



Response by RSSB to
The Shaw Report:
The future shape and
financing of Network Rail -
The scope

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Letter from the Chairman

Nicola,

As your scoping report recognises, changing one bit of the railway system, such as the major infrastructure provider, will have an impact across the railway. This is because the interaction of infrastructure, trains, passengers and freight makes the railway inherently more complex than many comparable systems. This means that, regardless of structure, the system has to find ways to work as a whole including at the various interfaces to deliver a safe and efficient railway. RSSB have played a crucial role in supporting this cross-system working over the last 13 years.

RSSB was established after a period of unacceptable safety performance specifically to address system wide issues, including safety, standards and research. Although RSSB has limited authority (only standards are imposed by license), we have been able to build trust and confidence so that the industry can co-operate, notwithstanding their different commercial interests. As a result the industry and government have looked to RSSB to provide collaboration across a variety of additional technical topics; most recently for cyber-security.

I know, from research among our stakeholders and members, that this trust is built upon several essential components:

- A system wide perspective focussing on the whole railway and not the parts
- Engagement of all parts of the industry, from the expert technical input, to programme governance and the RSSB Board
- An evidence based approach built upon data, risk modelling and research.
- A trusted third party that is separate from any commercial interest in the railway system
- Recognised knowledge and expertise

The challenges and opportunities of growth and devolution that your report describes, will generate new structures and so new cross system issues. The changes that occur in the next period will introduce uncertainty and will introduce new risks into the system as a whole. It will therefore be all the more important that the industry is clear about where and why they work together to deliver a safe and efficient system. This is why we would encourage you to say something about the ongoing need for a trusted 'technical expert body'. I believe RSSB can contribute significantly in this regard.

This document responds to your consultation questions, but the theme of cross-system working runs throughout the detail.

In conclusion, we welcome your work as an opportunity to realise the benefits of growth and deliver an even better and safer system for the public. We look forward to your report and to the role that RSSB's people, experience and expertise can play in future industry development.

Anna Bradley
RSSB Chairman

Summary

RSSB provides expert technical advice, training and guidance about infrastructure, rolling stock, control systems, energy, rail operations, human factors, and safety risk; specifically in the areas of health and safety, standards, research and innovation. Our unique position, established through the effective coordination of our members' views enables us to take a whole system perspective. Drawing on this expertise we make the following key points:

- **Complexity will remain a constant - necessitating a whole system view.** Customers, growth and devolution all need to be managed within this complexity, with clear recognition of where single duty holder, bilateral, sector and cross-system solutions are the most appropriate.
- **Devolution would create a greater need to bring even more actors together to deliver a successful railway.** RSSB's expertise and its current roles and responsibilities can help enable this. This review provides an opportunity to enhance the efficiency and effectiveness of the railway, through improving structures, clarifying accountabilities, resolving funding challenges, and to set the right conditions for future growth.
- **Technical issues in particular need to be managed from a whole system perspective.** This ensures interoperability across the system and provides confidence to all parties, including investors, that decisions on the transfer of costs and risk are managed, free from individual commercial interest. It can also enable a single, independent national voice for technical standards and regulation in Europe.
- **The functions of technical expertise are distinct from those of system operator.** The wide range of systems planning functions, such as timetabling and capacity, and the provision of services to routes on a economic scale, introduce both different time frames and commercial dimensions that are less compatible with technical functions.
- **RSSB acts as an independent industry body providing support in safety, standards, research and innovation.** RSSB not only underpins much of the activity for safety co-operation required under ROGS but applies its own and industry expertise to a wide range of technical topics from new technology to sustainability.

We believe RSSB has the experience and skills base to make a significant contribution to the formation of a broader technical expert body for the GB railway as described in this response.

Our specific responses to selected relevant questions are summarised below, with further details provided in the main body of the response:

1 Infrastructure manager role and scope (Question 3)

The accountabilities of the infrastructure manager role need to be clearly defined. A separate capability to manage cross-industry technical standards will be increasingly important in the case of further devolution. RSSB, as an independent, whole system level, expert technical body, has considerable experience in delivering this.

2 The devolution and governance of infrastructure management (Q 8, 10, 11)

If the network is disaggregated certain technical processes and capabilities will still need to be provided at national level, including: standards management; collective safety decision making; product testing and acceptance; data and information management; influencing international Standards and Regulations; technical support to strategic decision making; supplier capability assurance; and confidential safety reporting. RSSB can help facilitate efficient and effective devolution by providing these functions.

3 Infrastructure planning (Q 15,16)

Our experience suggests that there are opportunities to improve planning and delivery of major enhancements by better consideration of standards early in the project lifecycle. There are some useful precedents in the oil and gas, utilities, and nuclear industries.

4 Structural options for infrastructure management (Q 17, 19, 20)

We have proposed a number of criteria to assess structural options for a future infrastructure provider in relation to technical expert functions, including: avoidance of conflicts of interest; clear accountabilities, governance and assurance; control of risk; and enabling innovation.

In our view, an independent technical expert body would be an important feature of any new industry structure to:

- Provide national standards management, safety monitoring and risk modelling
- Maintain a national voice on European regulations
- Advise on health, sustainability and environmental strategy
- Coordinate research and system-wide technical strategy development, and new product acceptance.

RSSB could bring considerable experience and expertise in fulfilling this given our current role and capabilities.

5 Financing and funding an infrastructure operator (Q 24, 25)

The right conditions need to be created to attract private sector investment. RSSB can contribute to creating these conditions by providing trusted frameworks that are free from commercial bias, including technical support to long-term strategic planning, efficient standards that support interoperability and safety obligations, and an evidence base for decision making.

We would be delighted to engage with the review team to provide further background, or to develop the thinking further in the area of independent system-level management of technical issues.

Introduction to this document

This document provides RSSB's response to the Shaw Report consultation document - '*The future shape and financing of Network Rail - The scope*', November 2015.

We have structured our response as a series of topic areas which relate to the consultation questions. We have kept this in the same order as the questions for the convenience of the review team. In each topic section we have listed the relevant questions and provided our response in terms of a headline summary with supporting text.

We have only provided responses to those questions which are relevant to the scope and remit of RSSB.

Aim and representation

The aim of this response is to inform the review team of important matters relating to safety, standards, research, and innovation which should be considered in the review.

RSSB is a not-for-profit, expert industry body with membership from GB rail infrastructure managers, passenger and freight train operators, rolling stock owners, infrastructure contractors, and suppliers (see also the section *RSSB and its relationship to infrastructure manager(s)*, and Appendix A). Member organisations have not been specifically consulted, as we have assumed that any responses that member organisations wish to make will be provided to the review team directly by them. None of the responses is confidential.

It is important to note that Network Rail itself is a member organisation of RSSB, and therefore this response does not contain any comments with respect to Network Rail's structure, funding or performance. Instead, our comments focus on the wider context of the railway as a whole. In some places this does include comments on the infrastructure manager as a role within the railway system, but not on Network Rail as the current incumbent in this role.

RSSB and its relationship to infrastructure manager(s)

RSSB was established in 2003 after the Cullen Report to address the need for a system-wide perspective on safety, standards and research, and a range of cross-industry systems. These are summarised in the table below, with more detail in Appendix A.

RSSB functions	Summary of activities
Standards	RSSB manages the development of national rules in Railway Group Standards, National Operations Publications (such as the Rule Book) and other industry standards and guidance. The infrastructure manager's company standards have to align with these requirements.
Safety	RSSB's analysis of safety performance and risk, and provision of guidance supports rail industry members in making informed decisions in order to meet their legal obligations for health and safety.
Research and innovation	Continuous improvement in the railways is supported by RSSB's research, development and innovation activities. RSSB manages a range of programmes and schemes funded by government and industry to: inform the knowledge base; influence improvements in business performance; and deliver the industry's Rail Technical Strategy.
Sustainable Development	RSSB is responsible for the development of the industry's Sustainable Rail Programme. The principles and objectives of sustainable development are relevant to building tomorrow's railway.
Supplier assurance	RSSB manages the Railway Industry Supplier Approval Scheme (RISAS) which provides a mechanism to assess and approve critical product suppliers, supported by the safety regulator. RSSB also manages the Railway Industry Supplier Qualification Scheme (RISQS) which is the single entry point for suppliers to the rail industry.

Parties across the rail system, including infrastructure managers, passenger and freight train operators, rolling stock owning companies, infrastructure contractors, and suppliers rely on RSSB to provide a trusted, independent of commercial conflict, evidenced based, and expert approach (see Appendix B for a list of RSSB's members). This applies to:

Standards - where collective decisions are required on the transfer of cost and risk across interfaces.

Safety - where data collection and risk modelling provides an evidence base for monitoring industry performance and assessing risk. This work underpins the duty

holders' requirement to cooperate under ROGS, and the evidence base to support decision making under the Common Safety Method regulations.

Research and technology - where work on both filling knowledge gaps to define safe and efficient standards, and the development of a long-term technical strategy require cross-system thinking and expertise; especially as new technology is introduced, and shifts existing assumptions.

Network Rail, as the infrastructure manager for the GB mainline railway network, is a key party involved across a majority of physical, operational and commercial interfaces. Its input is essential to ensure that standards, research, safety and innovation initiatives reflect the best short-, medium- and long-term interests of the whole railway system; and that all other parties to the railway can engage in open, collaborative and trusted solutions that are not dominated by any single perspective.

We would like to ensure that the Shaw review has a good understanding of the current role of RSSB and the ways in which we might fit in with the final recommendations. This is particularly because the *scoping document* refers to the role of RSSB incorrectly in two places:

First, Section 3.32 states that '*Network Rail also receives on-going oversight from other organisations, including... the Rail Safety and Standards Board, which sets safety and technical standards.*'

RSSB does not provide any safety or other oversight of Network Rail, and does not hold any accountabilities for its safety performance. RSSB advises and supports the industry, including Network Rail, in addressing its legal obligations and in achieving its objectives, such as improving performance. Further details are provided in Appendix A.

Second, Annex C classifies RSSB as a safety body instead of an industry organisation and a technical expert body.

Network Rail has its own individual safety requirements and other obligations as a duty holder. It sets its own company standards, which it uses to control hazards, in addition to applying Technical Specifications for Interoperability (TSI) and national rules required by law. For the GB mainline railway national rules are mostly contained in Railway Group Standards (RGS). Network Rail also uses the Rule Book to operate safely and adopts industry agreed Railway Industry Standards (RIS) to address its obligations.

RSSB does not have any direct regulatory authority, although there is an obligation on duty holders to comply with RGSs as a licence condition. The scope of RGSs comprises requirements which supplement the TSIs and address the technical compatibility between railway subsystems, aimed at promoting open markets and harmonisation. RSSB often supports and represents the National Safety Authority (ORR), as well as its members, at European and international meetings on standards that affect the GB rail network, including Network Rail as the infrastructure manager.

Infrastructure manager role and scope

Q3: What are your views on these (i.e. Network Rail's) accountability arrangements and their effectiveness?

In addition to the infrastructure manager role there is a need to have a distinct capability to manage cross-industry technical standards and make collective decisions at a whole system level.

The accountabilities of the organisation that performs the function of the *infrastructure manager* role within the 'whole system' need to be precisely defined.

We think that the accountabilities of the organisation that performs the function of the *infrastructure manager* role need to be better defined within the context of the whole system. The Railways and Other Guided Transport Systems (Safety) Regulations (ROGS) 2006 set out that an infrastructure manager's role includes developing, maintaining, managing and using infrastructure, or permitting its use for the operation of a vehicle.

The recent ORR system operation consultation introduces a new role of *system operator* which includes:

- Long-term network system operation (proposals and projects for changes to the network to meet strategic needs).
- Infrastructure management (maintenance and delivery of changes to the network)
- Short- and medium-term network system operation (determining and allocating capacity and operating the system).

Currently, the *infrastructure manager* organisation fulfils all these system operator roles.

Our experience suggests there are some issues about whole system operation which would benefit from being addressed in future definitions of roles.

- Under the current arrangements, this organisation has commercial relationships with other actors within the system, such as TOCs and FOCs. This can sometimes give rise to conflicts of interest, especially should it become a system operator, where an independent, whole system perspective is necessary to make effective cross-system technical and safety decisions.
- In some future scenarios, there could be many infrastructure managers - for example, HS1, HS2 and Crossrail, as well as devolved routes. This could give rise to technical compatibility issues if not suitably coordinated.

The role of the *infrastructure manager* organisation therefore needs to be defined precisely within the context of a *whole system*, ensuring that accountabilities are clear at this whole system level as well as at subsystem levels.

The role of RSSB in safety, standards, research and innovation could make a valuable contribution at a whole system level.

RSSB's role (summarised in *The devolution and governance of infrastructure management* section) is unique in the UK rail industry in holding this independent whole system perspective. We believe that this capability could be harnessed to make a valuable contribution at the whole system level in any future industry structure.

The devolution and governance of infrastructure management

Q8: Is there a case for changing the route structure and what are the advantages and disadvantages of different approaches to disaggregating the network, for example on the basis of:

- *Physical, political or economic geographies?*
- *Service type, e.g. commuter services, inter-city services and regional services*

Q10: Can you point to any specific economies of scale that should be protected at national rather than route level?

Q11: What processes and capabilities need to be in place (at both the centre and route level) to support Network Rail's current devolved structure?

RSSB recognises that devolution would require certain key technical processes and capabilities are ensured at national level and that avoid conflicts of interest.

There are several processes and capabilities that should be protected at national level to enable the benefits and risk of devolution to be achieved and managed.

Whichever devolution approach is adopted, there are several activities within RSSB's current scope and remit which will need to be conducted at national rather than route level if the benefits are to be achieved. These include the following:

- **Standards management and rationalisation:** Having diverse standards in different parts of the network would lead to unnecessary costs and inefficiencies, for example:
 - Suppliers having to manufacture small volume product variants, due to system operation complications and incompatibilities at interfaces
 - Multiple testing regimes, lack of synergies in maintenance, divergent operating regimes
 - Lack of a critical mass of expert technical resources.

There is a further benefit in retaining a national approach to European interoperability and a link to the Fourth Railway package to be adopted across Europe. RSSB advocates a continued push towards TSIs, with fewer company-specific standards supported by local guidance or control measures, which would help to improve rationalisation and cost-efficiency.

- **Safety decision making:** Collective decision making on health and safety is important to maintain performance levels, ensure consistency of approach, share knowledge and experience, and better manage risk and liabilities. There is a track

record of success with this model. It is vital that the UK rail industry does not allow any slippage in its leading safety performance.

- **Innovation and product acceptance:** Testing and acceptance of new products must be managed once, rather than by each route individually, to avoid costly duplication of effort and excessive acceptance timescales, and to achieve economies of scale. Slow and risk averse product acceptance has been recognised in recent years as one of the key barriers towards greater innovation in the GB rail industry.
- **Data and information management:** Coordinated management of technical data and information across the network would provide major benefits in terms of network management and optimisation, asset management effectiveness, and enabling common solutions to be implemented with greater economies of scale and knowledge sharing.
- **Cyber security:** It is essential to ensure that a coordinated approach is used across digitally integrated systems for data management and protection.
- **International influence:** European regulations, directives and standards can have a major impact on UK rail costs and efficiencies. It is important to maintain a national voice to effectively influence the course of these, make the case for the interests of the UK national railway, and ensure that this is better streamlined, to help support DfT in its capacity as a *member state*.
- **Strategic planning and decision-making:** It is essential to maintain a strategic decision-making capability at a national system level, to balance stakeholder needs and ensure the best long-term solution that represents the national interest. Strategic decision making requires independent technical advice and evidence.

RSSB could facilitate devolution of the network by providing or contributing to these important national processes and capabilities.

RSSB already has a critical mass of independent expertise in the above areas which exists independently at the whole system level. This expertise could make a valuable contribution to ensuring that any devolution delivers the benefits that are being sought.

Infrastructure planning

Q15: How well do the current delivery and planning processes work for projects of different sizes?

Q16: Are there any useful models or precedents from other sectors or countries for long term infrastructure planning and delivery processes that we should consider, including in relation to management of and engagement with suppliers during the planning process?

Consistent and early application of standards is essential to ensure that projects are successfully delivered on time and to budget, and RSSB has considerable expertise in this technical area

The scoping report alludes to a number of areas of concern with regard to infrastructure planning and delivery for which RSSB's expertise could be relevant.

In particular:

- **Inadequate project definition and risk/reward balance:** One of the contributors to major cost and schedule overruns is the lack of adequate project definition at the time that major capital commitments need to be made. *Standards, interoperability, safety and technical issues* can be major contributors to overruns unless they are adequately considered *early in the project life-cycle*. In our experience these issues are sometimes not defined sufficiently at an early enough stage. Standards in particular can have major impacts, and managing them effectively requires not just an understanding of their technical content but also expertise in how they are managed and interpreted.
- **Capacity and technical ability:** Available capacity and technical expertise is limited in some key areas, for example cyber security and ETCS, and this can be a barrier towards fast and effective planning and delivery. In the case of the infrastructure manager role, there is sometimes high pressure to deploy key technical expertise in support of short-term operational needs, which can cause problems for major enhancement projects which also require this expertise.
- **Lack of a system-level perspective:** Planning of major enhancements is by its nature an activity which has to have a system-level perspective across both infrastructure and other elements, and benefits from a longer-term strategic view. There are typically multiple actors involved who have different interests with respect to the enhancement, and individually they may be conflicted from considering and deciding objectively on the necessary trade-offs and system-wide implications.

RSSB could contribute significantly to addressing these areas of concern.

RSSB could help in providing a critical mass of technical expertise in the above areas to support the infrastructure planning and delivery process, as well as ensuring a more strategic system-level perspective in establishing, for example, whole-life and whole-

system costs and benefits. This is especially valuable for enhancement projects with a long life-cycle.

Part of RSSB's role is to interact both within the rail industry and across adjacent sectors. As such, we are able to offer a view on other models and precedents from both other sectors and countries, notably the nuclear, utilities, and energy sectors. Some case studies have been provided in Appendix C to illustrate the value of this knowledge. In particular how these industries have enabled better long-term infrastructure planning and delivery through better engagement with the supply chain, independent technical governance mechanisms, and portfolio-based approaches to enable flexibility in the delivery of smaller projects

Structural options for infrastructure management

Q17: What would be the most important structural features of any future infrastructure provider?

Q19: Do you have any views on how the relationship between the periodic review process and other processes with which you are involved could be improved?

Q20: What criteria should be used to assess structural options under consideration? How, if at all, should these criteria be prioritised?

In a rail system with multiple infrastructure providers, the role of an independent technical expert body is essential

We propose a number of criteria to assess structural options for the whole system, which would help to address issues raised in this response.

The rail system is clearly complex and involves the collaboration of many players with different roles, interests and incentives. This complexity could further intensify if multiple infrastructure providers are involved. The role of infrastructure manager is key, and its remit needs to be carefully defined within the context of the whole system. Whatever criteria are used to assess options, we would suggest that the following criteria are included for assessing any structural options for the whole system:

- **Avoidance of conflicts of interest:** Does the option ensure that system-level technical decision-making, especially with regard to infrastructure planning, is free from conflicts of interest resulting from commercial or contractual relationships between the infrastructure provider and other actors in the system?
- **Clear accountabilities, governance and assurance:** Does the option provide clear accountabilities for each key function, with suitable and unconflicted governance and the availability of independent technical assurance?
- **Control of risk:** Does the option ensure that health and safety risk levels are not increased, and that environmental and sustainability goals are met? Does the option provide transparency and confidence on decisions that transfer cost and risk between parties?
- **Enabling innovation:** Does the option allow for suitable incentives for actors in the system to innovate, and does it remove barriers which have hindered innovation in the past?

RSSB's view is that an independent technical expert body is required as part of the structure to enable these criteria to be met.

Whilst it is beyond our scope to advocate any specific organisational models, legal structures or authorities, our view is that to meet the above criteria an independent technical expert body is required. The role of such a technical expert body should be distinct from that of a system operator, which typically assumes responsibility for:

- Capacity allocation (train pathing and engineering planning)
- Track access planning
- Train control
- Route enhancement planning

In contrast the role of a technical expert body would include:

Standards management and rationalisation including interoperability, data and information management, cyber security, and maintaining a national voice on European regulations, directives and standards

Safety monitoring, risk modelling and facilitation (but excluding safety management which remains a line responsibility of the operating railway)

Sustainability and environmental strategy

Research and system-wide technical strategy development

New product acceptance: Whilst this is not part of RSSB's current remit, central management of testing and acceptance of new products in a way that ensures independence and a whole system perspective, has been identified in previous studies as an effective way to avoid costly duplication of effort and excessive acceptance timescales, and to achieve economies of scale (refer *Achieving VfM from a Railway Systems Authority Final Report*, issued for the McNulty Study, February 2010). RSSB has considerable understanding of research and innovation as this is a core activity today.

There is a strong rationale for having such an independent technical expert body.

An independent system-level technical expert body:

- Is required to deal in an unconflicted way with cross-system issues that require significant technical expertise and evidence. The infrastructure manager role is unable to offer this due to its commercial conflicts.
- Is necessary to achieve a passenger- (and freight-) centric railway, which requires a whole system approach. The infrastructure manager role is not well-placed to provide this perspective.
- Will be increasingly necessary to manage cross-system technical issues to ensure consistency and economies of scale, in the case of further devolution or disaggregation and the possibility of multiple infrastructure managers. It will allow for further growth and scale-up of the network without introducing further complexity.
- Can help to rebuild and reinforce trust and collaboration between the actors in the system, which is an important enabler for a well-functioning rail system.
- Is better positioned to work towards greater rationalisation of standards than a technical body which is part of the infrastructure manager. This is a key barrier to innovation.
- Can help to ensure collaborative strategies and consistency of approach in the management of health and safety.

RSSB could make a significant contribution to such a body.

Financing and funding an infrastructure operator

Q24: What positive case studies are there (e.g. international examples in the railway sector, other sectors internationally/in the UK), where more affordable and sustainable funding and financing structures have been implemented, with or without private sector capital input? And how do you think the lessons learnt could be applicable to Britain's railway infrastructure?

Q25: What are your views on the enabling factors facilitating a sustainable and affordable capital structure for Britain's railway infrastructure? What factors would be required specifically for private sector capital introduction?

The right conditions need to be created to attract private sector investment. Having clear, independent frameworks for safety, standards, research and technology is one of the key features necessary to create these conditions.

Previous studies in the GB rail sector have shown that attracting private sector investment requires certain conditions.

Most notably a study of measures to develop the UK supply chain capability to meet the needs of the future railway¹, have suggested a number of conditions necessary to attract private sector investment:

- **Clear and stable long-term strategic direction and planning:** Confidence in the long-term stability of infrastructure investment planning.
- **A stable regulatory environment:** Regulations and standards which provide sufficient certainty for the private sector to make long term investments.²
- **Level playing field for commercial entities:** Well-functioning open market without distortions or undue advantages for incumbents, especially those in monopoly positions. This means, for example, channelling innovation funding through an independent body rather than an infrastructure manager or other actors in the system.
- **Manageable levels of commercial risk:** Risk and uncertainties need to be adequately bounded either through technical definition or other mechanisms, to suit normal investment criteria.
- **Viable business models:** Business models need to be in place which enable suitable returns on investment to be achieved, overcoming any barriers associated with the

1 Enabling Innovation Team, August 2013. Route mapping capability for GB and international rail markets

2 Allen & Overy, 2009. Global infrastructure development and delivery - The stimulus for debate. Allen & Overy Global Survey

involvement of different players (differences in who pays and who benefits?), and fixed term contracts which limit the time available for payback.

- **Avoidance of red tape when bidding:** A transparent bidding and awarding procedure which creates a level playing field for actors and minimises bureaucracy.³
- **Measures which encourage innovation:** Incentives or opportunities which encourage private sector investors to try new approaches which can create a step change in infrastructure delivery.

Higher public sector intervention with financial support does not necessarily encourage private sector investment, as it may trigger a higher probability of political interference in project management and of contract renegotiation, something that private investors are not comfortable with.

RSSB can contribute to creating the right conditions to attract investment.

RSSB could contribute to creating these conditions through:

- Providing a whole system technical perspective to assist in effective long-term strategic planning, as exemplified through its involvement in defining and delivering the Rail Technical Strategy.
- Managing national standards to encourage rationalisation and cross-system consistency, helping to ensure an open market for new products and innovations, reducing bureaucracy associated with product testing and acceptance, and lowering cost.
- Supporting the industry in maintaining high health and safety performance, a key factor in building investment confidence.
- Providing transparent arrangements on cross-industry systems (such as supplier assurance).

In Appendix C, we offer some positive case studies which illustrate where more affordable and sustainable funding and financing structures have been implemented, by the Singaporean water authority, and offer a view on how further investment could be realised from institutional investors and pension funds.

³ OECD, September 2014. Private financing and Government support to promote long term investments in infrastructure

Conclusion

In responding to selected review questions, we have sought to make the review team aware of important matters relating to safety, standards, research and innovation which should be considered in the review. We have focussed on the wider context of the railway as a whole, although we have also commented on the infrastructure manager role.

In conclusion we highlight the following key points:

Complexity will remain a constant - necessitating a whole system view. Customers, growth and devolution all need to be managed within this complexity, with clear recognition of where single duty holder, bilateral, sector and cross-system solutions are the most appropriate.

Devolution would create a greater need to bring even more actors together to deliver a successful railway. RSSB's expertise and its current roles and responsibilities can help enable this. This review provides an opportunity to enhance the efficiency and effectiveness of the railway, through improving structures, clarifying accountabilities, resolving funding challenges, and to set the right conditions for future growth.

Technical issues in particular need to be managed from a whole system perspective. This ensures interoperability across the system and provides confidence to all parties, including investors, that decisions on the transfer of costs and risk are managed, free from individual commercial interest. It can also enable a single, independent national voice for technical standards and regulation in Europe.

The functions of technical expertise are distinct from those of system operator. The wide range of systems planning functions, such as timetabling and capacity, and the provision of services to routes on an economic scale, introduce both different time frames and commercial dimensions that are less compatible with technical functions.

RSSB acts as an independent industry body providing support in safety, standards, research and innovation. RSSB not only underpins much of the activity for safety co-operation required under ROGS but applies its own and industry expertise to a wide range of technical topics from new technology to sustainability.

We believe RSSB has the experience and skills base to make a significant contribution to the formation of a broader technical expert body for the GB railway as described in this response.

Appendix A: RSSB's core functions and role

The core functions of RSSB are to:

- Manage the development of national rules in Railway Group Standards, National Operations Publications (such as the Rule Book) and other industry standards and guidance. The IM's company standards have to align with these requirements.
- Provide analysis of safety performance and risk and guidance that supports the rail industry in making informed decisions in order to meet their legal obligations.
- Manage a range of programmes and schemes funded by government and industry to inform the knowledge base; ultimately improvements in business performance; and deliver the industry's Rail Technical Strategy.

This appendix provides further details on standards, safety and research and innovation.

A.1 Standards

- **Purpose:** The development of national rules in Railway Group Standards, National Operations Publications (such as the Rule Book) and other industry standards and guidance. Forming GB positions and influencing European and international standards, and providing advice on technical and regulatory matters related to rail standards to projects and organisations. For more information go to <http://www.rssb.co.uk/standards-and-the-rail-industry>
- **Scope:** GB mainline railway system (this excludes HS1, Northern Ireland, Channel Tunnel Rail Link and the Channel Tunnel)
- **Authority:** The requirement to comply with standards under specified circumstances is given force by different means, depending on the 'appropriate authority' that requires compliance. These means are:
 - The law - European (such as Commission decisions and Commission regulations) and domestic (such as regulations - a type of Statutory Instrument). RGSs contain national rules which are imposed on projects when changes to a subsystem are being made.
 - Licence conditions - imposed through the licence granted by the Office of Rail and Road. RGSs are imposed on IMs and RUs through their licence conditions.
 - Safety management systems and contracts - imposed at company level. Rail Industry Standards which are requested by the industry to promote standardisation are often adopted to support the SMSs and contracts of industry parties.
- **Governance arrangements:**
 - Decisions on standards are taken by six standards committees (SC) for different subsystem areas. The SCs are chaired and supported (technical, regulatory, management and analytical) by RSSB, with representatives from infrastructure managers, suppliers, trade unions, train operating companies, freight operating companies, infrastructure contractors, DfT and the ORR.

- **What is the value that RSSB's involvement and structure provide?:** The RSSB managed and supported, collective, consensus-based, and industry agreed decision making structure, and RSSB's independence from individual commercial interest ensure:
 - Whole system perspectives to be taken into account underpinned by expert analysis and evidence.
 - Industry buy-in is built in the decision making and consultation processes so outputs are already owned by the industry.
 - Non-discriminatory solutions to be put forward which can withstand challenge.
 - The collective wisdom of industry expert's representative different areas is used to advise individual standard changes and industry projects giving a greater degree of assurance.
 - Principles and decision making process are agreed with the state and the industry.

A.2 Safety

- **Purpose:** Continuous improvement in safety performance needs good risk analysis and usable reporting systems. Together, RSSB's analysis of safety performance and risk and guidance in these areas supports the rail industry in making informed judgements and decisions in order to meet their legal obligations related to safety.
- **Scope:** Mainline railway system, including risk imported to the system from third parties.
- **Authority:** Whilst individual companies remain responsible in law for the safe operation of their undertakings, the effective and efficient delivery of safety performance relies requires collaboration and co-operation between different parties. RSSB facilitates the development of industry strategies which identify specific health and safety risk areas where improved collaboration can deliver further benefits by helping to drive the next decade of health and safety improvement for our staff, our passengers and members of the public. RSSB's safety performance reporting, models, systems and guidance supports the industry actors in meeting their safety obligations under the law more effectively and efficiently. The safety obligations are likely to originate from:
 - Railways and Other Guided Transport Systems (Safety) Regulations (ROGS) 2006 (as amended). ROGS Regulation 22 under the terms of the transport operator's safety certificates or authorities are required to work cooperatively with others to achieve the safe operation of their part of the system through the development and implementation of suitable control measures.
 - Regulations supporting the Health & Safety at Work etc. Act 1974 such as the Management of Health and Safety at Work Regulations 1999.
 - The European Common Safety Methods' (CSMs) which are defined as 'the methods developed to describe how safety levels and achievement of safety targets and compliance with other safety requirements are assessed'.

- **Governance arrangements:**
 - System Safety Risk Group (SSRG) provides oversight and direction to RSSB and develops industry strategies and policies in this area and reports to the RSSB Board.
 - The purpose SSRG is to understand 100% of system safety risk, identifying areas for improvement, facilitating safety co-operation across the industry including sharing good practice and horizon scanning to identify potential threats and opportunities. The terms of reference can be found here <http://www.rssb.co.uk/Library/groups-and-committees/2015-01-remit-ssrg-terms-of-reference.pdf>
 - Membership includes Network Rail, TOCs, ATOC, FOCs, INFRACO, RSSB, suppliers, ROSCOs, OTM/OTP (rep from M&EE Networking Group). Associate members are ORR (also representing DfT), BTP, Trade Unions, and LUL/TfL. Members are all senior managers from a safety background.
- **What is the value that RSSB's involvement and structure provide?:** The RSSB managed and supported collective, consensus-based and industry agreed decision making structure; and RSSB's independence from individual commercial interest ensure:
 - Whole system perspectives are taken into account, underpinned by expert analysis and evidence.
 - Industry buy-in is built in to the decision making and consultation processes, so outputs are already owned by the industry.
 - Non-discriminatory solutions to be put forward which can withstand challenge.
 - The collective wisdom of industry experts, representative of different areas, is used to advise individual standard changes and industry projects, giving a greater degree of assurance.
 - Principles and decision making process are agreed with the state and the industry.

A.3 Research and innovation

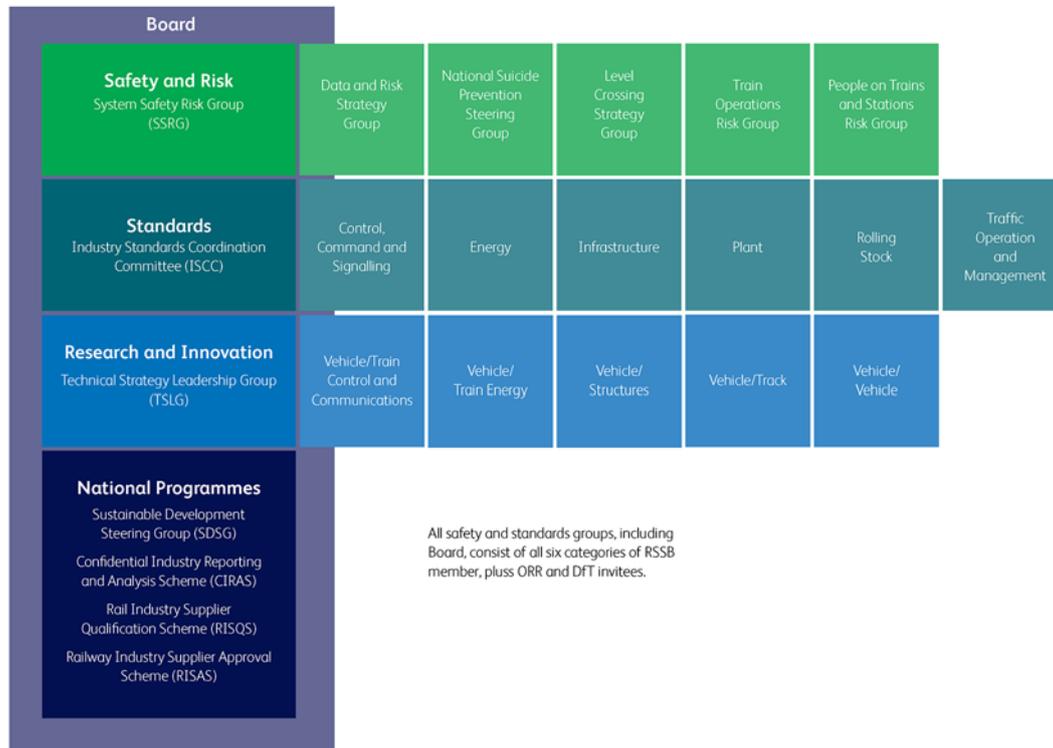
- **Purpose:** continuous improvement in the railways is supported by RSSB's research, development and innovation activities. RSSB manages a range of programmes and schemes funded by government and industry to inform the knowledge base and ultimately improvements in business performance. For more information go to <http://www.rssb.co.uk/research-development-and-innovation>
- **Scope:** GB mainline railway in terms of geographic scope. Functionally RSSB's research scope is:
 - Interface issues: engineering and operational interfaces within the railway, and interfaces with other parts of the community and society.
 - System issues: improving understanding of how the whole railway behaves and the interactions of its constituent parts.
 - Strategic issues: to support cross-industry planning and the development of the future vision and technical strategy of the railways and assess how that can and should be delivered.
 - Many other issues that individual companies cannot address on their own, such as identifying good practice.

- **Authority:** RSSB research and development is primarily funded by the Department for Transport (DfT), with additional contributions from RSSB members and the European Union. Research partnerships and co-funding schemes bring added value to the programme. Industry also invests in a range of funding schemes under RSSB's roof to enable innovation. These are managed as part of the Future Railway programme (a partnership between RSSB and Network Rail) to implement the Rail Technical Strategy (for more details go to <http://www.futurerailway.org/Pages/default.aspx>). Funding is available to support demonstration projects to take innovation from a concept out onto the railway to prove it works and make the case for further business-led investment. There is no specific legal obligation on industry parties to fund or participate in RSSB's research and innovation activities. They do so because it is beneficial to them as RSSB members and as an industry.
- **Governance arrangements:**
 - The Technical Strategy Leadership Group (TSLG) represents all stakeholders in the rail industry from train operators to rolling stock owners, the infrastructure manager, to freight companies, the government, and the regulator. TSLG develops the whole system, 30-year technical vision for the railway and oversees the strategic research programme.
 - Cross-industry System Interface Committees (SIC) provide the industry expertise and input and act as client groups for specific research activities thereby providing the assurance that research funding is aligned with industry priorities.
- **What is the value that RSSB's involvement and structure provide?:** Research and innovation support the industry to achieve its short- and long-term goals. The railway is a vital part of Britain's transport system. Rail's popularity has grown substantially over the last 20 years and demand is predicted to grow even further. To satisfy this growth and to remain a viable and sustainable mode of transport, the railway needs to reduce its own costs, increase capacity, performance, customer satisfaction and its environmental credentials, while maintaining a positive safety record.
 - RSSB's programmes represent an efficient and cost-effective means for the industry to come together to research, develop and problem-solve whilst retaining complete ownership and direction of the outputs through the ownership of RSSB.
 - Delivery of railway services is done by many organisations, and all share the common purpose of improving performance and reducing cost. Through RSSB, the industry works together to address issues which no individual company or sector of the industry can solve on its own.
 - The industry's programme has evolved from being solely about safety to a broad portfolio of issues where industry wants to collaborate. The focus is on providing a solution to a problem or opportunity. This doesn't always involve a conventional approach to research and development. The programme has delivered a wide range of solutions and knowledge to improve the operation and engineering of the railway system, and supporting the people that make it work.
 - We help the industry and its supply chain find the answers to the challenge of reducing the cost and carbon, but increasing the capacity and customer satisfaction in the future railway. The investment in our R&D services plays a vital role here although the benefits are estimated to be worth much, much more. Projects closed in the second quarter of 2014-5 cost about £2m but the size of potential benefits are thought to be about £90m, 45 times the original investment.

Appendix B: RSSB's membership and the breadth of representation from the whole railway system

The railway is a complex system with multiple interfaces delivered by many different organisations. At RSSB, these different organisations come together to inform industry wide collective decisions. Through research, the understanding of risk, and analysis, we help the rail industry in the areas of safety, standards, and innovation. RSSB is part of the industry, non-profit-making and independent of any commercial interests. The list of RSSB Board members can be found at <http://www.rssb.co.uk/about-rssb/governance/board-and-board-committees>.

The demand for RSSB's services comes from the industry itself, and informed by cross-industry groups. For more details on various groups and committees and how the industry is represented on them go to <http://www.rssb.co.uk/groups-and-committees>. The representation on the groups is often wider than RSSB's membership and includes trade unions, passenger groups, DfT, and ORR, as observers and to provide input and oversight as necessary. The figure below shows the principal industry groups.



Outside its membership RSSB also partners and works with Universities (Rail Research UK Association) and various National (such as the British Standards Institute and

Engineering and Physical Sciences Research Council) and International/European institutions (such as International Railway Union (UIC)) on behalf of the industry. For more information go to <http://www.rssb.co.uk/research-development-and-innovation/groups-and-partnerships>

RSSB's current membership spans the whole system, including infrastructure manager, train and freight operators, rolling stock owners and suppliers to the industry. Below is a list of all our members by category. Those shown in bold are required by licence to be members of RSSB.

Passenger train operators

Abellio Greater Anglia Limited

Abellio ScotRail Ltd

Arriva Trains Wales

DB Regio Tyne and Wear Limited

East Midlands Trains Limited

First Hull Trains Limited

First TransPennine Express

Govia Thameslink Railway Limited

Grand Central Railway Company Limited

Great Western Railway External link

Heathrow Express Operating Company Limited

London & South Eastern Railway Limited

London Midland

London Overground Rail Operations Limited (LOROL)

Merseyrail Electrics (2002) Limited

MTR Crossrail

Northern Rail

NXET Trains Ltd

Rail Express Systems Limited

Serco Caledonian Sleeper

South Yorkshire Supertram

Stage Coach South Western Trains Limited

The Chiltern Railway Company Limited

Tyne and Wear Passenger Transport Executive

Virgin Trains East Coast

West Coast Railway Company Limited

West Coast Trains Limited

XC Trains Limited

Non-passenger train operators

Balfour Beatty Rail Limited
Devon and Cornwall Railways Limited
Direct Rail Services Limited
DB Schenker Rail International Limited
DB Schenker Rail (UK) Limited
Freightliner Limited
Freightliner Heavy Haul Limited
GB Railfreight Limited
RTS Rail Transport Service GmbH

Network Rail and other infrastructure managers

Network Rail
High Speed Two (HS2) Limited
Rail for London

Rolling stock owners

Angel Trains Limited
Eversholt Rail Group
Porterbrook Leasing Company Ltd

Infrastructure contractors

Amey Rail Limited
Babcock Rail Limited
Colas Rail
Harsco Rail Limited
Volker Rail Group Limited
JSD Research and Development Ltd

Suppliers

Alstom Transport UK Limited

Arcadia Alive

Atkins Rail Limited

Bombardier Transportation UK Limited

Carillion Rail

DeltaRail Group Ltd

Faiveley Transport Birkenhead Ltd

Finning UK Limited

Hitachi Rail Europe Ltd

Independent Glass Co Limited

Interfleet Technology Ltd

Knorr-Bremse Rail Systems (UK) Limited

LPA Industries Limited

Rail Operations (UK) Limited

Railway Approvals Limited

Ricardo Rail Limited

Siemens PLC

TES 2000 Limited

Unipart Rail

Appendix C: Examples of good practice in infrastructure planning, delivery and funding

This appendix provides good practice examples from other industries, which we hope will inform the review team in developing future models. These pertain specifically to Q16 and Q24.

Q16: Are there any useful models or precedents from other sectors or countries for long term infrastructure planning and delivery processes that we should consider, including in relation to management of and engagement with suppliers during the planning process?

The following examples from nuclear and oil sectors provide some useful lessons:

- **Sellafield site operation and decommissioning - engaging with the supply chain.**
Sellafield is a nuclear fuel reprocessing and decommissioning site, one of the most complex high-hazard nuclear sites in the world. Annual operating costs are some £1.6 billion, with total undiscounted liabilities of some £80 billion. Prior to January 2015 the entire management of the site was contracted out to a supplier consortium, referred to as a parent body organisation, which took over the management and leadership of Sellafield Ltd, the site licence holder, comprising some 11,000 staff.
After several years of operation under this model it became clear that this type of supply chain engagement had resulted in poor major capital project performance and value for money. In January of this year the government decided to take Sellafield Ltd back into direct public sector control as a subsidiary of the Nuclear Decommissioning Authority, and instead to engage the supply chain at a lower level to partner with Sellafield Ltd.
The key lesson here is that when the level of technical uncertainty and the scale of liabilities is very high, it is not possible to pass on the risk cost-effectively to the supply chain. The new arrangements still have to prove themselves in practice, but the philosophy is to place the public/private interface at the right level to suit the scale of the risks and liabilities, and to use the supply chain in a focused and agile way to enhance technical and management capacity and capabilities.
- **Major upstream oil and gas company - Independent technical governance:**
Upstream oil and gas development and production often involves high capital expenditure, complex technology challenges and high levels of uncertainty, for example with regard to the precise properties of the fluids being produced. The economic attractiveness of infrastructure investment is also greatly affected by the speed at which production can be ramped up. To ensure that project teams are making the correct technical and project management decisions, many oil and gas companies employ a project board comprising senior members who are not conflicted by personal involvement in the project(s).

Major infrastructure projects often have independent technical and assurance committees who advise the project board. *The key lesson here is that major infrastructure projects benefit from strong governance, with independent technical advice from individuals who are not personally involved in execution.*

- **Major energy companies - Using a portfolio-based approach to enable flexibility in the delivery of smaller projects:** The existing Governance for Railway Investment Projects (GRIP) capital project management system (CPMS) is used for major capital project delivery, and is similar to those used by most oil and gas majors (including Shell and Exxon Mobil). CPMS systems involve a series of stages and gates to move a large infrastructure project from concept to delivery. Some organisations use a portfolio based approach which enables a lighter touch project management and governance structure for projects of lower value, complexity and risk. In the oil and gas industry, key gates include a concept selection gate, followed by a financial investment decision (FID). Flexibility can be introduced by moving the FID stage depending on the classification of a particular project on the basis of, for example, CAPEX spend and asset complexity, an approach used by Total and ENI. Other companies such as BP and ENI do considerable exploratory work up front to ensure that work is feasible before committing to a more substantive investment. *The key lesson here is to employ a portfolio-based approach to enable lighter touch processes to be used for smaller, lower risk projects.*

Q24: What positive case studies are there (e.g. international examples in the railway sector, other sectors internationally/in the UK), where more affordable and sustainable funding and financing structures have been implemented, with or without private sector capital input? And how do you think the lessons learnt could be applicable to Britain's railway infrastructure?

The Singaporean water authority is an example of where these measures have been applied to generate private sector investment through effective long-range planning and supportive regulation, whilst minimising public sector investment

A positive case study for where sustainable funding and financing structures have been achieved is the Singaporean water (desalination and recycled 'NEWater') system infrastructure. Private companies who won bids to establish new water infrastructure were entrusted with designing, building, owning and operating desalination plants, though subject to governmental control and oversight, with virtually no public sector investment⁴. To enable this, the Singaporean authorities developed long range plans and action frameworks at the system level, encouraged the showcasing of new technologies from overseas, and took a system-wide view from supplier to consumer, and established a robust regulatory regime which covered water efficiency labelling and updating of building codes. Checks and balances have been applied by specifying financial penalties (for example, if insufficient storage capacity is achieved).

⁴ Siemens, 2014. Public-Private Partnership Success Stories

Further investment could be realised from institutional investors and pension funds, who are showing greater interest in infrastructure

There is considered to be a large funding potential among, in particular, long-term institutional investors such as insurance companies and pension funds that show a growing interest in such 'alternative' asset classes.⁵ These types of investors do not participate in construction, operations or maintenance - they 'simply' provide funds to get a return on their debt or equity investment. For example, the BT Pension Scheme recently invested in a 13 % equity share of Thames Water⁶. New institutional infrastructure investment models are also emerging, some of which allow for reduced risk for the private sector. The insurance company Ageas set up an agreement with Natixis Bank to build up an infrastructure loan portfolio of €2 billion over 3 years, which provides higher security as banks and institutional investor(s) co-invest.

5 OECD, September 2014. Private financing and Government support to promote long term investments in infrastructure

6 Financial Times, 7 February 2013. Pension funds wary of UK infrastructure.

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