Setting the Context for Stations as a Service

A review of current policy, legislation and standards in the UK rail industry

"The railway has been at the heart of UK's transportation system, driving economic development, and moving people and goods in a safe and sustainable way."

Contents

1. Introduction

The ever-faster adoption of technology innovations in our society has led to big gains for the environment, our productivity and quality of life. Consider the paper ticket, now nearly obsolete across most of the airline industry. The adoption of the paperless ticket has fundamentally changed how airlines, ticket agents and passengers interact in the process of booking a flight.

Similar ground breaking changes are taking place in the rail industry. The railway has been at the heart of UK's transportation system, driving economic development, and moving people and goods in a safe and sustainable way. Having grown significantly in recent years, the rail industry is today looking at increasingly innovative ways to further improve safety, performance, efficiency and sustainability.

In order to explore what sorts of changes in technology, data and processes in stations would benefit passengers, train operators and Britain's railways overall, Cisco started the StaaS (Stations as a Service) project in January 2014. Co-funded by the Technology Strategy Board (the UK's innovation agency) and RSSB (Rail Safety and Standards Board), StaaS is an innovation project with the goal of creating a new technical, operational and commercial model for future railway stations.[1]

The introduction of changes in the railways can only occur within the framework and limits of legislation, policies and technology standards. This brochure presents the findings of our research on European and UK legislation, DfT and Network Rail policies and strategies, and European (EN), British (BS) and Network Rail standards applicable to the introduction of new technologies and processes in the station environment. Considerable effort has gone into making this guide both comprehensive and relevant for any party wishing to introduce innovations and improvements into the station environment.

The brochure is structured as follows: Policy and Legislation Review in Section 2; Standards Review in Section 3; Summary in Section 4. Section 2 firstly addresses the UK government policy guidance and papers during the next five-year Control Period (CP5) (from 1 April 2014 to 31 March 2019). The section then reviews strategic responses and business plans across multiple industry delivery bodies. Section 2 then illustrates relevant UK legislations in six key areas:

- **Safety**
- **Reliability**
- **Capacity**
- **Financial sustainability**
- **Customer satisfaction**
- **Environmental performance**

Section 3, Standards Review, identifies industry system, product and procedural standards with which StaaS shall be designed to comply. The identified standards cover the relevant scope of technologies and retail communications subsystems that constitute the basis of the StaaS design. Section 4 concludes the review.

Project partners	Research partner	Co-funded by

2. Policy and Legislation Review

2.1 Introduction to UK government policy and responses from relevant bodies

The current guiding government policy for the UK rail industry is *Expanding and Improving the Rail Network,* published by the Department for Transport on 16 July 2012. The policy addresses the need to respond to the challenges of safety, reliability, capacity, financial sustainability, customer satisfaction and environmental performance in the rail industry.[2]

"During the course of determining the policy, the Secretary of State for Transport recognises the improvements to safety and reliability that have been achieved by the railway industry and wants to see continuous improvements in these areas. By 2019, she wants the railway to achieve performance and efficiency that compare favourably with the best European railways, and subsequently to maintain such levels. She wants the railway to develop its capacity and capability to support economic growth by meeting the key elements of forecast demand growth. The Secretary of State also wants the railway to become more financially sustainable. She wishes ORR to support the Government in requiring the rail industry to reduce dependency on public subsidy and to improve value for money for customers."[3]

The intention of being compliant with this policy has been comprehensively studied and presented in several policy documents. These policy documents illustrate a critical incentive structure for the UK rail industry to progress during the upcoming Control Period (1 April 2014 to 31 March 2019).

High Level Output Specification (HLOS)
The principle document supporting the development of government policy is *High Level Output Specification (HLOS) 2012: Railways Act 2005 Statement*, published in July 2012. The policy paper HLOS (2012) explains what the Secretary of State wants the UK rail industry to achieve during railway control period 5 (CP5). HLOS (2012) is a statutory requirement introduced by the Railways Act 2005.

HLOS (2012) is written based on the outcome of the influential McNulty report – *Rail Value for Money*, published in May 2011. Based on the analysis of broad efficiency across the whole industry, the study suggests it is 30% more expensive to run railways in the UK than elsewhere in Europe. To address this, the study puts forward a wide range of recommendations encouraging cost reduction, changes to deliver new efficiencies, and mechanisms to drive implementation.[4]

Accompanied by *Statements of Funds Available* (SoFA), the HLOS (2012) forms part of the Office of Rail Regulation's (ORR) five-yearly assessments of what Network Rail (who manage the rail infrastructure) must achieve over the next five years, the funding available to do so, and the incentives needed to deliver a good service.

Guidance to the Office of Rail Regulation (ORR)
The Guidance to ORR is the second critical policy paper issued by the Department for Transport. This document informs ORR of what it needs to take into account in carrying out its functions as the economic and safety regulator for the railways.

The document clarifies the Secretary of State's priorities as set out in the Command Paper addressed below and the role of ORR. It also instructs how to engage with government, emphasises the need to reduce the regulatory burden, and highlights the demands in safety, value for money and efficiency. Lastly, the document recommends that ORR take the five business case approach to using government funds.

Command Paper – Reforming our Railways: Putting the customer first

As indicated in the *Guidance to the ORR*, the Command Paper, published in March 2012, sets out Government's vision for moving towards a more unified regulatory structure for the railway industry. It also lays out the policies that are needed to realise this vision.

The Command Paper takes account of the findings and recommendations from McNulty's *Rail Value for Money* study. It provides the policy framework in advance of the policy publication *Expanding and Improving the Rail Network,* which includes both HLOS (2012) and SoFA.

The Command Paper instructs four objectives towards which the reform of the rail industry should develop:

- Securing value for the passenger, addressing concerns about the high cost of rail fares and their impact on hard-pressed families, by ending above-inflation increases in average regulated fares at the earliest opportunity and introducing new ticketing technology to reduce costs and increase flexibility.

- Dealing with the fiscal deficit, putting public finances on a healthier and more sustainable footing for the long term by aggressively searching out savings and returning these savings to the taxpayer.

- Supporting economic growth through continued taxpayer investment for passengers and freight in order to enhance capacity, connectivity and service quality where this is affordable and provides value for money, and by providing industry with the opportunity to invest in improving UK railways.

- Delivering UK environmental goals by reducing carbon emissions from trains and stations and by encouraging passengers to use the train rather than their car.

Overall, the Command Paper sets out plans to reduce costs by £3.5 billion per year by 2019.

[2] Great Britain. Department for Transport. (2012) *The High Level Output Specification (HLOS) 2012: Railways Act 2005 statement,* [Online] Available from: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/3641/railways-act-2005.pdf

[3] Great Britain. Department for Transport. (2012) *Secretary of State for Transport Guidance to the Office of Rail Regulation,* [Online] Available from: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/3642/sos-guidance-to-orr.pdf

[4] McNulty, R. (2011). *Realising the Potential for GB Rail*, Department for Transport and the Office of Rail Regulation.
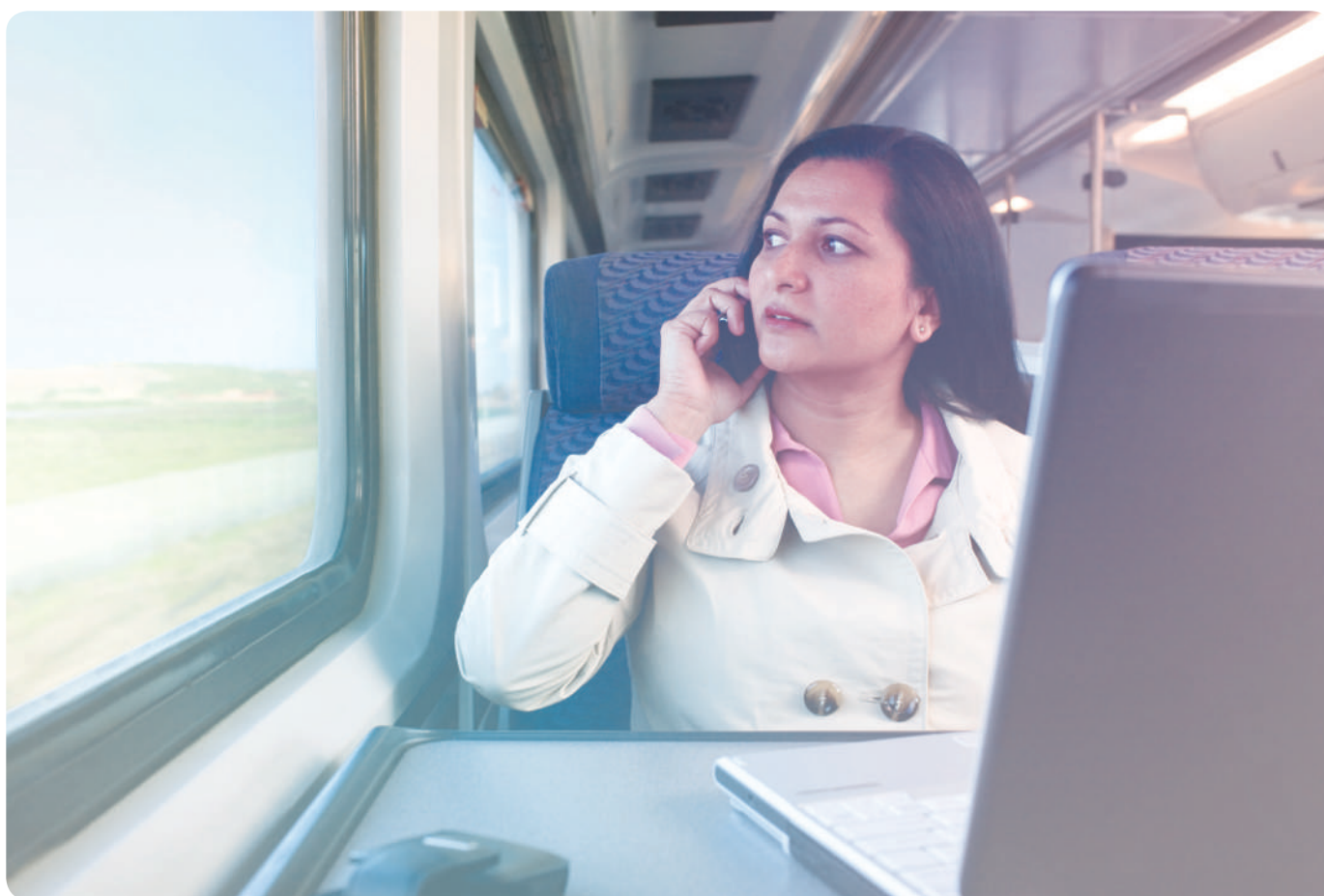
In responding to the above three policy documents, all of the relevant bodies including ORR, Rail Delivery Group (RDG), Network Rail and Technical Strategy Leadership Group defined their business plans to implement government policy. These influential documents shall be considered together with the three main policy documents as they provide a wide spectrum of implementation plans covering all six aspects of government policy: safety; reliability; capacity; financial sustainability; customer satisfaction; and environmental performance.[5] The following section identifies the direct response from each of the relevant bodies to government policy and introduces the relevant documents.

Office of Rail Regulation

Periodic Review 2013: Final determination of Network Rail's outputs and funding for 2014-19[6]

Rail infrastructure projects are planned on a five-yearly basis as part of the industry-wide Periodic Review.[7] The *2013 Periodic Review* (PR13) is the process through which "the ORR determines the outputs that Network Rail is expected to deliver, the efficient cost of delivering those outputs, and

the access charges the company can levy on train operators for using its network to recover those costs".[8] PR13 also establishes the wider regulatory framework for CP5. The document presents the financial framework within which Network Rail will operate and the incentives that will act on both Network Rail and Train Operating Companies (TOCs) to deliver and outperform their targets.

Rail Delivery Group

Industry Strategic Business Plan for England and Wales for CP5[9]
Industry Strategic Business Plan for Scotland for CP5[10]

The industry strategic business plans for England, Wales and Scotland published by Rail Delivery Group in January 2013 represent the rail industry's formal response to the two policy papers, the Command Paper and *High Level Output Specification* (HLOS). The plan sets out the industry's plans to deliver the outputs specified in HLOS through identifying key challenges in the industry, understanding markets and customers better, developing procedures to deliver more efficiency, listing the industry objectives during CP5 and articulating strategies and plans in detail.

Technical Leadership Strategy Group
Rail Technical Strategy (RTS) 2012, The Future Railway[11]

The Rail Technical Strategy report considers how the rail industry could harness technology over a 30-year period to improve performance, cost-effectiveness and environmental sustainability. The RTS report contributes to environmental policy through a close examination of energy consumption in the rail industry. It points out that an extensively electrified network has reduced reliance on fossil fuels and non-renewable resources; that asset specification has driven energy efficiency; and that sensors, energy storage technologies and smart grid technologies are beginning to monitor and manage energy use for maximum efficiency.

Network Rail
Strategic Business Plan for England and Wales[12]
Strategic Business Plan for Scotland[13]

Network Rail's strategic business plans for England, Wales and Scotland for CP5 are based on considerably deeper analysis than the one carried out for CP4. The ambitious plans commit Network Rail to making progress in improving service and value for money in the following areas:

· Delivering continuous improvements in safety, particularly reducing risk at level crossings.

· Enhancing the capacity and capability of the railway by means of a plan developed with TOCs to deliver 20% more morning peak seats into central London and 32% more peak seats into major regional cities during CP5.

· Reducing the variability in train service reliability with the target to deliver performance of 92.5% the Public Performance Measure (PPM) by the end of CP5.

· Delivering efficiency savings of 18% by the end of CP5.

The following six sections unpack the six aspects of government policy, identify relevant strategy and legislation, and assess their relevance to StaaS.

"Having grown significantly in recent years, the rail industry is today looking at increasingly innovative ways to further improve safety, performance, efficiency and sustainability."

5   Great Britain. Department for Transport. (2012) *The High Level Output Specification (HLOS) 2012: Railways Act 2005 statement*, [Online] Available from: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/3641/railways-act-2005.pdf
6   Office of Rail Regulation. (2013) *Periodic Review 2013: Final determination of Network Rail's outputs and funding for 2014-19*.
7   Great Britain. House of Commons Library. (2012) *Quick Guide to the Railways – Commons Library Standard Note, SN4128*.
8   Office of Rail Regulation. (2013) *Periodic Review 2013: Final determination of Network Rail's outputs and funding for 2014-19*.
9   Rail Delivery Group. (2013) *Industry Strategic Business Plan for England and Wales – Industry's response to HLOS for CP5*. Rail Freight Operators' Association, Railway Industry Associations, Train Operators Working Together and Network Rail.
10 Rail Delivery Group. (2013) *Industry Strategic Business Plan for Scotland – Industry's response to HLOS for CP5*. Rail Freight Operators' Association, Railway Industry Associations, Train Operators Working Together and Network Rail.
11 Technical Strategy Leadership Group. (2012) *The Future Railway*.
12 Network Rail. (2013) *Strategic Business Plan for England and Wales*.
13 Network Rail. (2013) *Strategic Business Plan for Scotland*.

2.2   Safety

### 2.2.1   EU and UK railway safety legislation

One of the EU's major objectives is the "construction of a safe, modern, integrated railway network".[14] In pursuit of its goal to achieve a single market for rail transport services, the EU established a common regulatory framework for railway safety and adopted the *Railway Safety Directive* (2004/49/EC)[15] into law on 29 April 2004.

This directive was translated to UK law by *The Railways and Other Guided Transport Systems (Safety) Regulations 2006* (ROGS). ROGS safety legislation requires transport operators to maintain a safety management system (SMS) and hold a safety certificate or authorisation indicating the SMS has been accepted by the Office of Rail Regulation. Transport operators must ensure their systems meet the targets set out in the EU's *Common Safety Targets* (CSTs).[16]

The ORR publication *A Guide to ROGS*[17] summarises ROGS legislation and describes practical steps that need to be taken to ensure compliance.

Fundamentally, any party wishing to operate a mainline railway is obliged to apply for and maintain a safety authorisation or certificate, depending on the type of operation. Holders of such a safety certificate (for transport undertakings) or safety authorisation (for infrastructure managers) are duty-bound to fulfil certain obligations. Such duty holders are required to establish and maintain:

· **A safety policy** that is communicated to all staff

· **Safety targets** related to the CSTs, including a description of how they will be met, and regular reporting on progress to achieve the targets

· **Procedures for meeting standards**, e.g., to assure legal compliance

· **Risk assessments and the control of new risks** by maintaining a change control process for this purpose

· **Training and skills** to assure staff competence

· **Management of safety-related information** with the goal of managing safety risks effectively

· **Response procedures to accidents and near misses**, including the reporting, investigation and identification of
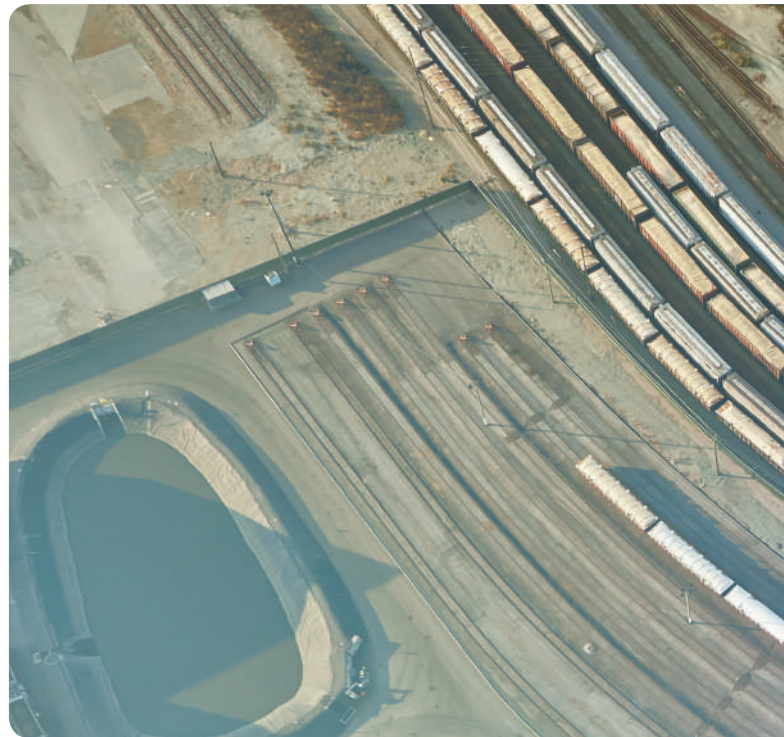
causes, and the subsequent communication to staff for learning and further risk-control purposes

· **Emergency planning**

· **Internal auditing**

ROGS further specifies that duty holders must apply relevant *Common Safety Methods* (CSMs), as developed by the European Railway Agency (ERA) and incorporated into EU law. The CSM regulation came into full force on 01 July 2012. The ORR recommends that the CSM for *Risk Evaluation and Assessment* be applied when a significant change impacts on safety.

Furthermore, transport undertakings and infrastructure managers must apply the CSM for monitoring their contractors and ensure that contractors apply the same process through contractual arrangements.

ROGS defines several broad categories of work as "safety-critical tasks".[18] None of these tasks are directly related to the operation of stations. Work involved in supervising and checking a second group of tasks has been classified in ROGS as safety-critical.[19] This second group of tasks includes installing or maintaining any part of the infrastructure. Stations are part of the railway infrastructure.[20]

The ROGS legislation further requires duty holders to diligently apply the CSM when changes in technology, procedures or organisation are implemented. The ORR guidance document for the application of the CSM on risk evaluation and assessment states that railway undertakings and infrastructure managers must first determine the significance of any change being proposed.[21]

In the course of the risk assessment and evaluation of a proposed change, the duty holder will determine if the change being made impacts safety. The introduction of new technologies into the station environment may entail organisational changes, which in turn require an evaluation and assessment of risk. The RSSB leaflet *Guidance on the*

use of the common safety method (CSM) on risk evaluation and assessment for organisational changes, issued on 29 June 2012, is meant to be read in conjunction with the ORR's guidance on the application of the CSM. As with the introduction of proposed changes in technologies, it must first be determined if an organisational change will impact the safety of railway operations.

A summary of how the CSM for monitoring has to be applied is presented in the RSSB leaflet *Understanding the New Regulation on the Common Safety Method for Monitoring: A brief note for safety and assurance managers*, published on 19 March 2013.

14 European Railway Agency. An agency of the European Union. [Online] Available from: http://www.era.europa.eu/The-Agency/About-ERA/Pages/Home.aspx
15 The European Parliament and the Council of the European Union. (2004). Directive 2004/49/EC. *On safety on the Community's railways and amending Council Directive 95/18/EC on the licensing of railway undertakings and Directive 2001/14/EC on the allocation of railway infrastructure capacity and the levying of charges for the use of railway infrastructure and safety certification*. [Online]
    Available from: http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CONSLEG:2004L0049:20091218:EN:HTML
16 The UK Department for Transport's Command Paper of March 2012, *Reforming the Railways: Putting the customer first* specifies that the EU's Common Safety Targets should be met.
17 Office of Rail Regulation. (2013) *The Railways and Other Guided Transport Systems (Safety) Regulations 2006 (A Guide to ROGS)*, Chapter 1, p. 18-22
18 These are: Driving and train dispatch, Operating signals and level crossings, and related communication, Coupling or uncoupling vehicles, Controlling the power supply connected to track and vehicles, Checking vehicles are working properly and, if loaded, loaded correctly, and Protecting the safety of people working on or near to the track, ORR, *A Guide to ROGS*, Chapter 7.3, p. 54
19 Office of Rail Regulation. (2013) *The Railways and Other Guided Transport Systems (Safety) Regulations 2006 (A Guide to ROGS)*, Chapter 7.4, p. 55
20 Office of Rail Regulation. (2013) *The Railways and Other Guided Transport Systems (Safety) Regulations 2006 (A Guide to ROGS)*, Glossary of Terms
21 Office of Rail Regulation. (2012) *Guidance on the application of the common safety method (CSM) on risk evaluation and assessment*, p. 8

2.2.1 General safety legislation in the UK

The fundamental Act addressing safety in the workplace is the *Health and Safety at Work etc. Act 1974 (HSWA)*. It places certain duties upon employers, people in control of premises, manufacturers and employees in all industries.

2.2.2 Relevant safety strategy and policy documents

The UK's *High Level Output Specification (HLOS) 2012: Railways Act 2005 for CP5,* published on 16 July 2012, places a high priority on safety in the railways. It specifies that the industry's record of passenger safety should continue to be improved using the current approach "so far as reasonably practicable". Current safety levels should be maintained, and industry efforts are to be focused on the achievement of the CSTs. The ORR monitors the progress against the HLOS (2012) based upon regular safety information reporting from the duty holders.

A publication by RSSB, *HLOS and Common Safety Targets – What you need to know,* issued on 30 April 2011, provides a summary of passenger safety and workforce safety metrics that are central to the CSTs. The document states that delivery of safety targets "will largely depend on reductions in the risk from accidents at stations and on trains which account for the vast majority of the risk".[22] RSSB also note, however, that CSTs only account for approximately 40% of the overall risk related to the railway.[23]

The ORR's safety strategy is described in its health and safety regulation policy statement for CP4 of April 2010. The strategy aims to ensure the health and safety of railway employees and passengers who may be exposed to risk from work on the railway, and to promote continuous improvement in health and safety measures. The policy statement promotes a vision of "zero workforce and industry-caused passenger fatalities, with an ever decreasing overall safety risk".[24]

The ORR's strategy for CP4 also provides strategy guidance on the topic of safety. Its strategy is to attain or maintain excellence in health and safety culture and risk control, and lists the following success criteria:[25]

• Proof of excellence in safety culture as measured against achievement of CSTs.

• Industry puts rules, standards, procedures and technology in place to support excellence in safety.

· All incidents and injuries are investigated promptly and thoroughly, and results are disseminated according to a rigorous process.

· Occupational health management reflects good practice.

Network Rail's safety strategy and policy as related to infrastructure is described in their *Asset Management Strategy*, published in February 2011. The first objective of Network Rail's asset management strategy is to "maintain safety at least to current levels".[26] In terms of optimization, Network Rail aim to achieve a balance between outputs, costs, and risk, including, e.g., "safety risk to passengers, workforce and members of the public caused by infrastructure faults".[27]

Finally, Network Rail's *Guide to Station Planning and Design (Section Operability, Passenger Safety)*, provides further insight into its safety policies for stations. In the section on Operability, the document provides guidance on:

· Ways to design stations to minimise the potential for accidents

· Ensuring full compliance with legal requirements for emergencies[28]

In addition, the Network Rail *Technical Strategy* paper, issued in June 2013, states that, with regard to infrastructure, better resilience and a reduced need for maintenance will be achieved through new materials, further consideration of whole life cost and improved, efficient design. Infrastructure-related technologies will lead to greater safety, further cost efficiencies and better reliability".[29] Network Rail aim to increase "the mechanisation of maintenance tasks" and improve "safety for the general public at key interfaces such as stations".[30] Network Rail point out that "current station information and management systems lack the integration that could improve efficiency, safety and passenger experience".[31]

Another theme of the strategy relates both to rolling stock and stations, and addresses the need to reduce dwell times of trains in stations. Measures to meet this requirement include construction measures (level platforms and train doors).[32]

According to DfT, the demand for passenger rail transport will grow by 16% by 2019.[33] As demand for rail transport outpaces capacity, crowding in stations will become a more prevalent risk for the safety of passengers. The RSSB publication *Crowd Management at Stations: A good practice guide* provides advice on how to predict crowding behaviour, and how to mitigate the risks associated with crowding through staff training and the effective use of technology.[34]

[22] Rail Safety and Standards Board. (2011) *HLOS and Common Safety Targets – What you need to know*, p. 1
[23] Ibid., p. 3
[24] Office of Rail Regulation. (2010) *Our approach to maintaining health and safety in Britain's railways*, p.2
[25] Office of Rail Regulation. (2008) *Promoting safety and value in Britain's railways: Our strategy for 2009-14.*
[26] Network Rail. (2011) *Asset Management Strategy*, p. 7
[27] Ibid., p. 10
[28] Network Rail. (2011) *Guide to Station Planning and Design*, Issue 1, p. 53
[29] Network Rail. (2013) *Technical Strategy*, p. 60
[30] Ibid.
[31] Ibid., p. 40
[32] Ibid., p. 74
[33] Great Britain. Department for Transport. (2012) *Secretary of State for Transport Guidance to the Office of Rail Regulation*, par. 4, [Online]
      Available from: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/3642/sos-guidance-to-orr.pdf
[34] Rail Safety and Standards Board. (2004) *Crowd Management at Stations: A good practice guide*, Issue 1

2.3   Reliability

Whilst neither the EU nor UK government provide legislation to ensure a minimum level of reliability in delivering railway transport services, a number of sources describe the respective reliability strategies of DfT and Network Rail.

DfT's white paper of 2007, *Delivering a Sustainable Railway*, specifies that train reliability is to be improved during CP4 from 88% to 92.6%, and further requires delays of more than 30 minutes be reduced by 25%. Reliability of the railway is measured using PPM. Reliability is not met when a scheduled train service is cancelled or arrives at its final destination more than 5 minutes late (or 10 minutes late for inter-city services).[35]

In order to better determine the factors that lead to a passenger being delayed, DfT requested that additional questions be inserted in the annual Passenger Focus National Passenger Survey.[36] The white paper points out that overcrowding in stations, for example, caused 1% of delays, and a further 3% of delays resulted from lack of or poor information[37] – both factors that are relevant to station infrastructure.

In its Command Paper of March 2012, *Reforming our Railways: Putting the customer first,* DfT defines further objectives to improve reliability. It notes that "overcrowding continues to be an issue on too many services, and the punctuality and reliability of services has been a cause for concern".[38]

Franchise specifications, the paper states, will mandate standards of reliability. Failure to meet these standards could result in termination of the franchise.[39]

The HLOS (2012) for CP5 issued by DfT defines the reliability targets to be met by 2019. It highlights that additional investment towards achieving greater reliability may not deliver value for money, as the reliability achieved in CP4 is already very high. HLOS (2012) requires the rail industry to achieve an overall reliability of 92.5% by the end of CP5, but without compromising the achievement of other goals.

The second reliability target requires that no more than 2.2% of trains are cancelled or arrive at their final destinations significantly late (more than 30 minutes late). In addition, the industry is to focus on achieving better reliability on poorly performing routes and on delivering a more consistently reliable service.

Whilst the reliability policy and goals are directly related to train services and not station infrastructure, it should be noted that services delivered to passengers in stations can contribute to the alleviation of the problems resulting from delays, such as overcrowding of platforms.

Network Rail's *Strategic Business Plan for England and Wales*, published in January 2013, describes in detail the strategy and measures to be undertaken to deliver HLOS. Continuous improvements to Asset Management capabilities are a major focus of the strategy for CP5. One of the goals in this area, Enhanced Asset Information, is to achieve real-time, system-wide infrastructure information.[40]

A key initiative is the introduction of risk-based maintenance to enable further refinement of maintenance tasks and intervals. The objective of this measure is to optimise maintenance regimes by quantifying the most cost-effective levels of reliability and risk from an improved knowledge of assets and their condition.[41] Such measures would help Network Rail avoid unnecessary work.

As part of their strategy to deliver against the HLOS reliability targets, Network Rail have allocated a Passenger Journey Improvement fund of £309m for use in CP5 in part to augment asset renewals that help reduce station transit times for passengers.[42]

Network Rail's *Technical Strategy* of 2013 includes, as part of their vision for the future, the aim to "continue development of decision support tools which analyse infrastructure data and improve the whole-system infrastructure reliability".[43] Better provisioning of more useful information to staff and passengers is one of the strategies identified to improve reliability.

"HLOS (2012) requires the rail industry to achieve an overall reliability of 92.5% by the end of CP5, but without compromising the achievement of other goals."

[35] Great Britain. Department for Transport. (2007) *Delivering a Sustainable Railway*, p. 35
[36] Ibid., p. 35
[37] Ibid., p. 36
[38] Great Britain. Department for Transport. (2012) *Reforming our Railways: Putting the customer first*, p. 16
[39] Ibid., p. 24
[40] Network Rail. (2013) *Industry Strategic Business Plan for England and Wales*, p. 20
[41] Ibid., p. 20
[42] Ibid., p. 47
[43] Network Rail. (2013) *Technical Strategy*, p. 64

2.4   Capacity

Meeting growing demand for passenger capacity is a fundamental requirement of the railways. The *Railways Infrastructure (Access and Management) Regulations 2005* stipulate that the infrastructure manager (Network Rail) is required, once a route has been determined to be congested, to conduct a capacity analysis and prepare a capacity enhancement plan. The capacity enhancement plan must identify options and provide a cost-benefit analysis of the measures to be taken to enhance the capacity of the congested infrastructure.[44] Although congested infrastructure is often the result of a lack of track capacity, station capacity should also be taken into account in capacity enhancement measures.

Government strategy for CP5 is built on four priorities. The first priority is the creation of a high capacity passenger and freight corridor linking the core centres of population in the Midlands and North with the container port of Southampton. The second priority is the increase of capacity and acceleration of journey times between key cities. The third priority is to facilitate commuter travel into major urban areas, thereby helping to expand the effective labour market and "unlock major economic benefits in the economies in the northern cities and conurbations". The fourth strategic priority is to improve the railway links to major ports and airports.[45]

DfT's policy statement of 03 October 2012, *Expanding and Improving the Rail Network*, gives further details on targeted capacity enhancements, including associated changes in station infrastructure. The actions defined in this strategy are the build-out of capacity on the Thameslink route. This programme lists upgraded stations as one of the benefits for passengers.[46]

Another set of actions is focused on "major mainline and station upgrades" to enhance capacity improvements, such as to enable longer, faster trains to operate more frequently.[47] Such capacity enhancements are likely to require upgrades in the station information and security systems, and may provide the opportunity for economic benefits from increased retail activities in or near stations.

Network Rail's *Stations Strategy of 2007* summarises the challenges arising from the need to adapt stations to changing – mostly increasing – capacity demands. "Demand changes are not only influenced by growth in passenger travel. Changes in travel patterns, competition, demographics, economic and geographic trends and changes in employment can all have a bearing on capacity requirements. Some stations may

decline in importance, for example if nearby employment ceases. Conversely, new stations may be required to meet the demands of new centres of population, changes in business and commuting patterns or to provide transport interchange opportunities. In some places stations may also need to be relocated to meet these changing needs."[48]

Network Rail's *Strategic Business Plan for England and Wales* of January 2013, issued in response to DfT's HLOS (2012) for CP5, makes route capacity improvements a key priority. It states that by 2035, the industry aspires to offer the capacity to accommodate twice as many passengers as today, including HS2.[49] During CP5, Network Rail aim to deliver the biggest increase in capacity in 100 years.[50]

Network Rail's *Technical Strategy* of June 2013 defines several objectives related to capacity enhancements in stations. The paper identifies some significant requirements on the infrastructure for meeting future demands on capacity, including the accommodation of more passengers without the need for larger spaces, and achieving a better understanding of required design changes necessary to cope with longer, more frequent trains.[51]

[44] Great Britain. Department for Transport. (2005) *The Railways Infrastructure (Access and Management) Regulations 2005*, par. 25, part (4) (a)
[45] Great Britain. Department for Transport. (2005) *Railways Act 2005 Statement for Control Period 5*, par. 5–10
[46] Department for Transport. (2012) Policy. *Expanding and Improving the Rail Network*, Thameslink.
[47] Ibid., Major mainline and station upgrades
[48] Network Rail. (2007) *Stations Strategy and Plan for Control Period 4*, p. 7
[49] Network Rail. (2013) *Strategic Business Plan for England and Wales*, p. 11
[50] Ibid., p. 16
[51] Network Rail. (2013) *Technical Strategy*, p. 64

2.5 Financial sustainability

In addition to developing the capacity and capability of British railways to support economic growth, the Secretary of State for Transport wants the whole rail industry to become more financially sustainable. Financial sustainability is a pillar of the policy guidance that the Secretary of State issued to the Office of Rail Regulation (ORR), requiring the rail industry to improve in the following two areas[52]:

· Improve industry efficiency

· Secure value for money from the railway for users and funders

The Secretary of State for Transport provided a high level specification of certain major projects and other investments that she intends the rail sector to deliver in CP5.[53] In HLOS (2012)[54], the Statement of Funding Available (SoFA) presents the maximum level of funding that government is able to commit.

To address efficiency and value for money, government, ORR and the rail industry have worked together to agree structures and incentives that can be pursued rapidly for the benefit of farepayers and taxpayers, obviating the need for reform via legislation. The two relevant policy documents are 1) *Reforming our Railways: Putting the customer first* and 2) *Realising the Potential for GB Rail.*

2.5.1 Improve industry efficiency

Improving industry efficiency refers to the policy guidance from government and ORR that encourages the rail industry to deliver the outcomes and savings that benefit both farepayers and taxpayers. The Command Paper,[55] published by the Department

for Transport in March 2012, sets out incentives for rail industry players to deliver cost reductions individually, but also to encourage them to align and work more effectively together to tackle whole-industry, whole-life, whole-system costs. The incentive structure covers the following key areas:

· Greater alignment between rail industry parties
· A franchising and incentive framework for train operators
· Open access operators
· An expanding rail freight sector
· Better governance for Network Rail
· A common-sense approach to standards
· Securing savings from rolling stock
· A strong and competitive rail supply chain
· A highly-skilled and productive rail workforce

2.5.2 Secure value for money from the railway for users and funders

The Department for Transport and the Office of Rail Regulation published the *Rail Value for Money Study*[56] in May 2011 to provide a baseline understanding of the policy "secure value for money". The study is published in the report *Realising the Potential for GB Rail* (summary report and detailed report).[57]

The *Rail Value for Money Study* takes the analysis of Network Rail's costs and looks broadly at the efficiency of the whole rail industry. The report highlights that whole-industry costs are 30% higher than comparable railways elsewhere in Europe. This is reflected in the high levels of fares and the need for continuing taxpayer support.

In response, the study puts forward a wide range of recommendations focused on creating an industry environment that encourages cost reduction, changes to deliver new efficiencies and mechanisms to drive implementation.

The study estimates that implementing these recommendations could deliver savings between £700m and £1bn annually by 2019.

2.5.3 The relevance of financial sustainability in stations

Although improvements to stations are not specifically mentioned with regard to better financial sustainability, such improvements can increase industry efficiency and help secure better value for money. A rigorously standardised approach to station information, security systems and value adding services for passengers, all residing on a single ICT infrastructure, can help achieve greater efficiency in the use of capital and the management of assets, and can also contribute to higher revenues. A standardised architecture would facilitate tasks such as to on-board maintenance personnel, as they would not have to deal with bespoke systems designs in every station.

The performance of a standardised, modern set of station infrastructure systems would be easier to measure, since such systems can be monitored remotely more effectively than the legacy systems still in use across much of the UK. Additionally, such a standardised set of station infrastructure systems could be bought as a technology service, delivered by the TOCs against a service-level-agreement, again helping to achieve a more financially sustainable railway.

2.5.4 Relevant legislation

Legislation pertinent to financial sustainability in the railways has not been enacted.

2.5.5 Relevant strategy documents

Network Rail (2013), Industry Strategic Business Plan for England and Wales for CP5 – 2014-19[58]

This document identifies "improving value for money and efficiency" as the biggest challenge for the rail industry (See Section 1.2.1). The report suggests that the industry must continue to develop new ways of working, as well as a franchising and regulatory framework that provides support and incentives to enable required change.

Enabling multi-party collaboration is critical to delivering a more efficient industry. For example, the report identifies how the Rail Delivery Group (RDG), Network Rail and TOCs could work together to improve efficiency (See Section 3).

Network Rail (2013), Industry Strategic Business Plan for Scotland for CP5 – 2014-19[59]

This document presents the same business plan in the area of financial sustainability as the plan for England and Wales.

Network Rail (2011), Investment in Stations – A guide for promoters and developers[60]

This document provides guidance to any organisation interested in investing in new stations or enhanced facilities at existing stations. Promoters would typically include TOCs, local authorities, community rail partnerships and private developers.

The guide explains the process a promoter could follow should they wish to approach the rail industry about investment in stations. Network Rail's role as coordinator of network planning on behalf of the rail industry enables it, if required, to be a gateway into the planning process. It will ensure that all relevant industry parties are consulted at the appropriate stage.

Network Rail (2011), Asset Management Strategy[61]

The purpose of this document is to define the strategy that will lead Network Rail to being demonstrably comparable with best practice in asset management in Great Britain by the end of this control period (2014).

The document prioritises the fundamental building blocks of an effective asset management regime, including:

· Optimisation of asset interventions
· Route-based asset plans
· Asset information
· Asset management competencies

[52] Great Britain. Department for Transport. (2012) *Secretary of State for Transport Guidance to the Office of Rail Regulation*, [Online]
    Available from: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/3642/sos-guidance-to-orr.pdf
[53] CP5 – Control Period 5, from 1 April 2014 to 31 March 2019
[54] Great Britain. Department for Transport. (2012) *The High Level Output Specification (HLOS) 2012: Railways Act 2005 statement*, [Online]
    Available from: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/3641/railways-act-2005.pdf
[55] Great Britain. Department for Transport. (2012) *Reforming our Railways: Putting the customer first*.
[56] McNulty, R. (2011) *Realising the Potential for GB Rail*, Department for Transport and the Office of Rail Regulation.
[57] Great Britain. Department for Transport and the Office of Rail Regulation. (2011) *Realising the Potential for GB Rail*.
[58] Network Rail. (2013) *Industry Strategic Business Plan for England and Wales for CP5 – 2014-19*.
[59] Network Rail. (2013) *Industry Strategic Business Plan for Scotland for CP5 – 2014-19*.
[60] Network Rail. (2011) *Investment in stations – A guide for promoters and developers*.
[61] Network Rail. (2011) *Asset management strategy*.

2.6   Customer satisfaction

Legislation related to technologies or services designed to enhance the customer experience in stations is listed in this section. Applicable legislation covers three areas: privacy and data protection; passengers' rights; and competition in commerce.

2.6.1   Legislation on privacy and data protection

The UK Data Protection Act 1998 sets forth how personal data of an individual may be processed. It also legally obliges entities which have determined what data to collect and process, so-called data controllers, to inform individuals as to what data is being processed, and for which purposes it is being used.[62]

The Privacy and Electronic Communications (EC Directive) Regulations 2003 and its amendment of 2011 implement European directives that protect the confidentiality of an individual's data, regulating which data – including traffic data – may be collected, used and stored. In particular, location data of individuals may only be collected as long as the person whose location data has been obtained cannot be identified.[63] The 2011 amendments to the law add provisions obligating data controllers to take appropriate measures to ensure the security

of user data, and to inform users in the event of a breach of security and confidentiality.

The Protection of Freedoms Act 2012 (Code of Practice for Surveillance Camera Systems and Specification of Relevant Authorities) Order 2013 provides guidance on the use of CCTV systems and the use of image material obtained through the use of such systems.[64]

The *Freedom of Information Act of 2000* obligates any listed public authority to provide any information it holds to any person making a reasonable request to obtain such information.

2.6.2   Legislation about passengers' rights

EC Regulation 1371/2007, a consumer protection law and part of the Third Railway Package, serves to provide a common legal basis for the safeguarding of passenger's rights. The law places obligations upon station managers to notify passengers, such as about their rights in connection with the purchase of tickets, and in case of cancelled or delayed services. It also requires station managers to provide non-discriminatory access to ticket purchase and station facilities, as well as to offer boarding assistance to disabled persons or persons with reduced mobility.[65] *Statute 2009 No. 2970 Transport*

incorporates the above EC 1371/2007 directive into UK law.[66] In addition, *Statute 2010 No. 1504, The Rail Passengers' Rights and Obligations Regulations*, which came into force in 2010, deals with passengers' rights in international carriage by rail. It is relevant to station operations in that it places a legal responsibility on station operators to ensure the personal security of passengers in stations, among other requirements.[67] It also grants the ORR the authority to enforce pertinent UK regulations and EC regulations when granting or renewing station licenses.[68]

2.6.3   Legislation regulating business practices

In addition to the above legislation, two further items of regulation are applicable to the operation of stations. These are the *Competition Act 1998* and the *Competition Act 1998 (Public Transport Ticketing Schemes Block Exemption) Order of 2011,* both UK laws. The former prohibits actions that may restrict, prevent or distort competition when engaging in commerce.[69] The block exemption order amends the act of 1998 by granting an exemption for agreement on public transport ticketing schemes, which would otherwise have been prohibited according to Chapter 1 of the *Competition Act.*[70]

2.6.4   Policies and strategies relevant to customer satisfaction

The 2009 report *Better Rail Stations*, commissioned by DfT, gives a strong indication of where UK government and the rail industry should focus policies with respect to stations. In the report, the authors find that "the customer requirement is for easy access through a safe and pleasant station environment. The cause of the dissatisfaction is not face-to-face service – which is highly rated when provided – but the physical station facilities, which are only scored at 50% satisfaction. If stations are to be improved, the solution must lie in finding affordable ways of bringing their facilities and environment up to a consistent modern standard."[71] The report points out that approx. £600m is available p.a. for station upkeep and improvements. This is not sufficient to do much more than keep most stations in their current condition. The study recommends increasing the funding for station improvements by at least 25% in CP5 in order to reduce the backlog of stations awaiting refurbishments. As a target, the report's authors recommend that customer satisfaction with station facilities reach 80%, an increase from the 50% level of 2009.

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[62] Great Britain. (1998) *Data Protection Act 1998*.
[63] Great Britain. (2003) *The Privacy and Electronic Communications (EC Directive) Regulations 2003*, par. 14
[64] Great Britain. (2012) *The Protection of Freedoms Act 2012* (Code of Practice for Surveillance Camera Systems and Specification of Relevant Authorities) Order 2013.
[65] Regulation (EC) No 1371/2007 of the European Parliament and of the Council of 23 October 2007 on rail passengers' rights and obligations.
[66] Great Britain. (2009 No. 2970) *The Rail Passengers' Rights and Obligations (Exemptions) Regulations 2009*.
[67] Great Britain. (2010 No. 1504) *The Rail Passengers' Rights and Obligations Regulations 2010*, Par. 16
[68] Ibid., Par. 14
[69] Great Britain. (1998 No. 41) *The Competition Act 1998*.
[70] Great Britain. (2011 No. 227) *The Competition Act 1998* (Public Transport Ticketing Schemes Block Exemption) (Amendment) Order 2011.
[71] Chris Green and Prof. Sir Peter Hall. (2009) *Better Rail Stations: An Independent Review Presented to Lord Adonis, Secretary of State for Transport*, p. 5

The report further recommends that minimum standards for station facilities be adopted and that the industry focus on four key areas of improvement:

· Better station access
· Better retail and catering
· Better funding and franchises
· Better management

The intention of the last area, the authors note, is primarily to make station upgrades easier and cheaper, and to make the Commercial Property team in Network Rail more responsive to regional needs.

UK government policy on customer service in rail transportation for CP5 is laid out in DfT's Command Paper of March 2012, *Reforming our Railways: Putting the customer first*. DfT acknowledge that a key challenge lies in achieving shared objectives and incentives to reduce costs and improve services for passengers.[72] One key policy that is relevant to station infrastructure is to encourage TOC investment. "We … recognise that passenger and freight operators, being closest to their customers and the market, are best placed to develop and invest in improved services and facilities that pay their way from a commercial perspective."[73] DfT have also provided direct funding for station improvements through their National Station Improvement Programme (NSIP), including the enhancement of access to stations, through the Access for All programme.[74]

The Command Paper goes on to state,

"Stations are a key part of the passenger experience. We are piloting a policy of transferring greater responsibility for stations to train operators who are the part of the rail industry serving passengers directly day to day. The pilot involves adding responsibility for long-term maintenance and renewals to the train operators' current duties for day-to-day maintenance and operation. This aims to enable an efficient, streamlined approach by placing most responsibilities with one party. The largest stations (such as London terminals) and the freeholds of all stations will remain the responsibility of Network Rail. Where appropriate, train operators would also be given greater commercial freedom, including rights to develop stations for the benefit of passengers and to improve commercial returns, with safeguards to prevent inappropriate station use or disposal. The ORR will monitor and enforce any arrangements we introduce for stations under a new licence condition. These changes are already being trialled in the Greater Anglia franchise (awarded in 2011) and will be reviewed to understand how successfully they are delivering greater efficiency by eliminating duplication of activity and supply chains."[75]

DfT also expect ORR to enforce the requirement that station operators provide accurate and timely information to passengers during periods of disruption.[76] In the HLOS for CP5 DfT echo this policy, and suggest that providing better information to passengers during disruptions is a

DfT's strategy paper of 2006, *Railways for All: The Plan to Make Great Britain's Railways More Accessible*, describes their policy on accessibility in stations. Measures to improve accessibility include making step-free access to the platforms available for disabled persons and those with heavy luggage, providing ramps to bridge the gap between the train and the platform for the wheelchair-bound, and providing trained staff to assist with these ramps. Tactile paving at all platform edges shall be provided to warn the visually impaired they are near the edge of the platform, and it shall be ensured that stations are well-lit and have clear, sign-posted "accessible routes" to platforms and station facilities for all people, especially those who may be unfamiliar with the station layout.[80]

The chapter on usability in the Network Rail *Guide to Station Planning and Design* offers straightforward guidance regarding the upgrading of station facilities to enhance customer satisfaction. Station improvements should be evaluated against four design principles:[81]

· Movement
· Accessible and inclusive
· Wayfinding and passenger information
· Comfort and attractiveness

The criteria for movement concern both people and vehicles. Stations should incorporate spaces designed for a logical flow of people and vehicular traffic, taking into account room for decision points, passenger cross flows and queues. Additionally, these spaces should be well-lit and have clear sightlines of principle destinations in the station.

The second design principle, making stations more accessible and inclusive, aims to provide stations that are obstacle- and step-free for all users. In addition, lift locations and capacities should be optimised, and, where feasible, access should be given to mobility buggies without impacting station operations.

"low cost and effective way of achieving passenger satisfaction improvements".[77]

The paper also recognises the increasing use of smart phones and passengers' expectations of good connectivity. In this regard, DfT aim to achieve a "high quality mobile data and voice network with near-universal coverage of voice and data mobile services, and seamless connectivity through the journey".[78] DfT point to their new model for new franchise specifications, which include minimum passenger satisfaction scores for stations. "Prospective franchise bidders should consider mobile communications and will be expected to work with mobile network operators and the telecommunications industry to consider methods for improving seamless voice and data mobile communications along their routes."[79]

"We are piloting a policy of transferring greater responsibility for stations to train operators who are the part of the rail industry serving passengers directly day to day." (DfT)

[72] Great Britain. Department for Transport. (2012) *Reforming our Railways: Putting the customer first*, London. p. 10
[73] Ibid., Par. 4.36, p. 47
[74] Ibid., Par. 1.17, p. 14
[75] Ibid., Par. 4.39, p. 48
[76] Ibid., Par. 2.48, p. 26
[77] DfT, HLOS for CP5, Par. 28
[78] Ibid., Par. 2.41, p. 25
[79] Ibid., Par. 2.37, p. 24
[80] Great Britain. Department for Transport. (2006) *Railways for All: The plan to make Great Britain's railways more accessible*, Chapter. 5, pp. 31–38
[81] Network Rail. (2011) *Guide to Station Planning and Design*, Issue 1, pp. 18–38

The category of wayfinding and passenger information provides guidance on insuring that stations have clear, consistent service information across the station environment that can be accessed and understood by all users.

Finally, the criteria addressing comfort and attractiveness set minimum requirements for the provision of passenger amenities, protection from weather and noise, and waiting rooms that are appropriate to the station function, use and capacity.

Supporting policy information on accessibility in stations is found in the Network Rail publication *Making Rail Accessible: A Guide to Our Policies and Practices*. The policies listed in the document all relate to providing suitable information and access to station facilities for disabled persons.[82]

Central to the guide is the document *Accessible Train Station Design for Disabled People: A code of practice,* issued jointly by DfT and Transport for Scotland in November 2011. The purpose of the code is "to assist those operating passenger trains and stations in making railway travel easier for disabled passengers".[83] It identifies all of the relevant standards that licensed station operators must follow "as

a condition of their license whenever they install, renew or replace infrastructure or facilities".[84] The document points out that whilst accessibility for disabled people has the highest priority, adherence to the principles in the code will benefit all passengers. Topics addressed include efficient crowd movement, an uncluttered environment and clear signage for optimal wayfinding.

Quick, easy and standardised wayfinding in stations is key to achieving improved customer satisfaction. The RSSB publication *Wayfinding in Stations: A good practice guide* provides detailed recommendations for station operators on the essential principles of successful wayfinding. The guide addresses signage and static information, lighting, as well as information that can be dynamic, audible, tactile, or temporary in its delivery.[85]

In matters of accessibility for disabled persons, it should be noted that for stations that serve international routes, EC legislation 2008/164, *Technical Specification for Interoperability (TSI) relating to 'persons with reduced mobility' in the trans-European conventional and high-speed rail system* is legally binding for train and station operators. TSI specifies the form and function of visual passenger information systems,

tactile signage, passenger information systems (termed passenger telematics applications in the law) and ticket vending machines, amongst other station facility components, defined as "interoperability constituents for infrastructure".[86]

Although it is primarily a safety-related topic, the avoidance of problems resulting from crowding in stations also affects customer satisfaction. The RSSB publication *Crowd Management at Stations*, published in October 2004, provides comprehensive recommendations on how station facility planners can develop an effective crowd management plan and design station facilities that minimise behaviours that lead to crowding.[87] This guide includes sections on the effective use of technology, including CCTV, to aid station management to monitor potential and actual crowding situations, and lists techniques to direct crowd flow.

The Rail Delivery Group's *Industry Strategic Business Plan for CP5*, issued in January 2013, notes that in order to improve an already high level of customer satisfaction of 83%, efforts should be directed at key drivers of customer satisfaction, including – in stations – enhancing the provision of customer information, especially when services are interrupted.[88]

Network Rail's *Strategic Business Plan for CP5 for England and Wales* also lists that funds for station improvements totalling £206m will be made available for station improvements. Half of this amount is allocated for improving the passenger experience in stations, whilst the other £103m will be used for accessibility measures proposed by local delivery stakeholders.[89]

[82] Network Rail. (2012) *Making Rail Accessible: A guide to our policies and practices.*
[83] DfT and Transport for Scotland, *Accessible Train Station Design for Disabled People: A code of practice*, p. 10
[84] Ibid., p. 11
[85] Rail Safety and Standards Board. (2006) *Wayfinding in Stations: A good practice Guide,* Issue 3, Summary.
[86] EC 2008/164, *TSI relating to persons with reduced mobility in the trans-European conventional and high-speed rail system*, 21 December 2007, Par. 5.3.1
[87] Rail Safety and Standards Board. (2004) *Crowd Management at Stations: A good practice guide*, Issue 1
[88] Rail Delivery Group. (2013) *Industry Strategic Business Plan for CP 5 – England and Wales*, Section 1.2.2, p. 8
[89] Network Rail. (2013) *Strategic Business Plan for CP5 – England and Wales*, p. 47

In their *Technical Strategy* of June 2013, Network Rail acknowledge that they "play a major part in creating the customer experience".[90] In the area of customer satisfaction, they set a goal to improve the availability of information, for example, so that passengers can make better travel choices and better use of their time. Among the objectives stated are the development of improved communication and disruption strategies, and the improvement of station facilities with an "emphasis on ease of access, passenger flow and customer services and benefits".[91]

Relating to services in stations and customer satisfaction, Network Rail see the following requirements:[92]

· **Integrated ticketing and connecting transport services for a seamless, whole journey experience.** When disruptions do occur, real time journey information should be accessible in a variety of forms to enable instant, personalised journey re-planning.

· **Reliable wireless broadband services throughout the journey so that customers can always remain connected.** Facilities should allow easy navigation through stations. Enhancements in the journey experience must enable passengers to use their time as efficiently and freely as they please.

According to the strategy paper, the following areas of investment – all directly or indirectly related to station facilities – would yield the greatest benefits:[93]

· Integration across transport modes
· Ticketing simplification and integration
· Security in stations and onboard trains through technology enablement
· Regulation of traffic in response to passenger demand

"Although it is primarily a safety-related topic, the avoidance of problems resulting from crowding in stations also affects customer satisfaction."

2.7 Environmental performance

The Secretary of State published policy guidance for encouraging environmental sustainability in the rail industry in HLOS (2012). Subject to the development of a satisfactory business case, industry is required to meet the following policies:[94]

· **Carbon and energy**: industry should set out plans for embedding the rail industry's Sustainable Development Principles and measuring and reducing the carbon embedded in new infrastructure throughout the lifecycle of programmes and projects. This should include the use of a suitable carbon accounting methodology.

· **Climate adaptation**: industry should confirm how decision-making processes and investment plans will take appropriate account of the risks and opportunities from anticipated climate change.

· **Wider environmental impacts**: industry should provide evidence in its investment proposals of how it is taking into account government's broader environmental agenda throughout the lifecycle of programmes and projects, including protecting and enhancing the natural environment, using resources in a sustainable way and promoting good health and quality of life through the effective management of noise and air quality.

The Command Paper presents more detailed policy guidance to reinforce the principles of environmental sustainability. It includes ten Sustainable Development Principles (SD Principles),[95] published in 2009, that are intended to be an integral part of industry culture and decision making processes. The ten principles, aimed at reducing the rail's environmental impact and becoming carbon smart and energy wise, are listed below.

Customer-driven
"Embed a culture where dialogue with customers puts them at the very heart of the railway, and where they are able to make optimal travel and logistics choices"

Putting rail in reach of people
"Position rail as an inclusive, affordable and accessible transport system through the provision of information and accessible facilities"

Providing an end-to-end journey
"Work together with all transport modes to provide an integrated, accessible transport system"

Being an employer of choice
"Respect, encourage and develop a diverse workforce, support its wellbeing and actively consider and address the challenges of the future global labour market"

[90] Network Rail. (2013) *Technical Strategy*, June 2013, p. 18
[91] Ibid., p. 19
[92] Ibid., p. 21
[93] Ibid., p. 22
[94] Great Britain. Department for Transport. (2012) *The High Level Output Specification (HLOS) 2012: Railways Act 2005 statement*, [Online]
Available from: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/3641/railways-act-2005.pdf
[95] Rail Safety and Standards Board. (2009) *The Rail Industry Sustainable Development Principles*.

Reducing environmental impact

"Operate and improve the business in a way that minimises the negative impacts and maximises the benefits of the railway to the environment"

Carbon smart

"Pursue initiatives to achieve long term reductions in carbon emissions through improved energy efficiency, new technology and lower carbon power sources and facilitate modal shift, helping others make more carbon efficient journeys"

Energy wise

"Maximise the rail's energy efficiency for traction and non-traction use"

Supporting the economy

"Boost the productivity and competitiveness of the UK, at a national and regional level, through the provision of efficient passenger and freight services and by facilitating agglomeration and catalysing economic regeneration"

Optimising the railway

"Maximise the rail system's capability and build on its strengths to deliver a transport system that is efficient and offers good value for money"

Being transparent

"Promote a culture of open and accountable decision making; measure, monitor and report publicly on progress towards sustainability"

In 2011, RSSB published *The Rail Industry Sustainable Development Report*,[96] which outlines industry performance and challenges against the SD Principles. The report also outlines the KPIs against which the industry will monitor sustainable development performance in the future.

2.7.1 Other relevant strategy documents

Rail Technical Strategy (RTS) 2012, The Future Railway[97]

Envisioning the future railway to be a low carbon, energy-efficiency railway, RTS suggests that the rail industry should 1) reduce reliance on fossil fuels, 2) reduce reliance on non-renewable materials and 3) adopt energy-efficient operations, rolling stock and infrastructure.

To deliver these objectives, RTS proposes five strategies and five enablers.

Strategies
· More 25kV electrification
· Develop energy-efficient specifications for railway assets
· Leverage intelligent traffic management to optimise energy use
· Adopt smart grid technologies
· Maximise the use of low carbon materials

Enablers
· Robust, lower cost electrification
· Improved electrification protection and control
· Energy-efficient systems
· Technology brokerage
· Improved sensors and monitoring systems

Industry Strategic Business Plan for England and Wales for CP5[98]

This *Industry Strategic Business Plan* sets out how industry can be part of a national plan to mitigate climate change by initiatives to reduce its carbon emissions (see Section 4.6). The industry's work on mitigating noise pollution has been transferred to Network Rail's plan for track asset management.

Industry Strategic Business Plan for Scotland for CP5[99]

This plan is similar to the business plan for England and Wales in response to the policy of financial sustainability.

Sustainable Development Strategy – Our vision and strategy: A railway fit for the future 2013–2024[100]

The *Sustainable Development Strategy* report focuses on a sustainable development vision and strategic objectives (outcomes, outputs and activities). The strategy also reviews the fundamental principles of a sustainable business and looks at key priorities where Network Rail will focus their efforts. It sets out key outcomes that Network Rail are seeking to achieve up to 2024.

Station Strategy and Plan for Control Period 4[101]

The station strategy document sets out the vision for the 2500 stations on the national rail network. The document addresses the station challenges identified in the *Delivering a Sustainable Railway* white paper, and defines how Network Rail will work with others to plan and deliver the vision.

The document covers sustainability by exploring the provision of a more sustainable station environment. In particular, the document discusses seven priorities in developing a sustainable rail network:

· Asset management
· Customer perception
· Resource efficiency
· Capacity
· Procurement
· Climate change
· Safety

[96] Rail Safety and Standards Board. (2011) *The Rail Industry Sustainable Development Report*.
[97] Technical Strategy Leadership Group. (2012) *The Future Railway*.
[98] Rail Delivery Group. (2013) *Industry Strategic Business Plan for England and Wales – Industry's response to HLOS for CP5*. Rail Freight Operators' Association, Railway Industry Associations, Train Operators Working Together, and Network Rail.
[99] Rail Delivery Group. (2013) *Industry Strategic Business Plan for Scotland – Industry's response to HLOS for CP5*. Rail Freight Operators' Association, Railway Industry Associations, Train Operators Working Together, and Network Rail.
[100] Network Rail. (2013) *Sustainable Development Strategy – Our vision and strategy: A railway fit for the future 2013–2024*.
[101] Network Rail. (2007) *Station Strategy and Plan for Control Period 4*.

3. Standards Review

This section identifies rail industry standards for the scope of the StaaS network and system architecture from the relevant standards including European standards (EN), Network Rail standards, British Standards (BS), RSSB and UK technical standards for interoperable smart ticketing (ITSO Specification). The identified relevant standards are currently mapped in six telecommunication areas in railway stations (Table 1):

· Fire alarm safety systems/Station management
· Telecommunications (fixed telephony and network)
· Public address (and voice alarm)
· Video surveillance systems (mainly CCTV surveillance)
· Public information systems display
· Access control systems

The existing output in Table 1 has been reviewed with the following technology and delivery partners, with whom Cisco is collaborating to create the StaaS network and system architecture:

· telent (partner, systems integrator)
· Abellio Greater Anglia (partner, train operating company)
· Workware Systems (partner, specialised in situational awareness)

3.1 Lack of standardisation for video surveillance material formats

It must be noted that no standards providing prescriptive guidance for the use of specific digital video surveillance material formats were identified. Currently, no standards prescribe which picture aspect ratio and resolution (e.g., picture height by width in pixels) must be used, the number of frames per second to be recorded and stored, and whether greyscale (black/white) or only colour images are permitted. The lack of such a standards inhibits the development of common-use video surveillance infrastructure systems that can easily be shared amongst authorities. More importantly, the lack of such a standard creates a significant barrier for ground-breaking innovation work in the many uses for video surveillance. If a standardised technology basis for video surveillance material and recording formats is not available, the commercial viability of any innovation work in this area will be limited.

Table 1: Reference standards for delivering the StaaS network and system architecture

No.	Standard	Brief Description	Fire Alarm Safety Systems/ Station Management	Telecoms. (Fixed Telephony and Network)	Public Address (Voice Alarm/ EN 54)	Video Surveillance Systems (CCTV)	PIS Display (Public Information Systems Display)	Access Control System	Notes
1	BS 5839 – 1:2013	Fire detection and fire alarm systems for buildings Code of practice for design, installation, commissioning and maintenance of systems in non-domestic premises	yes		yes				
2	BS 5839 – 8:2013	Fire detection and fire alarm systems for buildings Code of practice for the design, installation, commissioning and maintenance of voice alarm systems	yes		yes				
3	BS 7958: 2009	Closed circuit television (CCTV). Management and operation Code of practice				yes			
4	BS 8495: 2007	Code of practice for digital CCTV recording systems for the purpose of image export to be used as evidence				yes			
5	BS7671: 2008	Requirements for Electrical Installations (IEE Regulations 17th Edition)	yes	yes	yes	yes	yes	yes	
6	CLC/TR 50542	Communication between safety equipment and machine interfaces	yes						
7	EN 50121 –4:2006	Railway applications. Electromagnetic compatibility. Emission and immunity of the signalling and telecommunications apparatus	yes	yes	yes	yes	yes	yes	May not be applicable to equipment installed beyond 10m at the centre line of the track
8	EN 50122– 1: 2011	Railway applications. Fixed installations. Electrical safety, earthing and the return circuit. Protective provisions against electric shock		yes					Applicable when the station telecoms network is used for protective, earthing provisions
9	EN 50125– 3:2003	Railway applications. Environmental conditions for equipment Part 3: Equipment for signalling and telecommunications	yes	yes	yes	yes	yes	yes	Applicable only for equipment not installed in climate controlled equipment room

No.	Standard	Brief Description	Fire Alarm Safety Systems/ Station Management	Telecoms. (Fixed Telephony and Network)	Public Address (Voice Alarm/ EN 54)	Video Surveillance Systems (CCTV)	PIS Display (Public Information Systems Display)	Access Control System	Notes
10	EN 50126: 1999	The specification and demonstration of Reliability, Availability, Maintainability and Safety (RAMS)	yes	yes	yes	yes	yes	yes	
11	EN 50132-7: 2012	Alarm systems – CCTV surveillance systems for use in security applications – Part 7: Application guidelines				yes			
12	EN 50159: 2010 (Supersedes EN 50159-1:2001, EN 50159-2:2001)	Railway applications – Communication, signalling and processing systems Part 2: Safety related communication in open transmission systems	yes		yes				Dependent on how Abellio and Network Rail assign the safety integrity level
13	EN 54	Fire detection and fire alarm systems – requirements and testing procedures for all system components	yes		yes				Does not cover IP networking equipment.
14	EN 60849	Sound Systems for Emergency Purposes			yes				
15	EN 60950-1: 2006	Information technology equipment – Safety – Part 1: General requirements	yes	yes	yes	yes	yes	yes	
16	GI/RT7016	Interface Between Station Platforms, Track and Trains	yes	yes	yes	yes	yes	yes	Regulates proximity of structures, furniture to track on platforms, headroom, et al.
17	IEC 60335-2-75 edition 3.0	Household and similar electrical appliances – Safety – Part 2-75: Particular requirements for commercial dispensing appliances and vending machines	yes						
18	ISO 9001: 2008	Quality management systems – requirements	yes	yes	yes	yes	yes	yes	Required wherever software is the solution
19	ITSO TS 1000	Interoperable public transport ticketing using contactless smart customer media		yes					Integrated Transport Smart Card Organisation Limited
20	National Rail and Underground CCTV Guidance Document (Nov. 2010)	The guidance document will help operators comply with their legal obligations under the Data Protection Act				yes			

No.	Standard	Brief Description	Fire Alarm Safety Systems/ Station Management	Telecoms. (Fixed Telephony and Network)	Public Address (Voice Alarm/ EN 54)	Video Surveillance Systems (CCTV)	PIS Display (Public Information Systems Display)	Access Control System	Notes
21	NR/CS/TEL/30101	Telecoms Assurance and Compliance	yes	yes	yes	yes	yes	yes	
22	NR/GN/CPR/401	Guidance on Contractual Health and Safety Requirements	yes		yes	yes			
23	NR/L1/TEL/30029	Telecoms Installation	yes	yes	yes	yes	yes	yes	
24	NR/L1/TEL/30092	Telecoms Testing and Commissioning		yes					
25	NR/L1/TEL/30099	Telecoms Asset Management	yes	yes	yes	yes	yes	yes	
26	NR/L1/TEL/30100	Telecoms Design	yes	yes	yes	yes	yes	yes	
27	NR/L2/AMG/029/form/non-crit.	Network Rail definition of product introduction acceptance requirements for non-critical products	yes	yes	yes	yes	yes	yes	
28	NR/L2/CIV/003	Engineering Assurance of Building and Civil Engineering				yes	yes		The purpose of this Standard is to define engineering assurance requirements for design and construction of Building and Civil Engineering Works
29	NR/L2/EBM/088	Arrangements for Maintenance of New and Changed Assets	yes	yes	yes	yes	yes	yes	
30	NR/L2/RSE/100	Network Rail Acceptance Panel Processes	yes	yes	yes	yes	yes	yes	
31	NR/L2/RSE/100/05:2011	Product introduction and change	yes	yes	yes	yes	yes	yes	
32	NR/L2/TEL/30022	Technical Requirements for Communications Engineering Schemes and Services	yes	yes	yes	yes	yes		
33	NR/L2/TEL/30025: Issue 4	Standby Power Supply Requirements For Telecommunications Equipment		yes					
34	NR/L2/TEL/30094	Installation of Telecommunication Equipment and Systems		yes	yes	yes	yes		
35	NR/L2/TEL/30098	Testing and Commissioning of Telecommunications Equipment and Systems		yes	yes	yes	yes		

No.	Standard	Brief Description	Fire Alarm Safety Systems/ Station Management	Telecoms. (Fixed Telephony and Network)	Public Address (Voice Alarm/ EN 54)	Video Surveillance Systems (CCTV)	PIS Display (Public Information Systems Display)	Access Control System	Notes
36	NR/L2/ TEL/30130: Issue 3	Electronic Visual Customer Information Systems					yes		Updates version of NR/SP/ TEL/30130
37	NR/L2/ TEL/30134: Issue 2	Design and installation requirement for public announcement, voice alarm and long line public announcement systems			yes				
38	NR/L2/ TEL/30151	Design and installation of station cabling		yes	yes	yes	yes	yes	
39	NR/L3/ TEL/31104: Issue 3	Process for managing Telecoms software/hardware changes		yes					
40	P2PE (Point-to-Point Encryption)	Subset of PCI DSS		yes					
41	PA-DSS (Payment Applications – Data Security Standards)	Subset of PCI DSS		yes					
42	PCI Data Security Standards (PCI DSS)	Enhances payment card data security, also includes P2PE and PA-DSS		yes					
43	RIS-7700-INS	Rail Industry Standard for Station Infrastructure	yes	yes	yes	yes	yes		
44	TD GEN 096 Issue 1	Telecommunications directive – telecomm requirements for general emergency use at sub-surface stations		yes					

"Among the objectives stated are the development of improved communication and disruption strategies, and the improvement of station facilities with an 'emphasis on ease of access, passenger flow and customer services and benefits.'"

4. Summary

Led by Cisco, this brochure has been jointly reviewed by the StaaS (Stations as a Service) project partners, telent, Abellio Greater Anglia and Workware Systems.

The brochure has presented current policies and legislation in the UK rail industry and thus laid out the design basis for StaaS. This document has also identified 44 rail industry standards, including European standards, Network Rail standards and British Standards. In particular, the identified standards are mapped onto six functional areas, with which StaaS needs to comply in developing and testing the innovative IP-based network infrastructure for stations.

This brochure exists as guidance for those who may seek to deliver advanced ICT infrastructure services into UK rail stations. Readers are encouraged to use the contents and to supplement them with the referenced policies, legislations and standards to build their own business cases. It is important to note that any update to the existing referenced documents in this brochure will need to be incorporated in future practice.

For more information, please visit the project website, http://www.ciscocreate.co.uk/staas

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Project partners

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