An aerial illustration of a railway station and its surrounding urban environment. The station features a platform with a train, a station building, and a parking lot. The area is densely populated with various types of trees, including deciduous trees with green and autumn-colored foliage, and evergreens. Residential houses, a school, and a road with cars and a van are also visible. A dark blue semi-circular overlay in the top right corner contains the title and subtitle text.

Valuing nature – a railway for people and wildlife...

The Network Rail Vegetation Management Review

‘

The railways were built with the idea that they would make the countryside more beautiful.’

Sir John Betjeman

1979

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Foreword

In June 2018, Jo Johnson MP, then Minister for Rail, asked me to Chair a review of Network Rail’s approach to vegetation management across England and Wales. This followed concerns about the impact that tree felling, considered necessary for the safe operation and performance of the railway, was having on nesting bird populations.

Over the past few months I have been on a journey of discovery. I have sought to understand the apparent competing dilemmas faced by those who manage our railway network, those who champion the natural environment it supports, and those for whom railway trees, flora and fauna hold a special place in their hearts and minds.

I wanted to explore whether these goals had to conflict or whether there was a way of resolving all three, while recognising that safety will always be the primary consideration when developing policies for the management of trees and vegetation.

History shapes the present and informs the future. The profile of today’s lineside vegetation is a product of the evolution of the railway over decades. Influencing factors include the decline of the era of steam, the rise of diesel (reducing the need to actively manage lineside vegetation for fire risk), a reprioritisation of resources during ongoing industry restructuring and the fact that, without regular intervention, trees and vegetation will continue to grow. Similar factors will continue to influence the future. Electrification requires

more space to protect overhead wires, and the demand for more trains to satisfy growing passenger numbers will put pressure on limited resources. Considerable intervention will be required for the foreseeable future to ensure that lineside trees and vegetation do not pose a risk to the many thousands of people who use and operate the railway every day, and to minimise any impact on performance.

The publication of this Review coincides with a changing operating environment for the nation’s railway industry. In January the government published its 25 Year Environment Plan, incorporating the principles of the 2010 Lawton Review, Making Space for Nature. The Plan encourages the development of a Nature Recovery Network and green infrastructure, linking protected sites and landscapes, working

across boundaries to deliver wildlife corridors and natural services. So here's the opportunity. Network Rail's lines can be linear routes for wildlife as well as trains and when 'connected' to adjoining landscapes could be a powerful source of improvement for our country's natural capital.

The prize if we get this right is significant. Network Rail is responsible for 20,000 miles of railway lines, which carry over 1.7 billion passenger journeys each year. It is one of the busiest railways in Europe and Network Rail is one of the largest land owners in the UK. Hundreds of millions of pounds will be spent on 'managing vegetation' over the next 20 years to comply with safety and operational standards. But at the moment no-one is winning: Network Rail can sometimes get its vegetation management wrong – for wildlife and its reputation, or by compromising rail performance and impacting on the wider economy.

Let's think of things differently. If this huge resource can deliver multiple outcomes, that are good for wildlife and the railway, Network Rail could become one of the world's most environmentally responsible transport organisations, while continuing to run one of the safest railways in Europe.

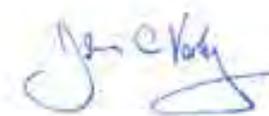
This report shows how we can achieve that ambition.

Firstly, and foremost, we must **value line side 'vegetation' as an asset**, not a liability. We need the right vegetation in the right place, reflecting a 'balanced scorecard' which optimises the need for a safe and reliable railway with positive environmental outcomes. The goal should be to give lineside vegetation the same weight as other performance assets such as track and signalling. Sending this message to senior managers would have an immediate and positive effect.

Teams responsible for managing and undertaking the management of lineside vegetation should be trained with the necessary new skills. To support them, the status of those qualified in arboriculture and ecology should be enhanced and they should be widely deployed. It can be done: the best practice we witnessed should be adopted across all routes and advice sought from expert bodies. Network Rail should be more consistent in its management across the devolved routes. Crucially, it needs to improve its engagement with stakeholders and the public, listen more, explain why things are done, and seek new partnerships and collaborations. So, the prize is not only to enhance the environment, but also operational performance and safety, and win greater confidence and buy in from the wider public.

My overall view is that, in the end, it will be human and cultural factors that will determine

whether Network Rail can capture and execute this new agenda. A passion to achieve and to meet demanding targets was evident at all levels in the organisation during our visits and discussions. This is a good base on which to build. With a compelling vision, the right leadership and the right motivation in place, the trees and wildlife habitats along our railway tracks will be valued as natural assets, playing a central role in delivering **a railway for people and wildlife**.



John Varley OBE TD,
Independent Chair
October 2018



Executive Summary

The government's 25 Year Environment Plan is clear that our natural environment faces greater challenges than ever. Society will need to take immediate and ongoing action to protect and enhance it – and this will require investment. The return on that investment could be significant for the economy, environment and society. The public sector has a major role to play in achieving this goal.

As one of the country's largest public landowners, the biodiversity and natural capital across Network Rail's estate is substantial. Network Rail has a responsibility to run a safe, efficient and effective railway, and also to act as steward for these national assets – not only to preserve, but also to enhance them.

This lies at the heart of the question that this Review has been asked to consider – can Network Rail, through the way it manages lineside vegetation, ensure the safety and performance of the railway while improving the natural capital that it owns on behalf of the nation?

The Review has sought the views and experiences of lineside neighbours, local communities, those involved in the railway and conservation experts. The level of interest and engagement has been enormous. It has been a sprint – delivered in four months over the summer of 2018. In that time the Review team have:

- reviewed nearly 100 documents
- directly engaged with over 100 people

- received and analysed over 8000 survey responses
- directly observed lineside vegetation and its management.

This report lays out the findings of that process and my subsequent recommendations. It has three key chapters which outline:

- The evidence
- Our analysis
- My recommendations



Network Rail is one of the UK's largest landowners

It owns **52,000** hectares of land on which there are nearly **6.3** million trees, most of which are less than **50** years old.



6.3
million trees



Across England and Wales it manages nearly **16,000** miles of lineside.

Network Rail is a large and sophisticated organisation with a very challenging job to do. The Review's findings are set in that context. Overall we have found that while environmental considerations are included to an extent in policies and standards, they are not truly embedded, and the approach is not balanced or consistent in its implementation. This is driven in part by an overriding and appropriate concern with safety, and also by pressures of cost, compliance and culture. There is a lack of strategic vision and ambition, and limited evidence of a culture that values the environment as a national asset.

The current leadership of Network Rail recognise the importance of the environmental agenda but have struggled to properly embed this across the organisation. This, coupled with over-stretched resource and no dedicated budget, results in the maintenance of lineside vegetation being squeezed by other priorities. The lack of appropriate performance indicators and a gap in levels of ecological competence and expertise across Network Rail exacerbate this problem.

There is a significant backlog of lineside vegetation management that needs to be

addressed to ensure full compliance with the company standard. The need to deal with this backlog has led to an increase in the planned level of vegetation clearance, which has led to a narrow interpretation of compliance, resulting in the opportunity to meet multiple policy objectives being lost.

Cost and a short-term reactive approach are the reasons most often given for this, but by not managing its vegetation as an asset, and in the context of wider policy, Network Rail risks increasing its whole-life-costs and destroying valuable natural capital. Network Rail has struggled to clearly explain its approach and engage effectively with lineside neighbours and the wider community, which has led to adverse public opinion. What is positive, however, is that there are pockets of best practice developing. It is these case studies that illustrate what can be achieved with the right approach, capability and focussed use of resources.

The Review makes six recommendations, each of which is accompanied by a timeline to deliver change.

1

The Government must set out a clear policy position for Network Rail in terms of delivering for the environment.

The policy should detail clear requirements for Network Rail to support delivery of the 25 Year Environment Plan. This should consider landscape scale benefits and the provision of wildlife corridors and give clarity on where any additional funding will come from.

2

Appropriate governance must be put in place at organisation, route and project level.

Accountability for outcomes must be embedded at all levels of the organisation - from the board to lineside teams. The approach to vegetation management in the nesting season should be addressed in full consultation with conservation bodies.

3

Network Rail should publish an ambitious vision for the lineside estate.

Network Rail must set out what it wants to achieve and how it will support the country's biodiversity targets. This should include a commitment to biodiversity net gain, seeking partnerships in delivery, and publishing natural capital accounts. Network Rail should recognise and celebrate its successes in delivering this vision.

4

Network Rail must value and manage its lineside estate as an asset.

Lineside vegetation should be managed in line with other operational assets. This requires a full understanding of the asset and its condition, management plans and targets that will deliver the desired outcome. The right specialist capabilities and competencies need to be in place, and innovative approaches to management tested and understood.

5

Network Rail must improve its communication with communities and key stakeholders.

Lineside neighbours have frequently claimed they do not understand Network Rail's approach to vegetation management and want to be more effectively engaged to help deliver the best outcomes. Network Rail must adapt, using a wider range of communication channels and tools, and be more open and transparent.

6

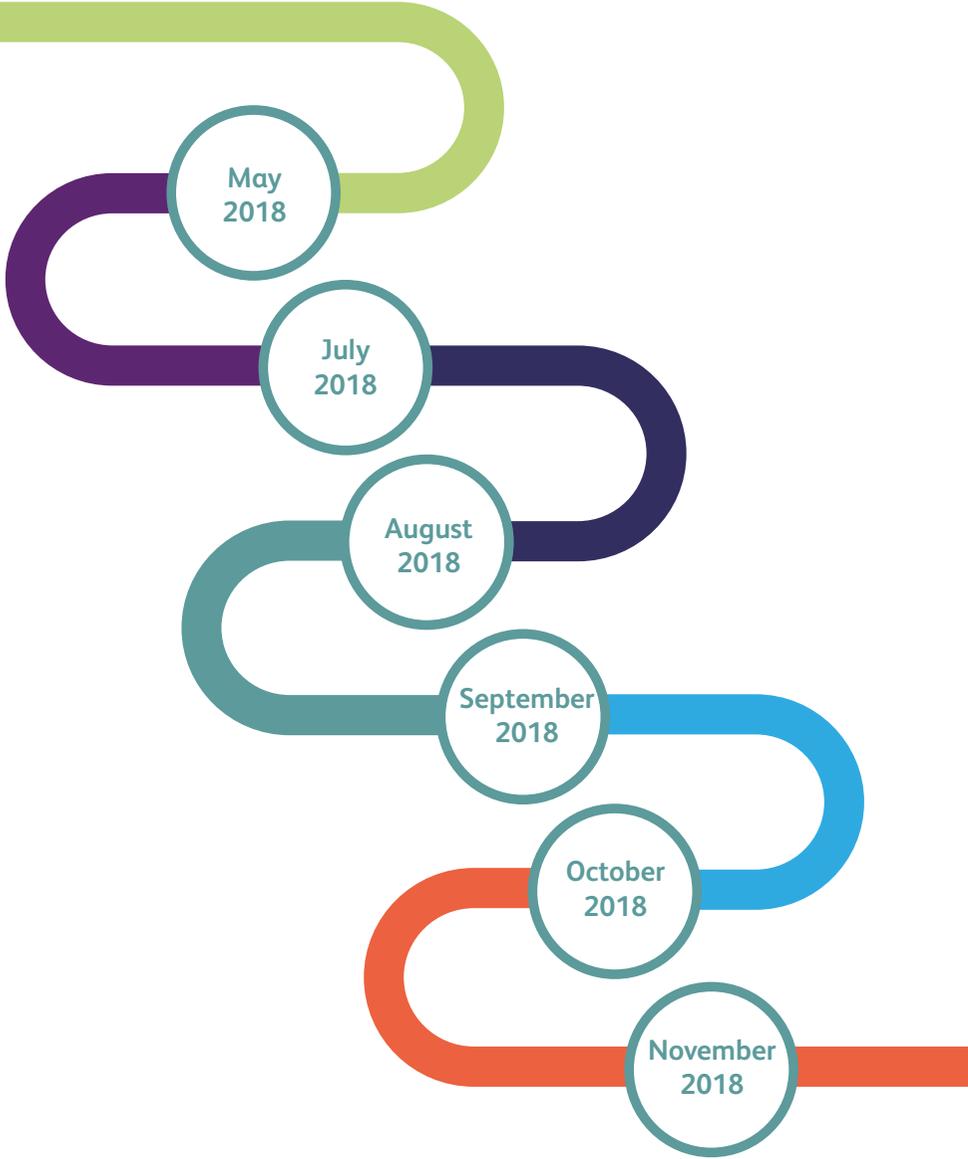
Network Rail should lead a cultural change for valuing nature and the environment across the organisation.

To enable change, the importance of environment and biodiversity must be embedded alongside safety and performance.

Taken together these recommendations can lead to a significant improvement in the railway's environmental impact while also reducing cost, and risks to safety and performance. The time is right for Network Rail to be not only one of the safest railways in Europe but the greenest too.

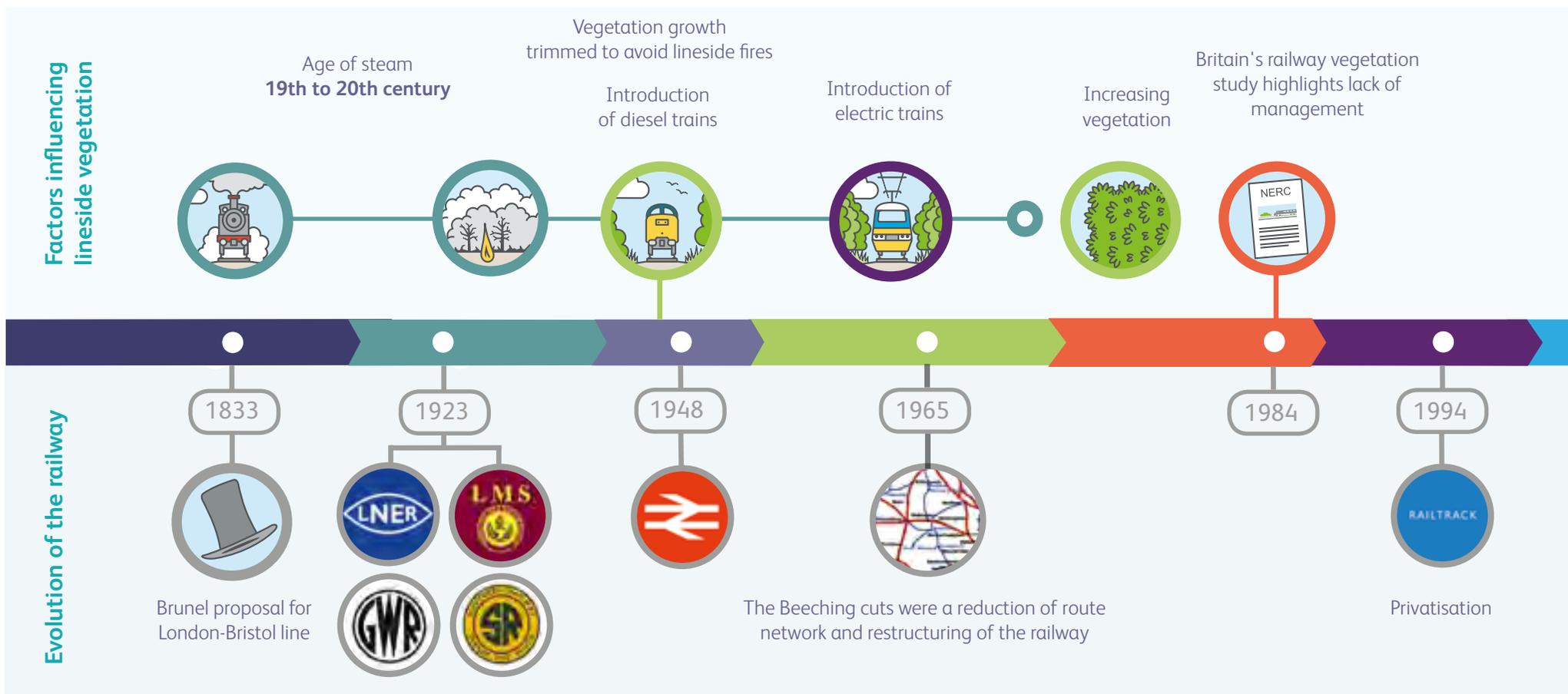
Project Process Timeline

Milestones	Detail
 <p>May 2018</p>	<ul style="list-style-type: none"> Jo Johnson MP, Minister for Rail, announces the Review
 <p>July 2018</p>	<ul style="list-style-type: none"> Appointment of Chair Terms of Reference Evidence gathering <ul style="list-style-type: none"> Over 100 documents reviewed
 <p>August 2018</p>	<ul style="list-style-type: none"> Evidence gathering Online survey launched <ul style="list-style-type: none"> Over 40 interviews 5 roundtables Over 100 stakeholders engaged
 <p>September 2018</p>	<ul style="list-style-type: none"> Stakeholder workshop Online survey closes Analysis of evidence <ul style="list-style-type: none"> Over 8,000 responses
 <p>October 2018</p>	<ul style="list-style-type: none"> Findings presented to Jo Johnson MP, Minister for Rail
 <p>November 2018</p>	<ul style="list-style-type: none"> Report published

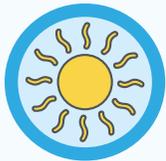


Rail Industry Timeline

'History shapes the present and informs the future. It is a product of the evolution of the railway over decades. Influencing factors include the decline of the era of steam, the rise of diesel (reducing the need to actively manage lineside vegetation for fire risk), a reprioritisation of resources during ongoing industry restructuring and the fact that, without regular intervention, trees and vegetation will continue to grow.... With a compelling vision, the right leadership and motivation in place, the trees and wildlife habitats along our railway tracks will be valued as natural assets, playing a central role in delivering a railway for people and wildlife.'



Climate change
Greater frequency
of extreme weather
events



Times
article highlights
tree felling



Lawton
Review



c. £300m pa cost
to industry from
leaves on the line



Guardian
article highlights
tree felling



25 Year
Environment
Plan



Valuing Nature
A railway for people *and* wildlife



2002



2003

2010

2011



Rail Value for
Money study

2014



Routes
devolved

2018

2019



Transforming the rail industry
to benefit passengers and help
build a stronger economy

Future

Background



Network Rail is one of the UK's largest landowners. It owns 52,000 hectares of land on which there are approximately 6.3 million trees. A significant number of these are less than 50 years old. Across England and Wales the company manages nearly 16,000 miles of lineside - enough to stretch over halfway around the globe. Great Britain has one of the oldest, yet safest railways in the world.

The flora, trees and other vegetation, along the lineside has changed considerably throughout our nation's railway history. What we see today is the result of the operational priorities of the railway adapting to the shift from steam to diesel and the evolution of the rail industry. Prior to 1960, much of lineside vegetation was managed through 'annual burning, scrub clearance and grass cutting with vegetation kept generally very low due to the risk of fire from passing steam trains'.¹ This resulted in a unique flora that has been noted in academic literature.



A Nottingham to Grantham train leaving Gonerby Tunnel in March 1950 hauled by J6 0-6-0 No. 64237. Photograph courtesy of Humphrey Platts.

¹ Caroline Sargent, *Britain's Railway Vegetation*, Institute of Terrestrial Ecology, NERC, 1984

A photograph showing a yellow and grey train traveling through a dense forest of tall, mature trees. The train is positioned in the lower center of the frame, moving away from the viewer. The trees are tall and thin, with dense green foliage. The sky is visible through the canopy, appearing bright and clear. The overall scene is a lush, green forest with a railway line cutting through it.

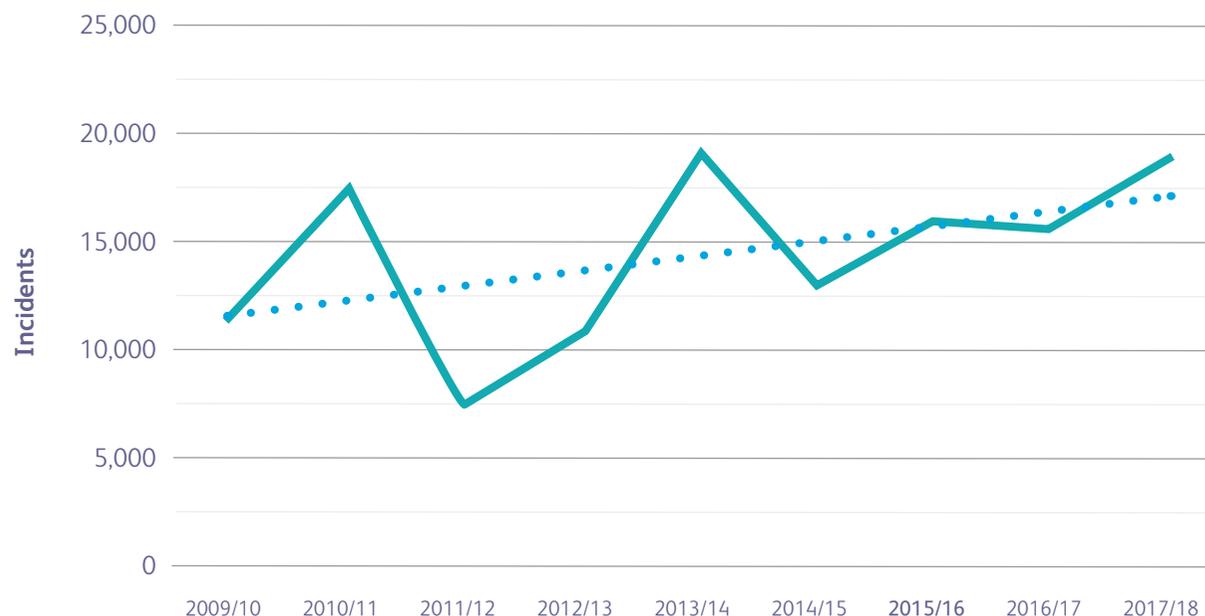
Where older trees of considerable value are known, they can be managed sensitively. The iconic c150-year-old Sequoias near Bradford on Avon were scheduled for removal to ensure compliance with the Standard. However, given their importance Network Rail has instead assessed the trees and removed any significant threat to the railway. They are now monitored through an ongoing inspection programme.

*'Railway property embraces a considerable diversity of plant habitats, which can be grouped into three principal categories. These are, firstly, the mainly grassy slopes which flank the line on embankments and cuttings; secondly, the ballasted road bed; and thirdly, railway buildings, including stations, bridges and tunnel portals, retaining walls, and various other structures. Much of the interest of railway flora derives from a combination of circumstances in which on the one hand plant communities are protected from the destructive influences of modern agricultural practice, while on the other they are subjected to a whole range of controlling influences deriving from railway practice. The extent to which these do control the flora can readily be seen when a line is closed and dismantled. The artificial equilibrium is lost and the flora very soon loses its distinctive character.'*²

Currently, management of vegetation tends to be reactive and focussed on minimising safety and performance risks as they are identified. The underlying risk from vegetation is small - less than 1% of the overall assessed risk, in terms of fatalities or injuries.

However, the number of vegetation related incidents in 2009/10 was 11,500 and has risen to nearly 19,000 in 2017/8 - leading to

Figure 1 - Network Rail recorded incidents involving trees or branches



over 1,750 train cancellations. Though the numbers vary annually according to the weather, a rising trend can be seen over the last 9 years.

During the summer of 2018, storms Ali and Bronagh led to over 150 incidents of trees or branches on the tracks in less than 48 hours. While uncertainties remain, it is possible that such incidents will increase as the climate changes.

'While future projections remain uncertain, increases in maximum wind speeds experienced during storms would have significant implications for overhead power lines, data network cabling and the rail network, as well as for offshore infrastructure. Vulnerability to this risk is expected to increase with higher rates of vegetation growth, resulting in more tree-related failures for electricity and transport networks.'³

² K. G. Messenger, *A Railway Flora of Rutland*, Proc. bot. Soc. Br. Isl. 1968. Vol. 7, (3).

³ UK Climate Change Risk Assessment, Committee on Climate Change 2017

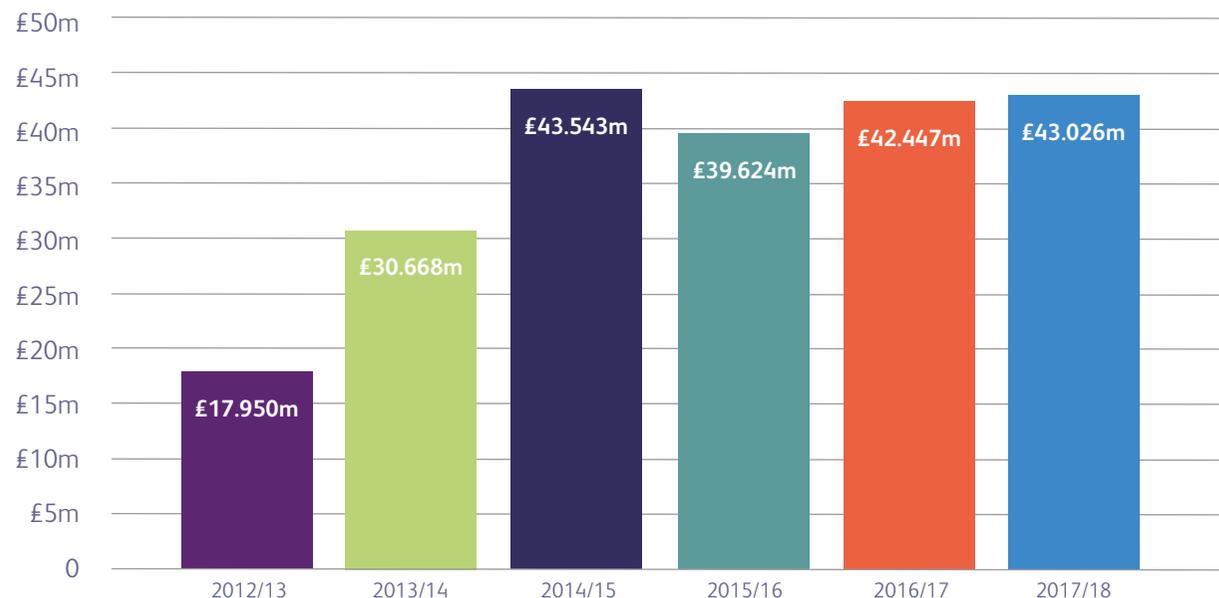
Climate change will also lead to other potential risks:

*'The potential for increased flood risk caused by heavy rainfall, and the impact on slope stability if vegetation is cleared from embankments and cuttings, should be considered. There is also a potential increased risk of destabilisation of earthworks if trees are removed. It is recommended that disseminating existing good practice (such as CIRIA C712) and undertaking further research will help gain a full understanding of the most appropriate and resilient tree species to plant and manage in different locations, taking into account climate change...'*⁴

The Review's recommendations are therefore timely.

'Leaves on the line' (a phrase which strikes both fear and derision in equal measure with many rail commuters) is associated with significant performance issues. Each year poor adhesion and reduced braking efficiency affect train services. Leaves on the line may also block an electrical circuit that allows the signalling system to locate, and thus protect, the train. Annually, these translate into an economic cost of nearly £300m.⁵

Figure 2 - Network Rail spend on external vegetation management contractors



The total amount that Network Rail spends on vegetation management is unknown. It is neither differentiated within their accounts nor monitored as a distinct cost item. However, spending with external contractors on vegetation management has averaged £42m in the last four years, having risen from just under £18m in 2012/13.

⁴ Tomorrow's Railway and Climate Change Adaptation, RSSB 2016

⁵ This is based on research commissioned by the Rail Delivery Group's Passenger Demand Forecasting Council. The research estimated the economic costs through analysis, including factors such as rail revenue impact, indirect tax impact, external disbenefits and GJTC (Generalised Journey Time including Crowding) reliability disbenefits. The key drivers were the reduced autumn timetable, meaning fewer trains, and the performance dip that results in fewer trains being on time.

Literature review



Network Rail has a wide range of internal guidance and policy documents covering aspects of vegetation management. There is also extensive literature concerned with the ecological and arboricultural aspects of lineside vegetation management, including legislative requirements, government policy, standards and guidance. A full literature review is included in the appendices to this Review, which are published as a separate document. The key facts are outlined below.

Relevant legislation

The relevant environmental legislation includes the Wildlife and Countryside Act 1981, and the Conservation of Habitats and Species Regulations 2017. Under the 1981 Act it is an offence to intentionally or recklessly cause harm to any species that is protected, including by harming its habitat, and the 2017 regulations gives similar protection to wild animals. The Natural Environment and Rural Communities Act 2006 also places a duty on

public authorities, including Network Rail, to conserve biodiversity.

Duty to conserve biodiversity – Every public authority must, in exercising its functions, have regard, so far as is consistent with the proper exercise of those functions, to the purpose of conserving biodiversity.⁶

More recently, the European Union (Withdrawal) Act 2018 (section 16) makes clear that environmental considerations of the precautionary principle and prevention of environmental damage (among others) will be maintained in UK legislation, once the UK leaves the European Union.

The duties to protect the environment mentioned above sit alongside a separate set of duties relating to health and safety. The Health and Safety at Work Act 1974 (HSWA) creates a number of statutory duties to ensure that employers conduct their undertakings in such a way as to protect the health, safety and welfare of their employees (section 2), or anyone not in their employment who

may be affected thereby (section 3). In the case of Network Rail, these duties will include the management of the lineside estate and associated vegetation in order to ensure passenger and employee safety of those using the rail network. It is clear that some tree felling and control of vegetation is necessary to protect the safety of both Network Rail's employees and the public and that such action can reasonably be said to be required in order to comply with the statutory duties imposed on Network Rail under sections 2 and 3 HSWA. Further, the Wildlife and Countryside Act 1981 provides defences against the offences in relation to the harming of wild birds in section 1 of that Act where a person's action was necessary for the purpose of preserving public safety and where the harm was the incidental result of a lawful operation and could not reasonably have been avoided.

Network Rail's approach to lineside vegetation management must therefore be designed to ensure compliance with both its environmental and health and safety duties.

⁶ Natural Environment and Rural Communities Act, 2006

Relevant Network Rail policy

The Lineside Asset Management Policy (2017) states that *'The Lineside asset shall be inspected and maintained so that it is sufficient to prevent risk so that safe and reliable railway operation can take place. Action shall also be undertaken where there is a risk to our neighbours. The threats shall be identified and the appropriate controls adopted.'*

'The secondary but essential requirement is to manage the lineside in accordance with legal obligations.'

The policy states that vegetation should be considered as an asset and requires that *'Clearance operations should be planned so that they will have the least impact on the ecology of the site' and that 'the options for vegetation in this policy should also reflect the benefit of proactive management activities with regard to ecology and the environment.'* The Review notes that this policy is due to be updated.

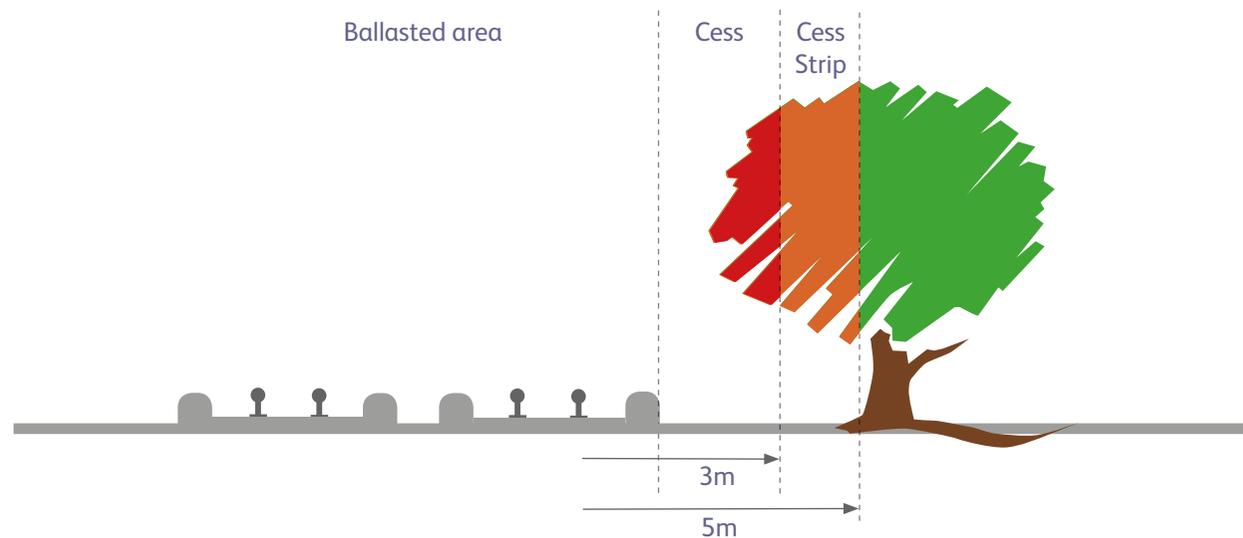
At a strategic level, Network Rail's Environmental Policy (2017) has a requirement to manage land sustainably with consideration to its impacts on biodiversity, and ensuring that it continually improves environmental performance. The policy also states

'we will set objectives and targets to monitor our environmental performance'. In addition, the Network Rail Strategic Business Plan 2019 – 2024 states *'we plan to improve biodiversity on and around the railway'* and the Network Rail 2018 guide to the Responsible Railway Plan describes a Biodiversity Information and Risk Management Project to *'improve the planning and management of biodiversity impacts before works'*, which will increase efficiencies in the planning of work and use of resources, as well as improving relations with lineside neighbours.

Network Rail standards

The Network Rail Standard covering vegetation management is NR/L2/TRK/5201 issue 4 (2012) [The Current Standard]. This will be replaced by NR/L2/OTK/5201 Lineside Vegetation Management Manual Issue 1 (2018) in April 2019, which is supported by the recently published Module 2 Lineside Vegetation Management Requirements (NR/L2/OTK/5201/02) [The New Standard]. These cover the key requirements for the management of risk, asset knowledge, and the impact of vegetation on other assets, and set out the requirements against which compliance is assessed.

Figure 3 - Schematic representation from the Current Standard of the vegetation structure when linespeed ≥ 60 mph; red, prohibited; amber, action where required; green, allowed



The Current Standard sets out an inspection regime under which visual inspection must take place every three years and a survey every five years. These are entirely risk focussed with no mention of biodiversity. It requires that lines with a speed limit under 60 mph are cleared of woody vegetation to 3 metres from the track, those with limits over 60 mph are cleared to 5 metres from the track (see Figure 3). There are further requirements that vegetation is cleared to 3.5 metres from overhead line equipment and that all stumps are killed 'to prevent coppice growth'. There is no mention of any environmental or ecological requirements.

The New Standard sets out a specification for managing vegetation based on areas for immediate action, action and alert (see Figure 4). The Immediate Action zone describes the area where vegetation poses an immediate risk and has corrective action timescales. The Action zone sets out the area where vegetation poses a future risk and work should be scheduled. The Alert zone sets out the area where vegetation does not necessarily pose any risk but needs to be monitored. It sets out a similar inspection regime, though the five yearly survey has been replaced with a tree inspection. There is no mention of biodiversity in the inspection requirements.

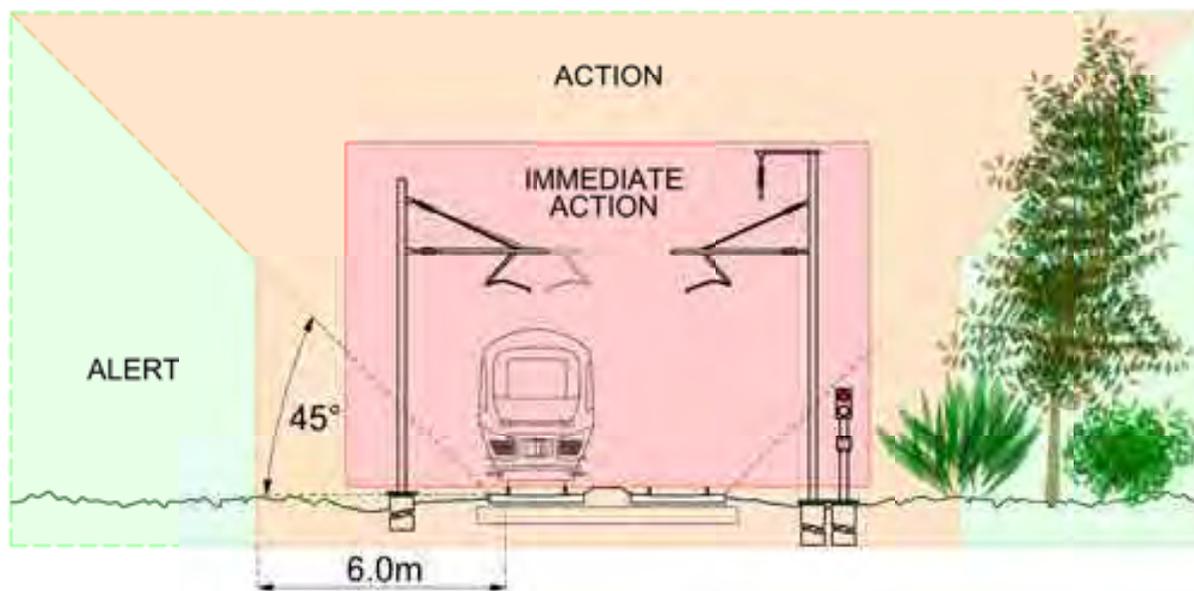
The New Standard sets out the need to follow legislative and environmental requirements. It requires that '*planting shall be taken into account where planned clearance work will result in a loss of connected woodland or scrubland*'. It further sets out guidance that work should '*encourage the establishment of desirable lineside conditions that add value not only to the lineside but also to the surrounding environment in terms of:*

- *connecting environments*
- *promoting and providing biodiversity*
- *protecting areas of ecological and historical importance; and*
- *improving the resilience of the vegetation.'*

And '*where management operations are proposed the impact of such work is assessed and information is gathered regarding:*

- *negative impacts on the public as a result of the vegetation removal*
- *value provided by trees and vegetation as a visual amenity to the surrounding environment; and*
- *effects on biodiversity'.*

Figure 4 - Intervention zones from the New Standard



The New Standard gives non-mandatory guidance that the management of tree stumps should be location specific. Options include pollarding and coppicing as well as removal or killing.

The 25 Year Environment Plan and National Planning Policy Framework

The 25 Year Environment Plan, published in 2018, sets out how the UK government intends to meet its ambition to *'leave the environment in a better state than we found it'*. The goals include:

- Achieving a growing and resilient network of land, water and sea that is richer in plants and wildlife.
- Creating or restoring 500,000 hectares of wildlife-rich habitat outside the protected site network, focusing on priority habitats as part of a wider set of land management changes providing extensive benefits.
- Increasing woodland in England in line with an aspiration of 12 % cover by 2060: this would involve planting 180,000 hectares by the end of 2042.

The plan establishes the need for natural capital to become key to decision-making, with a commitment to *'set gold standards in protecting and growing natural capital – leading the world in using this*

approach as a decision-making tool'.

The plan also establishes the government's ambitions to mainstream the principle of biodiversity net gain.

The revised National Planning Policy Framework (2018) provides a strategic approach to maintain and enhance ecological networks in planning decisions. It focuses on measurable net gains, requiring that unavoidable losses of biodiversity (after following the mitigation hierarchy) are quantified to demonstrate that the gains in biodiversity are greater. The Framework makes substantial reference to green infrastructure, including commitments to:

- the production of stronger new standards for green infrastructure
- optimising new and existing green infrastructure to extend wildlife corridors into towns and cities.

Other relevant guidance and publications

Other publications that are relevant to Network Rail's vegetation management include:

- The UK Government's Biodiversity 2020 Strategy (for England's wildlife and ecosystem services). While not published by the current government, places significant emphasis on creating coherent



A Green Future: Our 25 Year Plan to Improve the Environment



and resilient ecological networks. Actions include enhancing ecological connections and wildlife corridors through landscape-scale action.

- The Lawton Review 'Making Space for Nature' (2010). Highlights that England's collection of wildlife sites are too small and too isolated, which is causing declines of many species. Its recommendations include actions to establish a strong and connected natural environment with Ecological Restoration Zones, and with better protection for non-designated wildlife sites.

A wide range of other guidance and standards on ecological and arboricultural aspects of vegetation management have been published by industry bodies and conservation organisations. These are summarised in the literature review section of the appendices (published separately).

In gathering evidence, the Review has engaged with over 100 individuals and received over 8000 responses to its online survey. This section gives a summary of their feedback and perspectives.



Stakeholder feedback

Overall opinions

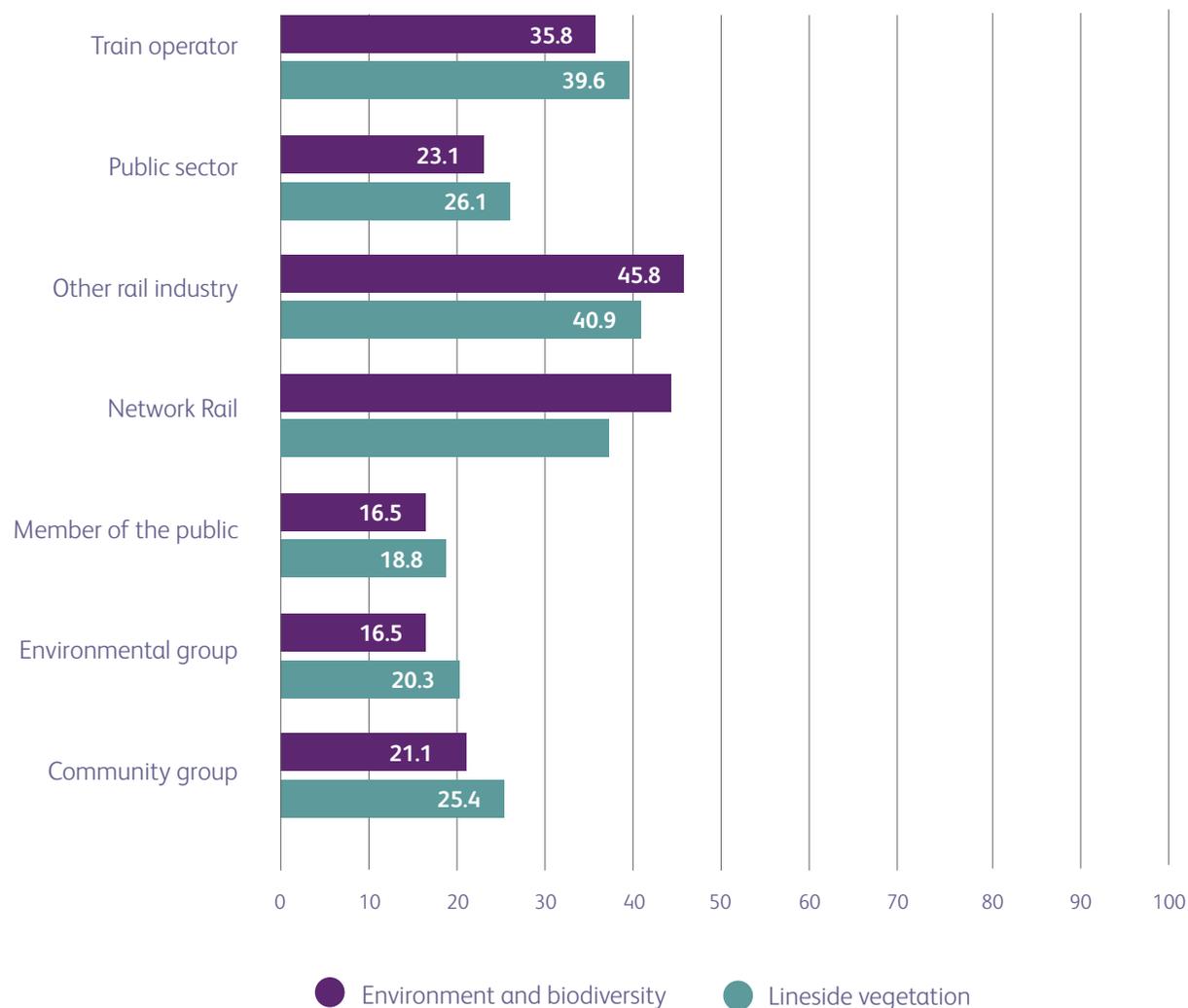


Network Rail is widely considered by stakeholders to be 'poor' at managing both vegetation and biodiversity with no sector giving even 50% positive opinions (see Figure 5). Its approach is considered to be generally reactive rather than planned and to lack balance, with whole-life costs and biodiversity not embedded into operational delivery.

Stakeholders consider that there is significant under-resourcing in the skills and capabilities needed, based on a culture that sees vegetation as a cost burden and a risk to safety and performance; not as an asset to the rail network and the environment. There is some good practice and some evidence of a change underway, but this is not consistent across the network.

Respondents to the online survey were asked for a single word to characterise Network Rail's approach. Across all groups, the results were largely negative, as illustrated in the word clouds⁷ (Figures 6 to 8).

Figure 5 - How well does Network Rail manage lineside vegetation, the environment and biodiversity? Survey responses



⁷ Words used more frequently appear larger in the word cloud

Closer analysis of the words chosen shows that there are different reasons for these views. Words chosen by members of the public, community groups and the public sector are focussed on what they consider to be excessive clearance with negative impacts on the environment.

Train drivers' words focus more on 'haphazard' and 'insufficient' clearance, which can also be inconsistent and poor in terms of safety management. Only a few members of the public chose words associated with safety.

‘So, we can’t win; we don’t remove [trees], it’s apparently failure - we do, and it’s apparently an environmental tragedy. Truth is, we need to do more of our professional, thoughtful, ecologically sound vegetation control to avoid delaying thousands of travellers, and for safety.’

Sir Peter Hendy CBE, Chairman Network Rail
Twitter, 20/7/2018

Figure 7 - Community groups, public sector and members of the public word cloud



Figure 8 - Train driver word cloud



Figure 6 - Rail industry and Network Rail staff word cloud

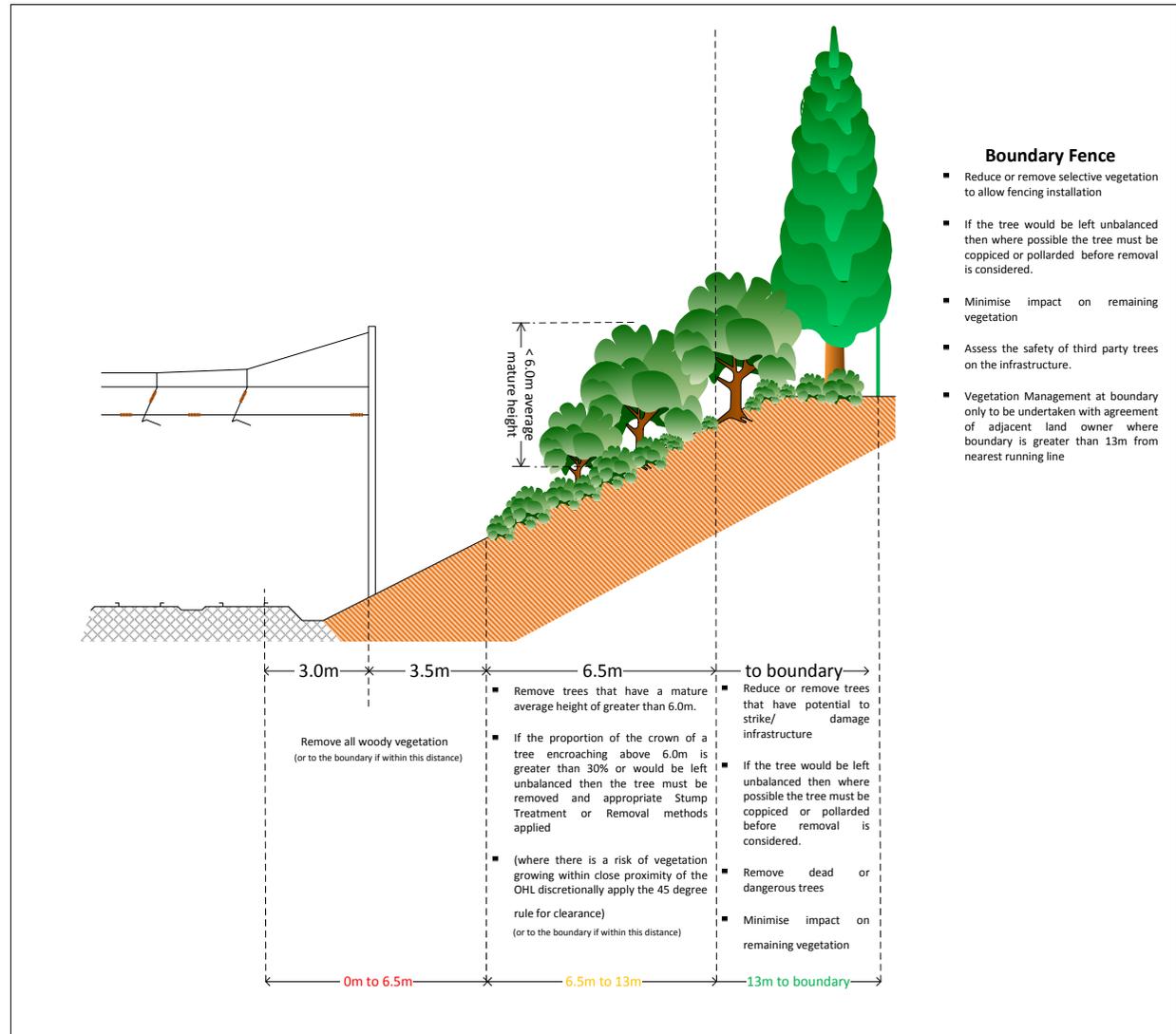


Policy and standard implementation

The Current Standard is well known and understood across both Network Rail staff and contractors. Those directly responsible for felling trees or managing vegetation, almost without exception, consider that their delivery is fully compliant with the Current Standard. However, the lack of detail in the Current Standard has resulted in a lack of consistency in application. For example, on the Thameslink Resilience Programme, three different contractors at separate sites all interpreted it in different ways (see the Hadley Wood case study). This has resulted in the Network Rail project team developing its own detailed specifications; an example is shown in Figure 9.

The Lineside Asset Management Policy 2017 appears not to be well known within Network Rail, or to be material to operational decisions on vegetation management. There are over 75 further relevant Network Rail documents provided to the Review which do not appear widely recognised or used.

Figure 9 - Example of Thameslink Resilience Project specification



Case study – Hadley Wood

In February 2018 vegetation management work was undertaken at Hadley Wood station, which sits in a cutting on the East Coast Mainline, north of London. Despite protests from the local residents' association and Rail User Group, a large section of the cutting was cleared to the boundary fence 60 metres away, prompting concerns about excessive clearance, the resulting ecological impact and the potential impact on slope stability. The two local bodies urgently pursued the issues directly with Network Rail and organised the 'Treegate Campaign' to alert the wider community.

In March, when the community representatives toured the site with the relevant project managers, it became clear that Network Rail had been unaware of the level of work undertaken by the contractor and considered the way the specification had been interpreted as inappropriate.

Subsequent to the initial clearance the local groups and Network Rail have had a more open engagement, with support from the Tree Council. Network Rail has made a number of commitments including no further trees being felled immediately, working to a detailed specification with a 'low level amount of cutting' and establishing a hedge planting trial with the Tree Council.

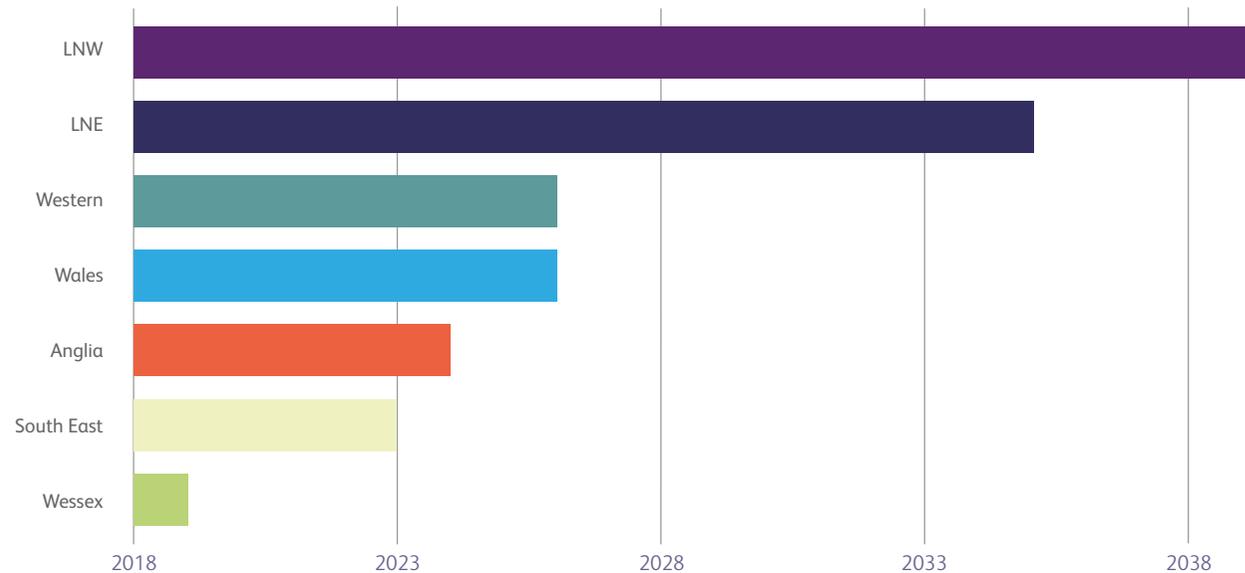


Focus on compliance

Among Network Rail managers with responsibility for the lineside, there was a focus on compliance with Standards within available resources. This was often driven by the fact that Routes are being monitored by the ORR due to the lack of **complete** compliance across the network. Target dates for **full** compliance in some cases exceed 20 years (Figure 10). The Review notes an inconsistency in approach with some Routes already applying the New Standard and others still focussed on the Current Standard.

This compliance led approach was not considered to integrate the real value of lineside vegetation in terms of biodiversity, the environment or wider benefits for society.

Figure 10 - Route target dates for full compliance to Standard



ORR view

- ORR has been concerned about vegetation management for some time and it has been on the regulatory escalator⁸ since February 2014.
- ORR considers that vegetation needs more effective asset management through better information and clarity of plans. Fundamental questions are whether the Routes know the asset and are prioritising works. Routes need to

know the risks and what they are aiming to achieve, including consideration of climate change and impact on embankments.

- ORR recognises that getting to compliance will take time. Network Rail appears to be taking action to address the non-compliances to the Standard and now needs to take a much more strategic approach.

⁸ The Regulatory Escalator is an internal prioritised register of current issues that the ORR has with Network Rail's delivery.

Reactive approach

When asked to describe Network Rail's vegetation management approach the most frequent concern expressed by contractors was its reactive nature and the lack of an overarching strategy. They considered that Network Rail focussed their resources around 'fire-fighting recurring issues' rather than achieving improved outcomes.

It is of concern that this remains largely consistent with the findings of earlier reviews in 2010 and 2013:

*'Unfortunately there has been less than rigorous delivery of maintenance activity to prevent re-growth at these sites... Instead of each year's clearance being an incremental step forward the current strategy resembles running up the down escalator. On anything other than a very short-term basis this is an inefficient use of resource.'*⁹

'Discussions at Route level have identified that there are no separate targets or funding allocations for the maintenance of sites previously cleared and that such activity is funded out of the same budget as site clearance. The pressure on Delivery Units to clear vegetation to address issues of signal sighting, crossing

*sighting and autumn adhesion issues leads to majority of the available budget being spent on new clearance rather than the maintenance of previously cleared sites.'*¹⁰

This approach was not considered to be cost efficient, with techniques such as using flails, chipping arisings on site and cutting to the boundary fence, all likely to be more costly in the long-term. Viable and more innovative alternatives were not often considered, due to short-term budgetary and capability constraints and perhaps a lack of appreciation of their benefits.

The reactive approach was also reflected in the views of managers at Route level, with vegetation considered to be the 'poor relation' and not treated as an asset in the same way as track and signalling.

Despite previous recommendations, budgets are still not ring-fenced and maintenance budgets used to fund other priorities. As a consequence, Network Rail has not been able to provide accurate data on overall vegetation management costs, historically or for Control Period 6 (April 2019 to March 2024).

Vegetation management is generally funded from operational expenditure (OPEX) rather than capital expenditure (CAPEX). This was considered to be a key limiting factor, as OPEX budgets are set year to year, restricting the

ability to plan ahead. Funding was also based on the previous year's spend, continuing the cycle of under investment.

In Control Period 6, Routes have proposed specific CAPEX budgets for vegetation management to help meet compliance with the Standard. However, projected ongoing maintenance spend, once compliance is achieved, remains unclear. These CAPEX budgets are yet to be agreed. Only three out of seven Routes have been able to provide these figures to the Review.

'Cost of current approach? No idea as we can't get the figures from maintenance on how much they currently spend.'

Network Rail Senior Asset Engineer
Lineside

⁹ Review of Autumn 2010 Performance, John Curley and David Rayner

¹⁰ National Industry Autumn Review, 2013, John Curley and Claire Volding

Focus on short-term cost

When tendering for framework contracts, contractors considered the overwhelming factor on successful bidding to be price and the proposed delivery programme. The focus on low cost and short-term duration contracts means that, generally, companies encouraging environmental good practice and innovation are priced out of the market.

Contractors considered that Network Rail did not seem to understand that pro-active vegetation management costs less in the longer term – both in terms of performance and sustainable management. This is illustrated by the whole life cost modelling undertaken as part of Network Rail’s own review of its contracting and procurement strategy (see Figure 11).¹¹

Figure 11 - Cost modelling for different approaches to vegetation management



¹¹ The total cost calculations are based on an estimate that 15% of the lineside track has been cleared to NR standard. Graphs represent cost per mile.

The Network Rail contracting and procurement review, has mirrored some of the concerns expressed by stakeholders. These include:

- *‘The current strategy is frequently described as “Cut & Maintain” with the large-scale clearance (Cut) carried out by external suppliers and the annual/bi-annual clearance (Maintain) carried out by internal Maintenance staff.*
- *However, Maintenance teams often have more pressing, short-term demands and these tasks take priority over vegetation clearance. Over time this can effectively result in the strategy becoming Cut & Regrow, increasing the medium-term risk and increasing the life-cycle costs, especially when a subsequent large-scale “Cut” is required.’*

Contractors generally saw advantage in more collaborative, long-term relationships that would encourage investment in environmental management, staff capabilities and innovation. Many contractors had such relationships with clients in other industries. This was supported by the contracting and procurement review, with the recommended strategic approach being:

Strategic, long-term, co-operative relationships with select suppliers

including volume commitment, increased engagement on environmental and safety programmes/improvements.

Contractors, who work across many sectors, thought that there were examples of best practice across the forestry, highways and utility sectors that could provide useful benchmarks and learning.

Environment is not embedded

All stakeholders involved directly in lineside work described the focus on safety and operational performance, with ecological considerations being ‘an afterthought’ rather than integrated and an approach characterised as ‘cutting vegetation’ rather than ‘managing habitats’.

Network Rail staff considered that while the company’s approach met with legal compliance, it did not reflect good environmental practice. Key issues raised included a lack of basic ecological skills among lineside staff and little consideration of the value of lineside vegetation in the standards and guidance.

Most environmental stakeholders highlighted the lack of clarity on Network Rail’s role in delivering the government’s environmental policies, drawing comparisons with the clearly stated expectation on Highways England.

The role of the regulator was raised as key in this respect. However, ORR considers that it currently has no remit on lineside environmental issues and any change would need to be set by the Department for Transport.

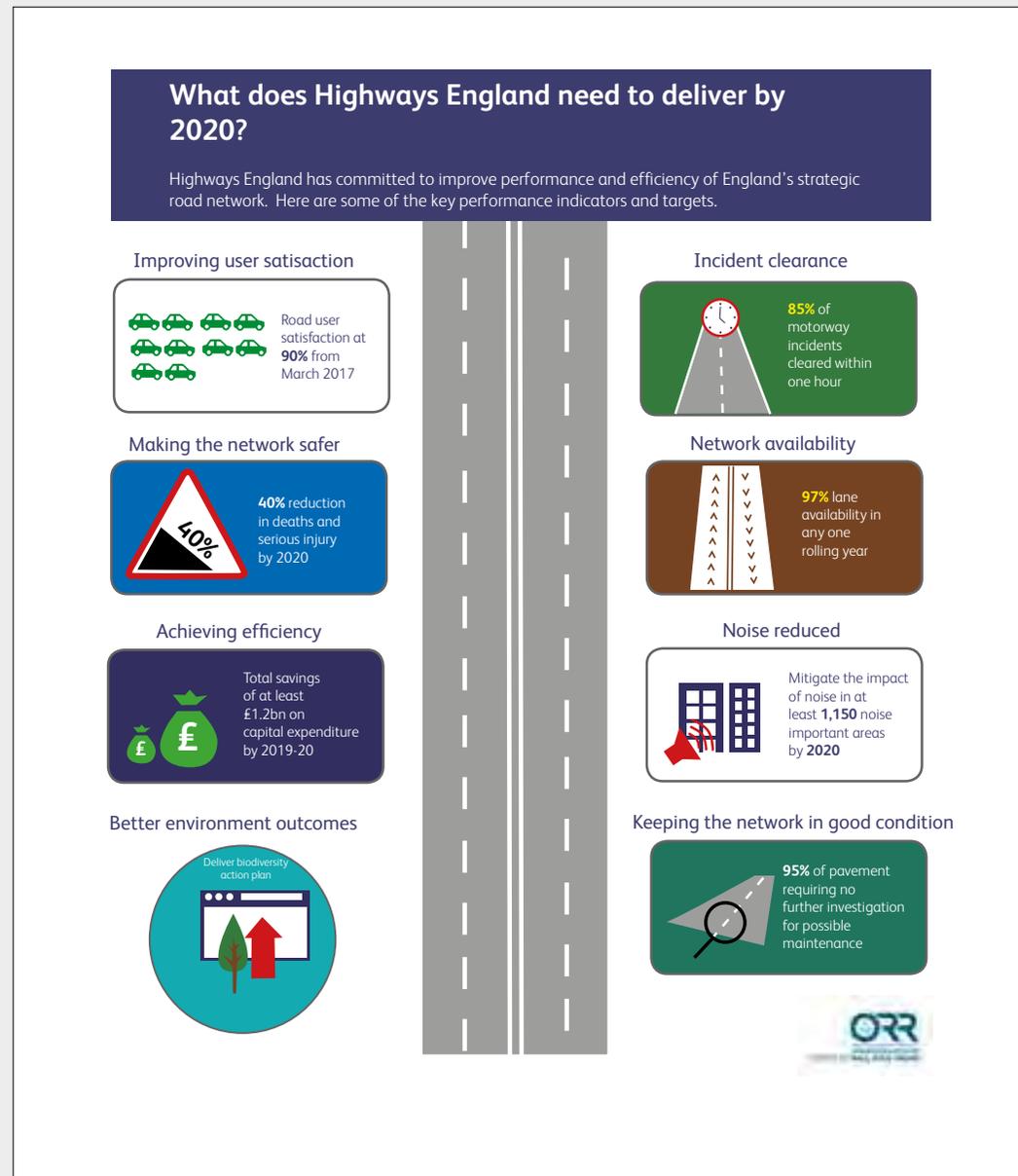
Environmental stakeholders considered that there were examples of good practice within Network Rail, highlighting Infrastructure Projects’ commitment on Biodiversity Net Gain as industry-leading.

Case Study - Highways England

Highways England is the government company responsible for the Strategic Road Network (SRN). The Department of Transport's Road Investment Strategy: 2015 to 2020¹² (RIS) outlines the major investments and requirements to manage and improve the SRN. This includes that *'the operation, maintenance, and enhancement of the SRN should move to a position that delivers no net loss of biodiversity. And, in the long term, the Company should deliver a net gain across its broader range of work'*. To meet this, Highways England has set targets of 'no net loss' by 2020 and 'net gain' by 2040.

The RIS also states Highways England 'must publish a Biodiversity Action Plan to show how it will work with service providers to halt overall biodiversity loss, and maintain and enhance habitats and ecological networks'.

The Department for Transport has allocated £300m to an Environment Fund over the six-year spending period covering 2015 to 2021 with biodiversity one of seven key target areas.



¹² Road Investment Strategy: for the 2015/16 - 2019/20 Road Period, Department for Transport, 2015

Lack of appropriate resource

Across all stakeholders it was highlighted that vegetation management and environment are under-resourced in Network Rail. The lack of basic ecological identification skills, such as tree species identification, was regularly held up as a critical gap indicating that Network Rail is not always making informed decisions when planning vegetation management.

Both Network Rail staff and those stakeholders who have worked closely with Network Rail described the critical lack of environmental specialists, including ecological and arboricultural experts. This has meant that Infrastructure Projects' teams and Routes are often unable to make detailed analysis of vegetation and management options at a local level before starting work.

The Review found that all Routes have a Route Environment Specialist, though this role was in some case shared between Routes. There were no dedicated ecologists at Route level with the exception of London North Western Route which has four full time ecologists in its works delivery unit, which undertakes all clearance work.

It was accepted that there would be a cost in increasing specialist skills and capability. However, the cost of getting vegetation

management 'wrong' is much higher and carries increased risks to operational delivery. For maintenance, it was highlighted that trained staff would enable more proactive and planned management through better understanding and use of robust data. This would enable better prioritisation and a move away from the reactive approach.

Training was also considered to offer a significant opportunity to increase staff engagement, with resulting impacts on overall performance. The Anglia Route has created a City and Guilds training course for inspectors on vegetation management, to create a consistent level of skills and knowledge across the route and invest in their staff. This approach could be more widely adopted.

As well as impacting directly, the low level of ecological resource was considered to impact on quality assurance. This issue was raised by Network Rail staff and stakeholders, who have experienced clearance that has gone far beyond the defined standard, and also poor-quality ecological surveys, neither with any Network Rail challenge.

Given the level of contracting and sub-contracting in vegetation management,

Network Rail's lack of technical capability was considered high risk, and to undermine its ability to act as an intelligent client. There is evidence that some managers are so concerned that they are taking the initiative themselves. The Review is aware of one senior asset engineer who arranged for training to ensure that they were personally able to review environmental and ecological assessments.

Vegetation management and environmental management further share an unwelcome common bond within Network Rail as disciplines that do not benefit from the levels of accountability, support and funding enjoyed by traditional asset management disciplines.'

Route Environment Specialist

Leadership

Both Network Rail staff and stakeholders were unclear on Network Rail's vision for its lineside vegetation, or indeed whether such a vision existed. This was considered to exacerbate the prevailing attitude that vegetation is not a priority, as well as generating inconsistency across business units and fuelling short-term, reactive responses based on cost rather than longer-term planning.

Feedback from Network Rail Routes suggested that the leadership around vegetation management was limited or in some areas felt to be non-existent, enhancing the perception that lineside was the 'poor relation' to other asset areas. Governance and management issues included a lack of any indicators or targets outside compliance with the Standard. Lineside teams often reported to track engineers who had different priorities and incentives.

It was widely felt that lineside strategies developed by route asset management teams are seen as secondary, rather than integral, to overall operational demands. Feedback included that a defined overall plan and strategy across each Network Rail Route could help to improve this situation. The recent appointment of a professional head covering vegetation has begun to change this

perception and has been positively received. Some stakeholders noted that this should be considered as only a first step in the right direction, as the role is currently only one-third focussed on lineside vegetation, and also includes drainage, boundaries and asset protection and optimisation.

Lack of data

Capturing and using data is critical to inform ecological management and assess impact. However, ecological data is not routinely collected or evaluated by Network Rail. This point was highlighted by all environmental stakeholders as they considered it was fundamental to measuring performance and understanding impacts. Several stakeholders characterised this as Network Rail 'not knowing what it has'.

Further, the lack of a single authoritative data source on vegetation means that the scale of the work necessary to comply with the Standard is not understood in detail, though there are estimates of the percentage of lineside that is compliant with the Standard.

Again the contracting and procurement review reached a similar conclusion:

'Off-track asset data very poor quality. Urgent attention/upgrade required to inform future strategies and demand planning.'

This issue has been identified in the past, with the 2010 Curley Review noting:

*'The effective planning of the autumn mitigation programme should incorporate the structured analysis of a large amount of data and risk assessments, where appropriate. The data are currently spread through a number of disparate systems and databases.'*¹³

The recently appointed professional head with responsibility for vegetation has identified 'better data' as a priority area in creating an asset management approach to vegetation. This will allow routes to prioritise work based on '**predict and prevent**' rather than '**react**'.

The Review noted some good practice in this area, including the development and use of a biodiversity calculator based on Defra metrics and the partnership between the HS1 Maintenance Team and Kent Wildlife Trust to deliver a baseline survey and monitoring.

¹³ Review of Autumn 2010 Performance, John Curley and David Rayner

Case Study – HS1 and Kent Wildlife Trust

High Speed 1 is the rail line from London to the Channel Tunnel. It is managed, on behalf of High Speed 1 Ltd, by Network Rail (High Speed). The requirements of the Channel Tunnel Rail Link Act 1996 included landscape and biodiversity mitigation and enhancement. Planting included 230 ha of native broadleaved woodland, 40 km hedgerow, 1.2m native trees and shrubs, 370 ha of permanent grassland, 45 ha of grass and wildflower seeding. Features included land bridges and wildlife tunnels. A five-year intensive management programme established the planting, followed by annual management plans to maintain and enhance.

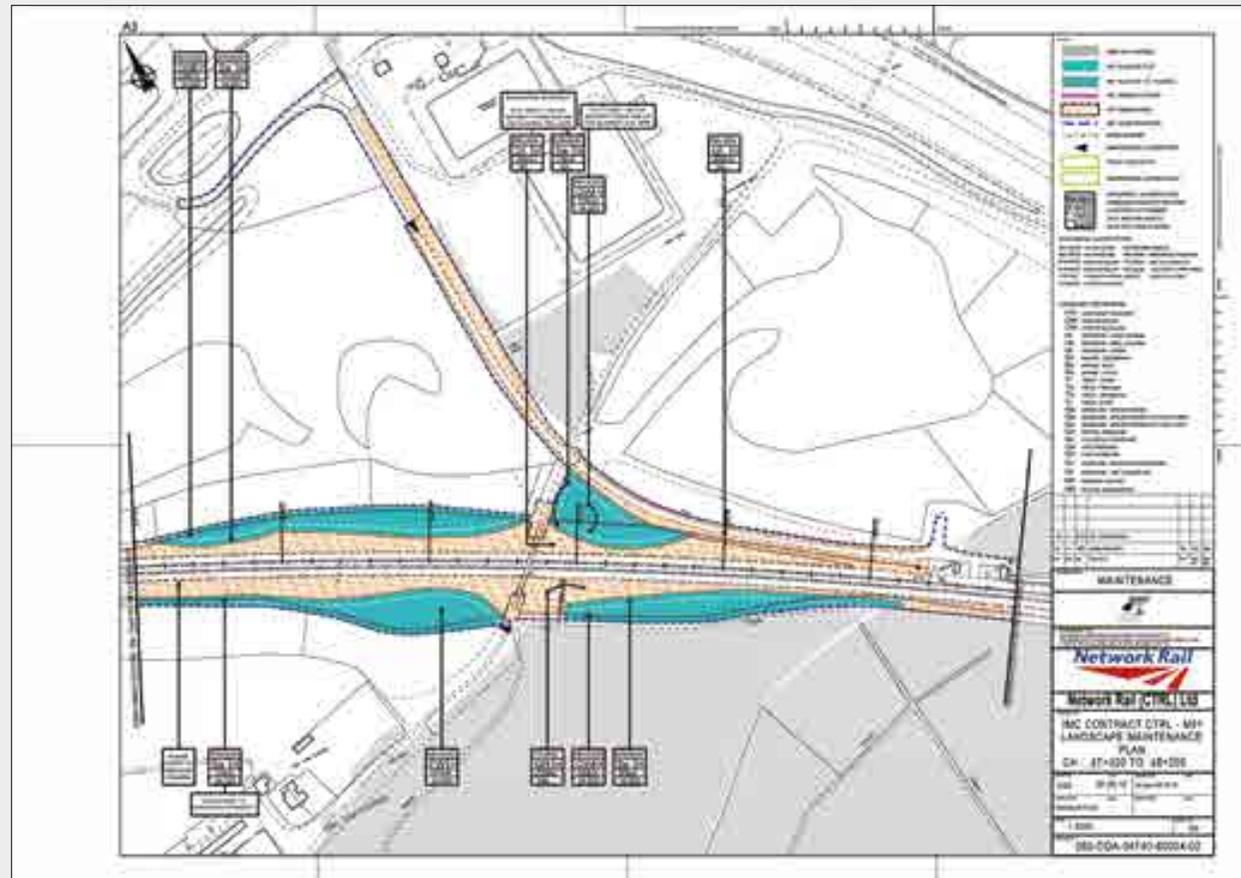
While the planting was developing appropriately it became apparent, to Network Rail (High Speed), that ecology surveys were needed to evaluate the biodiversity value of the linear landscape. This would also deliver on a commitment to achieve the Biodiversity Benchmark.

Network Rail approached The Kent Wildlife Trust which, with appropriate funding, undertook a baseline desktop study. The study involved overlaying Kent Wildlife records onto a GIS map that included the High Speed 1 route and a 2km buffer and focussed on identifying protected species and significant habitats.

The initial baseline survey method was tested in a field pilot and transferred to a five-year programme of surveys. The first survey season was completed in 2017 and the 2018 survey is currently being undertaken. The next stage is to develop biodiversity indicators, followed by longer term plans that will include biodiversity objectives. These will inform the

annual management plans and determine maintenance methods that will protect and enhance the biodiversity value of the asset. This may include less tree replacement, more scrub and species rich grassland.

The whole mapping project cost less than £10,000, with annual surveys costing in the region of £8,500.



Inconsistent approach

Contractors noted a disparity between their experience of maintenance (at Route level) and Infrastructure Projects, with the latter generally having more time and budget to consider biodiversity, though this was inconsistent. Infrastructure Projects were also considered to have a greater level of skills and expertise, leading to better assurance, such as through inspections and surveys. However, there was a prevailing view that this knowledge and vision for the site can get lost when a project is handed back, as maintenance budgets aren't available for on-going management to the same specification; and the valuable data was not always handed over.

Even within Routes there were considered to be inconsistencies in the detail and quality of specifications, with some cutting back to 8 metres, others to 6 metres, and others using the New Standard which applies from 2019. The information flow from Network Rail to contractors was considered sporadic and dependent on individual managers, with difficulties experienced in obtaining data on protected species, though this should be available to Network Rail staff. It is noted that contractors do have access to some, but not all, of the same resources as Network Rail.

Poor communications

The online survey which formed part of this Review suggested that all respondent groups rated Network Rail's communications about vegetation management negatively (Figure 12). Though industry groups were slightly more positive, there was a clear consensus that Network Rail should be more open and transparent, as well as more innovative in the methods used to communicate and engage.

Many Network Rail staff and stakeholders talked at length about the importance of improving communication with the public. Internal stakeholders highlighted the significant costs to the organisation from dealing with complaints regarding vegetation management. Network Rail staff also described how internal communication needs to be improved, with many lineside staff unaware of the environmental and sustainability requirements for vegetation management.

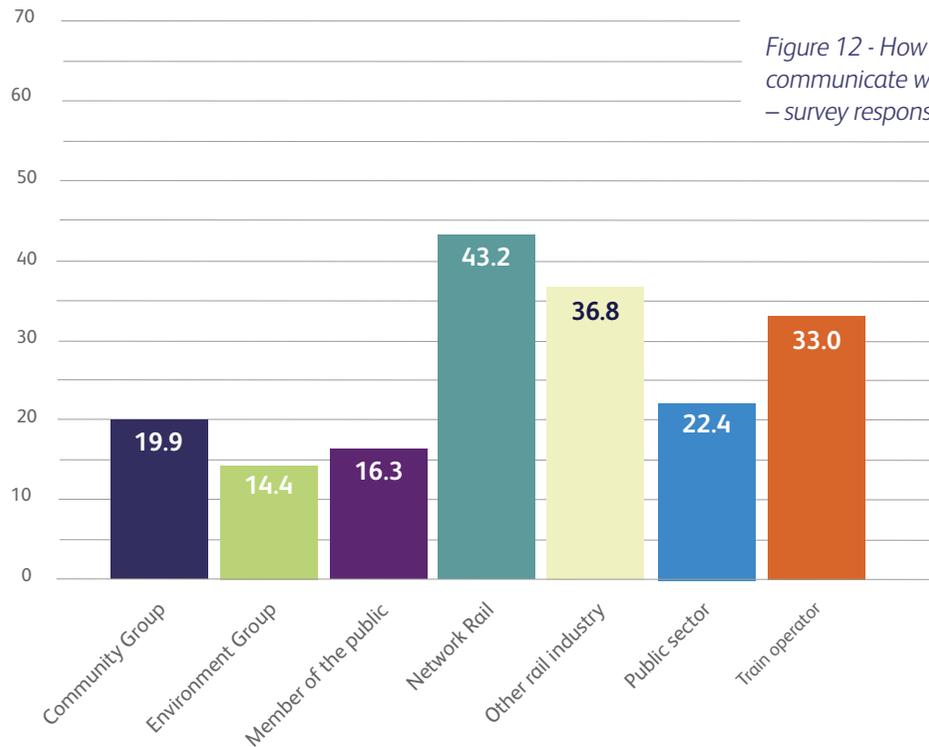


Figure 12 - How well does Network Rail communicate when managing vegetation? - survey responses

Network Rail does have some generic vegetation management information on its website and a standard communications process which enables a scalable approach. This ranges from letters to local communities 14 days in advance, through to community meetings where lineside neighbours are invited to a drop-in session to meet the project team and arborists. However, much of the communication effort is delegated to the local teams, which can lead to inconsistencies in approach and a lack of clear decision-making rationale.

Community stakeholders expressed concern over the lack of clarity in communications over the scope of, and reasons for, planned works. Example template letters for communities include terminology such as ‘managing vegetation on the grounds of safety’ and ‘the targeting of certain trees based on distance from the track’, or ‘those known to cause significant adherence issues during leaf fall season’. But these letters do not explain the scale of the tree felling needed, the specific areas where work will take place, or outline the impact this would have in the short or longer term, visually, or for biodiversity.

In Hadley Wood (see case study page 25), the only communication from Network Rail prior to the work had been to immediate lineside neighbours stating that they were ‘removing

vegetation from 6.5 metres either side of the tracks’ and ‘removing trees which are within striking distance of the railway’. In fact the lineside was completely cleared to 60 metres from the track in some areas. There was no public meeting to outline the scope of the work, which might have been expected given the significant local impact.

The Hadley Wood Rail User Group identified a similar experience at Grange Park, in the same borough, constituency and on the same Network Rail Route. At the time Network Rail had committed not to do any more felling in the area without informing the council and local MP. Network Rail failed to inform either party before starting work at Hadley Wood, as the commitments made at Grange Park had not been shared with the Network Rail project team.

The Review notes that issues at Grange Park were highlighted in the 2012 Greater London Assembly report ‘On The Right Lines’. This recommended carefully considering the specific language used and clarity in explaining the type of work to be carried out:

‘Network Rail and Transport for London should immediately use more specific and informative language when notifying stakeholders about vegetation management. They should move away from standardised template letters and use a wider range of templates to be more explicit about the type of management works announced. Letters should also provide weblinks where people can find more detailed information about line-side works.’¹⁴

It would appear that these recommendations provide a sound basis to improve external communications and should be adopted by Network Rail and acted upon.

‘When people don’t understand what is happening and why, that is when relationships go wrong.’

Network Rail Project Manager

¹⁴ On the right lines? Vegetation Management on London’s Railway Embankments January, Greater London Authority, 2012

Good practice

Despite the concerns raised and the areas for improvement more generally, there are also areas of good, and even leading, practice across Network Rail some of which are mentioned above. Stakeholders highlighted the Greater West Programme's approach as a significant example of good practice. The relationship with The Tree Council was also seen by most stakeholders as highly valuable and beneficial to more informed and better engagement.

Many stakeholders described Infrastructure Projects' work on Biodiversity Net Positive as innovative and industry-leading. This was especially in regard to engagement with stakeholders, use of Defra's biodiversity unit metric in combination with ecological assessments, and linking a project's biodiversity net gain with local nature conservation priorities.

Network Rail staff and some contractors also noted a general improvement to the way biodiversity has been approached in more recent times with more training, a greater focus on biodiversity in decision making and improvements in the New Standard, such as selective retention of trees.

Overall there is a sense within Network Rail that there is the start of an improving culture and more strategic and informed leadership on vegetation management. But, this could be significantly improved with more robust data, clearer guidance, focussed leadership and accountability, better communications and route strategies for vegetation management.

The Tree Council

The Tree Council works with Network Rail and their neighbours to help improve trackside management of trees, hedgerows and other vegetation. As a 'critical friend', we advise Network Rail on ways they can manage their trees to create wildlife corridors while they carry out the important vegetation management needed to keep the railways safe.

Network Rail is the fourth largest public sector landowner in Britain. Therefore, working with them to get things right can have a massive positive impact for wildlife across the UK. Some trees will always have to be removed for safety reasons but others can be pollarded, coppiced or even laid as hedges. That's better for the environment, better for wildlife, better for local communities and, in our experience, could cost less than current techniques. With large numbers of ash trees growing on the railway, as Ash Dieback spreads, these issues will become even more important over the next 10 years.

We are running trials with Network Rail over the coming autumn which will lead to a better understanding of the various management options. As a result, we hope that Network Rail employees at every level will receive even more training in tree management and that their contractors will receive clear instructions. Network Rail is a huge organisation, with thousands of employees, working on eight different lines across England, Scotland and Wales, so it's important to continue constructive discussions until new practices are fully embedded.



Case study – Greater West Programme

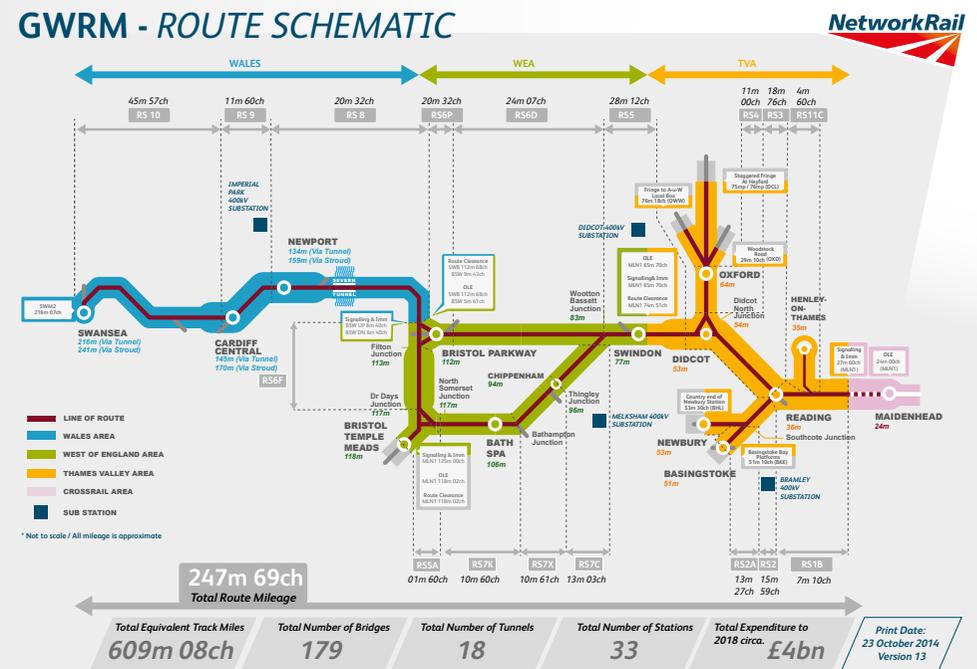
The Greater West Programme (TGWP) includes the electrification of the railway from London to Cardiff, Newbury and Oxford. The programme has made a voluntary commitment to Biodiversity No Net Loss, to leave a long lasting legacy within the local environment and communities.

To enable electric trains to run safely, woody vegetation within 3.5 metres of the overhead line was removed, with low-lying vegetation allowed to regrow and maintaining a 'green corridor'. A calculation of biodiversity units before and after vegetation clearance was undertaken, based on Defra methodology and using ecological information from habitat surveys commissioned by Network Rail. This showed that No Net Loss could not be achieved without further interventions, due to the limited opportunity to replant woodland along the operational railway. The Biodiversity No Net Loss initiative was launched to identify, develop and deliver scrub woodland planting and enhancement projects.

The programme has engaged with local stakeholders to discuss the approach and identify potential offset projects and partnered with The Trust for Oxfordshire's Environment and The Wildlife Trusts to help assess and select projects that would deliver the best outcome to biodiversity.

So far six offset projects have been selected for funding, representing 7ha of woodland planting, 58ha of existing woodland enhancement, as well as elements of pond restoration, wildflower meadow creation, grassland preservation and scrub planting. Another 13 projects are currently being assessed and if successful, would deliver No Net Loss and potentially Net Gain.

The overall cost for delivering No Net Loss is estimated to be around £800,000, covering 400 lineside miles.



Our Analysis

This section summarises the Review's analysis of the evidence against our Terms of Reference. It sets out the Review's opinion of Network Rail's performance against the key questions that we have been asked to consider and puts this in the wider policy and stakeholder context.



The rationale, evidence base and effectiveness of Network Rail’s vegetation management policy. In particular, how environmental considerations are viewed in the context of government’s ambition for the natural environment and:

- its statutory duties for health and safety
- its wider responsibilities for maintaining and enhancing network performance
- delivering improved services to passengers (such as improved mobile connectivity)
- ensuring value for money.

Existing vegetation management policy

The key documents that define Network Rail’s ‘existing policy for vegetation management’ are the Current and New Standard along with the Lineside Asset Policy. Environmental considerations are included in these to varying degrees but within an overall approach that focuses primarily on assessment and control of safety risk, with performance and environmental consideration as secondary issues.

The Asset Policy includes the need to ensure value for money; in defining vegetation as an asset, it confirms that whole life costing should apply. The Current Standard includes the need to meet ‘cost targets’, but not specifically value for money. Network Rail’s own contracting

and procurement review has concluded that the current approach is not minimising whole life cost. This aligns with stakeholder views, including from contractors, Network Rail managers and external experts, that a long-term approach would reduce cost.

None of the policy documents cover improved passenger services, outside of performance.

Environmental considerations receive improved coverage in the New Standard that comes into force in April 2019. This New Standard includes several aspects that align with good practice.

Examples include:

- zonation of management that is proportionate to the risks
- re-planting areas of tree felling with suitable species
- minimising wounding and balancing crowns when undertaking tree pruning.

Coppicing and other forms of tree retention measures are cited. However ‘clearance’ is the most frequently mentioned activity, rather than a more holistic approach to managing vegetation and achieving multiple outcomes.

Guidance

Beyond these, Network Rail has a vast array of guidance documents relevant to vegetation management – 75 were provided to the Review.

While this shows that a wealth of information on lineside vegetation management exists, the documents need extensive cross-referencing and are not well known or understood.

Ecological and arboricultural guidance includes protected species assessments to be undertaken before works start and that works affecting nesting birds should not be undertaken during the nesting season.

The documentation describes the potential for works to affect protected species. However, this is typically framed as a risk to cost and delivery rather than impacting on the biodiversity or natural capital. There is also guidance for works to comply with protected species legislation. However, most of the control sheets used to manage risks on the ground make no mention of protected species or biodiversity.

Overall, vegetation is rarely attributed with a value, either as a specific asset or part of an ecological network or habitat. For example, veteran tree features such as cracks and lifting bark are appropriately cited as indicating potential hazards, but there seems to be no acknowledgement that such features could be important habitats and require an ecological assessment (such as for bats).

Greater consideration of the environment

As noted with regard to the New Standard, there has been a shift in emphasis in recent documentation to recognise the ecological value of lineside vegetation, as well as other values, such as visual screening and bank stabilisation. There are also recent documents that describe vegetation as an asset, to be managed with sensitivity for biodiversity value, including:

- targeting specific habitat types with specific management for network safety
- habitat connectivity and retention
- promotion of biodiversity
- protecting areas of ecological importance
- planting or seeding to compensate for loss of connective habitat.

Further evidence of a shift in policy are the commitments from Infrastructure Projects in their Control Period 6 Strategic Business Plan that:

- major infrastructure projects with a value over £20m should have a net positive effect on biodiversity (see case study)
- renewals activities (above £5,000 or 150m in length) require a biodiversity risk assessment and evidence of opportunities taken to maximise biodiversity gain (following the mitigation hierarchy).

However, many Route level Strategic Business Plans for Control Period 6 do not mention biodiversity.

Network Rail is measuring its biodiversity impact on major projects using Defra's biodiversity metric, which gives an ability to monitor and account for losses and gains in all biodiversity. However, at corporate level there is no fixed target for compensating for tree loss, habitat loss, or change in biodiversity value as a result of its maintenance or upgrade work.

No requirement from government

The Review has found no evidence that there is any specific requirement or expectation on Network Rail to support the government's ambition on the natural environment. The High Level Output Specification makes no mention of vegetation, environment or biodiversity, though the associated Guidance to the Office of Rail and Road requires the regulator to have regard to sustainable development.

No ringfenced funding has been made available to deliver wider policy objectives on environmental issues that may have a wider economic and natural capital return. This contrasts with Network Rail's most obvious comparator, Highways England.

The Review has noted that other infrastructure sectors are also incentivised on environmental

performance. The Water Services Regulation Authority (Ofwat) proposes higher rewards for water companies that deliver innovative and stretching outcomes, including for environmental performance. It expects water companies' business plans to embed natural capital approaches at catchment scales.

Case study Thameslink

In 2014, the Thameslink Programme was the first Network Rail project to set and achieve a target of Biodiversity Net Positive. It applied Defra's 'biodiversity unit' metric to quantify losses and gains in biodiversity and to measure progress towards Biodiversity Net Positive, which it successfully achieved in partnership with the London Wildlife Trust. Its approach included establishing a specific policy and accompanying procedure; rolling these out via training for its staff and supply chain; applying Defra's biodiversity metric to quantify all biodiversity losses and gains; and engaging with a grass-roots wildlife organisation for its Net Positive efforts to directly support conservation efforts in line with government policy.



The effectiveness of Network Rail’s implementation of their existing vegetation management policy, and an options appraisal of alternative policies and models.

Focus on compliance undermined by lack of resource

As noted above, where work was carried out this was without exception considered to be compliant with the appropriate Standard. However, the overwhelming feedback from stakeholders, both internal and external to Network Rail, has been that vegetation management is not planned strategically and ecological considerations are an afterthought.

As a result, while implementation can be considered to align with the Current Standard, it may not be compliant to the New Standard in terms of the guidance around ecological planning and impacts. Nor does it align with the Lineside Asset Management Policy in terms of being planned to have the least impact on a site, or to use options that reflect the benefits of proactive management of ecology and environment. The Review considers that this has been fundamentally driven by a lack of resource and priority.

The Review also considers that appropriate implementation is likely to be hampered by the sheer number of relevant documents. This

has the potential to cause uncertainty over what is required and how to comply, and may disengage staff who have limited time and capacity to absorb them. There are parallels with research done to inform the Safety Leadership and Culture Change Programme, which found that the number of safety rules (over 1,400 in place at Network Rail at the time) made it almost impossible to be compliant. This led to the development of 10 safety rules – the Life Saving Rules – to drive appropriate behaviour.

Potential safety implications

The evidence gathered by the Review shows that as well as the ecological impacts, Network Rail’s implementation is also considered to have potential safety impacts among Network Rail staff, train operators and rail industry stakeholders. While the risk from vegetation remains low, the potential impact is high and is understandably of particular concern to train drivers who would face the most significant risk.

In responses to the survey conducted as part of this review, nearly 60% of drivers who provided comments about ‘How well does Network Rail manage lineside vegetation’ considered that the lack of management might cause safety issues. (see Figure 13).

Figure 13. How well does Network Rail manage lineside vegetation? Train driver comments

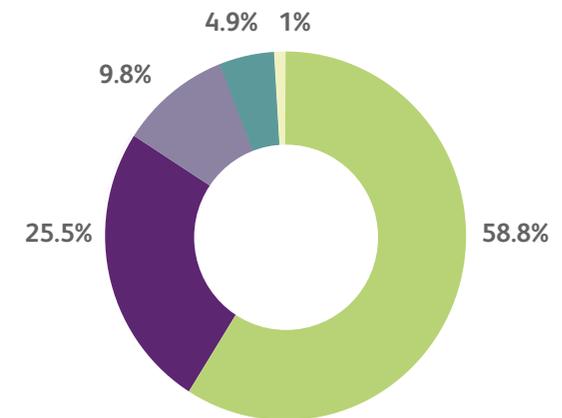


Figure 13 Key

-  Lack of management leading to safety issue
-  Inconsistent approach
-  Well managed with safety as a priority
-  Other (General comment)
-  Too much vegetation removed



As a train driver ... my second or third worst fear is coming round a curve to see tons of twisted wood fallen across my line and knowing that with a 3/4 mile stopping distance there is no way I will be able to stop before it kills me.'

Train Driver

Little evidence of asset management

As a result of historically not managing the lineside as an asset over a significant period, there is no adequate risk profile, prioritisation or modelling. Data, where it exists, is sporadic and held in a variety of places, with no central repository or asset register.

This applies both to overall asset data, including on asset condition, and baseline ecological data. This was characterised throughout the review as Network Rail 'not

knowing what it has' and is further evidence that the Asset Policy is not being appropriately implemented. The lack of appropriate data is widely acknowledged within Network Rail and is a key focus for the new professional head responsible for lineside vegetation. The Review is concerned though that there are no funds allocated in Control Period 6 for developing such an asset database for vegetation.

However, the Review's findings are clear that while an asset management approach is necessary to better integration of environmental considerations, it is not sufficient. The lack of a governance structure around biodiversity outcomes is a further critical gap in implementing this asset policy. The Review has found that outside the Infrastructure Projects' commitment for CP6, there are no targets at corporate level, no indicators at Route level and a lack of assurance at project level. Incentives are not in place to deliver 'proactive management of ecology and environment', with no downward pressure from executives or funders to change existing approaches.

Best practice clearly shows that management based on 'the right habitat in the right location' is essential to maximise the long-term, multi-functional benefits that green infrastructure can generate.

For Network Rail, such habitat management must be developed and delivered at Route level to align with the organisation's structure and decision making.

Alternative policies

The limited time available for the Review has meant that it has not been possible to undertake a comprehensive appraisal of alternative policies and models. However, the evidence considered has included a review of relevant guidance and good practice; and consideration has been given both to the wider policy context and to understanding the potential of emerging models around biodiversity net gain and natural capital accounting. The analysis undertaken as part of the Review points towards an opportunity for a significant evolution of the current policy. This is a complex piece of work which Network Rail should take forward with the Department of Transport and other key stakeholders following the publication of this Review. The recommendations in this Review will help frame future work.



Identification of where best practice already exists, and whether best practice can be implemented more effectively on other parts of the network, taking into account route devolution.

The Review has found a range of best practice across Network Rail's approach to vegetation management and case studies are included throughout the report. They include:

- Thameslink achievement of Biodiversity Net Positive (page 40)
- Greater West No Net Loss programme (page 37)
- HS1 partnership with Kent Wildlife Trust to baseline and survey habitats (page 33)
- Infrastructure Project commitment to Net Positive in Control Period 6 (page 40)
- London North Western's investment in in-house ecological expertise (page 31)
- The Network Rail biodiversity calculator (page 46)
- Anglia Route's City and Guilds training course for inspectors (page 31)

The Review has noted that these examples of good practice are not systematic and have often been driven by a single committed and determined individual.

There is no reason why such approaches could not be implemented more widely. Route devolution should not be a barrier to this, barriers rather lie in the lack of incentives, governance and resources.



I want to get to a situation where a section manager can log into a system, look at their area and recognise where the potential issues are and what needs to be done in priority order. They can then go to managers and say where work needs to be done and be supported to get resources.'

Network Rail Professional Head



Network Rail's capacity and capability and that of its supply chain, and whether this is adequate to control vegetation in a way that strategically identifies and optimises opportunities to enhance wildlife and the natural environment both within the existing Network Rail footprint, and supports broader landscape scale initiatives of third parties.

Staff training, including of third parties, and whether more skills are needed to identify alternative approaches to current felling practises; and where possible, scope for technological innovation, such as improvements in adhesion management.

Environment is not adequately resourced

Across Network Rail as a whole the Review found that for vegetation management generally, and professional ecological advice specifically, there are gaps in capacity and capability. These severely limit the ability to optimise opportunities to enhance wildlife on Network Rail land, let alone on a broader landscape scale.

While all routes have a general environment specialist, the lack of any ecologist at Route level, outside London North Western Route, means that there is no professional ecological focus for over 12,000 lineside miles.

While the Review has not been able to test this empirically, the consistent view has been that capabilities and training among front line staff are also lacking, with the inability to identify tree species often being cited as a practical barrier to making informed decisions on ecological opportunities and management techniques.

The Review has also found that stakeholders consider that the lack of ecological understanding has limited the ability of Network Rail to act as an 'intelligent client' where work is outsourced.

In terms of capacity, the Review concludes that vegetation management has been under-resourced. This is evidenced by the backlog of work that had led to all Routes being monitored closely by the ORR due to non compliance to the Standard. This was confirmed by all relevant stakeholders, with lineside management universally considered to be significantly under-funded and under-resourced. Vegetation management being often undertaken reactively to deal with specific issues rather than planned in systematically. The Review considers that this has the potential to impact as much on safety and performance as on biodiversity.

As mentioned below, while there is an industry research programme on adhesion management, there was no evidence that this

is currently being considered in decisions on vegetation management.

Vegetation is not a priority

The lack of capacity and capability is rooted in a culture where vegetation management is not considered to be a priority. There are no relevant KPIs, lineside delivery teams often report to track engineers who have different priorities and incentives, and budgets for vegetation management are not ringfenced or secured. Throughout the evidence gathering the overall culture was characterised as seeing vegetation as a cost to be controlled rather than an asset to be managed.

The Review has noted that both the culture and level of investment in vegetation management are changing, and this is to be welcomed. However, the evidence seen by the Review does not suggest that there is a systematic approach to developing an appropriate level of capacity and capability, and a risk of inconsistent delivery remains. This is the case both at Route level and in the support functions. Core elements of the required capability for identifying opportunities, including baseline data collection and surveys, are currently unfunded in CP6. Nor is it clear that proposed Route level vegetation management budgets for CP6 are yet ringfenced and guaranteed.

Capability is available in the supply chain

In considering the capacity and capability of the supply chain, the Review notes that this is a mature market with a range of potential suppliers, capacities and capabilities. Whether these are used is largely dependent on Network Rail's contracting strategy. Network Rail's own analysis suggests that the current approach - framework contracts with no committed spend and a large number of small tenders - is not achieving its aim of greater value for money, and is resulting in minimal investment and high recruitment costs for suppliers.

The supplier perspective has consistently been that the skills and capability are available in the supply chain. But short-term, 'lowest cost wins' tenders mean that environmental, as well as whole-life cost, considerations are priced out.

It is further noted that the current approach of short-term contracts allied to the high cost of servicing makes Network Rail an unattractive client. This reflects concerns from the 2013 Curley Review:

*'The history of inconsistent and uncertain funding levels over recent years has led to the loss of specialised vegetation management contractors who have been attracted by the opportunity of longer term contracts from other utilities, for example power distribution companies.'*¹⁵

Alternative approaches

Throughout the Review, while alternative approaches have been raised, including coppicing, pollarding and hedging, there has been little evidence of a systematic approach to when or where these might be used, or understanding their benefits or costs. Where such approaches have been used, this has mostly been driven by individuals, in some cases with little ongoing management or monitoring.

At Sonning Cutting, an innovative alternative approach was agreed with the local community representative (Professor Alastair Driver, a professional ecologist) which included:

- pollarding 170-year-old oaks which would otherwise have been cleared
- retaining the maximum amount of scrub to meet safety requirements
- leaving dead timber on-site in a safe place
- mitigation for biodiversity loss.

It is to Network Rail's credit that the local team responded by engaging with the local community and implemented the resulting agreement. However, the Review notes that there was no baseline measurement and no resource for ongoing monitoring, meaning that the impacts are unknown.

There are compelling reasons, on ecological and cost grounds, to trial a range of alternative approaches in different scenarios and to capture the resulting data on costs and impacts.

Beyond alternative vegetation management techniques, the rail industry has a research programme considering engineering solutions to low adhesion caused by leaf fall. The most significant project is the trialling of variable rate sanders, where sandboxes mounted on the train keep an appropriate flow of sand to increase adhesion between the wheel and the rail. This was not mentioned by any operational lineside stakeholders, most likely as an in-service trial is not due to take place until 2019.

¹⁵ National Industry Autumn Review, 2013, John Curley and Claire Volding



Network Rail's ability to monitor and account for the number of trees felled and replaced, in the context of wider national biodiversity objectives, and how this can be aligned with best practice for environmental reporting.

Lack of systematic monitoring

Network Rail does not currently monitor the number of trees felled at a national level, nor does it have a policy of compensating for tree loss at a corporate level. As noted above, there is currently no specific requirement on Network Rail from government to support national biodiversity objectives.

Within specific projects there are some clear examples of good practice in terms of accounting for, and mitigating, biodiversity loss, with the Greater West and Thameslink programmes already cited above. Looking ahead into Control Period 6, this practice will become significantly more widespread given Infrastructure Projects' commitment to Biodiversity Net Positive. This is a significant commitment that should be applauded.

To support delivery of this, Network Rail has developed a biodiversity calculator based on Defra metrics which is aligned with current good practice. The Review has noted some stakeholders' concerns with the metrics approach and how this can lead to replacement

of woodland with other habitats. However, Network Rail's approach aligns with current official guidance.

Biodiversity objectives

For greatest biodiversity benefit, holistic habitat management should be the focus.

The evidence gathered in this Review, including from almost all conservation groups, has emphasised that trees, while important, are not the best proxy for biodiversity and their importance for biodiversity is generally over emphasised when they are in the public eye. The importance of scrub and grassland was emphasised, especially given its undisturbed nature when lineside.

Given the evidence of the significant backlog in vegetation management, it is appropriate that mitigation for some habitat loss should be an important element of Network Rail's approach. This must align with the accepted mitigation hierarchy and ensure clarity and transparency in reporting. It is the Review's opinion that such reporting should reflect emerging good practice in natural capital accounting, aligned with the government's 25 Year Environment Plan.

Further, given Network Rail's status as a public body, it is appropriate that any mitigation approach should encompass national policy objectives as well as local needs.

In this context the targets in the government's

25 Year Environment Plan to create or restore 500,000 hectares of wildlife-rich habitats outside protected sites and plant 180,000 hectares of woodland are highly relevant in informing Network Rail's approach.

'We are adopting the principle of biodiversity accounting, which incorporates metrics and calculations endorsed by DEFRA, so that we can measure the impact that our infrastructure development and maintenance works have on biodiversity. However, we don't have a fixed target for compensating for tree loss, habitat loss, or changes in biodiversity valuation as a consequence of our maintenance or upgrade work.'

Vegetation Management Explained,
Network Rail



BIODIVERSITY CALCULATOR



The screenshot displays a dark-themed interface with a grid of nine green navigation buttons. The buttons are arranged in three rows and three columns. The top row contains 'PROJECT DETAILS', 'HABITAT COMPARISON INFORMATION', and 'BIODIVERSITY UNITS - BEFORE WORK'. The middle row contains 'BIODIVERSITY UNITS - AFTER WORK', 'LINEAR HABITATS', and 'OFFSET UNITS'. The bottom row contains 'EVIDENCE BASE', 'DASHBOARD', and 'NOTES'. At the bottom of the interface is a grey contact box with an envelope icon, the text 'For more information or help with the Biodiversity Calculator please contact:', and the email address 'SustainableDevelopment@networkrail.co.uk'.

Version 1.0 September 2017

Network Rail's Biodiversity Calculator is a tool to measure a project's biodiversity baseline and track progress towards achieving Biodiversity Net Positive.



Network Rail's handling of communications to and from the public.

It is clear that the language and channels Network Rail uses to engage with communities are not always in line with the priority residents place on understanding the likely changes that vegetation management will bring to the look and feel of the environment around their homes. The impacts of this were clearly brought out in the Review's public survey.

While acknowledging that any such survey is likely to draw out those who have had a poor experience, it is the Review's opinion that this is an area where there is significant room for improvement. Exemplary communications management demands a high level of professional skill and effective organisational processes and systems.

Network Rail has processes and appropriate information publicly available on the issue of vegetation management. The breadth and variety available for use, both generally on the website and for use at community meetings, demonstrates a commitment to transparency on this issue at a corporate level.

However, the lack of a systematic and customer-centric approach to the communications process can create inconsistency in terms of language of

communication, tools used, audience reached and message. Of equal importance, there appears to be no formal record of the communication strategy adopted during each information campaign, nor any real opportunity to share best practice, measure effectiveness, or ensure feedback and learning.

The opportunity exists to build on best practice and adopt a consistent approach when engaging with lineside neighbours and wider communities. Developing social media capabilities for use at a route level, along with professional multi-channel engagement plans supported by appropriate training and resources, would address much of the inconsistency and ineffectiveness of communication experienced by stakeholders. This should result in significant improvements in understanding by communities, and Network Rail people, of the need for and approach to vegetation management and the organisation's biodiversity strategy.



The extent of any recent or proposed changes in the scale or scope of the programme and underlying drivers.

There is a need to address the backlog

The Review has found a broad range of evidence that vegetation management has been under resourced over many decades. This includes evidence of concern about vegetation management backlogs and increased felling programmes stretching back to the 1980s.

*'...scrub and woodland clearance is on an ad hoc basis, ..., for a number of years no effective action was taken. Major work has now become essential, leading to some unnecessary clearance which is causing consternation to, among others, the Tree Council.'*¹⁶

The large backlog and the time it will take routes to achieve compliance are noted elsewhere. This backlog will remain the underlying driver for high levels of vegetation management activity over at least the next 5 years, and over 10 years on some routes.

The Review notes the significant increase in the amount of contracted vegetation management work over the last 5 years, rising from just over £15m in 2012/13 per year to around £40m per year in each the last four years. However,

¹⁶ Caroline Sargent, *Britain's Railway Vegetation*, Institute of Terrestrial Ecology, NERC, 1984

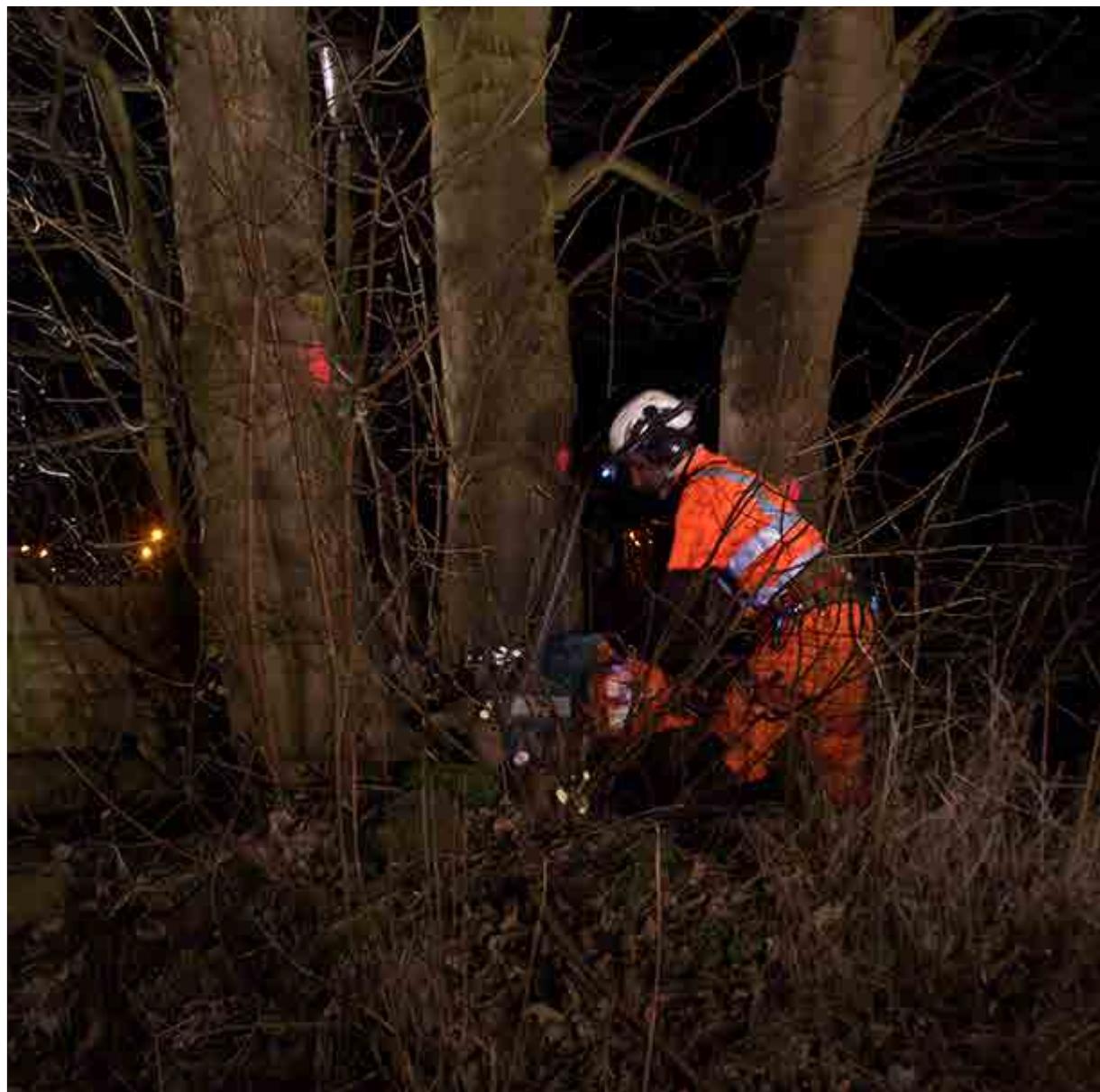
it is unclear that this has led to any increase in compliance. Network Rail data shows that the annual level of newly compliant lineside miles delivered has dropped from 600 miles in 2014/5 to under 250 miles in 2017/8.

Network Rail has been unable to provide a full dataset of intended spend or level of vegetation management planned for Control Period 6. However, to meet target dates for compliance will need an annual average clearance rate across the whole network of between 700 and 800 miles over the Control Period.¹⁷

Three Routes have provided proposed CAPEX budgets for achieving increased levels of compliance in Control Period 6. The total for these Routes is £18m per year, this would roughly align to the clearance rates assumed above.¹⁸

No tree felling target

The Review has found no evidence of a target or estimate for the number of trees that will be felled in future. However, as noted above, the need to meet the backlog of compliance with the Standard is likely to lead to an increase in the number of trees felled. This may be exacerbated by interpretation of the 'Action zone' in the New Standard as this is both wider than the clearance zone in the Current Standard and includes a 45° line from the rail.



¹⁷ This is based on a straight line rate, from existing levels of compliance supplied by Network Rail

¹⁸ This assumes a cost of compliance of £30,000 per mile.

My Recommendations

I have considered the available evidence, along with the views and experiences of people from within Network Rail and its supply chain, the wider rail industry, conservation groups, rail users and neighbours.

My three conclusions and six recommendations are:

1

While there are pockets of best practice across the network, the overall approach to vegetation management is reactive and inconsistent. There remains a significant percentage of the rail network which is non-compliant with the Standard in terms of minimising potential hazards from lineside vegetation.

2

Network Rail does not take into account accepted environmental best practice throughout all of its estate.

3

With the right vision, leadership and governance, a new culture could be established that would drive improved outcomes for safety, people and the environment.

Estimated costs are included, although it has not been possible to fully cost my recommendations due to the time available for the Review and the lack of data in some areas. While initial investment to facilitate change will be needed, in the context of Network Rail's overall lineside budget, I believe it is affordable, necessary and may even lead to a reduction in whole life cost. This investment will generate significant value, in terms of enhancing natural capital, across one of the largest land holdings in the country.

I have suggested six strategic recommendations, each with a timeline to deliver real change over the next ten years and beyond.

Network Rail is already putting in place plans to consistently deliver and maintain compliance to its own standard for safety and reliability.

These recommendations seek to build on this work and embed the principle of valuing and enhancing natural capital. This will result in increased biodiversity and wider environmental outcomes across Network Rail's estate.

A review of the structure of the railway has recently been announced by government. I ask that the Rail Review takes on board our findings and considers how they may be delivered through any changes that might be proposed to the current industry operating model. I would of course be delighted to discuss this with the review team.

Within six months of this Review being published I intend to review progress with key stakeholders.

1. The Government must set out a clear policy position for Network Rail in terms of delivering for the environment

Clear policy position

To ensure clarity, transparency and consistency over what is expected and required of Network Rail, the Department for Transport must develop a clear policy position and coordinated set of expectations for the role of rail infrastructure in supporting the delivery of the 25 Year Environment Plan. The policy should consider how Network Rail's unique landholding can support landscape scale benefits and biodiversity connectivity through the provision of wildlife corridors. It should include how benefits will be delivered, through requirements on Network Rail.

Cost: minor

Clarity on funding

The policy should provide clarity on where any additional short-term funding for investment will come from, as well as addressing longer-term issues such as the potential for rail infrastructure managers to benefit from the proposed new Environmental Land Management Schemes and opportunities from private funding where outcomes are delivered beyond Network Rail's estate

Cost: will depend on approach



2. Appropriate governance must be put in place at organisation, route and project level

A board champion

The Department for Transport and the Network Rail board should, with immediate effect, appoint an existing or new Network Rail non-executive director with responsibility for Natural Capital. To be tasked with championing Network Rail's role in supporting the delivery of the 25 Year Environment Plan and ensuring board level review of plans and progress.

Cost: minor

Route level KPIs

By the beginning of Control Period 6, Network Rail should establish route level KPIs, which are aligned to centrally set targets on habitat management plans and asset policy. Initially these KPIs may be process measures, such as the delivery of route specific habitat management plans outlined below. However, they should move to outcome-based indicators as soon as management plans are being delivered, and in any case within two years. These KPIs should be monitored by the Office of Rail and Road (ORR) with reporting in the public domain and an annual report to the

Minister for Rail. These targets and indicators should be aligned to government policy and included within the regulated framework of requirements for the Control Period.

Cost: minor

Review the Standard

Before it is formally adopted in April 2019, Network Rail should review its new vegetation standard to identify any opportunities for changes that will deliver early wins which benefit biodiversity, without increasing risk to safety or performance. I would expect that the proposed new standard is further developed post April 2019. The aim is to consolidate and simplify the many policy and guidance documents to facilitate effective 'on the ground' interpretation. This will ensure consistent delivery of biodiversity targets and compliance across the network.

Cost: minor

Nesting season

With the volume of work needed to continue to protect public safety, vegetation management

and tree felling will need to continue to take place throughout the year. This is established practice by woodland managers in the private, public and conservation sectors.

In doing this, Network Rail must ensure that it not only complies with relevant legislation and its Standard but also delivers the work in the context of this Review's ambition to see a net gain in biodiversity across its overall estate. All lineside vegetation management should be planned to minimise any negative impacts on biodiversity; this is particularly important during the bird nesting season.

Prior to the start of the next nesting season, Network Rail must ensure that it is ready to adopt an improved operating model, one which ensures clarity on outcomes and methods, and a transparency and robust assurance of its approach to tree felling and other vegetation management. In developing this approach Network Rail should engage with, and ensure the support of, key environmental stakeholders and expert bodies.

Cost: minor for process, delivery cost to be calculated

3. Network Rail should publish an ambitious vision for the lineside estate

‘The goal should be for Network Rail to be seen as a transport infrastructure world leader in environmental management.’

Ambitious vision

Within a year, Network Rail should set out an ambitious vision for the lineside estate, setting out the outcomes that it aims to achieve. This should place Network Rail’s approach in the context of natural capital best practice and its role in delivering the government’s 25 Year Environment Plan.

Cost: minor

Strategy and plan

To support this, a strategy and plan should be published that set out how the vision will be delivered. The strategy should include specific measures of success, including targets for biodiversity, such as No Net Biodiversity Loss by 2024 and Biodiversity Net Gain by 2040.

It is likely that achieving this will require some offsetting in the medium term, which should be done to best practice standards, with a commitment to phasing this out, in favour of on-site delivery, within a defined period of not more than ten years.

The government’s 25 Year Environment Plan sets challenging targets for woodland and wider habitat creation. When offsetting, Network Rail should play a full part in the delivery of these targets; in particular around native woodland creation.

Cost: To achieve No Net Loss on compliance to Standard is estimated to cost between £15m and £23m¹⁹ over 20 years, on top of a total clearance budget of between £200m and £300m

A partnership approach

As part of the vision, Network Rail should establish how it will work in partnership with neighbours, conservation groups and suppliers, including other landowners, to develop a nature recovery network of wildlife corridors, extending habitat management plans in key areas into joint management plans with neighbouring landowners. This could play a key role in

accelerating the ability to meet the government target to ‘Creat(e) or restor(e) 500,000 hectares of wildlife-rich habitat outside the protected site network’.

Cost: uncertain, may reduce costs

Route State of Nature report

Once the vision is agreed, Network Rail Routes should publish annual State of Nature reports based on natural capital accounting principles. As well as reporting back on performance across key indicators and projects, this should set out progress on the journey to a natural capital balance sheet, risk and asset register. The objective should be to monetise and quantify impacts, where possible, to support better policy making and demonstrate how decisions are impacting on natural capital and aligned to best practice in environmental reporting.

Natural Capital reporting is already being adopted by other public sector land managers, including Forest Enterprise England. This approach could prove to be a blueprint for all public sector land managers to enable the development of a national Natural Capital report.

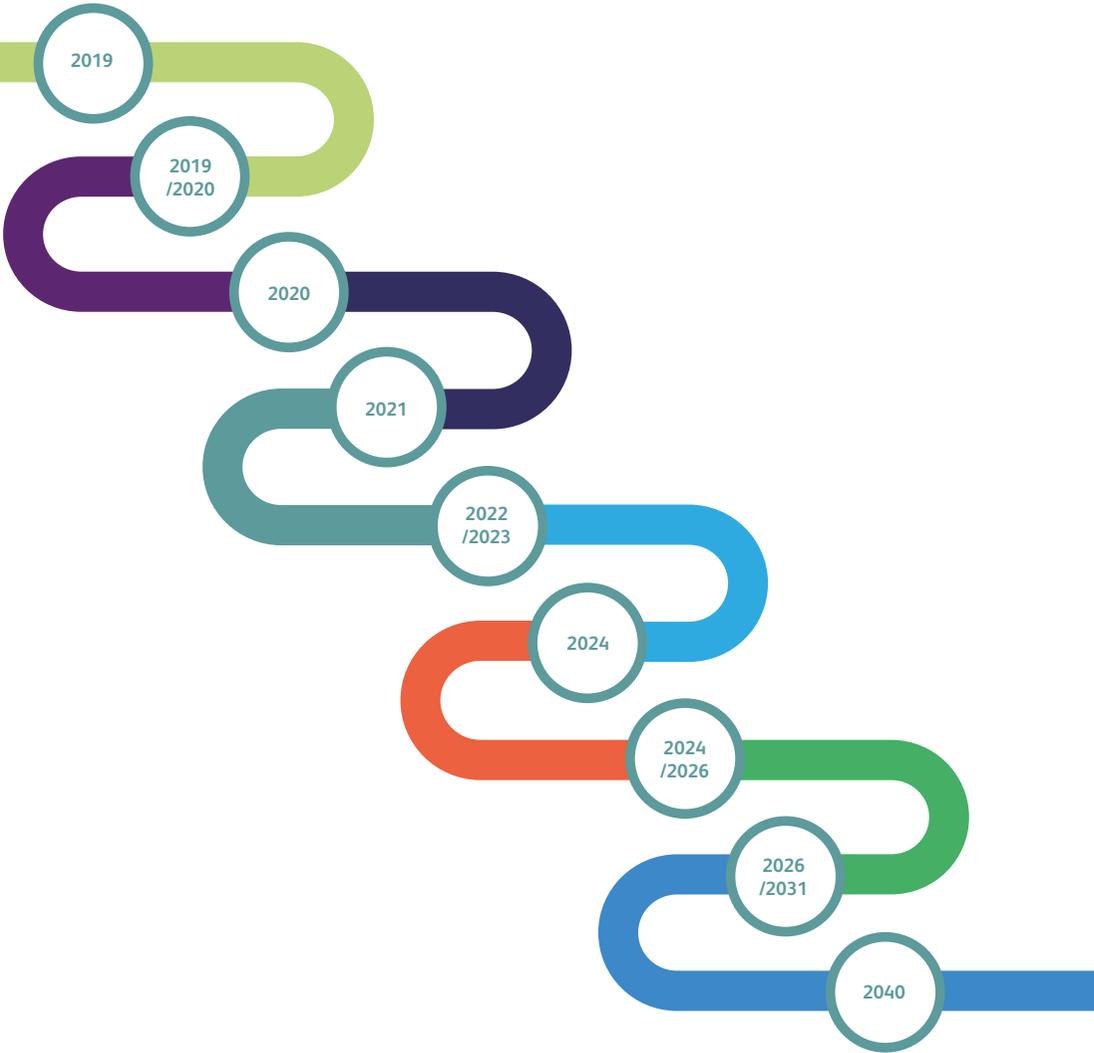
Cost: minor in relation to benefit

¹⁹ No net loss estimated at £2,000-£3,000 per lineside mile based on project experience. To achieve no net loss on the remaining (about) 7,500 non-compliant lineside miles (those that will be subject to clearance) would cost between £15m and £23m on top of a total clearance budget of between £200m and £300m (based on £30,000-£40,000 per mile).

A proposed timeline for Network Rail to achieve 'no net loss' of biodiversity by 2024, and a net gain by 2040.

Milestones

- 2019**
 - Calculate and publish the 'biodiversity unit' baseline of all Network Rail land
 - Publish a Biodiversity Delivery Plan
 - Employ biodiversity accounting on selected projects
- 2019/2020**
 - Identify and address any gaps in skills and resources
- 2020**
 - Routes undertake a pilot of biodiversity accounting
 - Infrastructure Projects produce their business plan for No Net Loss delivery
 - Annual biodiversity reporting
- 2021**
 - Roll out biodiversity accounting across Network Rail
 - All other business units produce their business plans for No Net Loss delivery
 - Annual biodiversity reporting
- 2022/2023**
 - Infrastructure Projects deliver No Net Loss
 - Annual biodiversity reporting
- 2024**
 - All operations achieve No Net Loss
 - Annual biodiversity reporting
- 2026/2031**
 - Phase out biodiversity offsetting and off-site habitat banking
 - Annual biodiversity reporting
- 2040**
 - All operations achieve Net Gain



4. Network Rail must value and manage its lineside estate as an asset

Develop an asset database

Robust data is fundamental to good asset management. Over the course of the next year Network Rail should develop a baseline dataset of habitats and biodiversity across its estate. This should be incorporated into the existing Network Rail master asset register. This should include appropriate data on how the asset sits within the wider landscape, outside Network Rail's estate. This will ensure that the asset can be considered within the wider landscape, not just along the railway line. It should also be linked to new and existing related asset data, such as on embankments and climate risks.

Cost: £8.9m over Control Period 6 ²⁰

Route specific habitat management plans

Based on this dataset, each Network Rail Route should, by the end of 2020/21, produce route-specific habitat management plans. These plans, based on 'the right biodiversity in the right location', should reflect the characteristics of the natural environment both locally and at a landscape level, as well as safety, performance and community

requirements. The desired biodiversity and habitat outcomes will necessarily differ by geography and environmental context. For example, plans for Wales, the South Downs, East Anglia, and the Yorkshire Dales will each be very different.

The outcomes sought should be embedded into daily lineside operations and used to plan proactively with a budgeted work plan over a 20-year period that will deliver long-term ambitions, working with partners drawn from stakeholders and the supply chain.

Cost: build into route maintenance plans

Skills programme

To deliver this change, a step-up in capability across the workforce and supply chain is needed. Over the next year Network Rail should undertake a review of the skills needed and a skills gap analysis, and develop appropriate elements to its existing competency-based management system. Network Rail should undertake a comprehensive programme of recruitment and training to ensure that it has a robust and appropriate level of ecological

and environmental expertise and understanding across the organisation. A full training programme should be implemented such that all relevant Network Rail people and contractors have the needed competencies by 2024.

Cost: estimated at £1.5m per year ²¹



²⁰ Developing a baseline £2.4m (£75 per lineside mile), ongoing monitoring £1.6m per year (£50 per lineside mile per year) (based on HS1/Kent Wildlife Trust experience).

²¹ Based on each route achieving same level of ecological expertise as LNW (4 ecologists). Average annual cost of employment £50,000 each. Training budget for lineside team £100,000 per year.

Demonstration projects

To inform the establishment of this new approach, within three months of this Review being published, Network Rail should establish a minimum of seven national demonstration projects; one per route in England and Wales. The projects should be co-ordinated to ensure that a range of important areas for investigation are considered. These should include:

- sites of high biodiversity value with a need for urgent action to improve reliability and safety
- addressing underlying issues, including data collection
- costing alternative approaches
- dealing with third party trees, managing ash dieback and biomass potential
- partnership delivery with neighbouring landowners.

In some cases potential projects have already been discussed or initiated – such as the Hadley Wood hedge trial (see box).

Cost: Hadley Wood hedging trial is costing around £25,000

Network Rail and The Tree Council have established a trial to test three different methods for establishing the hedge as part of replanting at Hadley Wood. The methods are:

- natural regeneration (using the natural seed bed)
- seeding (a historical method)
- planting using whips (the modern method).

The ecological aspects of hedges are well known, so the object of this trial is to determine which method establishes a hedgerow most successfully and establish which is the most cost effective method.

5. Network Rail must improve its communication with affected communities

A new approach to communications

Network Rail should review and update its internal and external communication and engagement processes, and its materials. The approach must ensure clear, transparent and consistent decision making in how local communities across England and Wales are engaged with. Network Rail should make better use of local community groups and social media platforms, to engage communities about planned work in a more timely and cost-effective manner. This should include clear explanations of why work is taking place and what outcomes it is intended to achieve. Visuals of what a site may look like immediately after any vegetation management, and what it could look like in two to three years' time, should be included. There should be a single point of contact for the community clearly advertised, as is common on many building sites.

Cost: minor

Capture corporate memory

To support effective community engagement, Network Rail should adopt a more formal and consistent approach to ensure that information from engagement with communities, including commitments made, is captured and retained as part of the corporate memory and is used to inform future decision making. This should include recording engagement with the media, councils and MPs. These systems must be made available to project and delivery teams, with protocols in place to ensure they are consulted as part of any works planning process.

Cost: minor



Abbey line before



Abbey line just after



Abbey line two years after

6. Network Rail should lead a cultural change for valuing nature and the environment

Culture change

Effective delivery of the recommendations above will need a change of culture. This must embed the importance of Network Rail's natural assets and the need for responsible management of the public land under its stewardship.

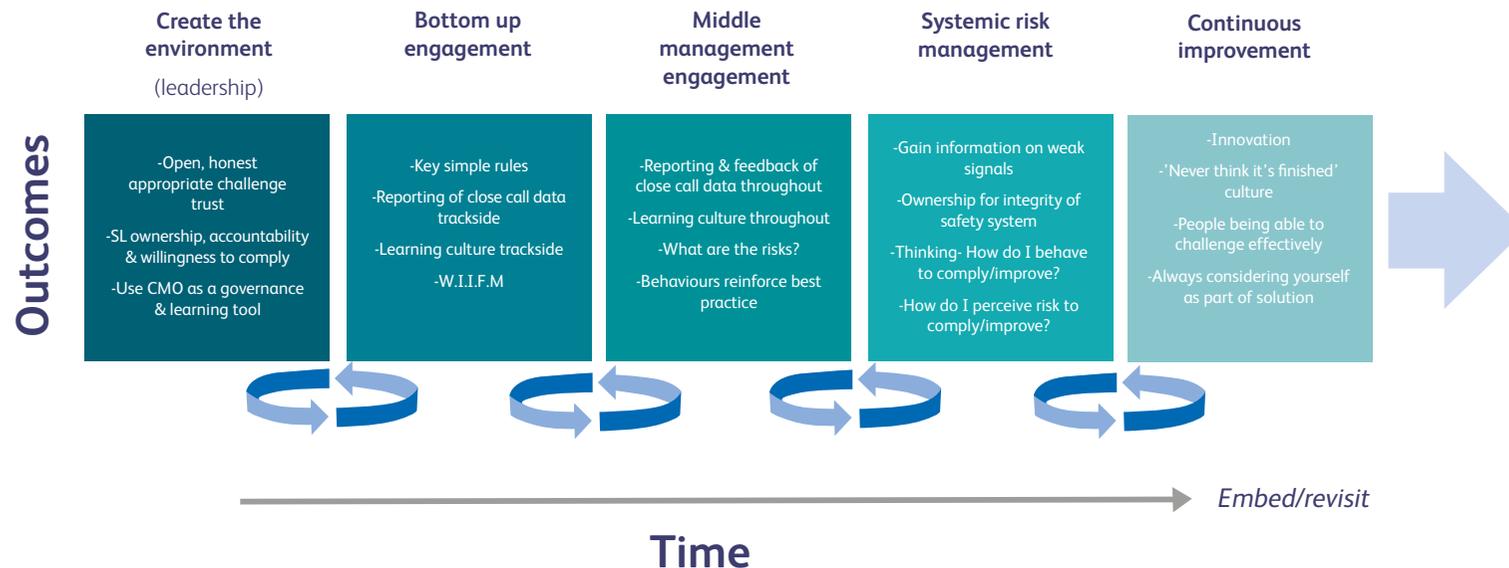
Network Rail has recent experience of a successful culture change programme around

further improving safety – the Safety Leadership and Culture Change programme. A new programme should build on these foundations, with leadership at all levels valuing nature and the environment and demonstrating through behaviour a commitment to putting nature on a platform alongside safety as business critical. Network Rail should ensure that it measures any shift in attitudes as an impact of the activity. This should be regularly reported to the board

and route managing directors, so that they can be sure that nature is properly valued throughout the organisation.

Cost: should be absorbed by ongoing governance and change programmes.

Figure 15 - Safety Leadership and Culture Change Model



Recommendations Table

Recommendation	Cost	Deliverable	03 months	06 months	1 year	2 year	5 year	10 year	20 year
The government must set out a clear policy position for Network Rail in terms of delivering for the environment	Minor	Clear policy position							
	Will depend on approach	Clarity on funding							
Appropriate governance must be put in place at organisation, route and project level	Minor	A board champion							
	Minor	Route level KPIs	Process		Outcome				
	Minor	Review the Standard							
	Minor for process	Nesting Season							
Network Rail should publish an ambitious vision for the lineside estate	Minor	Ambitious vision							
	£15m to £23m	Strategy and plan					No net loss - 2024		Net gain - 2040
	Uncertain	A partnership approach							
	Minor in relation to benefit	Route State of Nature report							
Network Rail must value and manage its lineside estate as an asset.	Total for CP6 £8.9m	Develop an asset database	Baseline		Monitoring				
	Build in to maintenance costs	Route Specific Habitat Management plans			Develop		Deliver		
	Estimated at £1.5m per year	Skills programme							
	Each trial will have different costs	Demonstration projects							
Network Rail must improve its communication with affected communities	Minor	A new approach to communications							
	Minor	Capture corporate memory							
Network Rail should lead a cultural change for valuing nature and the environment	Absorbed by ongoing governance and change programmes				Culture change				

My Thanks

I should like to thank Jo Johnson MP, Minister for Rail at the Department for Transport for giving me the opportunity to Chair this Review. It has been a privilege and a great pleasure.

The Secretariat was provided by the Rail Safety and Standards Board (RSSB). I have been impressed by the RSSB's professional, enthusiastic and impartial approach in delivering this report within short timescales over the summer holiday period. In particular I should like to single out Anthony Perret and Jane Dobson who provided the leadership and exemplary programme management.

Thanks are due to all the many subject matter experts within RSSB and in outside bodies who led specific lines of enquiry. Also Jeremy Hotchkiss and his team at the Department for Transport, who supported me in getting to grips with my brief. We

engaged at all levels across Network Rail with so many people who shared a common enthusiasm for their industry and this Review. I should like to thank them all and in particular Sir Peter Hendy, Chairman, and Dr Neil Strong, Principal Engineer, for supporting the Review team and their transparency and candour.

And of course there would have been no Review without the many contributions from over 8000 stakeholders across the rail industry, service providers, environmental bodies, community groups and the public. A special thank you for making time to contribute with so much passion and interest.

John Varley OBE TD
Independent Chair

Glossary

Glossary term	Definition or meaning
Asset	An item owned by a person or company, regarded as having value
Asset data	Facts and statistics about assets collected together for reference or analysis
Asset management	A systematic process of developing, operating, maintaining, upgrading, and disposing of assets cost-effectively
Asset register	A record that clearly identifies all the fixed assets of a business
Asset policy	The policy for managing assets
Baseline ecological data	Conditions and ecological features present within a specified site at the start of a defined period or project
Best practice	Commercial or professional procedures that are accepted or prescribed as being correct or most effective

Glossary term	Definition or meaning
Biodiversity	The variety of plant and animal life in the world or in a particular habitat
Biodiversity calculator	Methodology used to measure and record biodiversity value
Biodiversity mitigation hierarchy	The principle that negative biodiversity impact should be avoided where possible, then mitigated to reduce impacts where not possible, before being compensated through offsetting on-site and then off-site.
Biodiversity Net Gain	An increase in biodiversity
Biodiversity No Net Loss	No reduction or loss of biodiversity
Biodiversity Net Positive	Net gain to biodiversity features measured in quality hectares (for habitats), number or percentage of individuals (for species), or other metrics appropriate to the feature
CAPEX	Capital expenditure: funds used to acquire or upgrade physical and other assets
Control Period	The period to which a regulatory access charges review (a periodic review) applies. Control periods are typically five years in length, but maybe shorter or longer depending on what the regulator decides as part of the review.
Control Period 6 (CP6)	1 April 2019 to 31 March 2024
Coppicing	A traditional method of woodland management in which tree stems are repeatedly cut down to near ground level, known as a stool. New growth emerges and after a number of years, the coppiced tree is harvested and the cycle begins anew.

Glossary term	Definition or meaning
Defra	Department for Environment, Food and Rural Affairs
Defra's biodiversity metric	A tool that allows biodiversity losses and compensation to be measured
Defra methodology	Refers to Defra biodiversity metrics
Ecology	Branch of biology that deals with the relations of organisms to one another and to their physical surrounding
Ecological assessments	The monitoring of ecological resources, to discover the current and changing conditions
Environmental performance	How well an organisation impacts on living and non-living natural systems, including ecosystems, land, air and water
Environmental reporting	Reporting the environmental impacts and performance of an organisation
Flail	A type of powered equipment, which is used to deal with heavier grass or scrub which a normal lawn mower could not cope with
Hedging	The planting or trimming of hedges
Highways England	Government company which operates, maintains and improves England's motorways and major A roads
HS1	High Speed 1, high speed railway linking St Pancras International and the Channel Tunnel
Infrastructure Projects (IP)	Network Rail business unit dealing with major renewal and enhancement projects and programmes

Glossary term	Definition or meaning
KPI	Key performance indicators
Lineside delivery team	Team responsible for the area adjacent to a railway track
Natural Capital	Natural Capital comprises all the ecosystem services provided by natural assets including soil, air, water and all living things.
Nesting season	Season during which birds lay their eggs and hatch their young, officially February to August (Natural England)
Network Rail contractors	People or firms that undertake a contract to provide materials or labour to perform a service or do a job for Network Rail
Network Rail Standards	Functional or technical requirements that shall be met
Network Rail Routes	The railway network is divided into nine areas or Routes, which are Anglia, Freight (National), London North Eastern and East Midlands, London North Western, Scotland, South East, Wales, Wessex, Western
NERC	The Natural Environment Research Council
OPEX	Operating expense: refers to ongoing costs incurred to run an organisation. Examples of OPEX include routine safety checks on the railway tracks or repairing signalling when it fails.
ORR	Office of Rail and Road, the economic regulator of Britain’s mainline railway and health and safety regulator on all Britain’s railways
Overhead line	Wires used to transmit electrical energy to trams, trolleybuses or trains
Pollarding	A pruning system involving the removal of the upper branches of a tree, promoting a dense head of foliage and branches

Glossary term	Definition or meaning
Precautionary principle	Principles that where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent such damage
Preliminary Ecological Appraisal	Preliminary Ecological Appraisals (PEA) establish baseline conditions and evaluate the importance of any ecological features present (or those that could be present) within the specified site, as far as possible
Pre-qualification questionnaire	Questionnaire which sets out a series of questions for potential tenderers to answer regarding their level of experience, capacity and financial standing
Responsible Railway Plan	Network Rail national portfolio of key projects that will most effectively help to responsibly manage Network Rail's natural environment and add social value to the communities and help achieve a vision of a Railway Fit for the Future
RIS	Rail Industry Standard
Route devolution	Ongoing process of devolving decision-making to Network Rail's Routes
Route environmental specialist	Provides professional environmental advice and support and facilitates compliance with the Network Rail Management System and all relevant legal, industry and company standards
RSSB	Rail Safety and Standards Board
SRN	The Strategic Road Network of motorways and A-roads managed by Highways England

Glossary term	Definition or meaning
Senior asset engineer	Responsible for managing the examination and evaluation process for specific assets, and acting as client for investment into the asset
The Standard	The current Network Rail vegetation management standard setting out requirements for lineside vegetation management
The Tree Council	UK charity promoting the importance of trees, and critical friend to Network Rail
Track engineer	Engineer working within a design team to ensure compliance with all relevant technical standards and that the delivery of all the specified project outcomes are on time, within budget and to the quality required
Vegetation	Plants considered collectively, especially those found in a particular area or habitat
Vegetation management	General term used to describe the targeted control of vegetation
Vegetation clearance	The removal of vegetation from a particular site
Whole-life cost	Whole-life cost, or life-cycle cost (LCC), refers to the total cost of ownership over the life of an asset

Network Rail Vegetation Management Review – terms of reference

The review will consider all aspects of Network Rail’s approach to vegetation management, including:

- The rationale, evidence base and effectiveness of Network Rail’s vegetation management policy. In particular, how environmental considerations are viewed in the context of government’s ambition for the natural environment and:
 - its statutory duties for health and safety
 - its wider responsibilities for maintaining and enhancing network performance
 - delivering improved services to passengers (such as improved mobile connectivity)
 - ensuring value.
- The effectiveness of Network Rail’s implementation of its existing vegetation management policy, and an options appraisal of alternative policies and models.
- Identification of where best practice already exists, and whether best practice can be implemented more effectively on other parts of the network, taking into account route devolution.
- Network Rail’s capacity and capability and that of its supply chain, and whether this is adequate to control vegetation in a way that strategically identifies and optimises opportunities to enhance wildlife and the natural environment both within the existing Network Rail footprint, and supports broader landscape scale initiatives of third parties.
- Staff training, including of third parties and whether more skills are needed to identify alternative approaches to current felling practises; and where possible, scope for technological innovation such as improvements in adhesion management.
- Network Rail’s ability to monitor and account for the number of trees felled and replaced, in the context of wider national biodiversity objectives, and how this can be aligned with best practice for environmental reporting.
- Network Rail’s handling of communications to and from the public.
- The extent of any recent or proposed changes in the scale or scope of the programme and underlying drivers.
- The review will not cover Network Rail’s activities in Scotland, which are a devolved matter for the Scottish Government.

The Team

John Varley OBE TD, Chair of the Review, is Estates Director of Clinton Devon Estates. In his role at Clinton Devon Estates, John oversees the management of 10,000 hectares of land across East and North Devon, covering a range of operations, including farming, forestry, nature conservation and the development and management of residential and commercial property. Before joining the Estate, John held senior roles at BT in the international division and also in UK field operations, managing an engineering workforce. He has served as an independent member advising the government during the Lawton Review, Making Space for Nature, in 2010. He was subsequently appointed to the Department for Environment, Food and Rural Affairs' Independent Forestry Panel in 2011, and appointed as a judge on the government's

Nature Improvement Area Competition Panel. He is also a non-executive board member of the Environment Agency, and previously held positions as a board member of Natural England and as Chair of the Estates Business Group.

The **Rail Safety and Standards Board (RSSB)**, provided the Secretariat for the Review. RSSB is an independent body, which works with major industry stakeholders to drive improvement in the British rail system through research, standards and analysis.

Anthony Perret, was the project director for the Review. Anthony is Head of Sustainable Development Programme, RSSB.

Jane Dobson, was the project manager for the Review. Jane is Portfolio Head, Research and Standards, RSSB.

Review Team

Huw Gibson	RSSB	Human Factors
Philippa Murphy	RSSB	Human Factors
Joanne Bird	RSSB	Communications
Alice Monk	RSSB	Human Factors
Lauren Brown	RSSB	Sustainable Development
Rachel Larkum	RSSB	Design
Charlotte Marks	RSSB	Projects
Gareth Mayne	RSSB	Projects
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Ant Davey	RSSB	Communications
Glen Jones	RSSB	Operations
John Campbell	RSSB	Infrastructure
Chris Harrison	RSSB	Risk and Safety Intelligence
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Julia Baker	Balfour Beatty	Ecologist
Sam Bower	Balfour Beatty	Arboriculturalist
Richard Harris	3KQ	Workshop Facilitator
Rhuari Bennett	3KQ	Workshop Facilitator

Stakeholder organisations engaged

Alun Griffiths

Avondale Environmental Services Limited

Bat Conservation Trust

British Trust for Ornithology

Butterfly Conservation

Coombes Forestry Ltd

DEFRA

Environment Agency

Environmental Forestry UK Ltd

Forest Enterprise

Hadley Wood Association

Hadley Wood Rail User Group

Highways England

HS2

Institute of Chartered Foresters

Kent Wildlife Trust

Knepp Castle Estate

LDA Design

London Tree Officers Association

Natural Capital Committee

Natural England

Network Rail

Peter Neal Consulting

Rail Delivery Group

RSPB

Scottish Woodlands Ltd

Stobart Rail

TES2000

The Tree Council

Transport for London

Tree Design Action Group

Utility Arboriculture Group

Vital Human Resources Limited

The Wildlife Trusts

The Woodland Trust

Sir William Worsley - Tree Champion

Network Rail

Routes:

London North Western

London North Eastern and East Midlands

Wessex

Western

South Eastern

Anglia

Wales

Scotland

Infrastructure Projects

Safety Technical and Engineering

Appendices

A. Survey analysis

B. Literature review

C. Proposed net gain detailed timeline
(published as a separate document)





'Valuing Nature - A railway for people and wildlife'