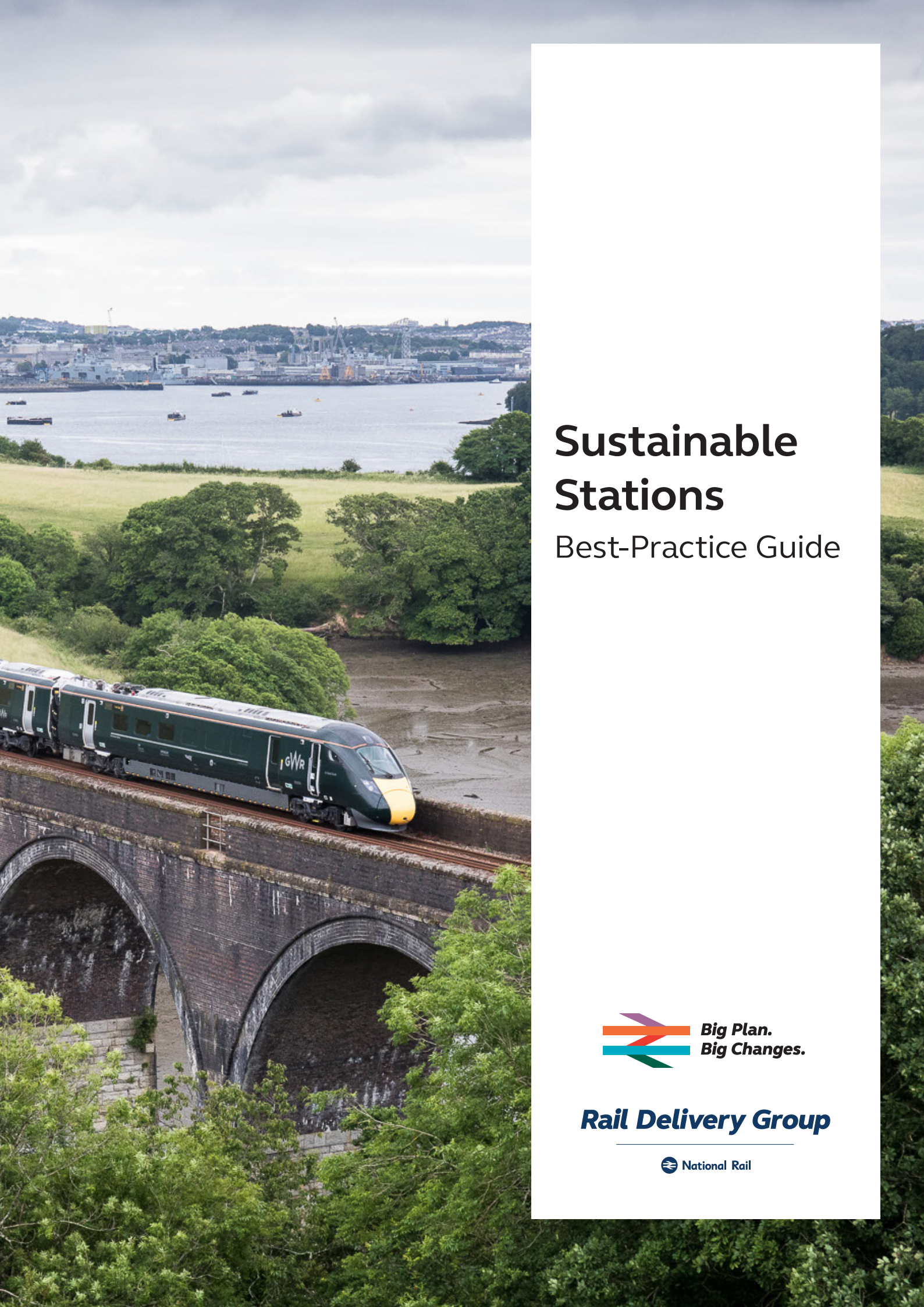

Sustainable Stations

Best-Practice Guide

Big Plan.
Big Changes.

Rail Delivery Group

National Rail

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Clickable Link

About this document

This document considers how stations can play their part in the government's commitment to deliver net-zero emissions by 2050. With a focus on environmental sustainability, this document outlines current environmental-best practice initiatives practised at GB rail stations and describes different options to further develop station sustainability. RDG recognises that all stations in Great Britain are different in terms of size, layout, and complexity of interfaces and staffing; a one size fits all approach to sustainability at stations is not suitable, but there are key principles that will be widely applicable.

1.1. Purpose

The government's legally binding commitment to deliver net-zero emissions by 2050 marks a responsibility on all, and the industry, to contribute in achieving a lower-carbon economy. The rail industry should be responsive to environmental challenges and work together to address and improve our sustainability performance. The transition towards sustainable transport also opens opportunities for rail to play a greater role in society and our shared future.

Stations already have the infrastructure and technology to demonstrate effort and improvement in this area. However, an established sustainability guide for stations does not yet exist. RDG want to support industry compliance to the Government's decarbonisation agenda by enabling operators to approach sustainability at stations in a consistent manner.

Stations are becoming increasingly understood as gateways to their communities and beacons for sustainable development. Improvement and investments to make stations better for customers and our employees must go further than providing better quality facilities. Instead, they should be environments that are inclusive and sustainable, with energy conservation in mind.

We understand there is no universal approach, and the relevant section headings in this document will suggest how the guidance might be applied in different station situations. It will be for operators and local planners to determine, alongside their local stakeholders, the best means for achieving a more sustainable offering at their respective stations.

1.2. Definition

The definition of Sustainability used in this document is based around RSSB's understanding of Sustainable development: "Sustainable development means meeting today's needs, without compromising the ability of future generations to meet their own needs".[1]

Building on the Rail Sustainable Development Principles and defining what sustainable development means for the railway, RSSB has been asked to lead on Sustainable Rail Strategy which is a core component of the Whole Industry Strategic Plan (WISP). RSSB are developing a coherent, unified framework for sustainability. The aim is to provide the government with solid information to inform policy and decision making. It is an opportunity for the industry to put sustainability at the heart of the rail industry and the rail industry at the heart of sustainability.

To understand more about the Rail Sustainable Development Principles

Communicating the social value of sustainability will play a key role in securing the cost-benefit of improving sustainability across our operations. RSSB is in the process of creating a Rail Social Value tool with a purpose to enable the industry to measure the social value of its activities (e.g. projects) as well as enable forecasting to guide investment decisions. The project includes the development of a revised social value library of measures and a common social value definition for the rail industry. The ability to determine the social value of environmental impacts is also being explored as part of this work.

1.3. Sustainability outputs:

The list below is provided to demonstrate where sustainability has the potential to deliver the following business outputs:

Improve **performance**

Enhance **passenger experience**

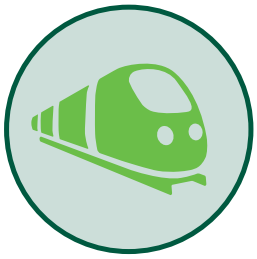
Minimise **operational costs**

Improve **legal compliance**

Improve industry's **public image**

Improve **environmental impact**

Support Britain's **economic recovery**



Enable **more people** to access and **use rail**

Deliver a transport system that offers **good value for money**

Objectives

2.1. Political landscape

In June 2019, the UK Government became the first major global economy to pass a law that requires us to achieve 'net zero' greenhouse gas (GHG) emissions by 2050. Transport has a huge role to play in the economy reaching net zero.

The Government is developing an ambitious plan to accelerate the decarbonisation of transport. The Transport Decarbonisation Plan (TDP) will set out in detail what government, business and society will need to do to deliver the significant emissions reduction needed across all modes of transport.[2] In order to decarbonise transport, the TDP aims to make public transport and active travel the natural first choice for public mobility. Stations will need to play a critical and proactive role to support and enable this transition, beyond decarbonising the railways.

Even though 2050 is a generation away, infrastructure and policy decisions made now will directly affect the railway's ability to meet this target in a cost-effective way. Industry should not therefore place all its focus on 2050 but instead adopt a step-by-step approach to smooth the transition to 2050, which will deliver real carbon reductions to the UK over the next 30 years. Furthermore, to achieve the commitment to limit the Earth's temperature rise to 1.5 degree Celsius this century, as per the COP21 Paris agreement[3], we will need to front-load change and drive significant transition in the next decade.

Environmental policy at stations should be bold and the ambition should be to significantly reduce carbon emissions at GB stations in advance of the Government's 2050 target. This is because most of the technology (and other resources, including an existing network of community engagement and volunteers) required to create sustainable stations already exist, and the focus should instead be to increase the uptake of these initiatives and establish clear accountability. Where possible, commitments to create sustainable stations should be mandated within management contracts and this should also include the construction and enhancement phase to ensure sustainable materials are used and suitable infrastructure put in place to support modal integration and other measures. New station proposals should be assessed on their carbon output, and their overall sustainability life-cycle in alignment with the Sustainable Development Principles.

Stations also have an important role as transport interchanges. Moving forward it is important that station infrastructure and timetabling is integrated with other travel modes, particularly those with low or zero carbon emissions such as walking, cycling and bus, to minimise the customer's carbon footprint through their end-to-end journey. This transition would support communities to overcome barriers to sustainable mobility, helping to reduce car dependency and car-orientated development, and would support the growing demand for mobility as a service (MaaS), which could be enabled by fares reform.

Furthermore, with more and more people walking and cycling as a result of the Coronavirus pandemic, DfT's announcement to invest £2 billion in new infrastructure, which will make it safer and more appealing to travel by foot or bike instead of by car, is welcomed by industry as a step to significantly reduce carbon in the station environment and widen access to rail. It is recognised that active travel modes are often constrained by time and distance, and accessibility, so it is important that rail services and infrastructure enable further integration and designed with inclusivity in mind. **The rail industry wants to work with Government, local authorities, customers and transport providers to ensure that stations support the seamless transfer of low-carbon transport modes.**

2.2. Station objectives

Rail Delivery Group coordinate the RDG Station Strategy Group (SSG) which is a high-level industry forum for stations, bringing together senior representation across Passenger Owning Groups, Network Rail, HS2 and DfT. The group acts at a strategic level to enable more efficient decision making and investment choices regarding station management and development, to enhance the station estate, and better serve customers, communities and the environment.

RDG Station Strategy Group outlines its core principles with a Vision for Stations[4], including long term plans to ensure "stations are managed in a manner which ensures their long term economic, environmental and social sustainability". Given the scale and scope of the station estate, the challenges are large and there is a need for long-term thinking to address sustainability now and in the future.

There are over 2,500 railway stations in Britain, and the responsibility for the operational management of those stations is divided between Network Rail and the Train Operating Companies (TOCs). With varying size, capacity and services, there are opportunities large and small at stations to serve their customers and communities. It is also apparent that the role of stations is continually evolving from static infrastructures to destinations in their own right, and productive, vibrant hubs for their communities, attracting footfall beyond those with intentions to use railway services, bringing communities together, and delivering a range of social, environmental and economic benefits[5].

As we emerge from the Coronavirus pandemic, we will also see opportunities for stations to evolve again and offer more and more ways in which to support communities and individual lifestyles beyond transport. For example, as places to shop and work, providing facilities for customers that encompass multiple use in one destination.

It is also an opportunity to address inequalities within communities, and to consider sociocultural changes in the way we live and work. For example, the increase of people working from home across Britain could see the repurposing of redundant station space as flexible 'offices' and meeting rooms, appealing to those who have less-than acceptable home-working conditions and whom can benefit from social interaction, greater broadband usage or better technical facilities. These developments can encourage sustainable ways of living within the wider community, such as by enabling people to pick up shopping or deliveries on their commute rather than making an additional journey, enabling 'zero waste' shopping, or enabling people to connect with nature through community gardening.

Stations across Britain offer a wealth of exciting and unique opportunities to deliver. We must ensure that a greater station offering takes into account the environmental impact of delivering

those extended services. Addressing the sustainability performance at our stations will not only make us more accountable for our carbon emissions but will also contribute to an improved passenger experience.

The objective of this Guide is to help industry support the Government's decarbonisation agenda and incentivise more sustainable operations by providing a Guide for operators that summarises existing best practice while providing a series of recommendations that can be applied across small, medium and large stations. It is also intended to help the railway lead the way on sustainability and deliver maximum benefit for the customers and communities they serve.

This Guide aims to drive improvements in the overall sustainability performance of stations by:

- **Raising** awareness of the environmental and social impact of station operations
- **Recognising** existing best-practice initiatives at stations across GB
- **Providing** a series of recommendations that can be applied across small, medium and large stations
- **Signposting** further resources and contacts across specific areas
- **Increasing** station and industry reputation in relation to sustainability efforts
- **Informing** future policy areas
- **Encouraging** further work for industry to develop a station-specific tool to address sustainability such as a benchmark or accreditation system for stations

2.3. Roles, Responsibilities & Stakeholder Engagement

Understanding various roles and responsibilities across stakeholders is an important step to support the case for sustainable development at stations, and a well-established model has the potential to maximise opportunities for improvement.

Enabling stakeholder buy-in is crucial to delivering effective sustainability projects. These are both internal and external stakeholders. Internally, having a board-level champion, or senior manager in finance, is crucial to ensure that projects which present a weaker financial business case, but meet sustainability objectives, are championed and properly discussed and considered during decision-making processes.

A good model would include a board level representative, someone on the investment committee, and someone at each station location to be knowledgeable and supportive of the benefits the sustainability project in question will deliver. It would also be beneficial to have project managers briefed and aware of sustainability objectives, and to introduce a protocol in which they seek information and support from the sustainability experts across the business when opportunities arise to improve or remodel the station.

It is important to also address sustainability in the supply chain, and ensure environmental objectives and targets are reflected within contracts. This will allow the Train Operating Companies (TOCs) and Station Facilities Owner (SFO) to improve overall results, while influencing their supply chain and procurement operations to improve the way the intermediaries work too. A sustainable supply-chain also has the potential to deliver greater profitability.

Beyond internal structures, there is a crucial need to engage and work with local partners and communities, drawing on their views, building understanding of local needs and opportunities, and ensuring there is ongoing dialogue, communications and feedback mechanisms around change.

Biodiversity

Biological diversity, or biodiversity, simply means the variety of life. To ensure biological diversity, ecosystems (plants), species (wildlife) and genetic (differences within wildlife) variations are necessary, with the connections that exist between these three boosting productivity and ensuring natural sustainability.[6]

Improving biodiversity at and around stations will not only have rewarding aesthetical effects on the station's immediate surroundings but will also have long term impact in the local environment, such as by improving air quality, creating more green space, and supporting pollinators and other wildlife. As stations become greener, and especially if communities are engaged in this process, they become a reminder for local residents and communities to consider energy use, carbon, and waste and live more in harmony with their natural surroundings.

The recommendations below outline practical steps to improve biodiversity in and around the station environment:

3.1. Stations with few or no green spaces

Stations that have hard landscaping, or considered to have limited biodiversity value, could consider the below actions for improvement, where this is possible:

- **Incorporate wildflowers in planters.** Bird boxes can be installed on buildings and larger trees.
- **Incorporate tree lines or hedgerows** in car parks to provide some habitat connectivity -the degree to which the landscape facilitates animal movement and other ecological flows.
- **Install green/living walls** to provide an ecological habitat and offset CO2 emissions.
- **Incorporate native flower and shrub species** in car parks.
- **Sustainable Drainage Systems (SuDS),** such as ponds and swales, can be designed to provide useful features for biodiversity and use of water butts for biodiversity including water butts for watering planting features.
- **Consider tree planting** around the surrounding area of the station.
- **Pollinator-friendly planting** through the installation of bee-friendly planters.

3.2. Stations with green spaces

If the station incorporates a green space, further actions to the above list that are quick and easy to implement are:

- **Engaging and supporting local volunteers,** station adopters and conservation groups to consider and implement biodiversity enhancments. This can deliver further benefits of health and well-being and generates a sense of community-ownership to biodiverse enhancements.
- **Include native species and wildflowers** wherever possible. Considerations should be made to what varieties provide good nectar, seed or berry sources for wildlife.
- **Installing bird or bat boxes** on buildings and trees.
- **Installing insect hotels** using recycled wood.
- **Introducing a small pond** to provide an additional habitat and homes for frogs and toads, plus a range of beneficial insects.
- **Avoid the use of herbicides** and pesticides.
- **Gardening without peat** when planting, potting and mulching.
- **Practice sustainable gardening:** choose sustainably sourced wood for furniture and planters, re-use all you can and save water wherever possible. Using repurposed containers, and avoiding single-use plastics like pots, which generally can't be recycled, is advised.

Engagement between rail partners and contractors is important to ensure the above steps are preserved. It is not uncommon for newly sown wildflower areas to be destroyed due a contractor not knowing about it.

For further information, and advice on engaging volunteers and overcoming biodiversity challenges, as well as safety rules and code of conduct please refer to the Community Rail Station Adoption Handbook:

https://communityrail.org.uk/wp-content/uploads/2019/07/Acorp-Station-Adoption-Booklet-050719.pdf

3.3. Challenges

Before improving the biodiversity value of the station, necessary steps should be taken to ensure initiatives do not implicate the operational aspect of the railway. Improving biodiversity should not inhibit station safety or have negative consequences on the station-environment. Station operational staff should ensure:

- Risk assessments are conducted prior to installing planters, bird boxes, bug-hotels and sustainable drainage systems. This applies to station staff, external contractors and volunteers.
- Do not leave tools, materials or equipment in a position where they could endanger customers or other persons using the station, or within 6 feet 6 inches (2 metres) of the platform edge.
- Avoid using herbicides and pesticides.
- For optimal results when enhancing biodiversity in and around the station, considerations should be made to the seasons i.e. regrowth periods.
- Measures should be taken to avoid disruption to wildlife and communities when undergoing construction work.

Efforts to improve biodiversity, should also consider the wider railway environment and the impact infrastructure works and repairs can have on the immediate surroundings. It is possible for nature reserves to be destroyed during network optimisation. To minimise damage to local habitats and reserves, risk assessments should always be conducted prior to any work taking place, and liaison between appropriate station-operation staff, planning teams, local conservation groups, authorities, and engineers should be made prior to work taking place.

Network Rail are addressing vegetation management on the lineside, which is incorporated in the Network Rail Environment Sustainability Strategy[7]. Among the initiatives, Network Rail are working on the aerial mapping of trees and vegetation along the network to identify areas of concern and take action to ensure they are managed appropriately. Network Rail also work with the Tree Council to identify and support opportunities for tree and hedge planting.

Operators should also seek reassurance from Network Rail before (i.e. installation of bird boxes) so that any initiatives taken at operator-level, that change the station infrastructure, are maintained beyond the operator's franchise contracts.

3.4. Case Studies

Case Study 1 - 'Buzzing Stations' Community Project, Buxton Station (small)

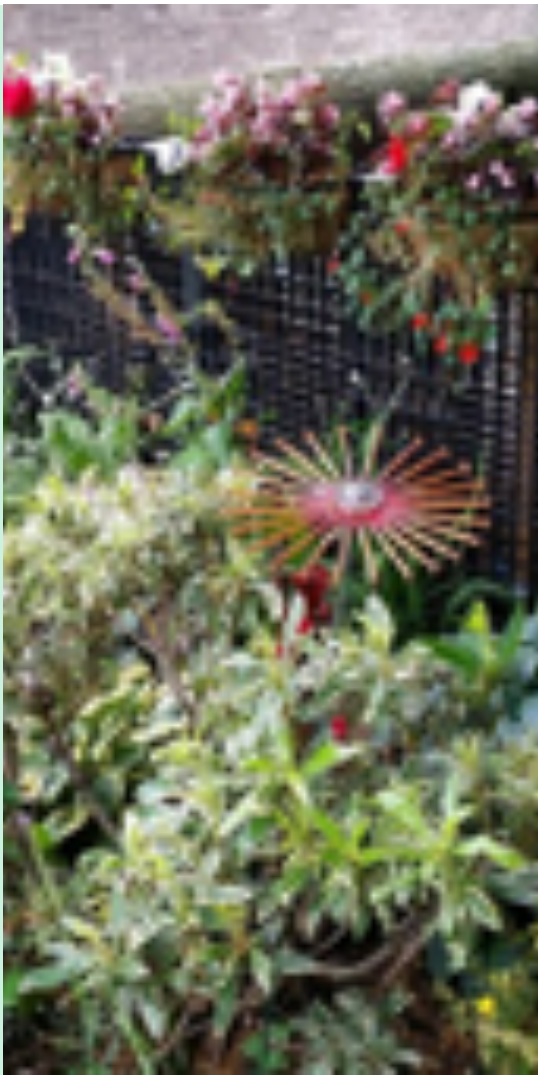
Friends of Buxton Station, with help from DB Cargo, Northern and Network Rail, have built a planter unit from old recycled railway sleepers to fill with plants to support the endangered Bilberry bumblebee, as well as providing a habitat for other insects and invertebrates. Collaboration from station volunteers and environmental agencies has been successful in bringing this project to life; the Redundant Assets Team at Network Rail donating the sleepers, Waterswallows donated the compost and DB Cargo, long-term partners of Friends of Buxton Station (FoBS) carried the sleepers all the way from Crewe. The project is a great example of how a group of engaged volunteers will come up with great ideas for improving biodiversity and spearhead the change themselves involving local people and partners.

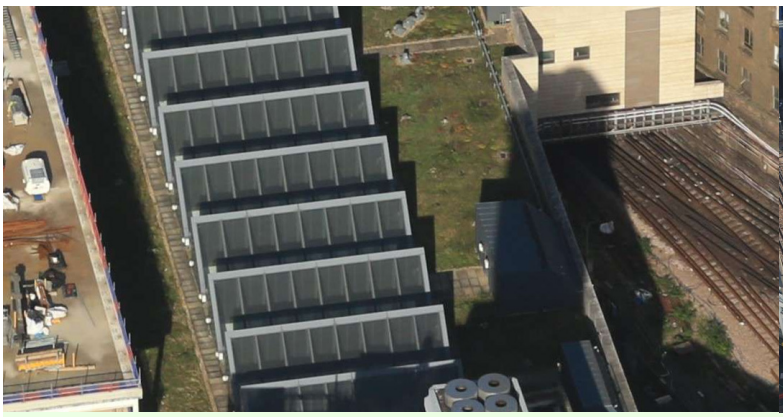
Case Study 2 - Perth Station Garden Biodiversity Project (medium)

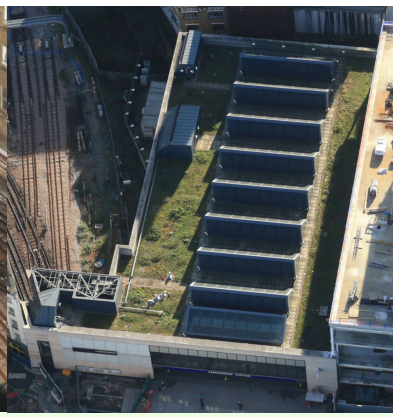
Local volunteers who maintained the platform planters at Perth station were keen to develop spare, overgrown ground at the station to improve biodiversity. Contractors were brought in to prepare the site, new paths and raised beds were installed and volunteers created the biodiversity garden with the aim of providing a food source for local pollinators and a suitable habitat for breeding and shelter. A wildflower meadow was sown, along with a pond and various nest boxes and insect hotels.

An initial ecological survey was carried out at the site in order to provide a baseline against which to measure changes, and species data recorded at the site will be added to the national database via local experts and community groups. Vegetables are grown in the raised beds to raise funds for the project and various heritage varieties have also been planted.

The project has won awards for the contribution to environmental improvement and community work. This project has been completed in cooperation with Tayside Biodiversity Partnership, RSPB and local businesses to ensure it enhances local activity and aligns with the local Biodiversity Action Plan.







Case Study 3 - Living Roof – Farringdon Station (large)

As part of the Thameslink Programme, Farringdon Station has undergone extensive work in preparation for the opening of the Elizabeth Line. Initial ecological surveys carried out at the start of the redevelopment recommended the inclusion of a living roof in the design of the new station building to increase foraging opportunities for certain bird species[8].

The new living roof can be used by a number of species which are subject to action plans at national and local levels, including birds, bats and a range of invertebrates. It also helps contribute 20% of the London Borough of Islington's annual Biodiversity Action Plan target for habitat creation. Despite its innovative nature, the installation of the new living roof was nearly £40,000 cheaper than using zinc.

Farringdon's new roof was named winner of the Ecology and Biodiversity category in the CEEQUAL Outstanding Achievement Awards 2013.

3.5. Volunteers

A great way to improve biodiversity is to engage with local volunteers, community groups and Community Rail Partnerships (CRPs). Communities can provide vital help by appreciating, protecting and enhancing biodiversity at their local stations. The rail industry supports and encourages volunteering via community rail partnerships, station adoption groups, and other community partners. Many operators also provide volunteering days for employees which can be used to better the station environment, which has proved successful in bringing colleagues together, improving employee well-being and enhancing the biodiversity value of stations.

> **"The CRP volunteers tend to be very committed to enhancing stations through planting and are particularly keen to encourage bees. I think the CRPs are successful because they have access to volunteers and have relatively low costs, compared to using a grounds maintenance company."**
>
> ***Great Western Railway***

Community Rail Network's Value of Community Rail Report[9] records around 8,500 volunteers give more than 390,000 hours every year to delivering community rail activity, on initiatives including community gardening, station maintenance, events, schools' engagement, walking and cycling activities, and accessibility programmes. This activity is calculated to be worth up to £33.2m in their contributions to stations and communities, and in social value to community rail volunteers themselves.

Supporting volunteers and station groups to come up with their own ideas for biodiversity improvements, especially working with local conservation groups, is a great way to maximise opportunity and improve the overall benefit to the station and its local community.

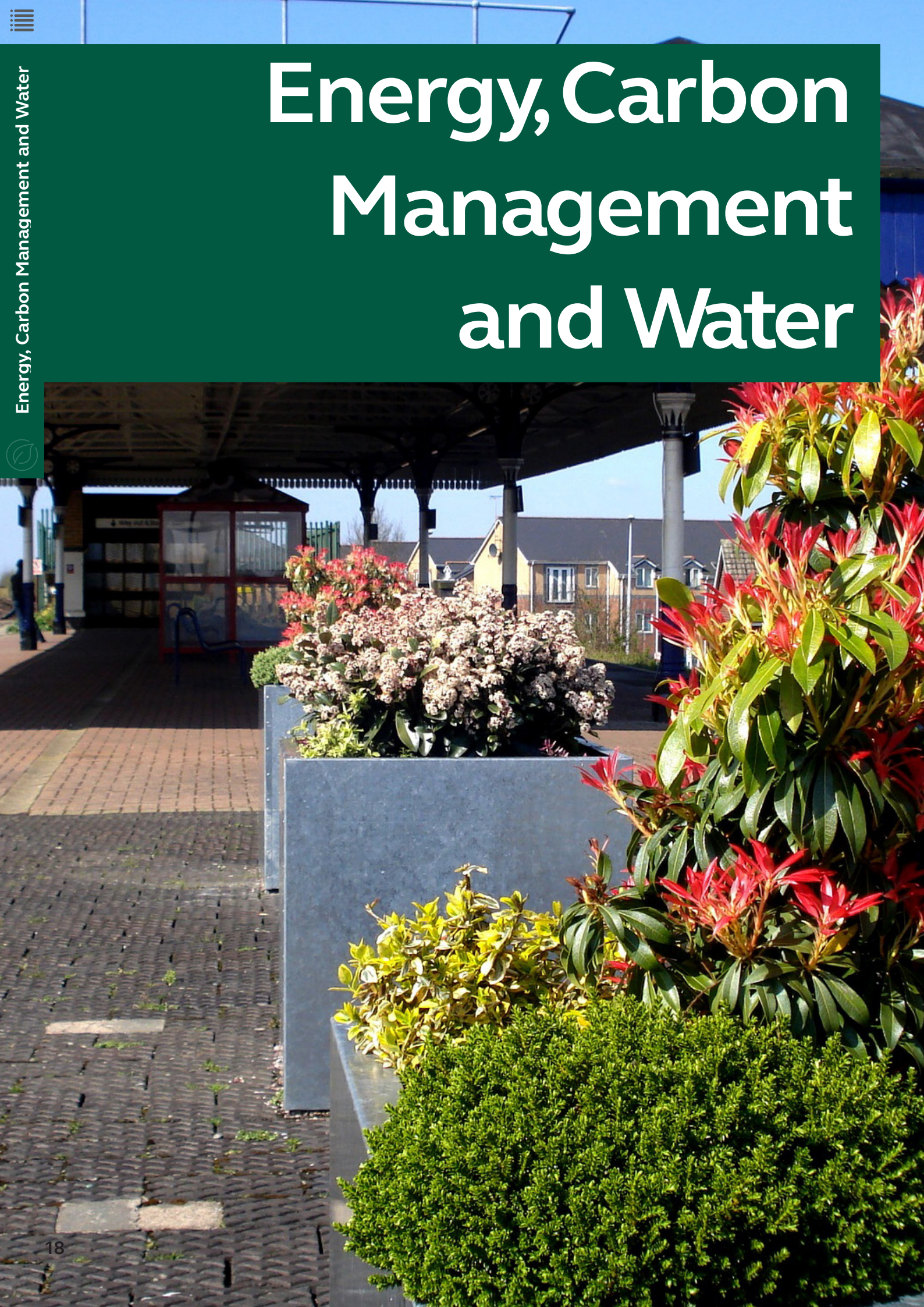
3.6. Biodiversity resources

The following resources and contacts are provided for Operators to find out more about what options are available to enhance biodiversity outputs at your station.

Link	Doc name, Charity or Organisation:	Description
	Bee Friendly Trust	The Bee Friendly Trust is a charity working with railway authorities, community rail partnerships, and local groups across GB to install bee-friendly flowering planters, fruit tree orchards and micro wildlife gardens on railway station platforms.
	Keep Scotland Beautiful	Charity that campaigns, acts and educates on a range of local, national and global issues to change behaviour. They provide environmental campaigns, services and practical initiatives that help Scotland with its environmental ambitions and problems. Activities focuses on four main areas: Sustainable Development Education, Local Environmental Quality, Sustainability and Climate Change, and Environmental Services. Keep Scotland Beautiful has a wide range of materials and advice on Biodiversity.
	Community Rail Network	Supporting and advising on station adoption and community rail partnership activities.
	Kew Gardens	Providing native plant seeds.

Link	Doc name, Charity or Organisation:	Description
	**The Tree Council**	Supporting tree and hedge planting. The Tree Council inspire and empower organisations, government, communities and individuals with the knowledge and tools to make positive change in planting and preserving trees and greenery.
	**ScotRail**	ScotRail's Biodiversity Fund programme is enhancing the biodiversity of Scotland whilst delivering economic, well-being and social sustainability outcomes by offering learning and development opportunities to local communities, including school children, the long term unemployed and vulnerable individuals. ScotRail have experience in delivering over 40 biodiversity fund projects and were nominated for a top Sustainability award in 2019 for its work to improve biodiversity across Scotland's Railway. Finalists in the Vibes Awards, won a Green Apple Award and were shortlisted for a RSPB Nature Of Scotland Award. TCV bring people together to create, improve and care for green spaces. From local parks and community gardens to Local Nature Reserves and Sites of Special Scientific Interest; from school grounds and hospital grounds to waterways, wetlands and woodlands; we connect people to the green spaces that form a vital part of any healthy, happy community.
 	**The Wildlife Trust**	The Wildlife Trust are working with operators, Network Rail and government to improve biodiversity at stations and across infrastructure projects in accordance to the Wildlife Trust Benchmark Scheme.
	**RSPB**	The RSPB can help you identify birds, and provides a tool (https://www.rspb.org.uk/birds-and-wildlife/wildlife-guides/uk-conservation-status-explained/) for you to check whether birds in and around your station are of conservation importance.
	**Biodiversity Toolkit: For Adopt a Station Volunteers**	This toolkit is designed to aid your work to create beautiful places which can be enjoyed by all and, in the process, contribute to the biodiversity of our railways.
	**Incredible Edible Network**	Incredible Edible Network work with organisations and CRPs to create food-based projects around stations including the installation of planters to grow salad, fruits and vegetables.
  	**Thameslink Programme**	The Network Rail Thameslink Programme was the first Network Rail Infrastructure Project to achieve 'net gain' outcomes for biodiversity. Thameslink Programme provides useful materials and including case studies on biodiversity.
	**Buglife**	Buglife is an organisation devoted to the conservation of invertebrates. Their website provides advice on insects and invertebrates, as well as education workshops.

Energy, Carbon Management and Water



4.1. Energy

Reducing carbon emissions should be a priority across the station's estate, with much of the infrastructure and technology already being available to both reach and exceed Government targets. Improvement of energy efficiency also leads to a reduction of financial costs, as well as improving environmental behaviour and contributing to the enhancement of the economic and social benefit of stations, passengers and the communities they serve.

Efficient use of energy is critical to achieving reductions, including the installation of smart metering at stations, developing and integrating reduced carbon design and renewables, switching to LED lighting and ensuring responsible utility management including the conservation of water.

Approaches to managing utility consumption in your station will be directly impacted by the size and maturity of your energy management plans.

Steps to improve energy management at stations:

- **Smart Energy Systems:** Heating, Ventilating and Air Conditioning (HVAC) systems are heavy energy consumers, particularly in large stations. Introducing smart energy systems is an effective way of managing the use of energy by regulating the HVAC. This makes it possible to manage the temperature of stations more efficiently, and can support the reduction of energy expenditure and associated CO2 emissions.
- **Pre-set temperatures for winter and summer months:** Pre-setting the temperature for winter and summer months, while considering temperature requirements for different station zones is a critical way to regulate energy outputs year-round.
- **Consider the installation of solar panels:** Providing your station has the correct infrastructure, solar panels are a relatively low-cost way to offset costs by generating electricity for free-consumption onsite. Cost of installation varies on station size, permeability and grid connection.
- **Embed energy efficiency and resilience in business processes** e.g. business cases, design, and procurement. Where possible, use a local supply chain to procure goods and ensure energy consumption and associated carbon emissions are considered in the planning, design and implementation of business activities.
- **Developing a culture of energy efficiency and low carbon behaviour** across the station, e.g. staff engagement initiatives and performance management. Consider monthly incentives for operational staff to minimise energy use i.e. avoiding the use of personal plastic use onsite, switching off lights in staff areas after use and encouraging low or zero-carbon modes to arrive at the station ahead of their shift.

4.2. Energy Management Standards

Environmental compliance is often measured by the building/station's scoring against established Environmental Management Standards. The below list summarises the most commonly accepted assessment methods for projects, infrastructure and buildings. All standards, to a higher or lesser degree, will rate the asset's environmental, social and economic sustainability performance.

- **ISO 14001** is the international standard for environmental management. Holders of this standard have committed to continual improvement.
- **ISO 50001** is the international standard for Energy Management and will give a clear message that your organisation is committed to Energy management. The standard is a commitment to continual improvement.
- **Energy Savings Opportunity Scheme (ESOS)** is required for all private businesses with a turnover above £45m or over 250 employees.
- **Carbon Trust Standard** is an assurance system that recognises organisations that follow best practice in measuring, managing and reducing their environmental impact.
- **BREEAM** is the most common sustainability standard for buildings with an assessment undertaken by independent licensed assessors using scientifically-based sustainability metrics and indices which cover a broad range of environmental issues.
- **CEEQUAL** is an international evidence-based assessment, rating and awards scheme for civil engineering, infrastructure, landscaping and public spaces including rail and stations.
- **EPCs/DECs** are energy performance certificates that use a rating scheme to summarise the energy efficiency of buildings in the European Union. The building is given a rating between A–G.

Increasingly TOCs are required to have external certification for projects of a certain type of size. For buildings, this is typically BREEAM or Equivalent.

Most stations are not buildings and as such are exempt from the energy performance of buildings directive, however self-contained buildings on the station site may qualify, so getting an impartial opinion on which buildings are captured is important to understand.

The majority of TOCs have a formal obligation within their franchise agreements to adhere to ISO50001, which is designed to support organisations in all sectors by providing a practical way to improve energy use through the development of an energy management system (EnMS).

At least 75% of the TOC estate have an obligation to meet at ISO 50001 and ISO 14001 standards

4.3. Energy audits

Reducing energy consumption may first require undertaking comprehensive energy audits. Basic tools for energy audits are available from the Carbon Trust or from other community interest groups.

The following common recommendations for large, medium and smaller stations are provided by LNER:

Small or Low-Cost Initiatives

- **Assign an Energy Champion** Having an energy champion for each site or group of sites who has the authority to read meters, brief staff on training days and share performance data is crucial to keeping the messages and positive feedback loops going across the business.
- **Collect Data** Metered data for utilities is usually robust enough for reporting indicative trends. For more detail, this may need to be addressed in employee awareness and training at nil or operational cost. The same principle can be applied to waste through contractor data.

- **Create station specific and route wide energy targets** If your energy data is currently poor, base this on data from off charging schedule/QX calculations or on directly metered energy consumption until utility data becomes more reliable.
- **Provide station teams with better information and training** to improve awareness and performance: (1) Responsibility could be given to on site teams for their energy use; (2) Introduction of "Data Dashboards", regular updates outlining key environmental targets and current performance; (3) Training for onsite staff on controls and optimal settings; (4) Awareness training and awareness campaigns, such as "switch off" events.

Medium cost Initiatives

- **Add performance observations to management inspections** to build a feedback loop for utility issues. Most teams should report regularly to safety teams on inspections, and anything out of place including property faults will be identified. Adding key questions regarding leaks, whether lights or other equipment are left on, whether it is too hot or cold, can help escalate issues on sight, and improve environmental performance once resolved.
- **Maintenance requirements** are an opportunity to review underperforming and aging heating or cooling assets. Boiler inspections, fixed electrical test and air conditioning inspections are examples of reports that can be used to evidence poor performance and build a business case for renewal or replacement.
- **Introduction of a clear specification for new fittings and replacements** with consideration given to life-cycle costing and operational efficiency. Procurement should happen at the station and project level. Specification of products that fit the company's strategy, communicated and controlled through procurement, will deliver consistent energy efficient and compatible replacements.
- **Natural light can be optimised through regular cleaning of windows, skylights and canopies.** Washing of windows and canopies not only makes the station look nicer it also ensures light sensors can work effectively and that natural light can be utilised as far as possible.
- **Install insulation wherever possible in new projects** and where heating is required for long periods in the station. Insulation should be installed in the roof, walls and around pipe work in a planned programme, starting with the most used systems. If you heat a space, you should insulate it, if you cool a space you should definitely insulate it. Insulation can be put external to the space, internally lined, on top of suspended ceilings and under floors. Where this cannot be done, consider ways of sectioning the space so the "conditioned" air is kept in the space.
- **Glazing should be replaced or secondary glazed** as an improvement programme starting with the rooms with highest occupancy. High quality double glazing is very effective at retaining heated or cooled air. Many older buildings have poorly sealed, single glazed windows which will allow drafts and heat loss to happen. If you are heating a space, ensure you have filled as many gaps and enhanced the opening, including doors and windows. For stations that are listed buildings, this may not be viable.

Large or higher-cost Initiatives

- **Explore on-site energy generation** for each site and identify high potential sites. In particular:
  - Solar collectors for electricity and water
  - Site mounted wind turbines
  - Heat pumps for replacement of heating systems
  - Solar panels can be placed on roof areas, as car park canopies or simply ground mounted. Payback vary but are typically around 12 years (2020 prices) with the correct orientation.
- **Consider building mounted turbines** If considering a turbine, the larger the turbine is, the more efficient it will be.

- **Introduce air source heat pumps** which offer cooling and heating and can be:
  - Small and stand alone and serve one waiting room, controls and good insulation are crucial to making this efficient.
  - Large units that serve several areas, this heated or cooled air would normally be transferred to the rooms through ducting in the suspended ceiling.

4.4. Energy case studies

Case Study 1 - Accrington Station, Lancashire – Solar Panel Installation

Accrington Station installed 12 six KWp Solar PV panels on top of lighting columns around the perimeter of the car park. The second phase of the project saw a further 18 solar panels installed on the station roof. In total the solar panel system provided over 5000 kilowatt hours of electricity and reduce carbon emissions by over three tonnes every year for the next 25 years.

The Low Carbon Energy Company were awarded the contract based on the fact that we are a local company and where possible could use a local supply chain to procure goods. This was a key component in the delivery of the project which aimed to procure services that are sustainable and reduce energy consumption and CO2 emissions.

Solar panels on the roof and in the carpark produce up to 30% of the electricity needed at the station and Solar-heated hot water helps to keep the station warm.

The station building also incorporates a community learning resource centre where the station is used as a centre for educational purposes and county council-run workshops. Over 4,500 children from 50 schools have visited under the Schools Education Programme to date, supported by Community Rail Lancashire.

Industry awards include the National Rail Innovation Awards, Network Rail Partnership Awards, Community Rail Awards, RICS NW & National Awards along with others.

Case Study 2 - Greater Anglia – Wireless Energy Management Systems

GA use Wireless Energy Management systems across 39 of their stations to reduce energy consumption. GA provided their supplier, Aimteq, with all their stations half hourly energy consumption data for a year. Aimteq identified the stations that would give best savings if implemented. It was installed into 39 stations and 3 depots. The sensors can be pre-set and there is a 2-degree band either way for temperature control.

GA estimate a total £190,000 saving on electricity bills.

Lessons learnt:

- Upon installation in 2018 it was coming back that waiting rooms were extremely cold. GA found that a door closures or heating units were not functioning, so the WMS proved a useful tool for asset performance.
- When installing the Voltage Optimisation Equipment (VOE) based on highest consuming stations GA found that the voltage consumption was to high, caused by shared use of their electricity supply with Network Rail.
- Once this was identified and raised with Network Rail, necessary steps were taken to ensure individual supplies were possible and functions running off those supplies were not a hazard to emergency generators.

4.5. Lighting

Ensuring stations are well-lit to support accessibility, wayfinding, customer needs and the operational running of the station is important. In order to ensure our lighting solutions are environmentally responsible, LED lighting offer the most straight-forward solution to be cost-friendly and environmentally efficient.

Most TOCs have now already successfully switched to LED lighting at stations. LED lighting supports sustainability in several ways:

- Low energy consumption (LEDs use less energy than other types of light bulbs)
- Brings down cost by reduced demand on energy grid
- Less demand on the natural resources required to power the grid
- Reduced maintenance costs over florescent tube systems

Going a step further in efforts to address lighting could also see the introduction of the following initiatives:

- **Consider using intelligent lighting systems** i.e. lighting that is time-based or uses sensors to determine appropriate use
- **Consider the stations local surroundings** when deciding what bulbs are most appropriate for the station. Stations in rural areas could risk disturbing station neighbours if lights are bright, or frequently turning on or off. This is especially applicable during off-peak times i.e. during the night.

Case Study 1 – Arriva Rail London

Arriva Rail London have recently undergone a programme of lighting replacement across their estate. Following an intensive tender process to ensure that Arriva Rail London were procuring a solution that would provide best value over lifetime, Dexeco were selected to supply products to replace lighting on open platforms and under canopy areas. Detailed surveys and lighting schemes were undertaken to ensure that the proposed solution would provide Arriva Rail London with a safe and compliant solution whilst achieving the energy savings required.

After the project was completed, the average energy saving across all stations total energy use was 12%, ranging between 7% savings and 25% savings depending on the size of the station. By installing state of the art LED lighting in their platform and canopy areas, Arriva Rail London have achieved an estimated 50% reduction in the lighting electrical load, whilst simultaneously improving the quality and reliability of lighting in these safety critical areas.

4.6. Water conservation

Monitoring systems should be applied to mains water supply/meters. Automated Meter Readings (AMRs) can then be used to identify and track any leaks and excessive usage that needs to be addressed. The data collected can then be aggregated to identify longer-term trends and issues.

The data can be displayed to relevant staff via the use of a portal. Having this information to hand will allow for informed decisions to be made, such as whether it is cost efficient to repair or replace particular equipment.

Having this information to hand will allow for informed decisions to be made, such as whether it is cost efficient to repair or replace particular equipment.

Water usage will of course be linked to the usage and particular activities at individual stations. For example, a station which sees tanking and train cleaning will see higher levels of water consumption.

Fixtures and fittings also play a key role in water consumption. It is recommended that TOCs look to procure efficient equipment (e.g. toilets, taps, etc). or example, the use of percussive taps that can allow TOCs to set the run-time.

greateranglia

If we detect more than 60 litres of water over a 24hr period, it makes us investigate. Previous experience has resulted in leak-detection which has enabled long-term cost savings when resolved. Approximate costs for installing a meter is £250 plus a maintenance cost thereon of approximately £50

There is a growing public consciousness around the waste caused by plastic bottles. As a result, there is pressure to increase the number of water fountains available to the public and passengers to fill up their reusable bottles. This is explained in more detail under Community (6.3).

Rainwater harvesting can be used to collect water for certain tasks i.e. flushing and station gardening (see Section 3 and 4.1). This has been done at Accrington station in East Lancashire. Accrington features a water recycling tank that uses rainwater for station toilets, rather than drawing clean drinking water via the mains.

4.7. Water Management

Water management and conservation should play an important part of the whole-building sustainable design strategy. There are a number of strategies that can be implemented to reduce the amount of water consumed at a facility. In general terms, these methods include:

- System optimisation (i.e. efficient water systems design, leak detection, and repair);
- Water conservation measures; and
- Water reuse/recycling systems.

There are often tensions in water management options at stations and resolutions to water reservation is not always straight forward. For example, biodiversity gardens and features (see section 3) require water supply i.e. fitting water butts into stations and enabling outside use. However, water refill points will often mean water usage increases. Where this is a concern, individual assessments of water usage at the station should be conducted to determine where solutions are likely to bring about wider sustainability benefits.

Case Study 1 – Birmingham New Street

Birmingham New Street aims to minimise the consumption of potable water by the use of dual flush cisterns in all toilets along with low flow sensor taps. All water consumption is also to be monitored via the BMS to allow close monitoring of consumption, something not regularly carried out at managed stations. A leak detection system will also produce an alarm in the control room if a leak is detected in the system. The project has also constructed a large 100m3 rainwater collection tank that collects clean rainwater from the roof and facade to provide for more than 60% of the stations toilet flushing demand and irrigation for planting. Other attenuation tanks have also been installed to prevent flooding from overwhelming the main local sewer during periods of intense rainfall due to the future effects of climate change and increased risk of flooding in the city.[10]

4.8. Water Fountains

Installing water fountains at stations is a way to reduce the use of plastic by our station staff and station users, while delivering significant benefit to customers and communities by improving access to natural resources and improving the overall passenger experience.

Recording the total litres of water use from fountains also enables industry to estimate the number of single use plastic bottles not purchased as a consequence.

Network Rail have been successful in helping save the purchase of over a million plastic water bottles in the year 2018-19, by supplying free-to-use water fountains at all 20 of their managed stations.[11]

To encourage customer-use, Network Rail teamed up with City to Sea, a national charity working to reduce plastic use by providing practical solutions, running campaigns, and changing public behaviour to champion reuse over single-use plastics.

Network Rail joined the City to Sea annual campaign 'National Refill Day' to demonstrate the ease of refilling water bottles on the go.

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Greater Anglia have also installed water fountains at 25 of their managed stations. Their fountains are plumbed into their mains supply, which also allows the water to be chilled. Every time someone fills up a bottle, it is recorded on the meter of the machine so that GA are able to monitor the estimated number of plastic bottles avoided.

With installation costs of around £250-£300 per fountain, GA targeted the top 25 stations in terms of footfall to determine what stations would generate the most benefit for passengers.

4.9. Energy and water management resources

Link	Doc name, Charity or Organisation:	Description
	BREAAM	The BREAAM water category lists ways to encourage sustainable water use in the operation of the building and its site. Issues in this section focus on identifying means of reducing potable water consumption (internal and external) over the life time of the building and minimising losses through leakage.
	Commissioning an Energy Efficient Projects	Information from the Carbon Trust to help organisations commission energy efficiency projects.
	Energy Management for Business Guide	Carbon Trust provides a range of tools, guides and reports to help achieve your sustainability goals.
	The Wildlife Trusts	The Wildlife Trusts is a grassroots movement of people working to protect wildlife and future generations. They provide a number of initiatives to conserve water usage.

Waste and Recycling

There are a wide variety of waste management approaches across TOCs. Waste management processes will inevitably have to take local circumstances into account (i.e. station size and footprint, passenger numbers, security issues etc.) but there are certain steps that can be taken to improve the process, by reducing waste, encouraging greater recycling and developing a more sustainable system overall.

5.1. Waste Management

Collecting, processing and removing waste from stations, and the railway in general, is a complex process. In many cases, waste is collected and then sorted by a contractor. Depending on the agreement in place, waste may be separated at collection (i.e. non-recyclable/recyclable paper/plastic/glass etc.) or it can be collected all together and then separated. A key issue is cross-contamination between different types of waste and how best to avoid it.

Many stations also collect waste from trains. On-board cleaning teams will remove rubbish from a train's bins and then add that to the station's own waste. Consequently, when processing waste, the relevant team or contractor may also need to consider the type of waste being collected from a particular route, and when and where segregation of waste is carried out (on or off the train). For example, a commuter route is more likely to dispose a larger number of newspapers than a non-commuter route.

The waste collected will come not only from passengers using the railway, but also from tenants at the station, including retailers. As a result, some larger stations can have considerable quantities of waste to process.

Where possible, TOCs and SFO's are encouraged to:

- Reduce waste at the offset. For TOCs own waste this can be done by working with suppliers and negotiating delivery and packaging requirements.
- Reduce volume of waste at large sites by use of compactors.
- Promote waste segregation at the collection point and educate/inform passengers about how to responsibly dispose of waste i.e. posters, comms channels, roadshows.
- Communications messaging is needed to help develop a culture-change about how passengers dispose of their waste (e.g. on train, at station, or at home). This is likely to be a long-term solution.
- Lease arrangements with tenants can be used to help incentivise/penalise certain waste management behaviours. Terms could consider environmental responsibility, sourcing and waste disposal.
- Consider how contracts with waste contractors can be optimised (e.g. smaller bins, changes to onsite storage and processing). Contracts could be aligned with an operator's environmental commitments.
- Consider how best to collect/process/separate on-train waste. This could include the layout and number of bins on board or at stations.
- Consider using different coloured bags for different areas to better identify what waste is coming from where.
- Locate waste collection in high traffic areas of the station.

Security measurements can often limit the amount of bins available, and risk assessments should be followed to determine the business case for implementing increased waste disposal points.

5.2. Recycling

Encouraging more people to recycle is a key pillar of creating a more sustainable railway. Many operators closely monitor recycling rates to identify areas that require more progress. Some also use local partners to adapt their recycling collection management process to the various facilities in their immediate local area. This has resulted in recycling rates increasing.

Recycling bins that separate recycling categories at the point of collection can also help improve recycling rates. However, their location and relevant security concerns need to be taken into account.

When recycling, consider:

- Sensors can be used in bins to identify how full they are and learn their weight.
- Waste brokers can be used to tailor recycling management to the local facilities available.
- Installing split recycling bins to encourage segregation at the point of disposal.
- Partnering with CRPs, station adoption groups and local schools to create awareness and reuse of materials i.e. by donation to local charities or community groups.
- Working with local newspaper providers on recycling to create shared awareness campaigns and collection initiatives.

5.3. Innovation

Technology and streamlined management processes can be used to improve waste management and recycling rates at stations.

Sensors can be used to identify when bins are becoming full or reaching their weight limit. This allows for optimised waste collection by either station staff or contractors, reducing unnecessary collections and associated issues (e.g. road traffic and congestion around the station site).

Data can be fed into dashboards that keep a running summary of an operator's or a station's waste management processes. These can factor in incoming and outgoing waste and trace where different types of waste are coming from. This information can be used to inform agreements with retailers and contractors.

New types of bins that can collect more waste and compact it are becoming common in public spaces and could also be used in specific places on the railway, subject to any security risks and concerns being appropriately managed.

A future objective for station waste could be the national standardisation of "Waste Management Practices for the Railway" including signage, segregation process, type and colour of bins with a nationwide launch campaign. All TOC's, no matter which region, service or size would manage waste all in the same way in order to make it easier for customers to adhere to.

5.4. Waste and Recycling case studies

Case Study 1 - Network Rail – Victoria Station Recycling Scheme

At Victoria station in London, Network Rail have been working with The Green Block, an innovative waste management company to improve their waste collection process. The system uses a dashboard to record in real time inbound and outbound waste. Before implementing the system, recycling rates were between 12-15%, and since its implementation they are now around 90%.

Manual segregation officers segregate the waste out, clean it to ensure there is no contamination and then process it via machine. The whole process is carried out on site to ensure a lower carbon footprint. The waste streams are then taken to different places to be processed by specialist subcontractors and recyclers.

The process has allowed Network Rail to off-charge waste management costs back to retailers and/or TOCs as necessary, which was not previously possible as there was no way to trace back where specific waste had originated. After 6 periods, Network Rail intends to bring a cost-benefit analysis together ahead of rolling it out at more stations.

Case Study 2 - South Western Railway Recycling Programme

In 2018, SWR received plaudits for its work with waste broker SWRnewstar to minimise its environmental impact. Throughout the year, SWR's passengers, staff and operations generated over 5,000 tonnes of waste but through new and improved management processes were able to recycle 78% (3,900 tonnes) and hit a zero waste to landfill target 8 months early. Since July 2018, 100% of SWR waste is diverted from landfill to either be recycled or used for energy generation.

SWR wins Green Apple Award in recognition of their green credentials

Community

The railway has a specific role to play in developing sustainable travel, with rail travel shown to produce some of the lowest greenhouse gas emissions by transport type. Crucial to developing sustainable travel and encouraging modal shift towards lower carbon journeys, is by engaging with communities.

Community engagement can deliver far-reaching benefits to station sustainability, both by input and output. Evidence shows community volunteers contribute to the station's sustainability performance (see Section 3.5 on Biodiversity and Volunteers), but also have far-reaching benefits to the health and wellbeing of station's environment and individuals within its community. Especially as the issues and dynamics for each station will be different, having a process to engage with and listen to local community needs is vital for success. For train operating companies, supporting and working with active community groups and community rail partnerships (CRPs) will deliver invaluable community insight, to bring about sustainable development that taps into local identities, aspirations and needs.

Through creative local thinking and resourcing, community groups and volunteers also deliver benefits that do not have to be costly and are often successful in providing the much-needed alignment with local councils and planners.

Case Study 1 - Community Rail Cumbria Cycling and Walking projects

Community Rail Cumbria are using their strong relationship with Cumbria County Council to better link walking and cycling with rail.

They are working in partnership with the county council to help them complete local Cycling and Walking infrastructure plans (LCWIPs) for the six major towns across the county, advising on requirements for cycling and walking routes to/from railway stations. They are also working with the active travel team to support healthy lifestyles, exploring the potential to use station volunteers as local walking guides.

Other projects include working with local bus companies to strength connectivity between rail and bus services, with the potential for some services to be re-routed to serve stations, working with Northern Rail to explore increasing cycle capacity on trains and improving signage and information for walking and cyclists in and around stations.

The umbrella body for community rail, **Community Rail Network,** have published a number of reports showcasing the value of community rail, including information on engaging with volunteers, access to funding, station travel plans and toolkits which can be found on their website: **https://communityrail.org.uk/resources-ideas/reports-resources-tools/**

6.1. Volunteers

In-depth research interviews with organisations active within the community rail movement found that while enhancing use of our railways remains a key driver, there is widespread acknowledgement that community rail can deliver social value in a range of related areas, and evidence of this happening, linked to all four pillars of the Department for Transport's Community Rail Development Strategy (1) providing a voice for the community; (2) promoting sustainable, healthy and accessible travel; (3) bringing communities together and supporting diversity and inclusion; and (4) supporting social and economic development.

Many organisations within community rail have reported a key area in which they felt they were delivering value is by promoting the railway as an environmentally friendly alternative to car use, and breaking down barriers to travel, whether perceived or physical, and highlighting the importance of green travel.

Engaging with local volunteers and station adoption groups can:

- **Empower** local people and communities to have more sustainable lifestyles
- **Deliver** community-led schemes and activities at the station that are relatively low cost but high-impact
- **Generate** a sense of community ownership on sustainability initiatives, which supports long-lasting development
- **Improve** biodiversity value of the station through volunteer support and community-led gardening projects
- **Promote** walking and cycling activities and improving accessibility to support integrated transport and sustainable modes to complete first and last mile travel
- **Educate,** engaging with local schools, young people and isolated members of society to improve inclusion in rail. This will expand the use of rail travel in the long term, as an inclusive and sustainable mode of travel
- **Enable** stations to be beacons of sustainable development, with communities at their heart.

6.2. Community Disturbance

Industry stakeholders must consider community disruption prior to and during station upgrade programmes. It is not uncommon for sustainability improvements to disturb the local community, especially in rural locations. For example:

- Installation of LED lighting in isolation of automated lighting systems can create light pollution to nearby station neighbours during evening services
- Infrastructure works can create noise pollution and physical disruption to station neighbours and surrounding communities
- Changes to the stations facilities during development and redevelopment can deter the local community from travelling
- Damage to local environment and wildlife during station, infrastructure and line side upgrades

Operators and Station Facility Owners (SFOs) should ensure community disruption is avoided or minimised. **In doing so, please consider the following guidance:**

- Conducting risk assessments to identify ways to minimise disruption
- Efficient use of customer information to inform the local community on the progress of the development (and when it is expected to be complete)
- Keep noise and light pollution to a minimum, especially in rural locations
- Consider the use of automated lighting systems on the station platforms, which will reduce electricity costs and environmental impact while being community-friendly
- Listen to the community's concerns and consider alternative solutions to improve environmental performance.

Air Quality

Air quality, and its implications for public health and the environment, have become a high-profile issue in recent years. The impact of poor air quality is particularly pressing in urban areas and awareness of the problem, and its causes, is growing amongst the general public.

For the railway, air quality is an especially important issue at stations. Elevated concentrations of nitrogen oxides (NOx) and particulate matter (PM) are found at stations for a number of reasons, such as internal pollution sources like idling diesel engines and poor air flow and ventilation. Retail units and external pollution sources also contribute to the higher levels.

In June 2020 the Air Quality Strategy Framework was launched by RSSB to set out a path by which the industry can work to significantly reduce harmful pollutant emissions that affect passengers, staff and the wider public[12]. This also included key sections on station air quality, how it interacts with the wider railway, and how it can be mitigated.

Air quality at stations cannot be tackled in isolation. It will form part of the wider railway's efforts to decarbonise and reduce pollution and will also fall under broader occupational safety and health initiatives designed to help those in and around the station environment.

The sections below outline several areas where steps can be taken to improve station air quality.

7.1. Monitoring station air quality

A running theme throughout much of the existing industry literature on air quality is the need for monitoring. This can take the form of both general monitoring across a station and personal monitoring to identify staff exposure.

- **Support will be needed from both NR and TOCs** for the initial installation of monitoring equipment and its subsequent management and maintenance.
- **Funding for and organisation of monitoring equipment may also be available** via research partners (e.g. a local university) who are keen to get real world data.
- **Consistency in the long-term is required;** a wide range of monitoring projects currently exist.

For more information on monitoring air quality, inside and outside the station, please refer to: rssb.co.uk

7.2. Managing station air quality

Interaction between a station and its local environment is important. The following recommendations are intended to guide station responses to improving air quality:

- **Address train idling** wherever possible.
- **Consider removing private vehicles from around the station** site where possible to optimise ventilation. Consider the best area for taxi ranks and bus stops that does not hinder the quality of air in the station forecourt.
- **Identify** and mitigate poor air quality resulting from station retail (and other occupants).
- **Pay attention to wider pollutants:** Local traffic, congestion and relevant measures (e.g. pedestrianisation schemes) can have an impact on station air quality.

- **Consider Air Quality Management Plans.** TOCs should look at local Air Quality Management Plans and relevant best practice examples. Stations may well overlap with existing clean air and management zones.
- **Engage with local authorities.** Local authorities may already be factoring rail into their own air quality and environmental strategies. Where possible, TOCs should engage in these discussions and help facilitate pedestrian-friendly design and forecourts, cycle parking, well-sited bus stops and timetable alignment.

7.3. Air Quality case studies

Case Study 1: Birmingham New Street Station

The nature of Birmingham New Street station presents a real challenge when managing air quality, with platforms essentially sub-surface with a low ceiling height, and a high number of diesel trains using the station. Therefore, an innovative ventilation system and intelligent operational controls are required to manage air quality at platform level.

Air quality data was monitored in detail over a number of years from winter 2016. This included a partnership with the University of Birmingham. The data monitoring highlighted that nitrogen dioxide (NOx) was the main pollutant at platform level. With real insight into what was happening at platform level a system has been established where air quality data feeds directly into managing the ventilation system. One hundred air quality sensors now provide real time NO, NO2 and CO2 levels. This data feeds into the control of the extract ventilation system to increase or decrease the speed of 98 ceiling mounted 'jet' fans and aim to improve air quality along the platforms. A digital display in the station control room provides a real time graphic of the emission levels at each platform and the speeds for each jet fan. This is also linked to the Building Management System (BMS) and logs data over a 10-day period.

As well as the 'intelligent' ventilation system that went through an enhancement in 2019, the data gathered and analysis in the station, alongside stakeholder engagement has also been used to develop and issue new guidelines to the TOC's to help minimise and reduce train idling. Rotation policies have also been implemented to ensure that employees rotate their activities and are not working at platform level for prolonged periods. Implementation of technological solutions that shutdown engines and avoid engine idling were also implemented.

Whilst direct comparisons are difficult to draw given the impact of Covid 19 on the rail network, initial data analysis suggests that the new ventilation system alongside behavioural and operational changes have had a significant impact on reducing NOx levels at platform level when comparing a week's data from 2016/17 with a week's data from February 2020.

Case Study 2 – Network Rail and ScotRail 7 Station Trial (7 station initiative)

In Scotland an Air Quality Working Group has been established between Network Rail and Abellio Scotrail.

Through the working group an action plan has been created. This includes specific activity to develop air quality management plans for 7 main stations across the network. Within 4 of the stations specialist air quality monitoring will also be set up. Over a 4 week period in each station 10 sampling points will collect air quality data to provide an accurate insight into what pollutants do or don't exist at ground level helping to inform next steps for the action plan.

7.4. Air Quality resources

Link	Doc name, Charity or Organisation:	Description
	Air Quality Strategic Framework, RSSB	The framework details a series of recommendations based around modelling, mitigating and monitoring.
	Rail Air Quality Mapping (T1186), RSSB	Updated and improved resolution mapping of GB rail emissions
	Air quality personal monitoring (T1191), RSSB	Survey of rail workers exposure to DEEE and best practise guide for further studies
	Revised guidance on air quality and health effects in rail (T1192), RSSB	'Toolbox Talk' style guide or web page covering basics on air quality in rail
	Rail standards review for Air Quality (T1232), RSSB	Up to date assessment of how rail standards interact with the industry's air quality efforts and any recommendations for changes
	Air Quality and Emission Targets (T1233), RSSB	Industry agreed targets for air quality across the rail network.
	Webinar: Improving Air Quality in Rail, EMSOL	Webinar detailing the cross-industry work being carried out with EMSOL to improve station air quality, including at Birmingham New Street and Bletchley.
	Air Quality Strategic Framework	The rail industry, through RSSB, established the Air Quality Steering Group to develop a collaborative approach to understanding and mitigating air quality risks. The resulting Air Quality Strategic Framework, published in June 2020, is based on a robust, risk-based approach to reducing air quality impacts. The framework details a series of recommendations

Station Design

It is critical that the design and development of stations is undertaken in a way which enhances lives in a positive and socially responsible manner. Stations are weaved into the fabric of our daily lives, so it is important we understand how changes to station design will impact our local communities, reduce our carbon footprint and support sustainable development.

8.1. Physical infrastructure and assessment considerations

To improve resource efficiencies and optimise the sustainability performance of the station, the asset owner must assess and measure its performance. This will also help bring down energy costs, which is important for the business when operating in an environment that has increasing prices of energy and natural resources.

Wider environmental and sustainability aspirations of the business will be supported by continual improved performance of operational managed buildings and property against national and international sustainability indicators (refer to Section 4.2 on Energy Management Standards).

Sustainability measures should be incorporated in to all existing and new station design, their construction, and operational management practices. The purpose of using these sustainability requirements is to design and deliver more sustainable buildings and operational property on a minimum Whole Life Cost (WLC) basis. Methods such as BREAAM and CEEQUAL are good indicators of assessment certification and should be used where possible in the operational and refurbishment stages of the building in question.

Due to the diverse nature of the station estate, it is recommended that sustainability measures are selected to best suit the station's specific assets. There are number of sustainability measurements and assessment methodologies available and it is recommended to consider the following when improving and measuring the sustainability performance for any development:

Further to traditional assessment methods, new station design development proposals should consider the following:

- What are the opportunities for efficiencies in sustainability?
- How will the sustainability and maintenance of assets be improved through their development?
- How does the asset development meet the requirements of an evolving society?
- How does the design reduce levels of waste and provide for better future flexibility?
- How is long term data capture used to improve the monitoring of the station's sustainability performance?
- Does the design address future station capacity requirements?
- How will the development benefit our community?

- How are local communities and stakeholders being consulted and engaged on the development plans and throughout the process?
- What are the diversity and inclusion constraints of the existing asset, and how can they be improved?
- How does the design improve the lives of people who use the station?
- How does the design interface clearly with other transport systems?

It is important that all new construction and refurbishment schemes include wider stakeholder engagement during design and planning stages and minimise disruption to local communities in the development process (See section 6.2 Community Disturbance).

It is highly recommended that low carbon technologies shall be explored to meet further energy requirements such as: heat pumps, solar technologies and solar thermal technologies, wind turbines (in consideration with cost benefit analysis), biomass heating.

It is further advised that all new construction and refurbishment schemes encourage passengers, staff and other users to walk, cycle or use public or community transport, by ensuring adequate facilities and accessible infrastructure to support integrated transport modes, as well as greenery and enhanced biodiversity around the station.

8.2. Future design principles

Stations should continue to be designed in a way that reflects uses and services that correspond to local needs, helping us embed stations as community assets. As we transition to more mature ways of understanding station-usage, our principles of station design will inevitably expand and evolve.

Future design must embody the needs of communities now and into the future. It is important to consider:

- **Facilitating inclusive travel and modal shift** by looking at the 'big picture' opportunities, allowing passengers to start and continue their journey without the use of a private car, by providing maps illustrating walking distances to other locations, and signposting customers to bus/tram stops, and ensuring timetabling is aligned to facilitate onward journeys.
- **Introduction of green spaces** not only to improve the biodiversity value of the station environment, but to allow the station to seamlessly belong in the makeup of the natural environment and deliver ecological and environmental resilience as well as people's increased health and wellbeing.
- **Versatility of space** so that stations are receptive and adaptive to future needs by considering unplanned use as well as planned future use i.e. repurposing empty units as office space or alternative community usage. Stations could also support more sustainable behaviours and community development, such as through parcel collection, zero-waste shops, and community meeting spaces.
- **Achieving maximum energy efficiency** by using state of the art innovation to operate net-zero carbon emissions, such as optimising natural daylight and ventilation, station roof design that reuses rainwater and energy efficient technology such as heat pumps and LED lighting.
- **Implement procedures that align with wider decarbonisation standards** and aspirations and which prioritise local supply chains and low carbon materials.

For further guidance on future design principles please refer to:

1. Network Rail and Design Council 'ThinkStation Design' Report, 2020.[13]
2. Network Rail and ARUP 'Tomorrows Living Station', 2019.[14]

8.3. Design case studies

Case Study 1 – HS2 Interchange Station (West Midlands)

The new HS2 station, to be built in Solihull and near the NEC in the West Midlands, has become the first railway station globally to achieve the BREEAM 'Outstanding' certification – a measure of sustainability for new and refurbished buildings – putting it in the top 1% of buildings in the UK for eco-friendly credentials.

The award recognises the station's eco-friendly features, including maximising natural daylight and ventilation, a station roof design which can capture and reuse rainwater, and features to enable net zero carbon emissions from day-to-day energy consumption.

The station's design includes minimising demand for carbon through the use of natural ventilation and daylighting. Energy efficient technology will be incorporated, such as air source heat pumps and LED lighting. In addition, the station and Automated People Mover maintenance facility have over 2,000m2 of solar panels generating zero carbon electricity.

Directing rainwater from the main station building via a network of underground pipes into a rainwater harvesting tank will assist in providing part of the building's water requirements. The estimated volume of the rainwater harvesting tank is 150m3 which will reduce the mains water demand for the station. The landscaping features sustainable drainage systems to reduce the burden on surface water drainage whilst naturally irrigating planted areas, and there will be new natural habitats created around the station, leaving a legacy of biodiversity and an enhancement of native species.

There will be 222 electric vehicle charging points in the car parking, and cycle storage for 176 bicycles with further room for expansion as demand dictates. There will also be dedicated pedestrian access into the station from the east of the railway, along with cycle access to the new station from the north, west and south-east through a mixture of dedicated routes.

The station design scored highly on a broad range of criteria including Health and Wellbeing, Energy, Transport, Water, Materials, Waste, Land Use and Ecology, and Pollution. In addition a further seven exemplar credits were achieved at design stage, including one for committing to undertaking a Post Occupancy Evaluation (POE) of the building to monitor its energy and water usage against the design predictions, three credits for generating a material efficiency metric and analysis into the embodied carbon of specified building materials, one for a commitment to manage construction traffic and the installation of electric vehicle charging points, and for achieving a higher standard of resilience to climate change.[15]

Case Study 2 – MerseyRail Ainsdale Station

Ainsdale train station has been awarded a top sustainability award for community involvement in the lead up and during the refurbishment project in 2018/19. MerseyRail was crowned the winner of the CEEQUAL Exceptional Achievement Award in the Community Stakeholder Relations category alongside designer Owen Ellis Architects and contractor Morgan Sindall. The refurbishment was funded by Merseytravel and Network Rail.

Ainsdale station is the most environmentally friendly on the MerseyRail network after extensive renovations completed in July 2018. The previous booking office was demolished to make way for a new building, complete with solar panels, low energy LED lighting with smart controls and rainwater harvesting tanks to serve the toilet facilities. The station also has an energy usage dashboard on display in the main concourse to share with the public on energy and water saving measures. Judges were impressed with the team, which they said, "went way beyond in delivering the details for the community" and praised the project for providing "a message to industry on looking for win-wins of delivering multiple outcomes in one project".

The local community was involved from the outset to ensure that the station was exactly what the village needed, and views and issues raised were taken into account and presented as part of the proposed overall solution. Changes in the design of the tower and road marking alternations to prevent overflow parking were incorporated following concerns from nearby residents, while the local community was kept informed of progress and consulted throughout the construction phase. In addition, the station was kept open during the redevelopment programme, ensuring passenger disruption was kept to an absolute minimum. MerseyRail reported 'early community and local councillor buy-in meant the end result was close to our passengers' hearts, and that they had been on the journey with them'.

Various design changes were made that improved resource efficiency of the project, including:

- Change of 'stone oval' to a lightweight frame and cladding design, which enabled reduced foundations and structural steelwork frame;
- Change of cycle storage design from a building to a cage, requiring less materials and foundations;
- Change to the car park design slowing more of the existing surfacing to be retained;
- Retention of existing lighting columns, only changing heads to LED;
- Retention of original footbridge instead of a new build, which was refurbished to an excellent standard.
- Reuse of excavated material which was re-graded and classed for re-use in permanent works minimising waste to landfill and new materials required for back filling;
- Change of piling from concrete piles to stone columns/ground remediation (reducing the need for concrete works on site and spoil off site) and programme benefits;
- Reuse of existing platform furniture which were taken off site, refurbished and replaced.

The Ainsdale station redevelopment met the needs of customers while reducing the operational running costs of the station. Their key driver was to be a leader in sustainable development, delivering a truly sustainable station to meet the needs of the local community as well as delivering the environmental sustainability strategy goal to reduce their impact on the environment.

8.4. Design resources

Link	Doc name, Charity or Organisation:	Description
	**Network Rail Building and Architecture Design Guidance**	Documents, links and guidance for anyone involved in the design and construction of station buildings.
	**Section 5: Roles and Responsibilities in the Network Rail Sustainability Requirements for Buildings:**	Information on the specific roles and responsibilities across the business to deliver compliance on sustainability measures. Can be used as guidance to apply similar governance at TOC level.
	**RDG Vision for Stations**	Detailing the Nine Principles that form the industry Vision for Stations which can be used to inform and support future station design.

Integrated Transport

Cross-modal collaboration is vital to achieving decarbonisation. While rail already has considerable carbon advantages, especially over long distances, industry is committed to working towards a more integrated transport system. This will create more inclusive access to rail as well as more sustainable end-to-end journeys. This includes better integration with other public and community transport modes including through ticketing and timetables, and also improved infrastructure which improves accessibility and builds upon the recent uptake in active travel such as walking and cycling.

Encouraging modal shift and more sustainable access to rail is a long-term process and will require effective planning and coordination between the railway and local communities and government, as well as other transport operators.

> **"Without planning and investment in better interchanges, the absence of affordable, efficient and easy to use alternatives will mean those with access to a private car continue to rely on them. Those without them will continue to be doubly disadvantaged by the negative social and environmental impacts of our over-reliance on private cars, and the inefficient planning and spending decisions that attempt to accommodate them."**
>
> **Campaign for Better Transport**

For a comprehensive overview and advice of how to integrate rail with other modes please refer to:

Community Rail station travel planning toolkit

Campaign for Better Transport publication on Integrated transport

9.1. Walking

Encouraging active, healthy and sustainable travel, in the form of walking and cycling, is a priority at the national and local level. Walking is both the lowest carbon and most inclusive mode, and therefore top of the modal hierarchy. Government strategies have been published advocating for more cycling and walking, and local authorities are increasingly looking to improve the active travel offering within their communities. [16]

The general view is that wherever possible, stakeholders should be taking steps to make active travel easier to use, and preferable to using private vehicles. Yet many stations are not easily or safely accessible by walking and cycling, such as due to a lack of safe pavements, paths and routes, high traffic speeds and volume, and/or facilities and accessibility at and around stations. Enabling more people to walk or cycle to rail stations as part of a longer journey can help journeys to be inclusive, low-carbon, healthy, convenient and enjoyable.

The following recommendations are encouraged to support walking and active travel around and beyond the station boundary:

- Safe, pleasant and convenient access to and from stations for those on foot should be prioritised wherever possible. TOCs should cooperate with local authorities to ensure good connections with their local areas, beyond the station boundary.
- Consider how best to organise space and street furniture outside the station, to encourage walking to and from the station (e.g. parking layouts, taxi ranks, pedestrian crossings, signage and maps).
- Improve safe and convenient routes into and within the station itself (i.e. permeability).
- Active travel and its prioritisation should be built-in to an operator's station management processes, rather than siloed into 'Environment'.
- Work with relevant local partners (e.g. Local Authorities, Local Enterprise Partnerships, walking and cycling groups, station friends and community rail partnerships etc.) to improve routes to stations for pedestrians and cyclists.
- Implement a Station Travel Plan, involving local communities and partners, to encourage and enable active and sustainable travel between stations and the wider local area.

9.2. Cycling

While meeting the needs of cyclists is slightly different to those of pedestrians, many of the recommendations for walking will also apply for cycling, and the needs of these groups should be considered in tandem. Measures aimed at enhancing and enabling cycling should consider the needs of cyclists riding to and from the station, as well as those taking their bikes with them on their onward journey.

The following recommendations are encouraged to support cycling and wider active travel options (i.e. e-scooters) around and beyond the station boundary:

- Improve long-term cycle parking options for those using bikes to access the station and short-term cycle parking options for those taking their bikes on their onward journey.
- Cycle parking should be well-located, easy to access and secure and of a size that is appropriate to local demands. Operators could consult with cycling groups and BTP to ensure develop appropriate facilities.
- Consider working with bike hire schemes to provide "bike and go" services.
- Improve safe, convenient access to and around the station site for cyclists, including onto the platforms (e.g. doorways, steps ramps, gradients, lifts).
- Consider how social value frameworks/tools can be used to develop more viable business plans for cycling and walking enhancements which may otherwise not be commercially beneficial.

Case Study 1: ScotRail's Cycle Fund and Class 153 'Active Travel' Carriages

ScotRail introduced a new fund as part of their commitment to improve access and facilities for cyclists at Scottish stations. Over a four-year period, £100,000 is being made available to local councils and community groups to help deliver projects that will contribute to a 'doorstep to destination' journey for customers.

The Cycle Fund will provide up to 50% of a project's costs and can be used to improve directions and signage around stations, upgrade connections between stations and their local communities and enhance facilities for passengers accessing stations on their bikes.

ScotRail is also in the process of modifying Class 153 single car diesel units to carry up to 20 bicycles and other equipment. These will increase bike capacity on existing services to popular leisure destinations on the West Highland Line.

9.3. Buses and coaches

Stations and rail franchises should look to maximise engagement with local planners and authorities to improve planning and opportunities to link up road and rail infrastructure. Bus and coach services should be reflected in station travel plans (STPs) to improve links between rail and other modes.

The strategic role of buses and coach services is to connect large settlements and busy routes where there is insufficient rail provision, yet there are rarely viewed in this way. A well-connected timetable between bus operators and rail operators is not only attractive to the passenger but can significantly increase the number of journeys made by multi-modal sustainable transport, and therefore reduce carbon emissions and make the railways more inclusive and accessible.

Where possible, consider:

- Aligning timetables between bus and rail services (including at weekends when Saturday and Sunday bus services are reduced)
- Improving wayfinding around the station to direct rail passengers to complete their journey by other transport modes such as buses
- Consider the location of the station and if coach services can fulfil part of the passenger journey i.e. are you near to an Airport, tourist attraction, etc.
- Opportunities for provision during delays – could there be standby and mitigation arrangements for when a train or bus is running significantly late?
- Improving road layout initiatives and station access to address severance and improve journey times
- Support the development of new interchanges (national, regional and local)
- How to make bus/coach interchanges accessible and avoid inaccessible routes i.e. steps from the station platform to the bus stop
- Work with community rail, local authorities, tourism bodies and other local partners to promote multi-modal journeys and consider opportunities for incentivising these

9.4. Shared mobility

Shared travel and mobility hubs are sites designed to accommodate and promote multi-modal trips, offering seamless switches between different forms of transport such as active travel, public transport, and shared services[17]. Stations should look to maximise opportunities, where possible, to support the integration of different travel modes e.g. shared bike use, trip sharing schemes and sustainable 'first and last mile' connections.

Supporting and facilitating first and last mile options will also encourage the reduction in personal car use, which is a vital step in reducing the carbon footprint of users, by reducing the amount of air pollution created by congestion. Private-vehicles (for 1 passenger) emit more carbon dioxide than alternative modes such as domestic rail, bus, and coaches.

Car sharing offers rail passengers a viable solution for completing their ongoing journeys in a more sustainable way, sharing the cost and cutting carbon emissions in and around the station environment and surrounding areas. Popular car-share servers include LiftShare and BlaBla Car.

Passengers can then make their own arrangements for splitting the costs of parking and petrol, and some TOCs already offer free car-parking for multi-passenger car users.

Quick win initiatives:

- Promote trip-sharing initiatives linked to the station and other local sites, with the use of social media, posters and comms, and working with community rail or other local groups
- Offer parking spaces purely for trip-sharing or car-clubs identified by a membership pass, account or token scheme
- Improve awareness of shared mobility as an easier, healthier and more environmentally sustainable mode of transport

Long term initiatives:

- Develop infrastructure that supports EV, bike and e-scooter charging or hire schemes
- Provide facilities for cycle and e-scooter storage, where it is safe to do so
- Redesign the station layout, forecourt and parking to prioritise pedestrians, cyclists and bus-users getting to the station and ensure any changes are accessible to all users

Case Study 1 - Chiltern Railways "3 for Free"

Chiltern Railways offer free parking to Rail Users at all Chiltern car parks when three or more people share a car.

At least 3 occupants of the car must come to the Ticket Office where staff will record the vehicle registration number and provide free parking. The offer is subject to the ticket office being open during the time of arrival at the station and there being an available car parking space.

Case Study 2 – Tring Station

London Northwestern Railway has launched a pilot car share scheme for passengers who use Tring station.

The scheme used LiftShare, to connect train users with others who use similar routes to the station. They then make their own arrangements for splitting the cost of parking and petrol. Passengers can also find people who may be looking for regular communal travel or shared taxi options. The scheme recognises that customer journey's does not simply start or end at the station.

London NorthWestern Railway worked with Tring Town Council and surrounding parish councils to devise and promote an accessible station access survey, using local insights of travel patterns affecting the station. This allowed an effective community consultation, with results showing that more than a third of survey responses would be interested in joining a trip-sharing scheme.

Case Study 3 – Enterprise Car Club Partnership with LNER

Enterprise Car Club (ECC) provides vehicles for its 120,000+ members within 500 metres of over 181 stations across the GB rail network. ECC partnered with LNER to cross-promote car club and rail travel to complete door-to-door journeys. Vehicles are located at owned LNER stations (e.g. Peterborough, Newark, Doncaster, Durham, Berwick etc.) and close to other stations on the LNER network including Edinburgh, Leeds, Newcastle, London and York.

In a survey of its members, Enterprise found that the scheme increased rail usage and found a preferred option for first and last mile mobility. It reported 69% of drivers who used vehicles near stations said they regularly (quarterly or more) combined rail travel with ECC to complete their journeys, with drivers saving an average of 71 road miles per long distance trip.

9.5. Electric Vehicles

Private-use vehicles are not an environmentally-friendly mode of transport, and efforts should be made to reduce the use to meet net-zero carbon emission targets in advance of 2050. However, accelerating the shift to zero emission technologies, such as electric cars, led by an Electric vehicle (EV) infrastructure, should be embraced by industry as a path in the right direction. This is because evidence shows car-ownership is still on the increase, there were 38.7 million licensed vehicles in Great Britain by the end of 2019, an increase of 1.3% compared to the end of 2018. [18] Furthermore, new registrations for ultra-low emission vehicles (ULEVs) increased by 26% from 2018 to 2019, and during 2020 Q2 18,968 ULEVs were registered for the first time in Great Britain, an increase of 30% on 2019 Q2. [19]

The RDG Station Strategy Group has responded to a recent consultation from OLEV on the introduction of Electric Vehicle (EV) charging points at stations. [20] There are now well over 100 stations on the GB rail network that have EV charging facilities, and this is a figure which is growing rapidly to support commuters make the switch away from fuel-powered cars to EVs.

Charging supply to support EVs can be very basic, or very powerful and therefore either cheap, or very expensive. FirstGroup, for example, have conducted a study to learn more about what's right for a station environment, which involves looking into the demography of various locations to determine what voltage is required at their respective stations.

Subsequently, voltage installation (and cost) depends heavily on the station in question, and is steered by factors including: social demographics, size and power of vehicles, journeys being carried out i.e. commuter stations or leisure stations which will determine distance travelled and charge required.

Most TOCs have an obligation to deliver a certain amount of EV charging points in the future and have reported it is about being EV-ready in the short term. This also applies to Network Rail, whom in agreement with the Secretary of State for Transport, have installed 346 EV charge points by the end of March 2021.

Challenges to consider:

- Becoming 'EV ready' (policy, regulation, administrations, programs and implementation)
- Infrastructure changes
- Car parking capacity
- Area demographics
- Voltage supply
- New technologies overtaking in future (the view that the technology is in its infancy)
- Who bares the cost i.e. Gov, NPCs, TOCs or NR as the asset owner?
- Charging capacity; adding significant extra charging will be a challenge and will force TOCs to look at how to overcome power capacity, battery storage, renewables etc. and how to meet the market penetration levels needed.
- Current demand surveys may be required to understand the right amounts of EV charging provision required for customers.
- Ensuring that the appropriate communication channels are utilised so that walking, cycling and shared transport is prioritised over private-car use, with the aim of shifting as many start and end journeys as possible to these modes.

Case Study 1 – South Western Railway

South Western Railway installed 60 electric vehicle charging points across six of their stations on the SWR network: Basingstoke (18), Farnborough (12), Andover (10), Haslemere (8), Wokingham (6) and Fleet (6) which were all complete by 2020.

By the end of Summer 2019, SWR invested £100,000 in the construction and installation of 13-amp trickle charging points that allow passengers to plug-in and charge their electric vehicles while they are parked for the day.

SWR contracted mechanical and electrical engineering specialists, SSE Enterprise Rail, to install Rolec EV WallPod charging units at busy commuter stations across their network.

These charging points are designed for the current generation of electric vehicles but are capable of handling higher electrical currents for future developments in the market. Each SWR station with a charging point has a designated parking space that will be clearly marked for passengers to charge their electric vehicles.

As of Summer 2020, SWR are seeking investment that will enable the roll out and installation of EV charge points across the entire SWR network.

Case Study 2 – GWR and Worcestershire Parkway Station

GWR have partnered with RAW Charging to install 26 smart-charging points at the new Worcestershire Parkway Railway Station.

Part of Great Western Railway's (GWR) network, Worcestershire Parkway is the first new railway station in the county for more than 100 years. The new station is to increase connectivity to London, the Midlands and South Wales and now offers drivers of electric vehicles options to charge their cars.

GWR's head of Sustainability, Amie Coppin, said: "We set out to find a delivery partner that would enable us to provide the best EV charging experience for our customers, allowing station users to take full advantage of the range of services on offer, and to make more sustainable choices about how they can travel".

Raw Charging reported a key issue for railway car park operators when it comes to installing EV chargers was the issue of 'idle' chargers, whereby commuters would plug in and leave their EVs for extended periods of time. They said, 'it has been key to consider the different use cases when implementing the design and installation of EV charging infrastructure, and not least catering for the commuter'. The project has two approaches - installing a larger number of chargers to meet future demand and configuring and trailing a combination of different pricing and access structures on the ChargePoint platform.

Worcestershire Parkway Station will be the fifth edition to GWRs network that already offers EV charging at the following stations: Bristol Parkway, Plymouth, Romsey and Trowbridge. GWR also work with ChargePoint genie, which is an account-based system that allows the customer to book and pay for their EV charging online or via a smartcard.

Case Study 3 – GTR partnership with Pod Point, Hatfield Station

Govia Thameslink Railway (GTR), has opened the largest dedicated electric vehicle (EV) charging hub in GB rail.[21]

The hub, which was co-developed with EV charging infrastructure provider Pod Point, is located at Hatfield station and features a total of 27 charging points -it aims to facilitate the growing demand for EV charging infrastructure.

The new facility is part of a wider programme of works to improve station facilities at every station across the GTR network – the plan includes approximately 1,000 individual projects and 230 stations.

Featuring 27 chargers, the hub, installed by EV charging infrastructure provider Pod Point, is said to be the largest in GB rail. According to GTR, the installation will result in a 150% increase in public EV charging devices in the Welwyn Hatfield district. The project follows a recent installation of 12 new charge points at Haywards Heath station, and is in addition to the existing 114 currently in place across the GTR network, bringing the total number of EV charging points to 153.

As well as aiming to make its stations more environmentally sustainable, GTR said it hopes the upgrades will make the journey experience more comfortable, safer and smarter for passengers, with much of the work based on customer feedback and community groups. Transport Secretary Grant Shapps said: “the announcement ticks all those boxes and will make journeys on road and rail much greener for local residents, commuters and businesses”.

9.6. Integration of the wider transport system

A multi-modal transport system with effective integration is significantly greater than the sum of its parts and better serves customers, communities and the environment. It is important to consider all station environments in the wider context of transport integration.

Access to the rail network is an important consideration of many surface access strategies, particularly airports and freight terminals. The location of stations near to other transport hubs such airports and freight terminals can help to further increase modal shift and relieve pressure on the surrounding road network.

The role and function of each of transport modes in and around a potential station location should be fully considered to understand the impact they might have. For example, a new station under consideration close to a port, particularly one with spare capacity, could be impacted by changes to freight movements on the surrounding networks.

Transport operators should work with local authorities to develop strategies for the provision of viable infrastructure necessary to support sustainable development, including large scale facilities such as rail freight interchanges or transport investment necessary to support strategies for the growth of ports, airports or other major generators of travel demand in their areas. Robust transport planning ensures that the various transport modes available are as integrated as possible to ensure a seamless journey for users of the transport network.

When addressing modal integration, consider:

- Innovation and technological developments to encourage new interchanges
- Technological progress – concepts like MaaS and associated progress with real-time information, smart ticketing and ride-hailing operations to allow travellers to have flexible itineraries, making swapping between modes and routes much easier and more commonplace
- Societal change – taking advantage of social changes such as car ownership in urban areas and among young people, to encourage more sustainable modes of travel
- Devolution – the establishment of new combined authorities and Sub-National Transport Bodies allows a more integrated approach to transport and land use planning to be taken in some places
- Improving accessibility and reduce reliance on the private car by making alternatives quicker and easier for all or part of a journey

9.7. Integrated transport resources

Link	Doc name, Charity or Organisation:	Description
	Community Rail Network: **Connected Stations – A Guide to community-led station travel planning**	Community Rail provide an in-depth toolkit on station travel planning, including support, case studies, tips, and funding advice to improve integrated transport at stations.
	Sustrans	Sustrans are a walking and cycling charity and are the custodians of the National Cycling Network. They provide information on cycling routes, and traffic free paths, connecting cities, towns and countryside, and the communities they serve.
	Campaign for Better Transport	This research highlights why and where better interchanges are needed. It considers the benefits of specific locations and looks at the role different organisations and policy initiatives should play in bringing more integrated transport developments about.
	CoMo UK **CoMo Mobility Hubs Guidance:**	CoMo UK is a charity advocating collaborative mobility and solutions to shared transport. The Shared mobility guide offers an introduction to the concept and benefits of mobility hubs and provides advice on tailoring hubs to local scenarios illustrated with case studies. The guide also signposts the reader to everything needed to take a mobility hub from concept to reality with details on available resources on branding, technical drawings and monitoring of impacts.
	Rail Delivery Group **Guidance on Station Travel Plans (2013)**	This guidance is based upon the lessons learned from a pilot programme of STPs and draws on evidence from other STPs that have been implemented. It is aimed at those who could benefit from implementing their own STPs, both in the rail industry and in local authorities. The guidance describes the benefits of STPs, provides advice on how to select stations where STPs are most likely to be successful and how to work in partnership to implement them. This Guidance may need updating.
	BikeAbility	Bikeability is the Department for Transport's national award provider for cycle training in England. It's about gaining practical skills and understanding how to cycle on today's roads and its advice and training programmes can be used to educate passengers who use cycle and rail as an integrated mode.
	Abellio, Greater Anglia Cycling Strategy (2016)	This document sets outs Abellio's, specifically Greater Anglia's vision to support cycling as a sustainable transport mode. It presents in some new ideas and principles in an overarching cycling strategy, which can be used by others in industry to support the delivery of various commitments on cycling.
	ZapMap	Zap-Map is a UK-wide map of charging points and aims to help EV drivers locate and navigate to available charge points.
	Living Streets	Resources and guidance to support walking.

Next Steps

The following recommendations, split into station-level and wider industry, are supplied to guide our response to addressing the sustainability performance of stations now and in the future. It should be noted that the recommendations are not exhaustive and will require the effort of multiple parties to be successful, i.e. station manager, station operational staff, TOCs, Network Rail, industry stakeholders, local councils, third parties and funders.

Long-term recommendations that rely on future policy and regulation are outlined in the **RDG policy framework for Sustainability.**

10.1. Station-level action

- **Thinking ambitiously** about how stations can play a maximum part in sustainability, which is not limited to environmental output and energy performance but acting as sustainability beacons in their communities, and engaging and empowering local people, groups and volunteers to improve two-way communications to deliver wider sustainability efforts.
- **Improved education and training facilities for staff.** Improving the energy efficiency and environmental performance of stations requires addressing individual actions and behaviours. Access to resources and better training is a low-cost solution to driving cultural change across the organisation.
- **Greater external communications.** Transparency on environmental efforts is a key way to improve reputation and encourage customer participation to be 'greener'. A key opportunity is by having more visible posters at stations or on-board trains to educate passengers on how to be environmentally-conscious i.e. informing them where their waste goes to encourage responsible behaviour.
- **Listening to users and communities.** A key way to try and test new ideas, and improve the experience of users, is to listen to local people, passengers, customers and station staff and encourage their input. This could be conducted via 'open-feedback' surveys, with reviews and suggestions raised by the station team to act upon or escalated higher where necessary and/or more in-depth community engagement, perhaps working with community rail.
- **Engaging with volunteers.** This is a key way to improve community alliance, station appearance and drive small-scale initiatives that are receptive to customer-needs, but also create a sense of community-ownership. Engaging with station adoption groups and other community groups and volunteers will also have far-reaching benefits to individuals and communities and secure a more sustainable future.
- **Improved alignment** between NR, TOCs, wider transport partners, authorities and providers outside the railway i.e. bus and community operators, local cycling and walking groups. Collaboration on key issues regarding infrastructure, planning, timetabling and provision will secure a seamless experience for customers and will support improved sustainable performance in the long term.
- **Shared stations vision** between NR and TOC managed stations. The advantage of longevity for NR has often inadvertently allowed NR to be more ambitious in their efforts to address sustainability. Having greater alignment between NR and TOCs about current and future focus, and what is achievable, will ensure more consistency in our overall station offering across Great Britain. The publication of the Network Rail Environmental Sustainability Strategy (NRESS) offers a suitable opportunity for NR senior leadership teams to disseminate information and objectives down to TOC level and invite TOCs to collaborate on meeting sustainability targets across the estate.
- **Formal accreditation of Biodiversity enhancement.** Utilising spare land on stations for biodiversity enhancements is often understood as a nice-to-have. Future efforts should focus on valuing biodiversity, so it is actually something that is measured and formally recognised as enhancing the local environment and air quality of the station.

- **Collaborating with wider stakeholders.** Opportunities exist to work with external organisations and stakeholders such as research partners and universities on issues including monitoring air quality at stations. This is considered a win-win opportunity with TOCs benefiting from funding support, technical expertise and equipment, and researchers/universities benefiting from real world data.
- **Sharing of experience.** Industry should continue to share both positive/successful case studies and negative/unsuccessful case studies to improve the efficiency in which we address issues and approach solutions. A clear method or forum in which we do this should be sought.

10.2. Wider-industry action

- **Fares reform.** Reforming the fares system and making the transition from physical paper ticketing and payment systems to mobile channels will be more convenient for passengers and will be key to reducing paper-use across the network. It will also help drive down retailing costs at stations so capital can be better used investing in the environmental performance of the station as well as enabling MaaS to bring about more integrated transport modes.
- **Internal stakeholder buy in.** Delivery of sustainability projects is better achieved and smoothed through having active, informed and empowered people within the business. A good model would include a board level representative, someone on the investment committee and someone at each location/station to be knowledgeable and supportive of the benefits sustainability projects could deliver.
- **Becoming more innovative.** The industry has long needed to adapt to future trends and technologies. This also applies to sustainability; engaging with think-tanks, SMEs and other third parties to bring about innovative solutions to how the station operates sustainably will be key for future growth and improvement.
- **Being joined-up.** Future retail strategy that will change the way we travel, i.e. by facilitating account-based ticketing and more digital solutions will have to be joined-up at station-level so improved customer experience can be aligned with improved sustainable performance. Benefits can be maximised, and comms can be improved when these strategies are seen as mutually inclusive.
- **Introduction of a railway-specific benchmarking scheme.** This will pave the way for greater accountability and will be a more practical way to deliver sustainable outcomes in accordance to what is viable for specific stations. Time will have to be spent on how to appropriately assign KPIs to specific stations that take into account differing infrastructure (i.e. Victorian vs new), layout, size, footfall, platform size etc.

10.3. Opportunities for further work

To be bold in our commitment to improve station sustainability and to support industry compliance towards the Government's decarbonisation agenda, opportunities exist for further work including the development of a rail-specific sustainable benchmarking system for stations.

This would allow stations to have access to a scoring process or accreditation scheme in which they can competitively address sustainability performance at stations, while reflecting on the specific opportunities or challenges posed by the operational station environment. A Sustainability assessment tool for stations should go further than current building assessments such as BREAAM by including rating criteria that considers differing station infrastructure, size, layout, funding opportunities and footfall.

A sustainable stations assessment tool would provide a way to contextualise industry performance by assigning KPIs based on what you would expect those stations to look like. This would ensure achievable outcomes for small, medium and large stations.

The RDG may not be best placed to supply the technical expertise to develop this work further, but it is earnestly encouraged that any future work should involve RSSB, Network Rail, TOCs, wider industry and third parties such as community rail and other third sector and public sector partners. Opportunities should also be sought to involve and engage communities in this process.

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In support of global efforts to decarbonise, reduce waste and increase biodiversity, we the undersigned, as the operators of Britain's railway stations, are committed to making our stations more sustainable. In doing so we will be informed by best practice set out in this guide and Network Rail's Environmental Sustainability Strategy.

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