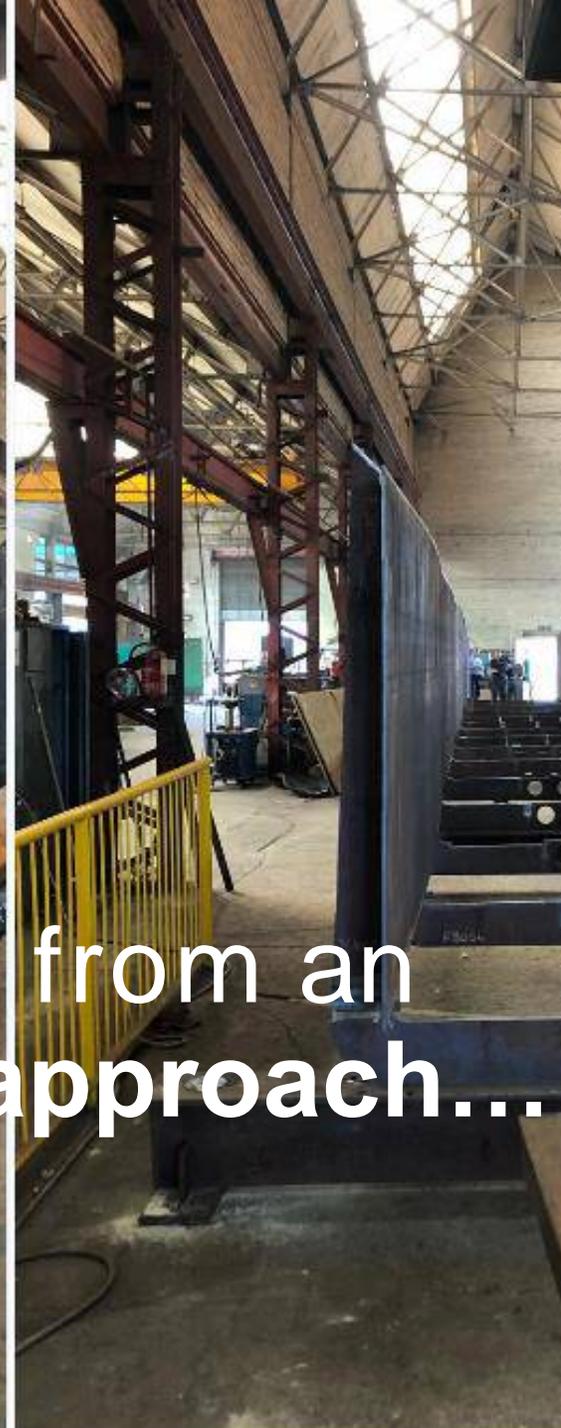
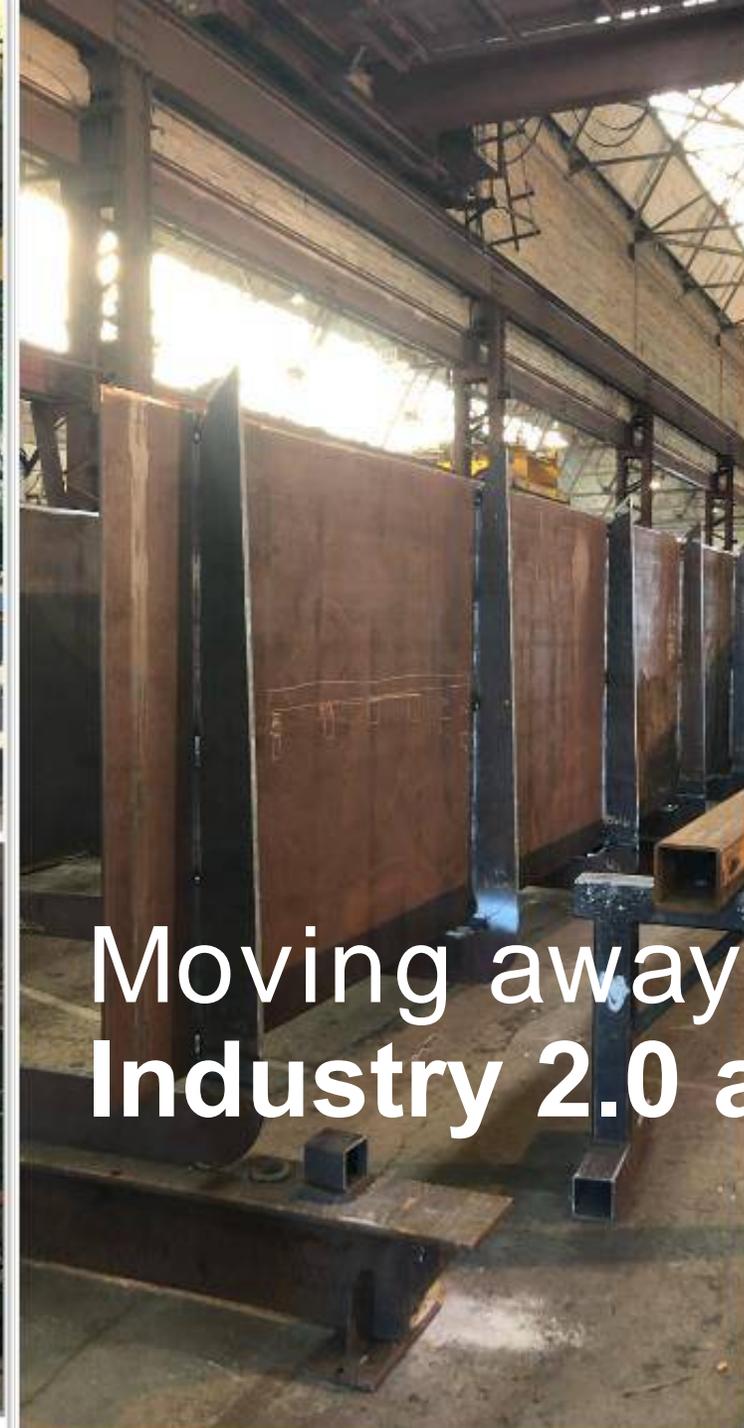
Constructed in 1969



Constructed in 2016

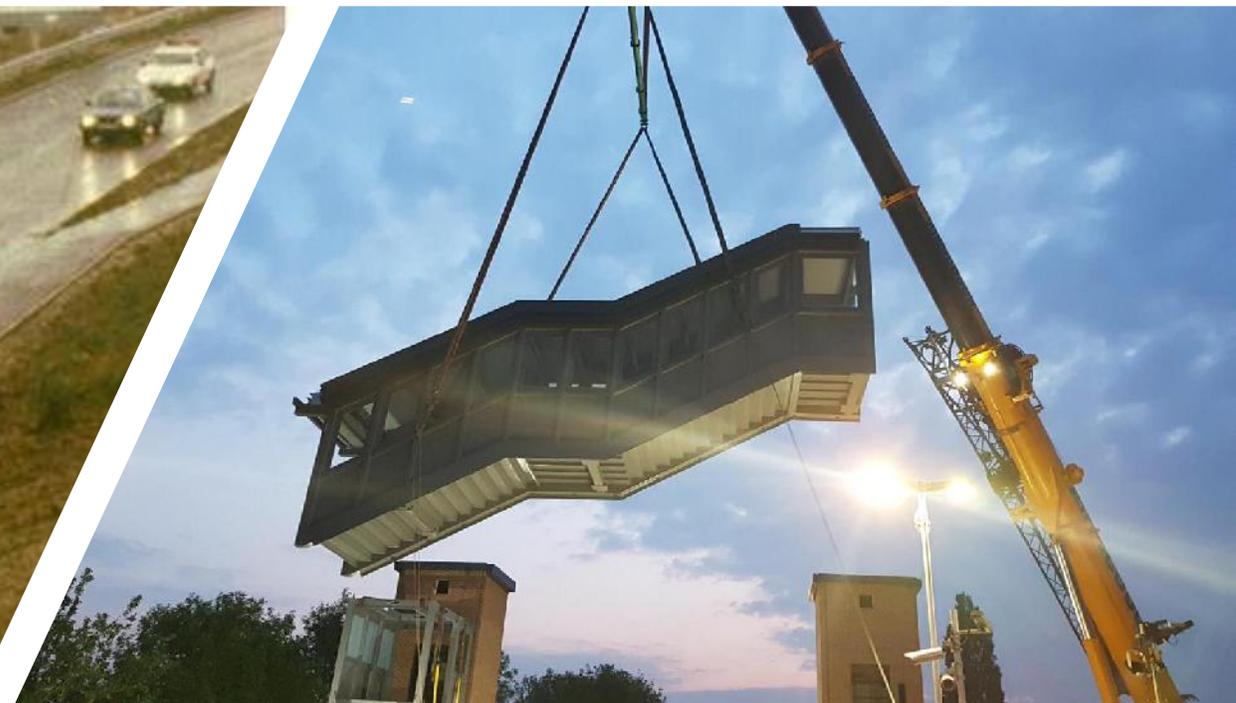


What do our passengers think in 2021?



Moving away from an Industry 2.0 approach...

Stuck in a
time warp...

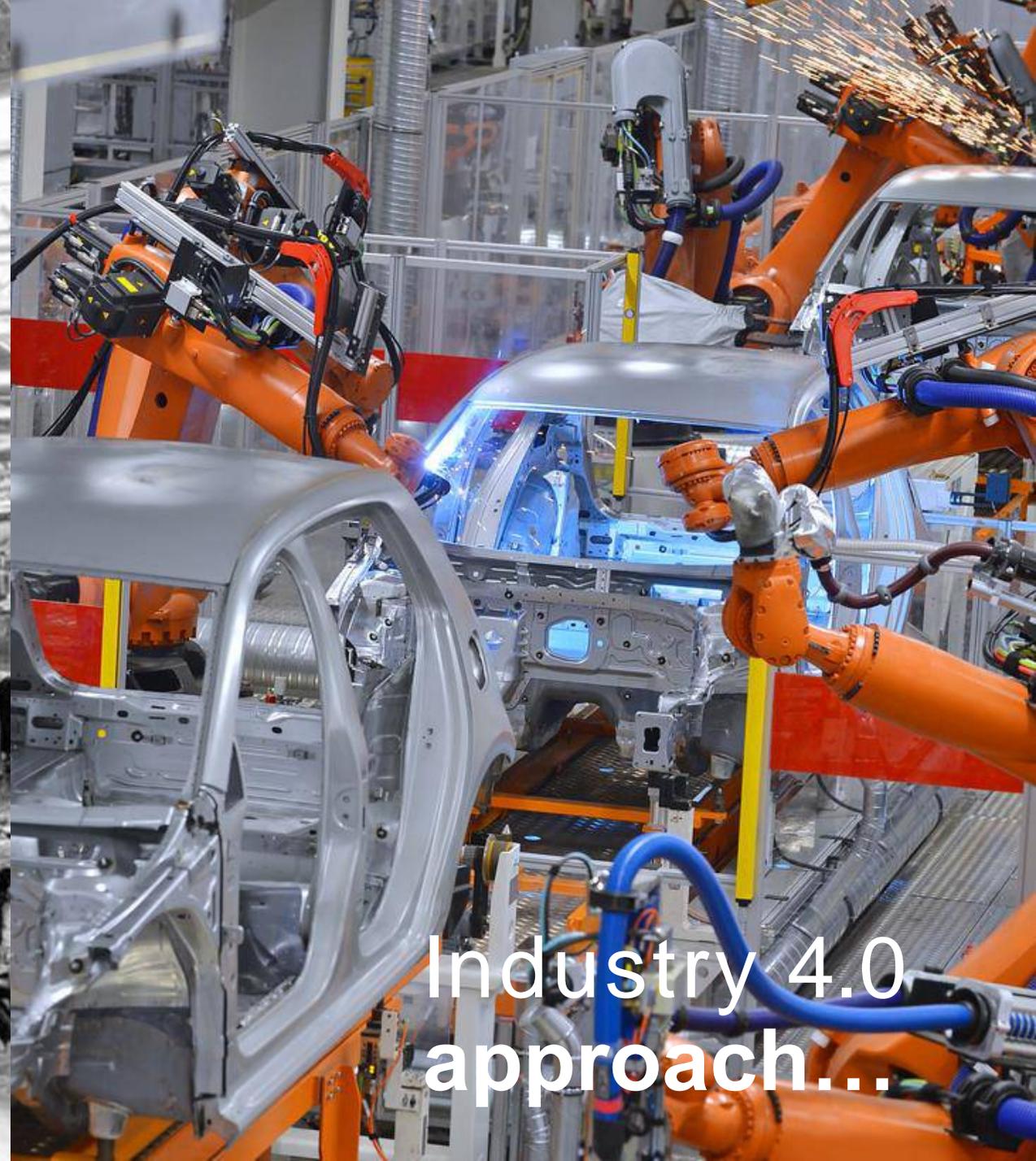




Looking at
other
industries...



1908
Ford Model T



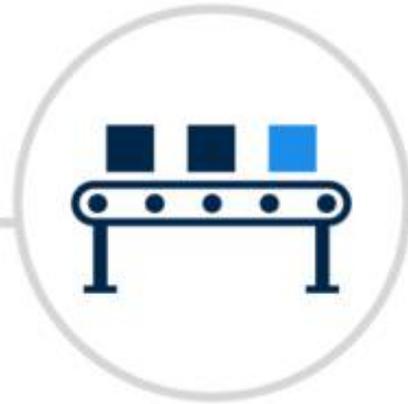
Industry 4.0
approach...

The Four Industrial Revolutions



Industry 1.0

Mechanization and the introduction of steam and water power



Industry 2.0

Mass production assembly lines using electrical power



Industry 3.0

Automated production, computers, IT-systems and robotics



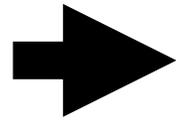
Industry 4.0

The Smart Factory. Autonomous systems, IoT, machine learning

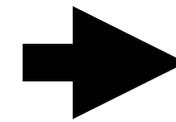
Striving for Industry 4.0...



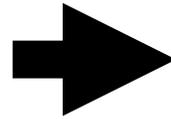
1980's



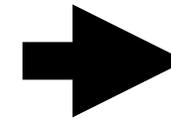
2020



NextGen



Frame
Beacon
Ribbon



AVA
Futura



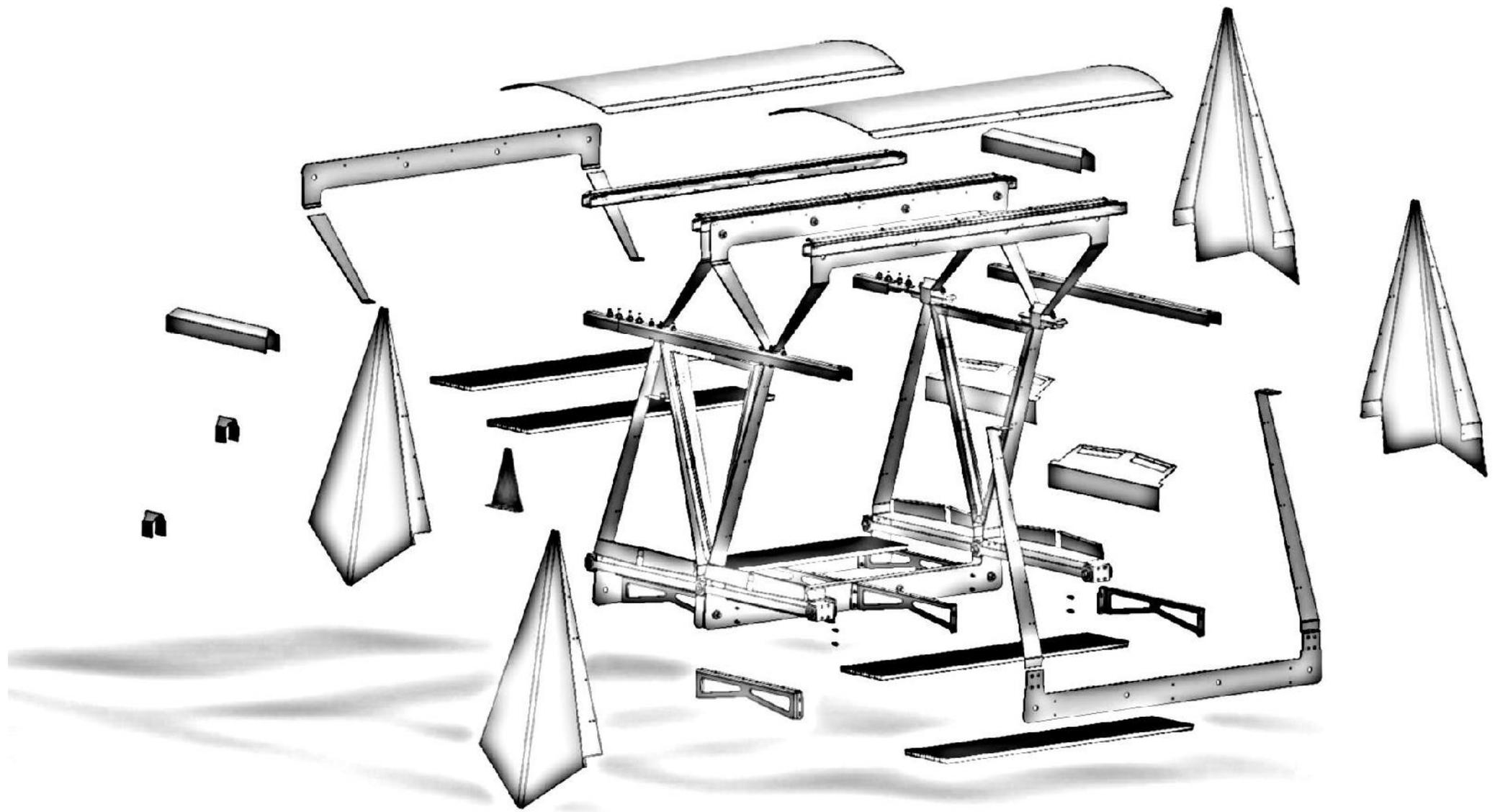


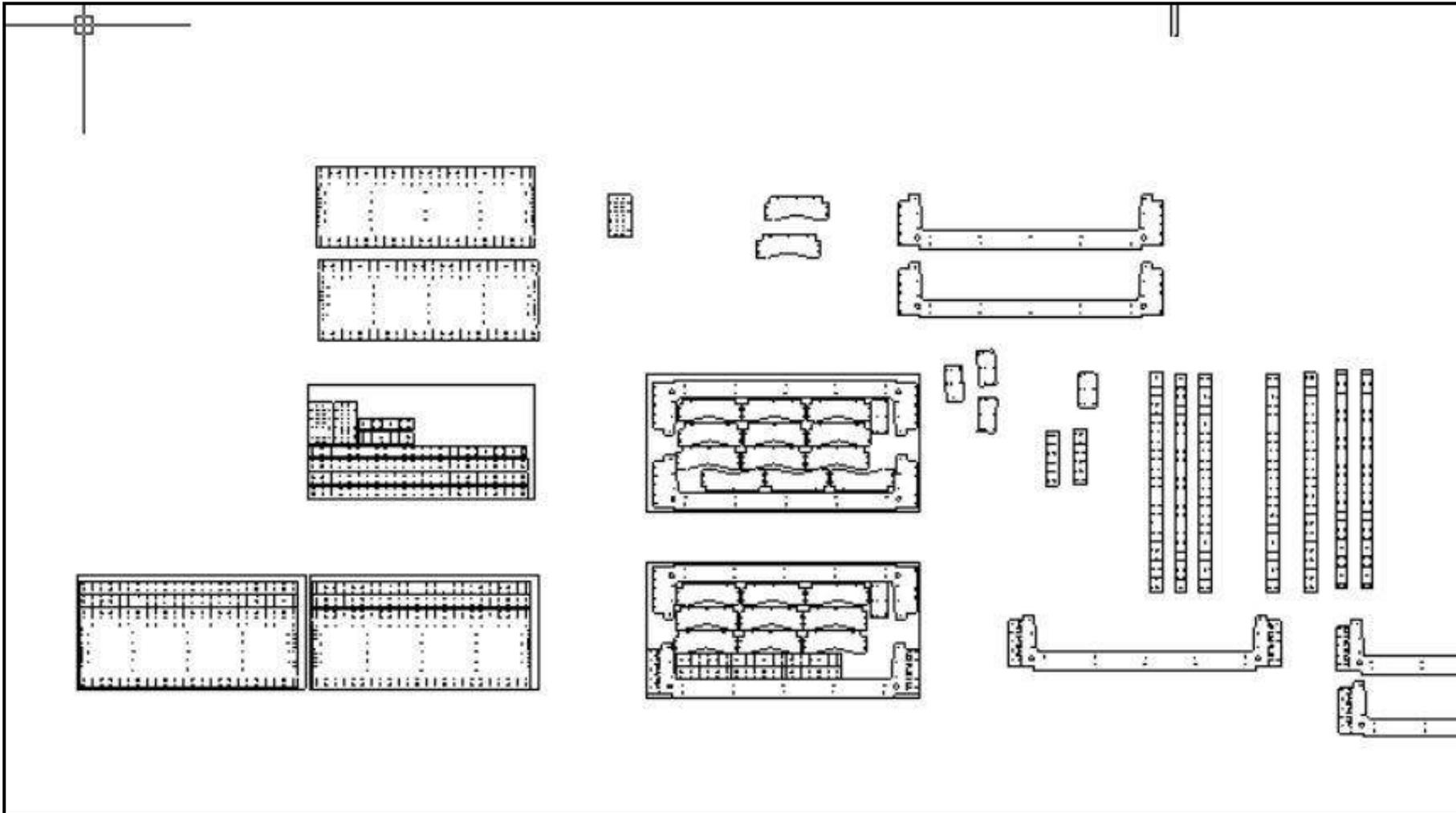


Widmerpool
Widmerpool

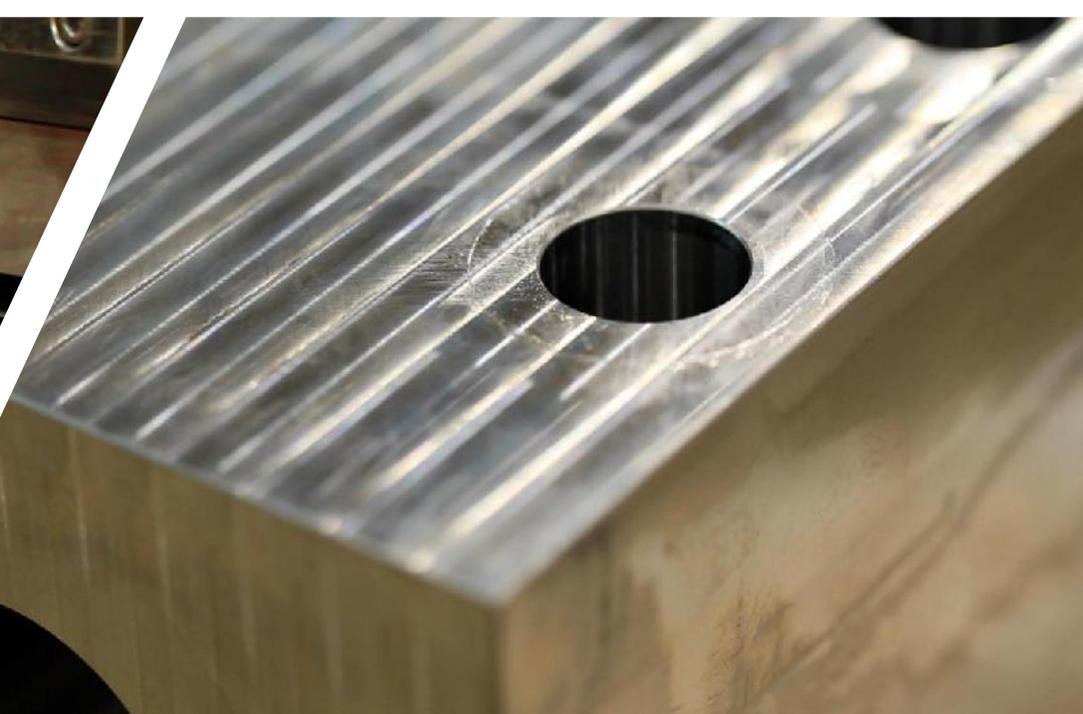
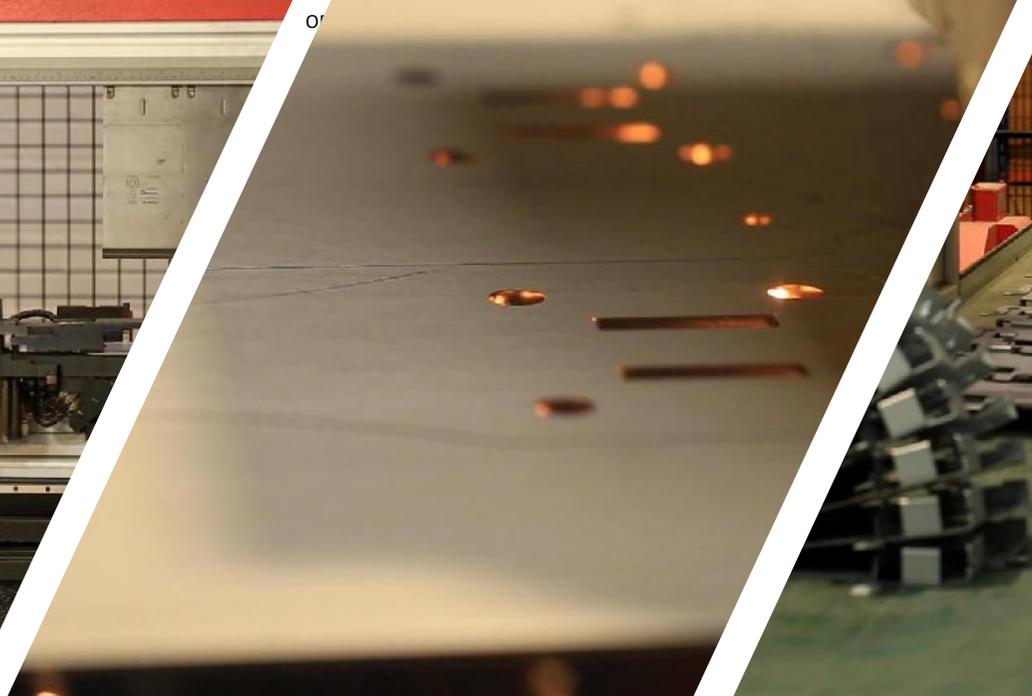
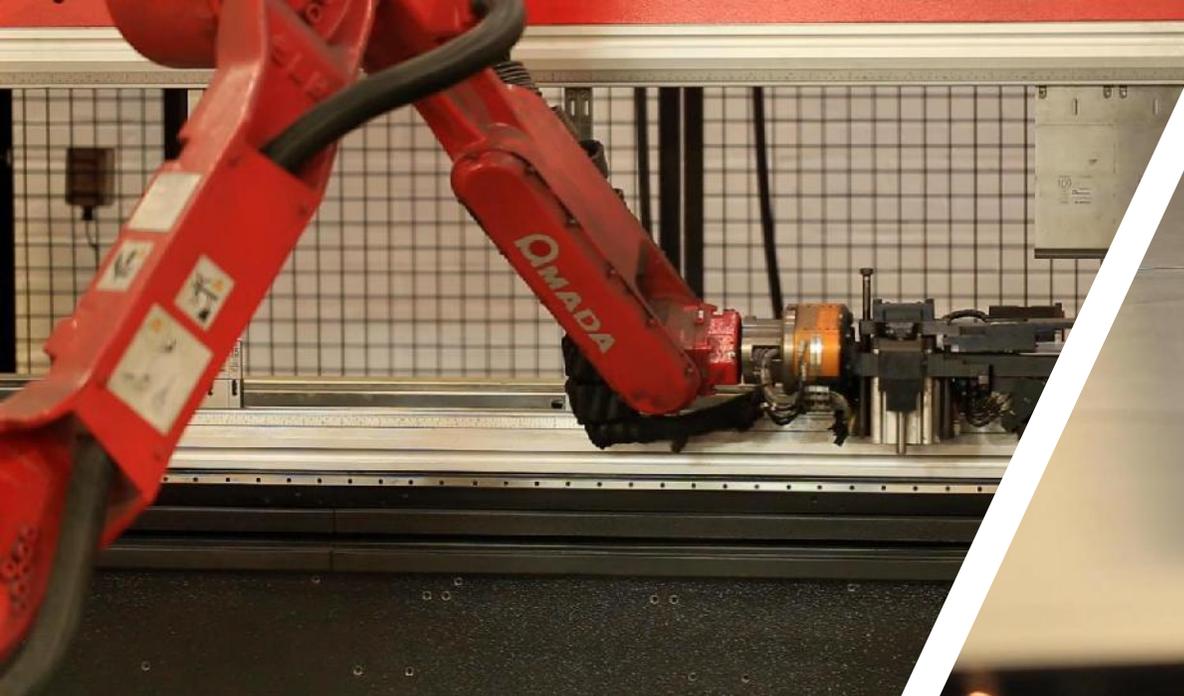
Widmerpool
Widmerpool

One Digitally Driven Manufacturing System





Stainless sheet utilisation: minimal waste: minimum CO2e



App Store Preview

Open the Mac App Store to buy and download apps.



ARki 4+

Experience Architecture in AR

Darf Design LTD

Designed for iPad

★★★★★ 4.6 • 44 Ratings

Free • Offers In-App Purchases

Screenshots [iPad](#) [iPhone](#)

Create new realities

Create full scale augmented reality experiences and save them to location.



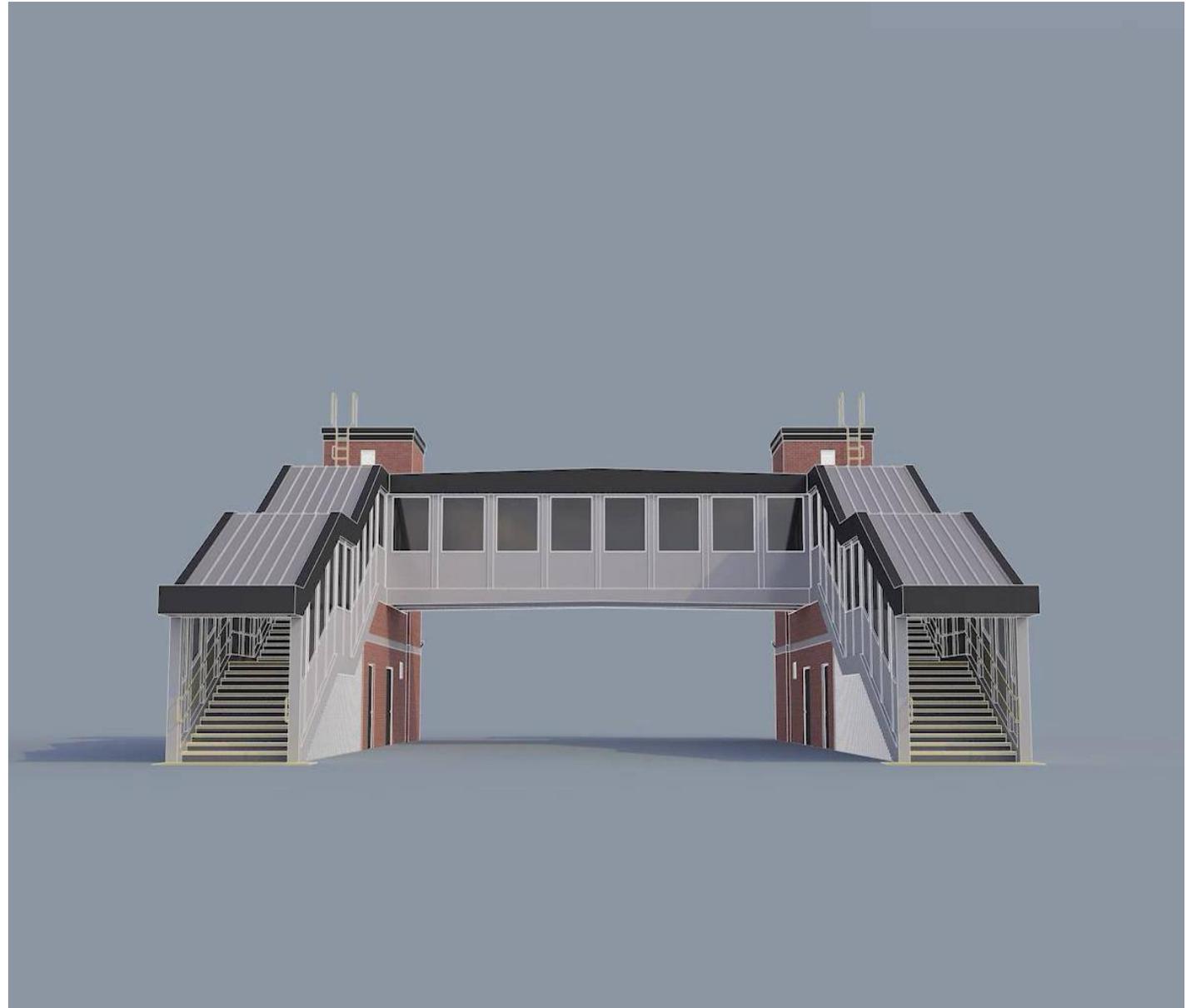
ARki plays nice with friends

Import OBJ files from your favourite 3D softwares

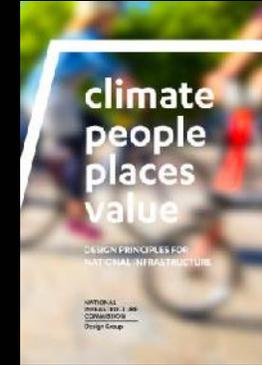


Peel back the layers

Peel back each layer with interactive layers.



Standards & Guidelines – Document Hierarchy



NR Design Principles (Board Support)



Design Principles
for National
Infrastructure

National Infrastructure
Commission
Design Group

NR Design Guidance (Advisory)



NR Design Standards (Mandatory)

'Open Source' Network Rail Design Manual Suite

Design Advice Panel
Station Design Guidance
Heritage
Public Toilets
Wayfinding
Footbridges & Subways
Inclusive Design
Office Workplace DNA
MDUs
Redundant Signal Boxes
Station Capacity
Vertical Circulation
Station Amenities
Security
Urban Realm
Mobility and Parking at Stations
Climate Action Manual
Masterplanning
Design Index
3rd Party Car Parks
Station Investment



Incoming...

Components & Fixtures
Lighting & Acoustics
Fire
Tactiles

Regional Design Champions

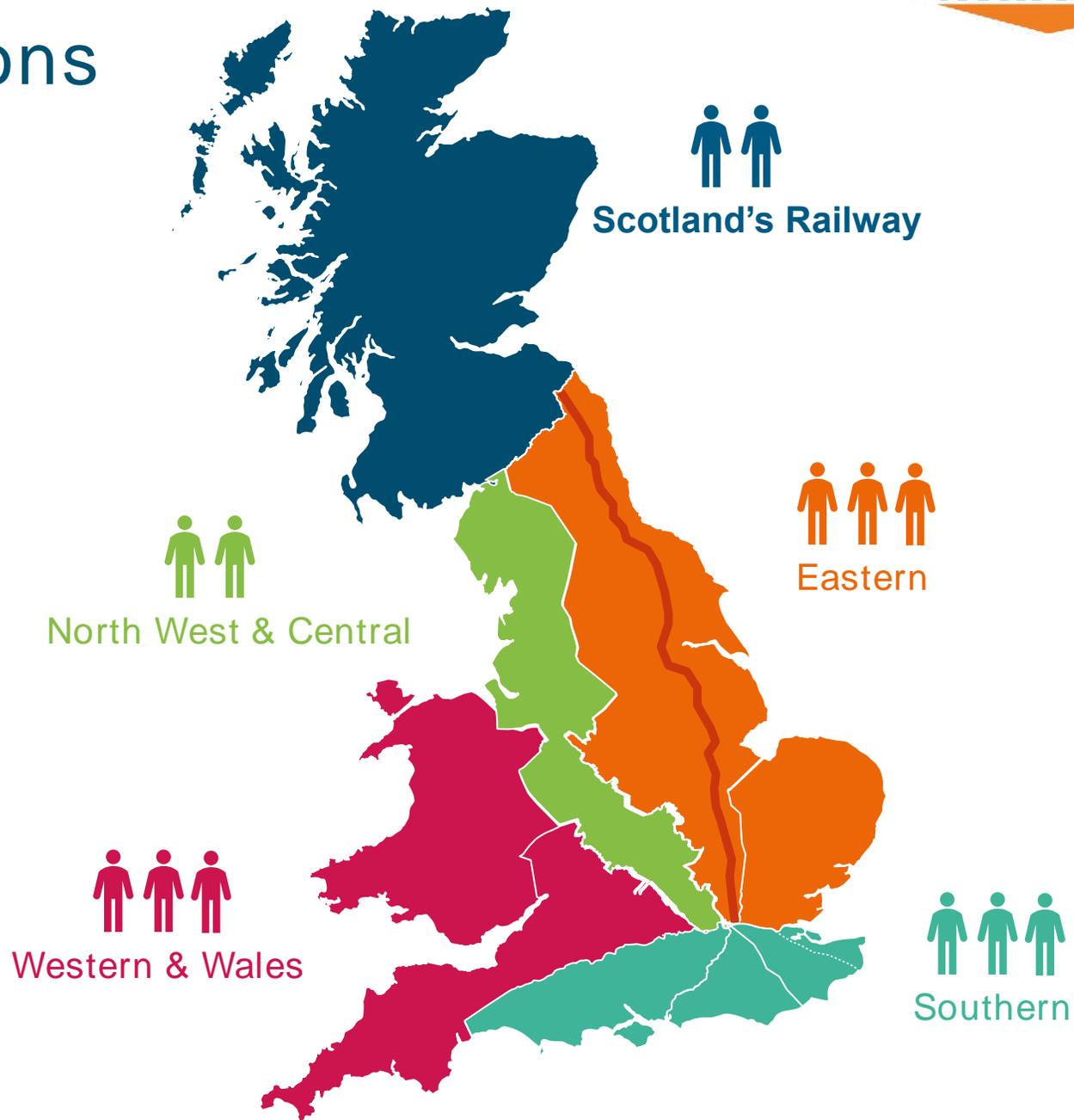


Regional Design Champions



Design Advice Panel (DAP)

- Chair / Lead Advisor
- Industry Expert 1
- Industry Expert 2
- Industry Expert 3
- Industry Expert 4
- NR Observer



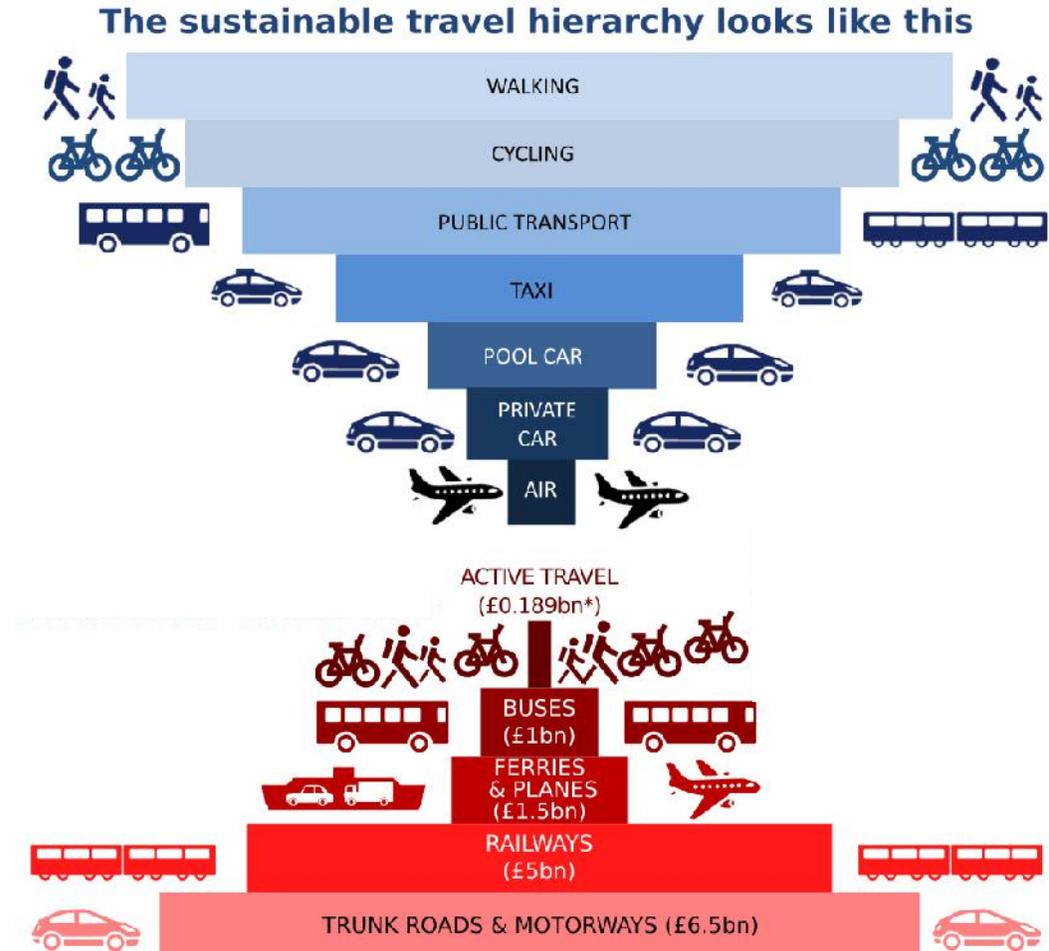


Climate

Investing in the right project

“Potential to deliver net zero should be fundamental to decision making on planning infrastructure investment.”

State of the Nation 2020: Infrastructure and the 2050 Net Zero
Institution of Civil Engineers



Sustainable travel hierarchy graphic and infrastructure spend numbers from
Scottish Government National Transport Strategy, January 2016
* Active travel spend pro-rata for period 2011-15, which may be an over-estimate

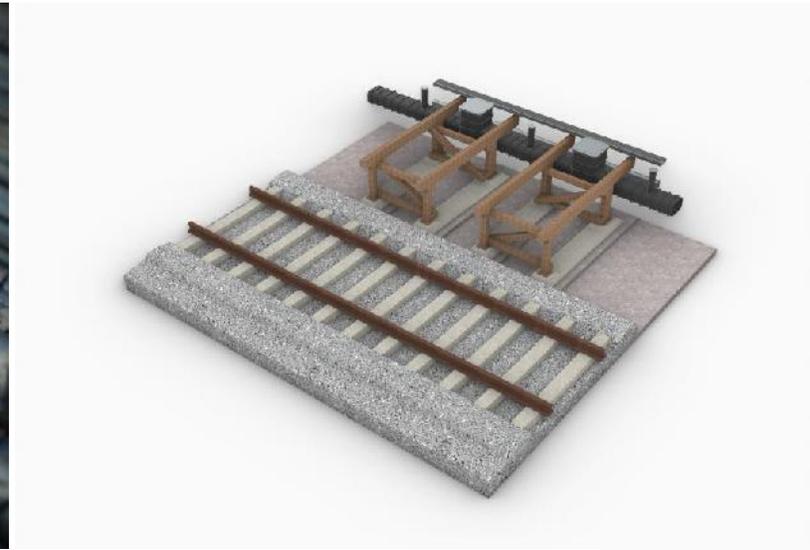
Designing out embodied carbon



Design optimisation



Change design standards



Transformative zero carbon design



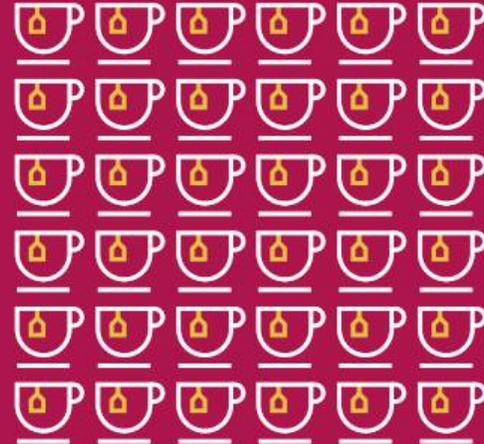
The CO2 in Network Rail's copers could make a lot of tea



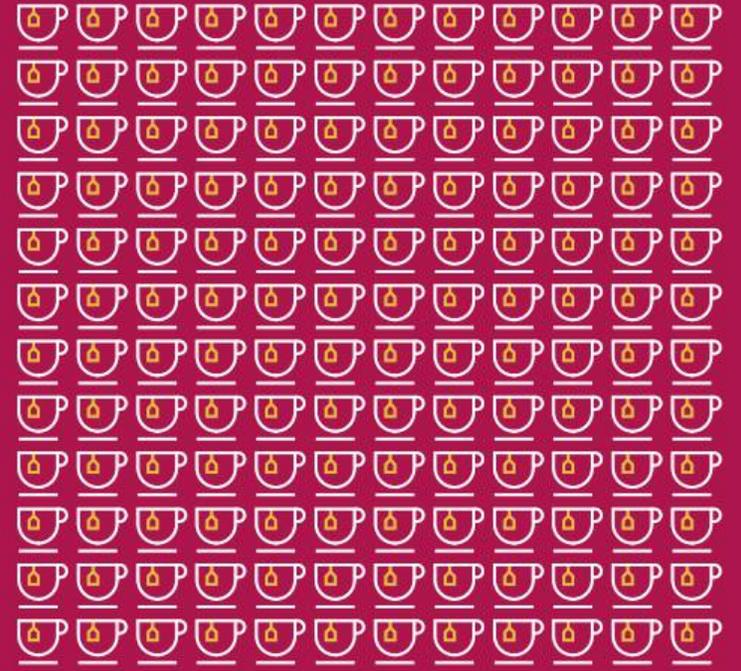
200 teas



716,981 teas



358,490,566 teas



1,792,452,830 teas

1 coper
0.0504t

1 station*
38t

1 region*
19,000t

The UK*
95,000t

Unit: CO2e/m2

*Estimate from a station with a 160metre platform

Standards & Guidelines – Document Hierarchy



NR Design Principles (Board Support)



NR Design Guidance (Advisory)



NR Design Standards (Mandatory)

NR/GN/CIV/100/04

Climate Action Design Manual For Buildings & Architecture



Design Manual
NR/GN/CIV/100/04



100/

04

Climate Action
Design Manual
for Buildings
and Architecture



Whole Asset Life Cycle Emissions



Manchester Oxford Road Station
© Copyright Giles Rocholl
Photography

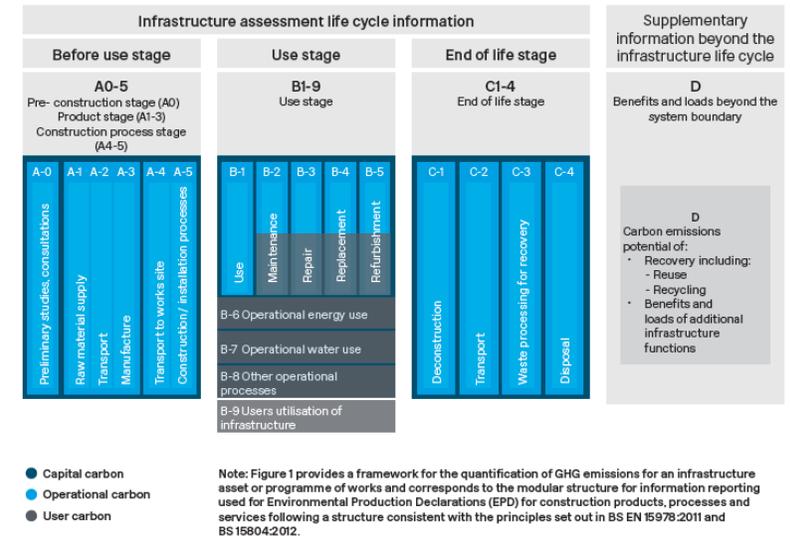
1. Introduction 1.1 Whole asset life cycle emissions

1.1 Whole asset life cycle emissions

Network Rail is committed to being a Net Zero Carbon organisation by 2050, with an Environmental Sustainability Strategy that lays out a roadmap of action. Network Rail is also in the process of setting a Science-Based Target (SBT), an emissions reduction target aligned with the Paris Climate Agreement. This means that all projects must take action now. That requires emissions from all activities to be reduced as far as is reasonably practicable, with the residual emissions offset. To ensure projects consider all emissions sources they influence, they should adopt a whole asset life cycle emissions approach.

Whole asset life cycle emissions are taken to be the emissions associated with the design and construction, operation and maintenance, and deconstruction and disposal of an asset, Figure 1.

Figure 1. Asset life cycle stages used for carbon accounting. Source: PAS2080:2016 Carbon Management in Infrastructure, BSI 2016



“Where do I go to get the big picture on station planning, and sustainable design?”



Operational and capital carbon reduction strategies

2. Guiding principles

2.5 Emissions reduction hierarchies sequencing

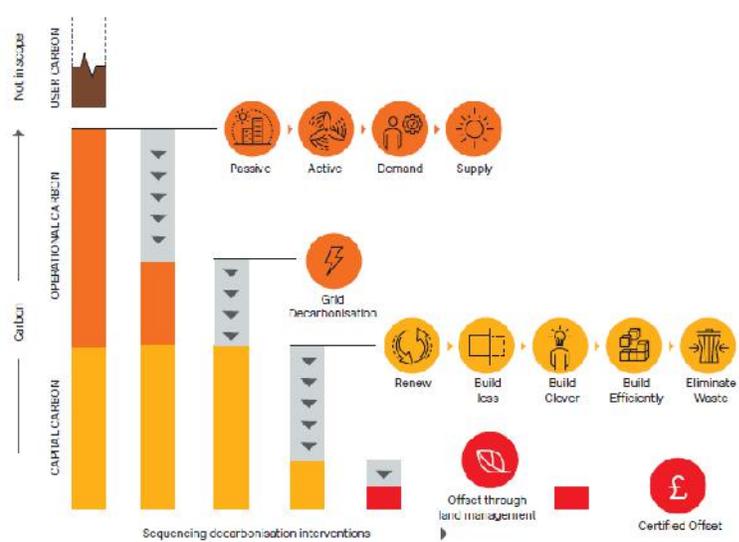


2.5 Emissions reduction hierarchies sequencing

This manual draws on reduction hierarchies for capital and operational carbon to propose a single framework project sponsors and designers can use to sequence their thinking on climate mitigation. Figure 13.

What this hierarchy means in practice is summarised in Table 3.

Figure 13. Operational and capital carbon reduction strategies in sequence. Source: © Arup



“What carbon reduction strategies should we be looking at?”

2. Guiding principles

2.5 Emissions reduction hierarchies sequencing



Table 3. Emissions reduction hierarchy explained

Principle	Description
Passive	Being lean is the highest priority and most impactful way to reduce emissions. It requires taking action to reduce the energy service demand of buildings and is most effective when considered during the earliest stages of ideation and design.
Active	Meet remaining demand efficiently and cleanly. Electrify
Demand	Manage demand dynamically using on-site storage Contribute to smart grids by installing two-way connections to the grid
Supply	Generate energy on-site Support renewables uptake by grid
Renew, transform & reuse	Evaluate the basic need for the development and exploring whether there are alternative means (reusing existing assets, or nature-based solutions obviating the need for construction, for example) of achieving the same outcomes.
Build less	Consider how the amount of new construction can be reduced, for example by re-using components and materials.
Build clever	Once the overall construction requirements have been reduced as appropriate, the use of low carbon solutions (including technologies, materials and products) should be considered to reduce resource consumption over the asset's life cycle
Build efficiently	Techniques that reduce resource consumption should be utilised during the construction and operation phases of the asset.
Eliminate waste	Choose designs, materials, details and construction processes, for example offsite fabrication, which reduce waste arisings to zero.
Offset through land management	Use sustainable land management across Network Rail's land holdings to sequester carbon in plants and soils
Certified offset	Purchase high-quality, transparent, independently verified and UK-based carbon offsets

Building Fabric and Orientation

4. Operational carbon 4.2 Building fabric and orientation

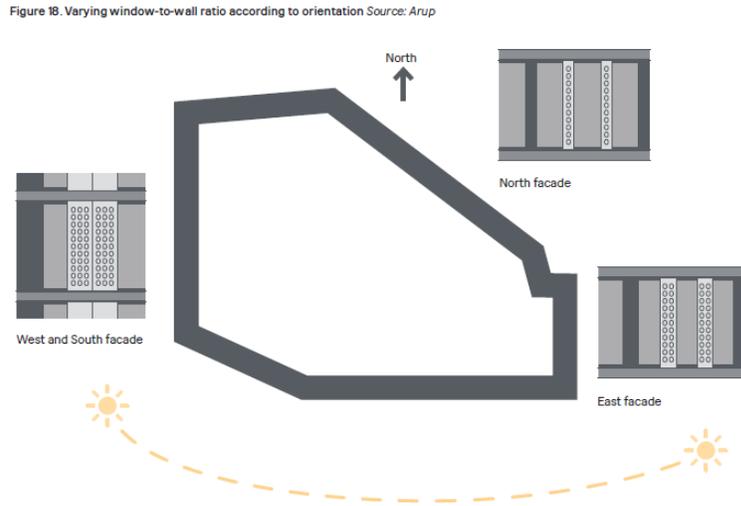


Climate Action
Design Manual
NR/GN/CIV/100/04
April 2021
Issue 44/90.

4.2.2 Façade performance

Façade performance can be characterised by five values; window-to-wall ratio, thermal conductivity (U-value), radiative conductivity (g-value, glazing only), air tightness and thermal bridging (Y-value).

Good low emission façade design finds a balance between daylighting, solar gains and artificial lighting.



4. Operational carbon 4.2 Building fabric and orientation



Climate Action
Design Manual
NR/GN/CIV/100/04
April 2021
Issue 46/90.

Shading devices should be provided on east, south and west façades as necessary, for example brise soleil or blind systems; an example of the former can be seen at Network Rail's new Doncaster office, Mallard House, Figure 19.

Figure 19. Mallard House in Doncaster incorporates brise soleil over south facing windows. Source: Network Rail



“What does an energy efficient building look like?”



Scope: Station Categories



A

**National
Hub**
2m plus trips
28

B

**Regional
Interchange**
2m plus trips
67

C

**Important
Feeder**
0.5-2m trips
248

D

**Medium
Staffed**
0.25-0.5m trips
298

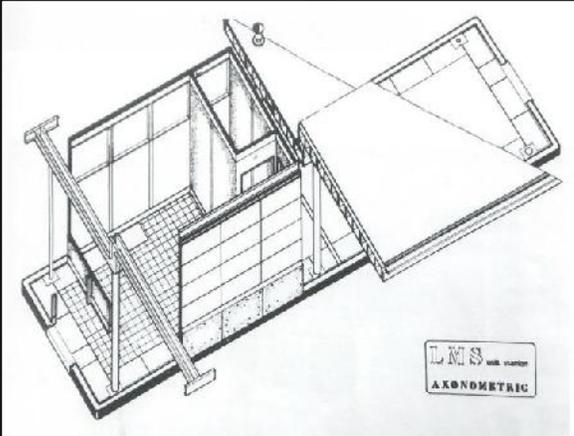
E

**Small
Staffed**
Under 0.25m trips
679

F

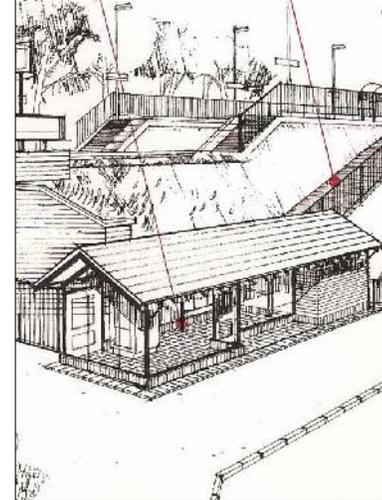
**Small
Unstaffed**
Under 0.25m trips
1200

The Past - the 50s, 60s, 70s, 80s & 90s



LMS Unit Station (1940s-50s)

Mob-X / CLASP (1960s-70s)



D70 (1970s)

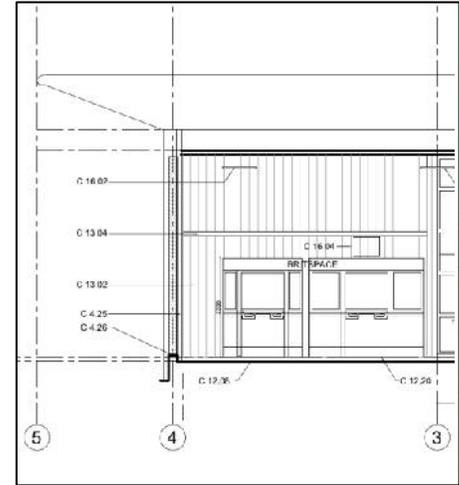
VSB-90 (1980s)

Modernist (1990s)

The Present and Future - Into the 21st Century...



MFAS (Modern Facilities at Stations) 2003



Network Rail Modular Station 2007



West Hampstead 2010



Crossrail 2021?



Is this the future of small stations?



Horden Station, County Durham

Is this the future of small stations?



14:13 Newcastle
at all times and allow customers to alight
130458
On the
On the

Way out

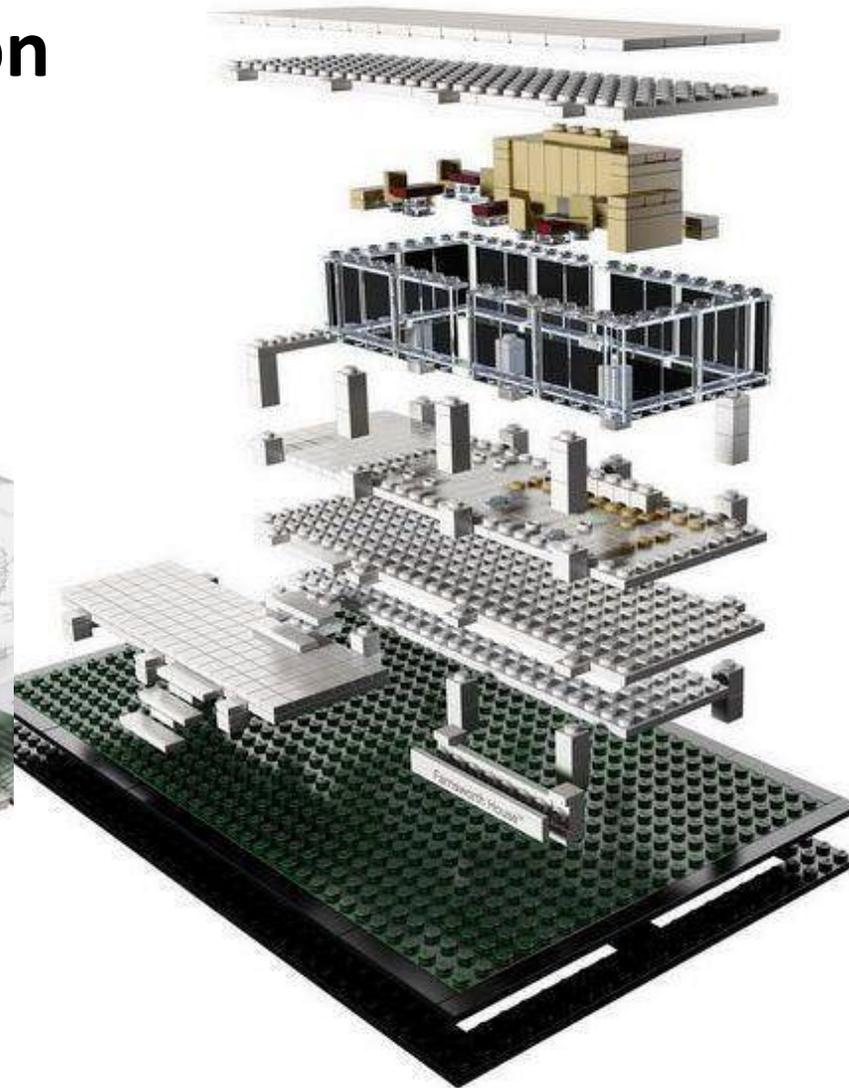
W

Horden Station, County Durham

Re-Imagining Railway Stations

Network Rail

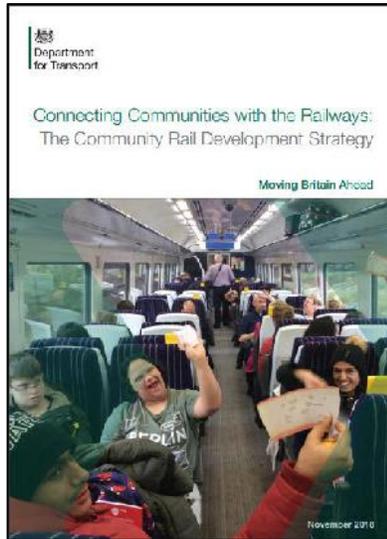
Station Design Competition



Challenge 1

Strategic Vision for Rail

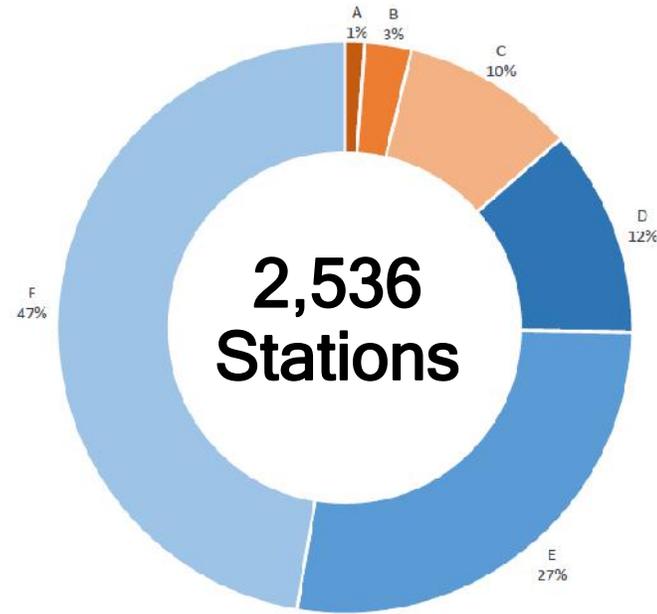
Connecting Communities



Challenge 2

Sustainable Small Stations

Tackling Climate Change



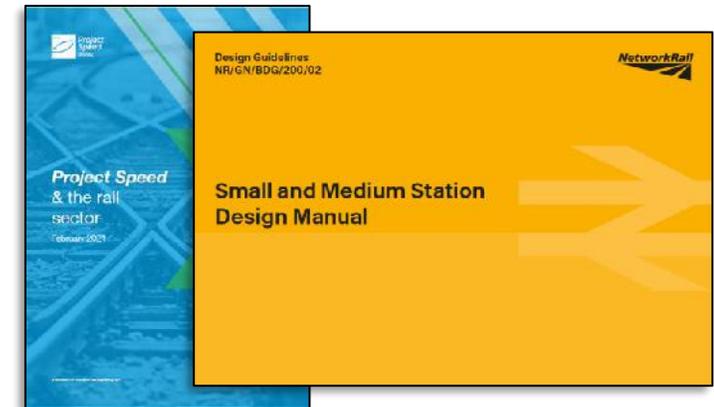
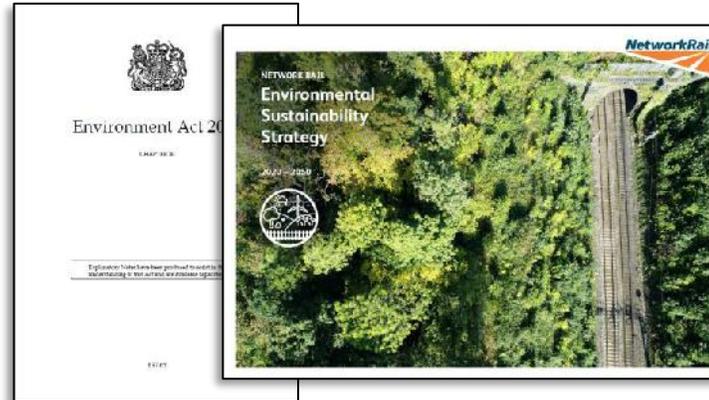
Challenge 3

Project Speed & PACE

Accelerating Design & Delivery



SMART DESIGN & DELIVERY



ThinkStation

A station for the future

11 Workshops | **324** Attendees

120 Organisations | **4** Cities

35,000 Post-its
London
Bristol
Manchester
Glasgow

- Rail**
- Network Rail
 - TOCs
 - Regulatory Bodies
 - Government Bodies
 - Government Departments
 - Heritage groups
 - Community Groups

- Design**
- Architecture
 - Urban Design
 - Landscape Architecture
 - Engineering
 - Graphic
 - Wayfinding
 - Inclusive
 - Technology
 - Modern Methods of Manufacturing

- Government**
- Local Authorities
 - Central
 - Agencies
 - Combined Authority

- Civic**
- Community Groups
 - Third Sector
 - Arts
 - Education, students
 - Education, academics

- Commercial**
- Business Groups
 - Retail
 - Media
 - Public Relations

- Non-Rail Transport**
- Air
 - Highways
 - Cycling

Future trends impacting rail identified by ThinkStation workshop delegates

Future Trends

Social	Technological	Economic	Environmental	Political
↓	↓	↓	↓	↓

ThinkStation Summary Report

Engaging Stakeholders in Network Rail's Competition Brief for a Future Passenger Hub

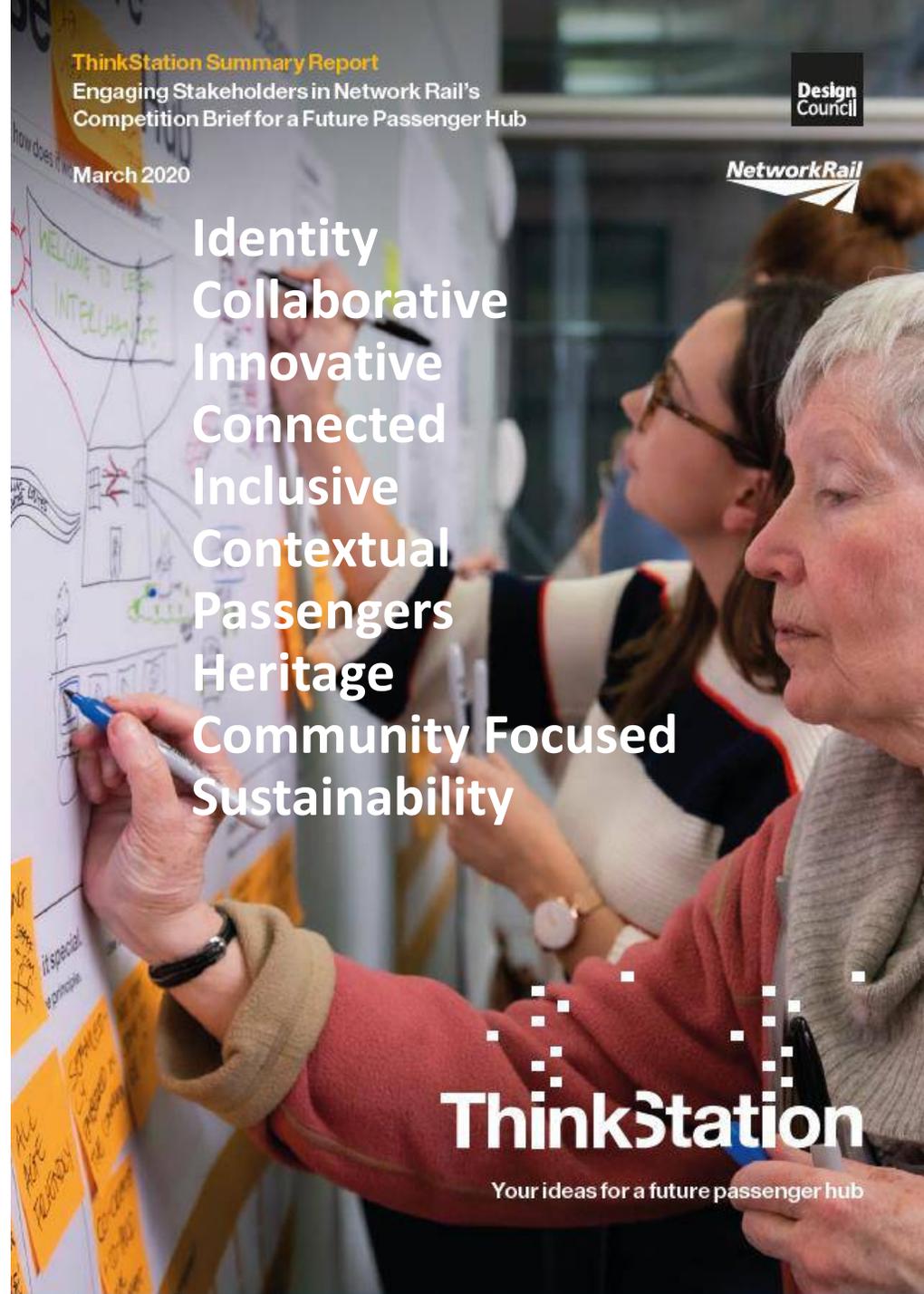
March 2020

Design Council



Identity
Collaborative
Innovative
Connected
Inclusive
Contextual
Passengers
Heritage
Community Focused
Sustainability

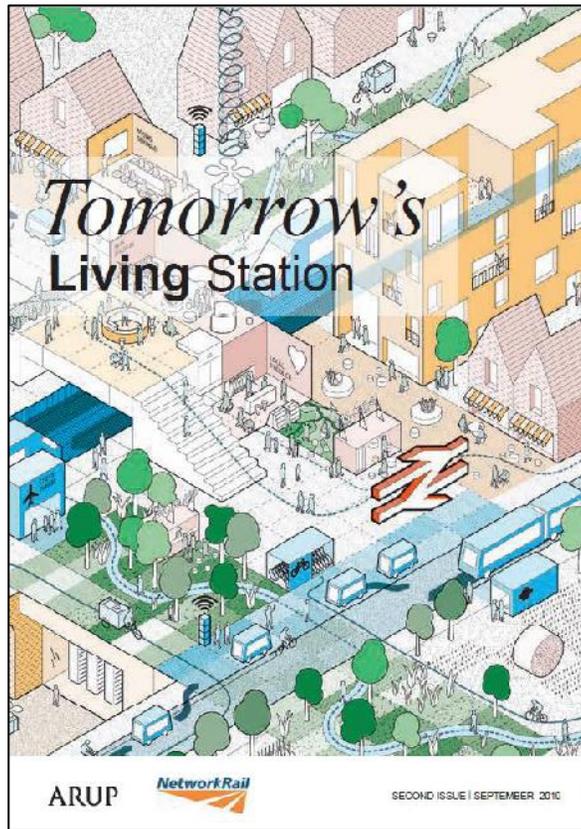
ThinkStation
Your ideas for a future passenger hub





Re-Imagining Stations

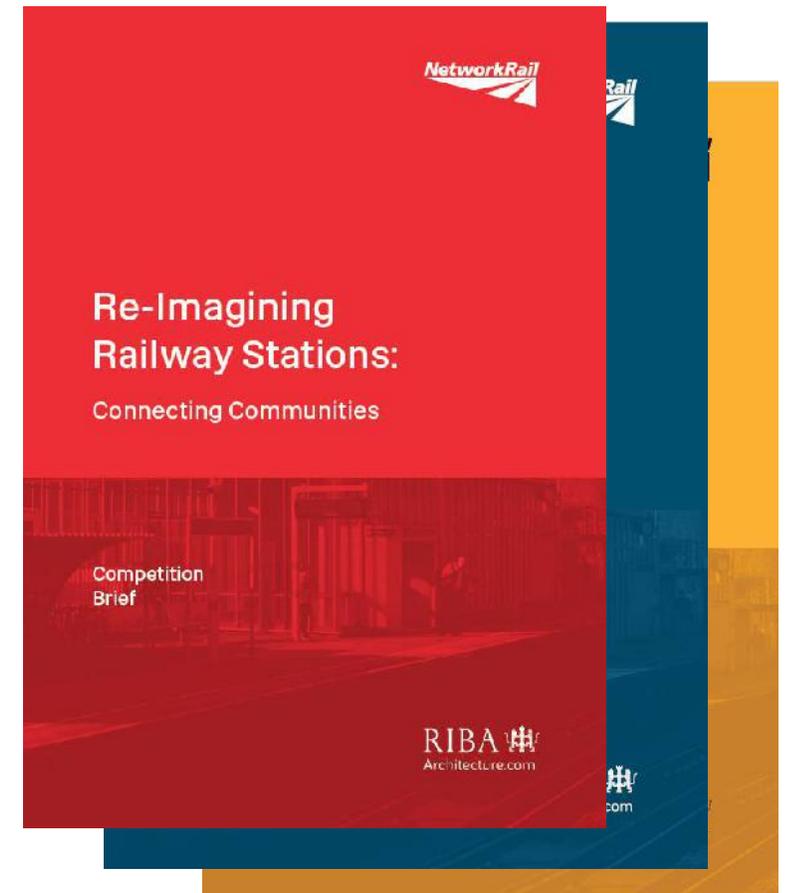
Tomorrow's Living Station
Research
2017-2019

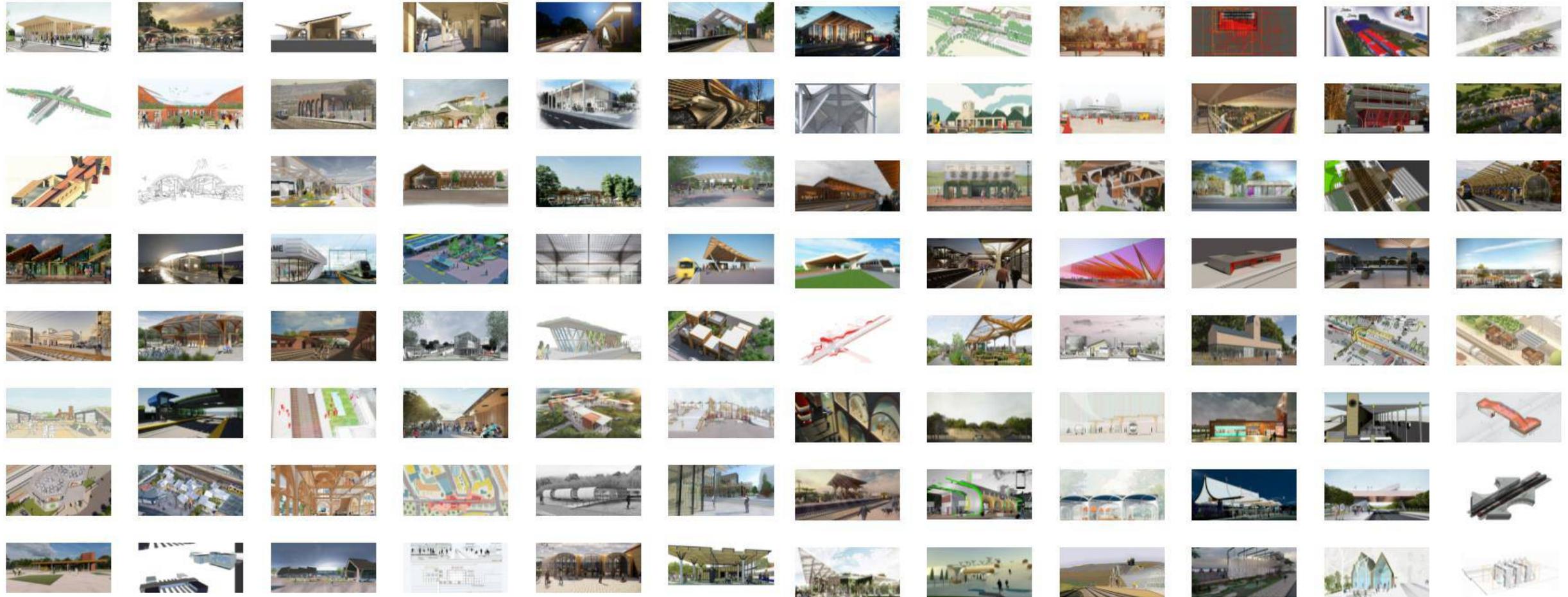


ThinkStation
Consultation
Nov 2019 - Feb 2020



RIBA Re-Imagining Railway Stations
Competition
July 2020 - Mar 2021





ribacompetitions.com/reimaginingrailwaystations

214 Entries, 34 Countries...

Station clock and Info tower with lighting that responds to train arrival and departure.

Community Activity Framework

Large sheltering 'floating' roof

Cullompton

Recycled Hard landscaping surface extends into the station

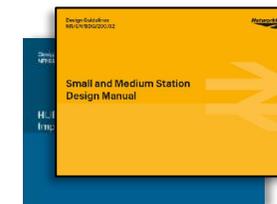
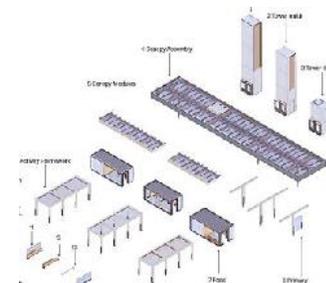
Context based welcome mat localised biodiversity landscaping





HUB

The Development Timeline



**ThinkStation +
Tomorrow's
Living Station
Consultation**

**Re-imagining Railway
Stations International
Design Competition**

**ExploreStation
public consultation
on winning proposal**

**7N Architects/Arup/LUC
Form A/D AIP Design
BEAP / DAP**

**Station Design Manual &
Implementation Strategy
IDC / Form B
Detail Design**

**Prototyping+
First Build
AIP**

2019

2020

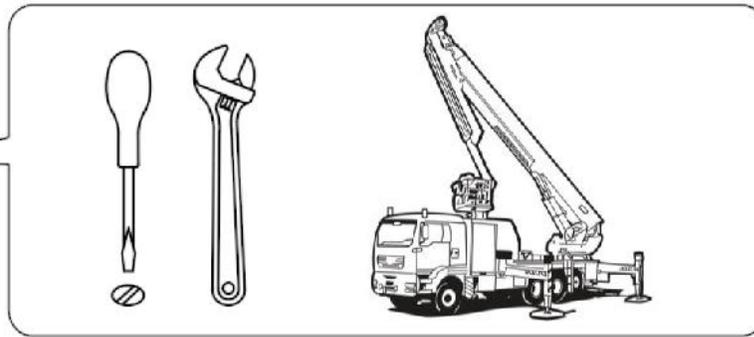
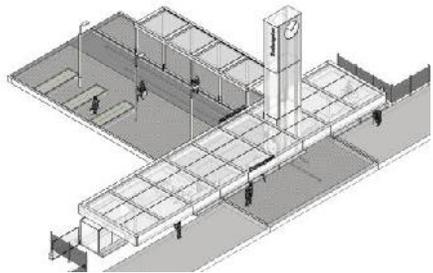
2021

2022

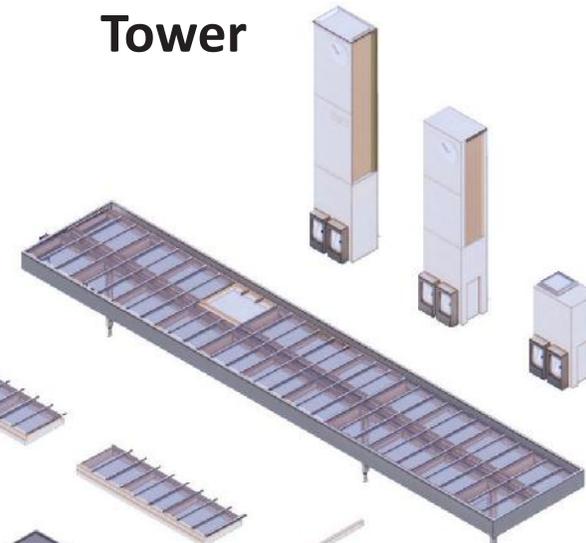
2023



SMALL STATION

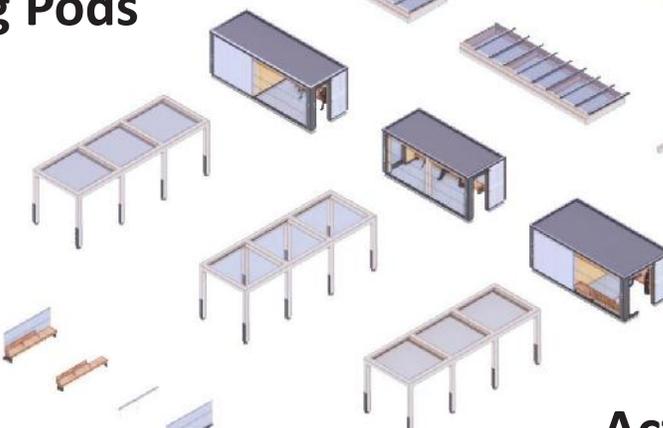


Tower



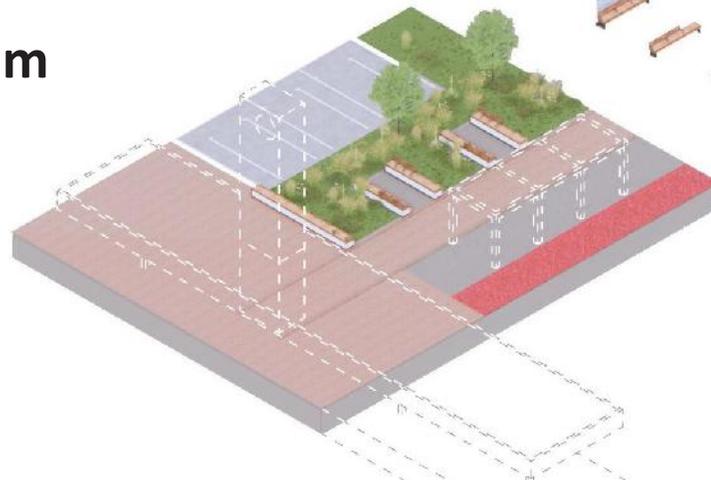
Canopy

Waiting Pods



Activity Frame

Station Public Realm
(Welcome Mat)



Tower

The Clock Tower contains incoming services and provides access to the canopy.

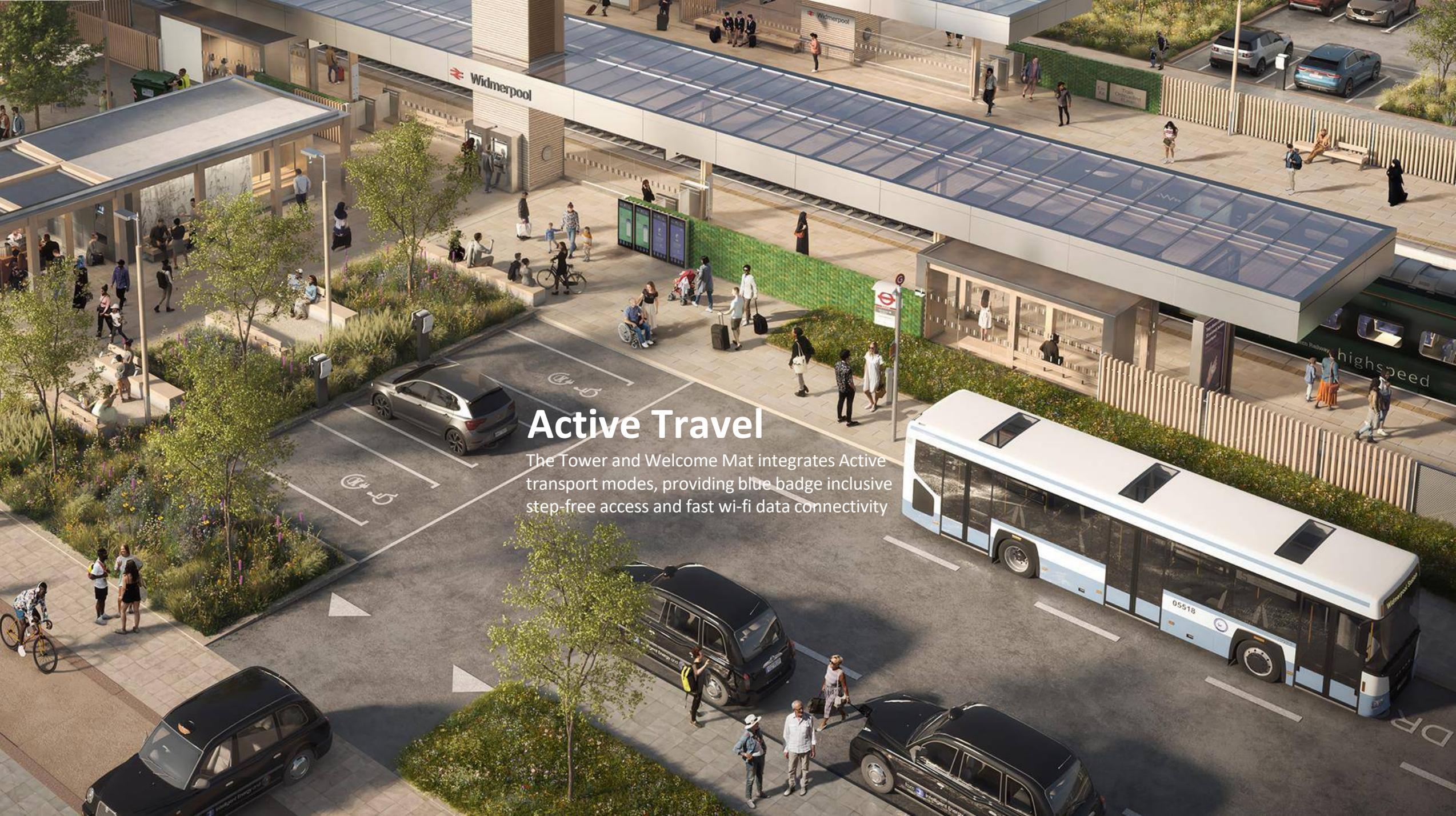
Canopy

PV Canopy provides shelter and generates power for lighting and passengers facilities

Pods

Dual aspect waiting pods providing passive surveillance and connection with station public realm





Active Travel

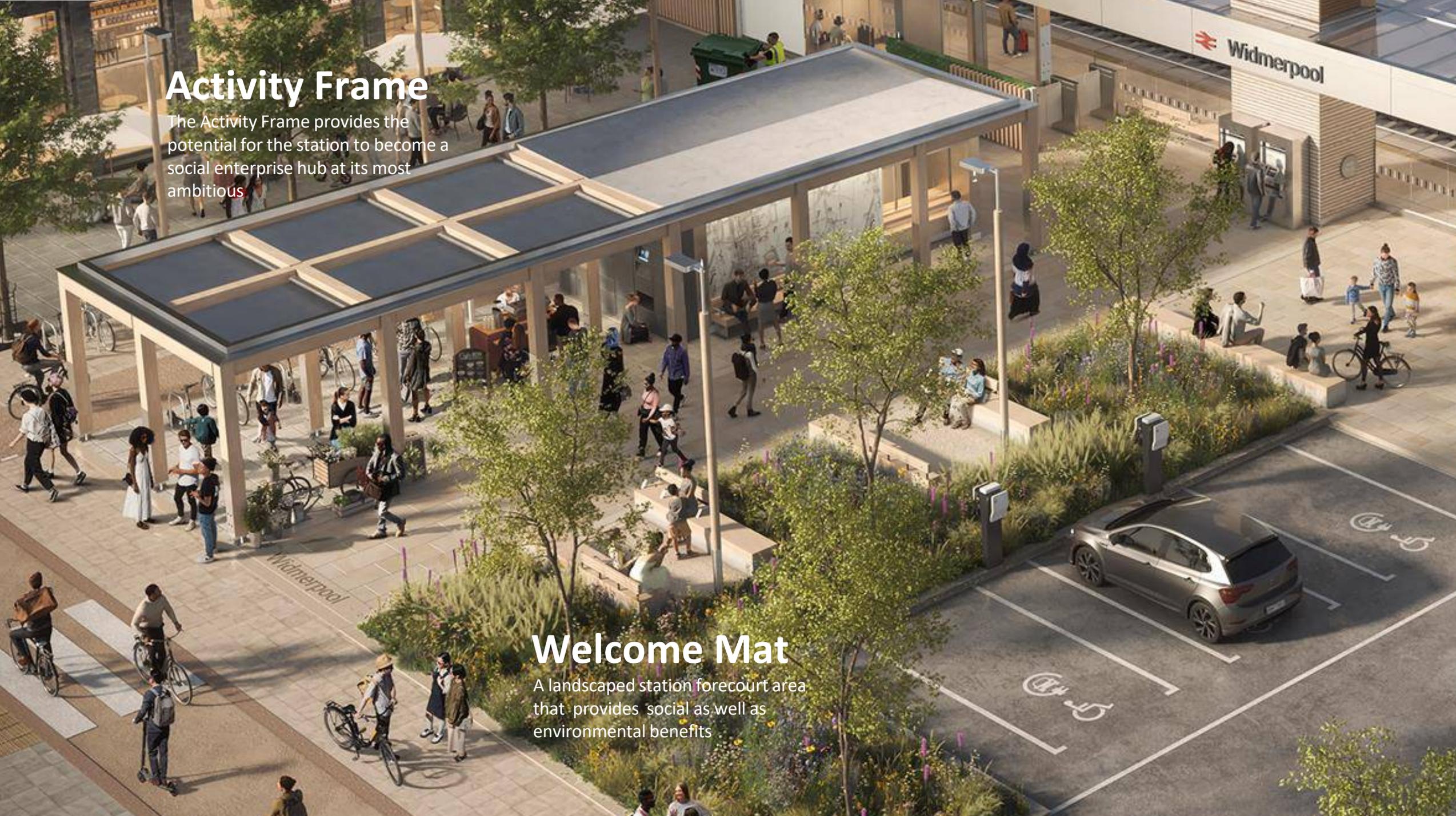
The Tower and Welcome Mat integrates Active transport modes, providing blue badge inclusive step-free access and fast wi-fi data connectivity

Activity Frame

The Activity Frame provides the potential for the station to become a social enterprise hub at its most ambitious

Welcome Mat

A landscaped station forecourt area that provides social as well as environmental benefits



Station Categories - Medium

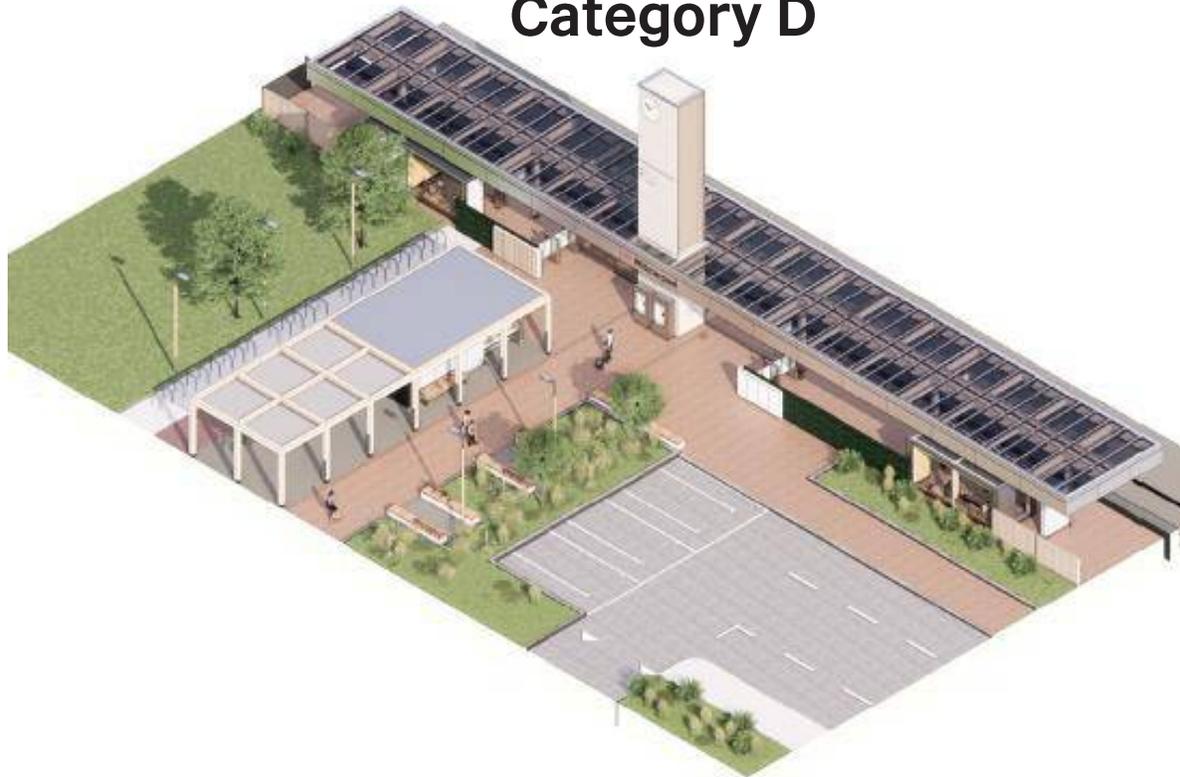


Category D 51m canopy



Category E 42m canopy

Category D



Category E



Station Categories - Small



Category F 18m canopy



Category F Mini pod only

Category F



Category F Mini



Clock Tower

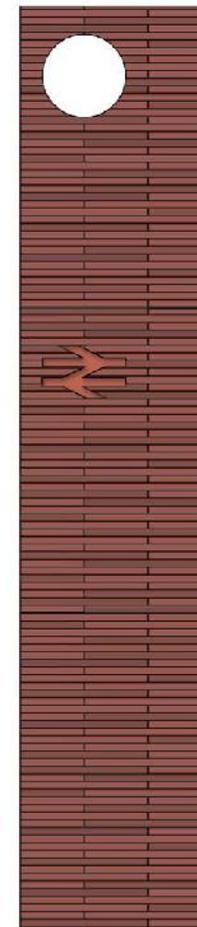
A recognisable landmark that signifies the station within the community and serves as the primary point of orientation for small stations.



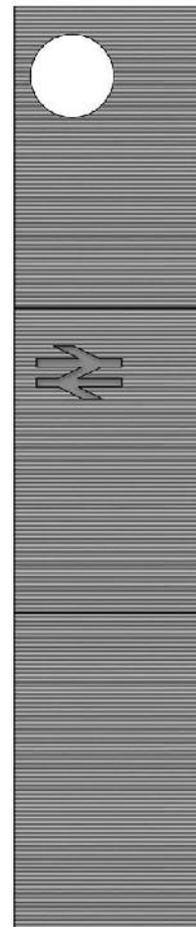
Timber



Masonry



Metal



Canopy Extendable & Adaptable



Extendable canopy

Adaptable Activity Frame

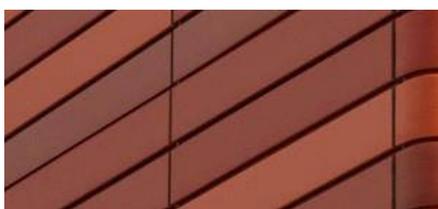
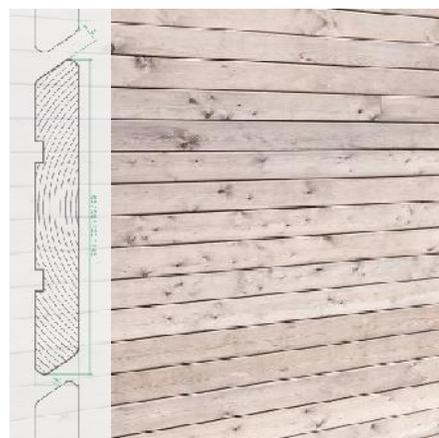
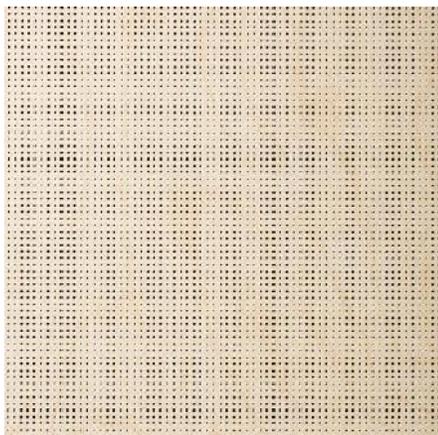
Modular Pods



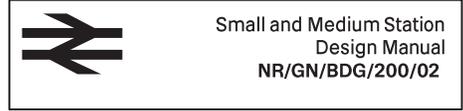
Line	Station	Arrival	Departure
1	Central	10:00	10:15
1	North	10:15	10:30
1	South	10:30	10:45
2	Central	10:15	10:30
2	North	10:30	10:45
2	South	10:45	11:00
3	Central	10:30	10:45
3	North	10:45	11:00
3	South	11:00	11:15
4	Central	10:45	11:00
4	North	11:00	11:15
4	South	11:15	11:30
5	Central	11:00	11:15
5	North	11:15	11:30
5	South	11:30	11:45

Updating facilities to improve the passenger waiting experience

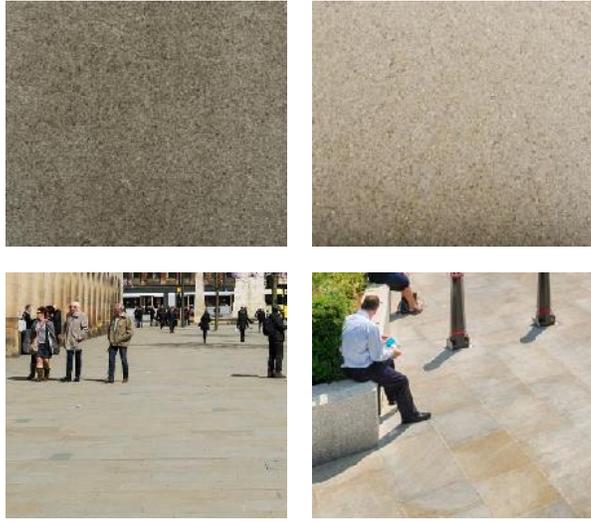
Basic Materials Palette



Paving - Themes



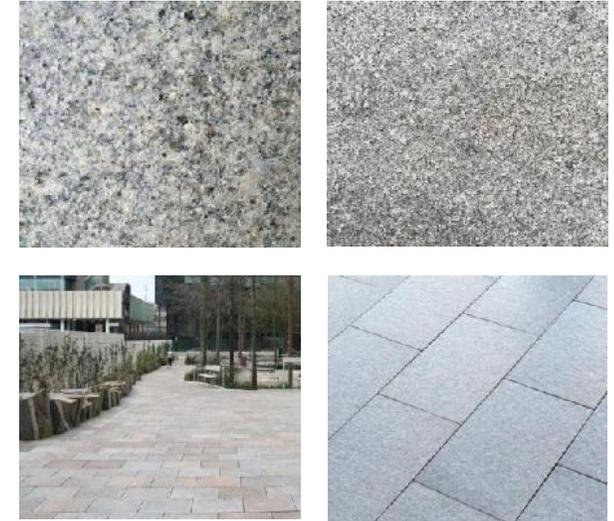
Primary Paving - Sandstone



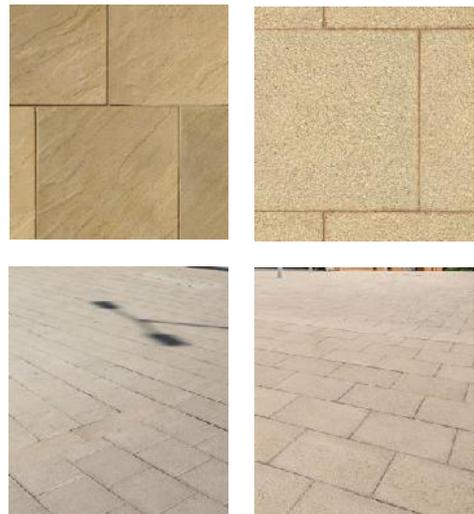
Primary Paving - Clay



Primary Paving - Granite



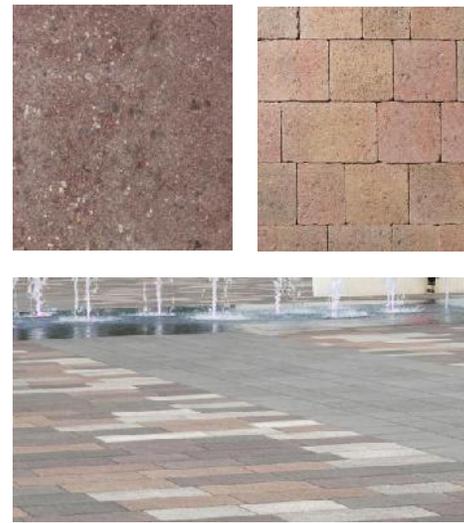
Secondary Paving



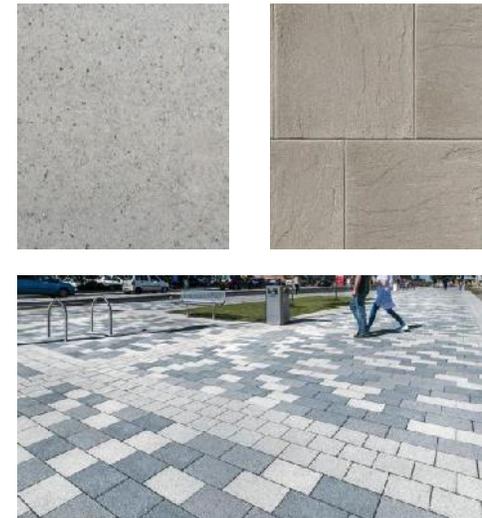
Tertiary Paving



Secondary Paving

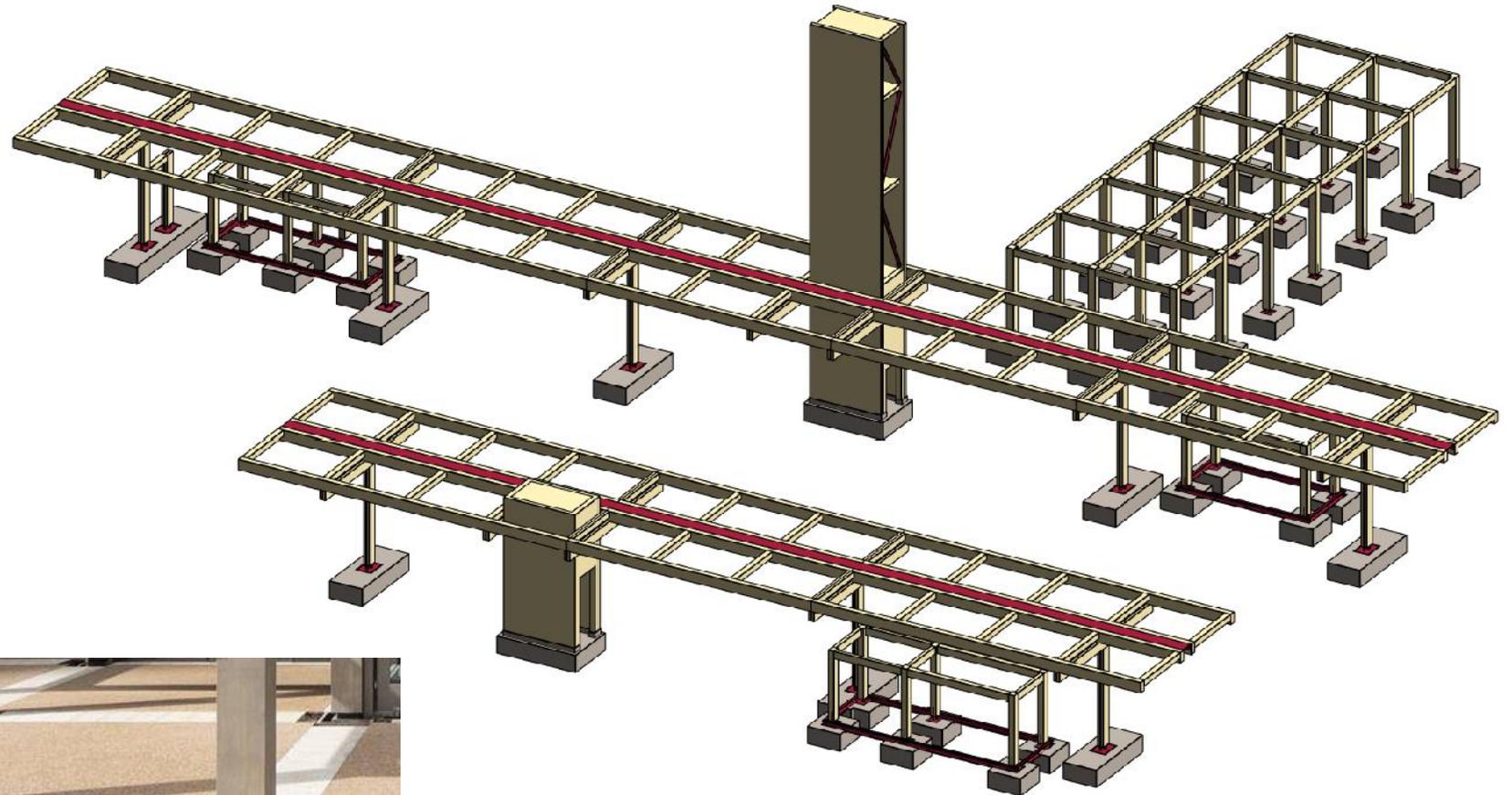


Secondary Paving



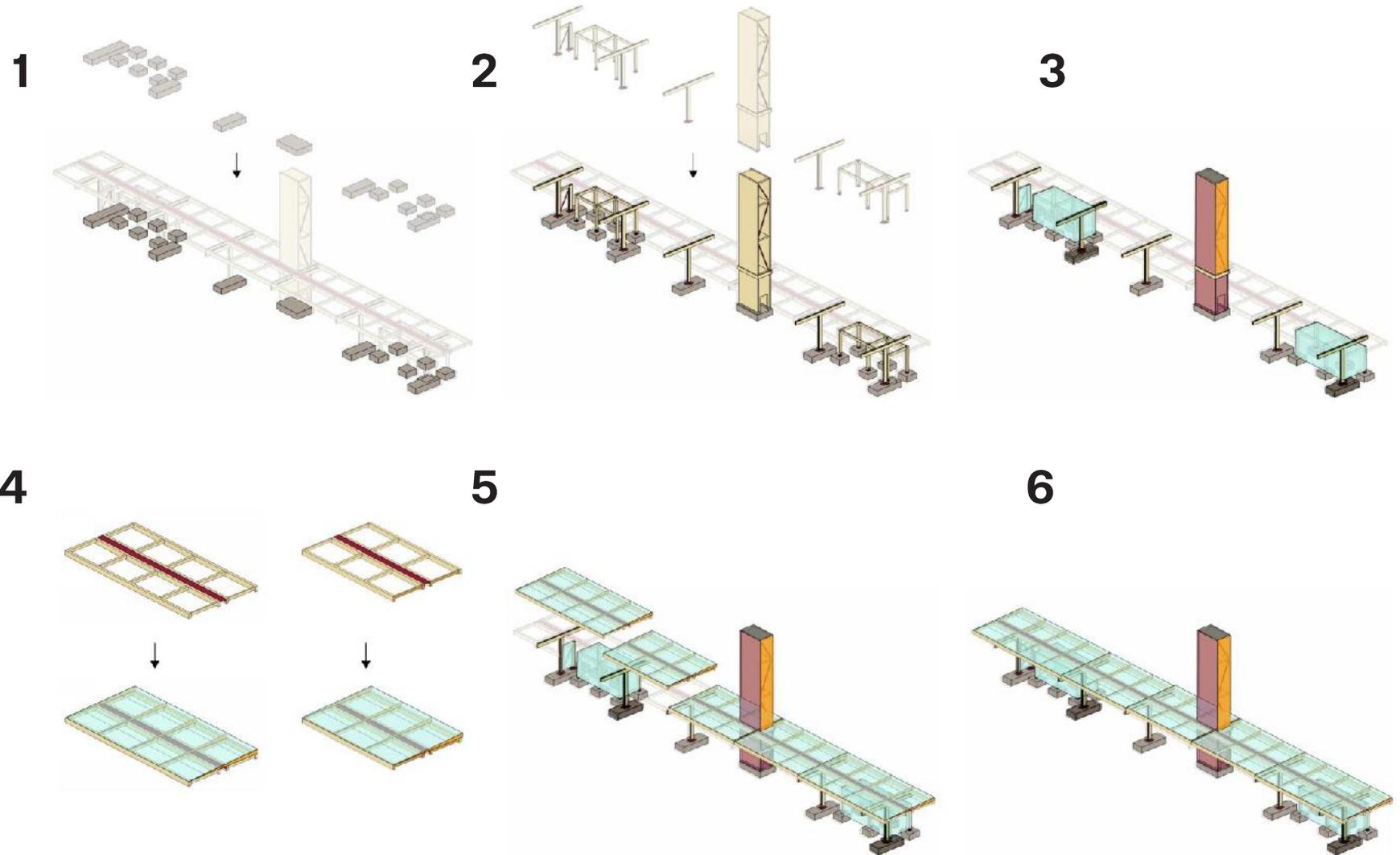
HUB

Design - Constructability Review



Delivery – 6 Step Construction Sequence

1. PAD FOUNDATIONS
2. TOWER & FRAMES
3. POD FITOUT
4. CANOPY ASSEMBLY
5. CANOPY LIFT
6. FINAL FITOUT



Whole Life Carbon Analysis

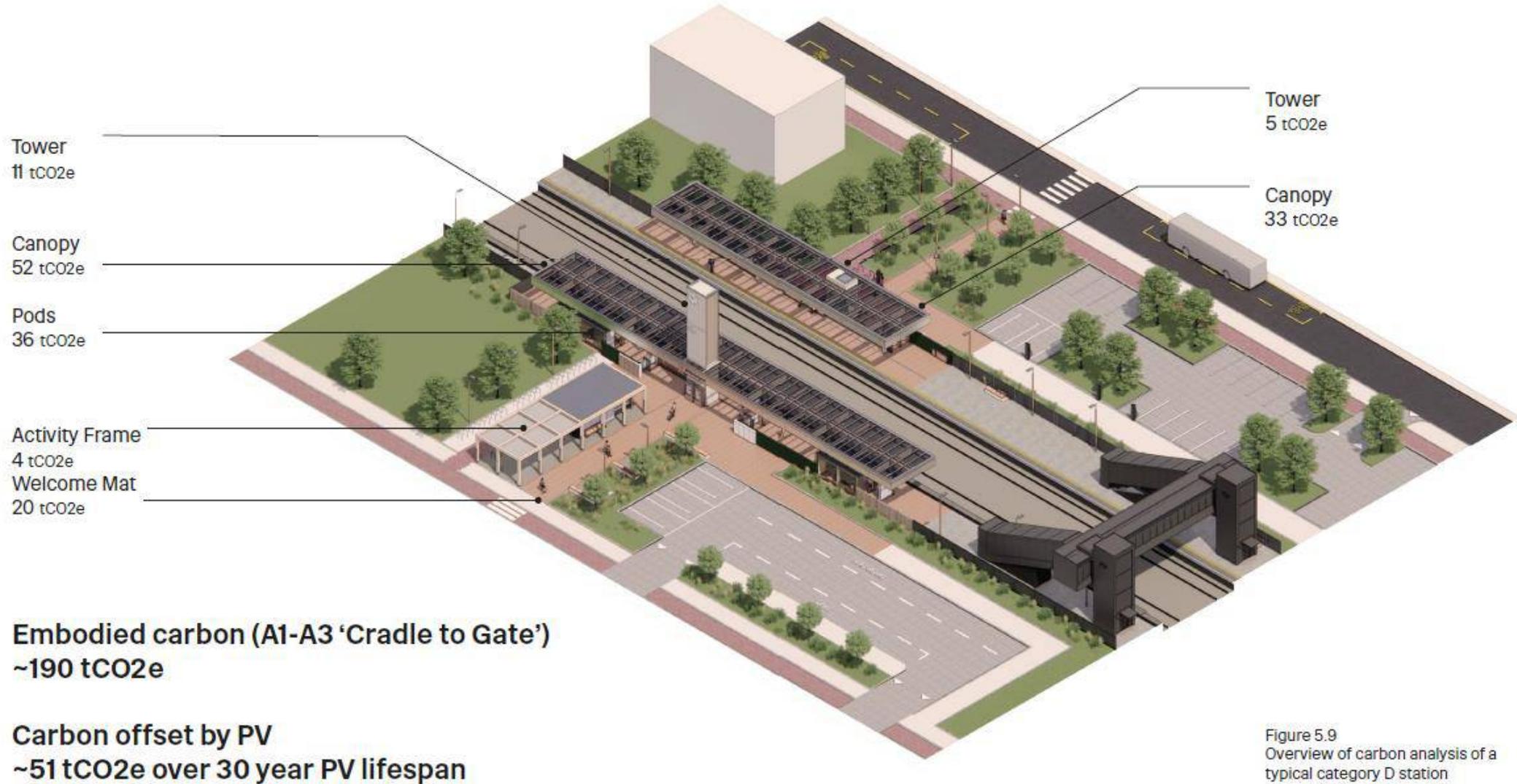
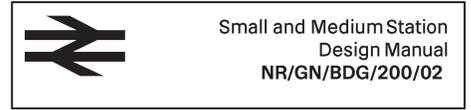
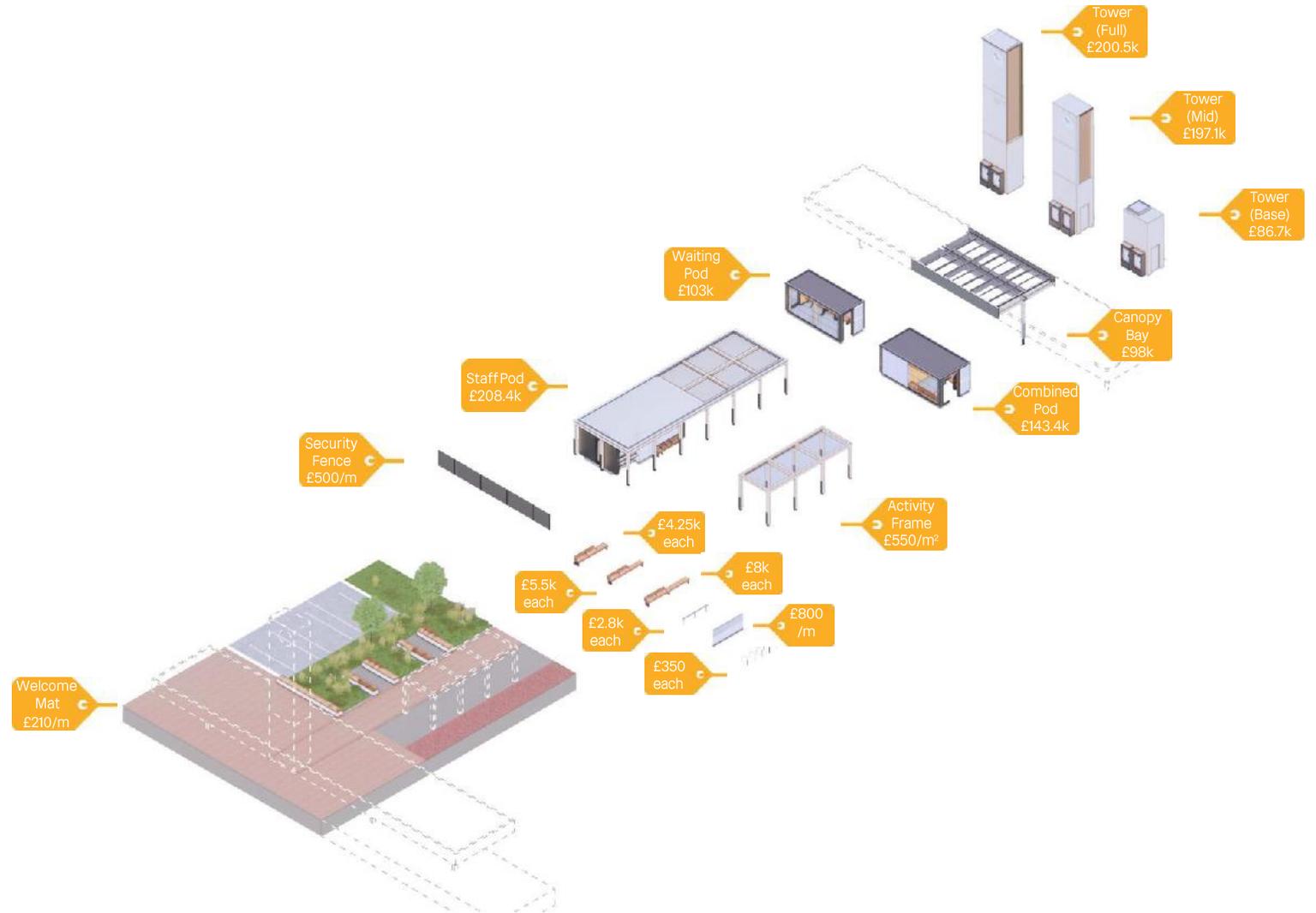


Figure 5.9
Overview of carbon analysis of a
typical category D station

Cost Plan

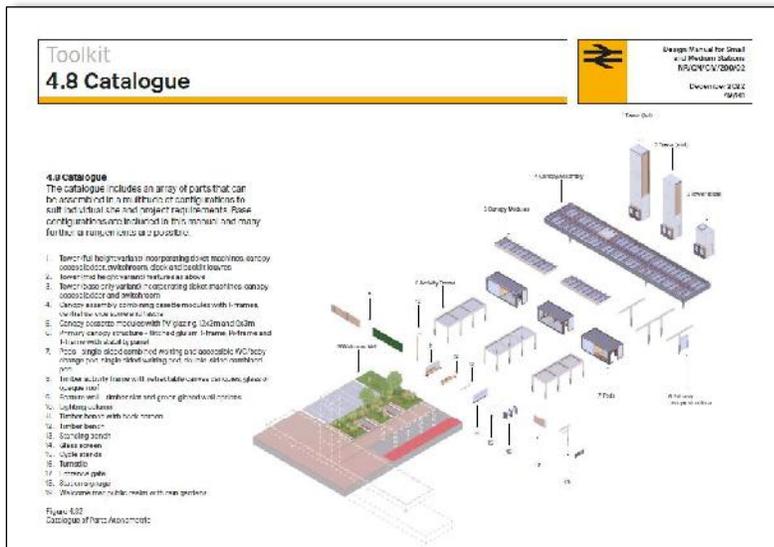
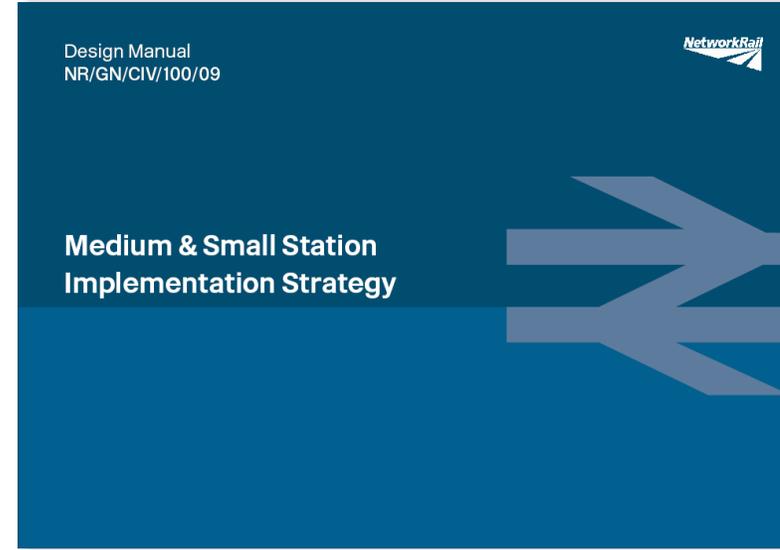
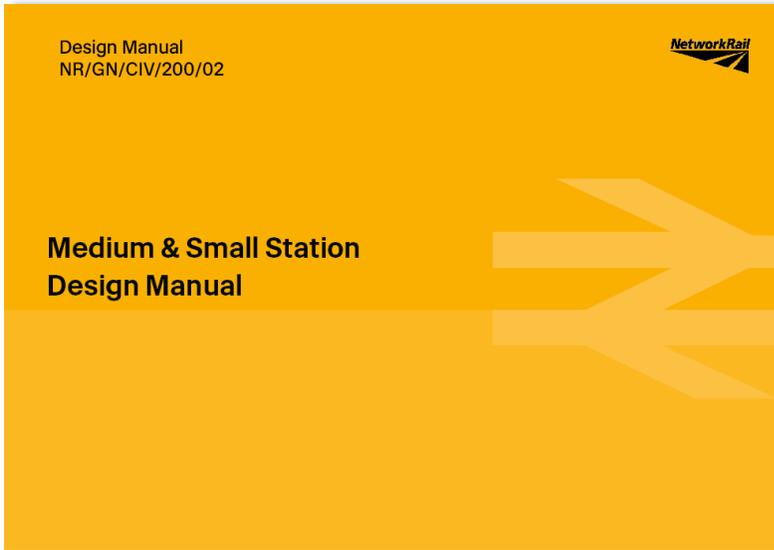
Indicative Cost Breakdown by Element (Excluding platforms & footbridge)

- **Tower (Full)** £200,500
- **Tower (Mid)** £197,100
- **Tower (Base)** £86,700
- **Canopy Bay** (9x6m) £98,000
- **Waiting Pod** £103,000 (per pod)
- **Combined Pod** £143,400 (per pod)
- **Staff Pod** £208,400 (per pod)
- **Welcome Mat** £210 per m²
- **Activity Frame** £550 per m²
- **Security Fence** £500 per m
- **Bench** (3.3m long) £4,250 per item
- **Bench** (4.4m long) £5,500 per item
- **Bench** (6m long) £8,000 per item
- **Leaning Bar/Bench** (2.8m long) £2,800 per item
- **Glazed Screens to Platform** (1.6m high) £800 per m
- **Cycle Stands** £350 per item



Technical Design

Implementation Strategy





#GreatBritishStation

RE 10:47 Stroudchester 10:45
Calling at: Borehampton, Buckingham, Cornwall, Devon, Dorset, Hampshire, Norfolk, Lancashire, Somerset, Yorkshire, Stroudchester

B

C

Walespool



i Info





#GreatBritishStation



Buildings and Architecture

Stations and Footbridges
A Journey by Design

Anthony Dewar

