ARUP

#25932 Review of Vegetation Management

Final Report

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Acronyms and abbreviations

Term	Meaning
ATR	Asset Technical Review, attended by Route Asset Managers and Regional Principal Engineers accountable for Drainage and Lineside
BAU	Business as Usual
CCT	The Common Consequence Tool banding is a score based on the impact of a derailment as a result of the proximity to infrastructure (such as tunnels) and line usage (e.g., Speed and Tonnage)
CCTV	Closed Circuit Television
DDD	Dangerous, diseased and dead (tree)
DLI	Digitised Lineside Inspection
DRAM	Director Route Asset Management
DU	Delivery Unit
Ellipse	The master register database of asset information that records the location, condition, configuration, components, and other information on drainage systems
ELR	Engineering Line Reference
FDM	Field Data Manager, Network Rail's desktop work and asset management solution
FMS	Fault Management System
FWI	Fatality Weighted Injuries/Index- method to work out safety performance

Term	Meaning
GRV	Geo-RINM Viewer
HMP	Habitat Management Plans
IAZ	Immediate Action Zone
IME	Infrastructure Maintenance Engineer
LiDAR	Light Detection and Ranging, a method of measuring the distance to a target by illuminating the target with laser light and measuring the reflected light
LTS	Lineside Tree Survey
MDU	Maintenance Delivery Unit
MyWork App	In-field work management application
OTME	Off Track Maintenance Engineer
OLE	Overhead Line Equipment
Planned Volume	The volume as agreed by RAM Drainage and Deliverer based on resources available and as entered into Ellipse.
RAM	Route Asset Manager
RAMP	Route Asset Management Plan
Remit	The Remit is a specification document for works which outlines the problem to be solved, the key deliverables, any specification and supporting information for the project
RZW	Red Zone Working
SPAD	Signal passed at danger
Standard Job	Standardised element of work detailing the amount of work (i.e., yardage or time) and the number of resources required as an aid to planning and defining work orders
STE	Safety, Technical and Engineering
TARR	Train Accident Risk Reduction
TME	Track Maintenance Engineer
TOC	Train Operating Company
VAMS	Vegetation Asset Management System
WAIF	Works Arising Information Form-A record of works proposed (or works done at the time the defect was observed) submitted to the Section Manager Off-Track for approval and addition to the work ban
WO	Work Order-MyWork application artefact describing work to be carried out, describing all aspects of the including equipment, resources needed, etc.
WSF	Wrong side failure

1. Executive summary

1.1 Purpose

Arup, in its role as Independent Reporter, was appointed by the Office of Rail and Road (ORR) and Network Rail (NR) to undertake a review of how NR undertakes vegetation management.

The scope of the mandate was defined in the Statement of Works (SoW), which was agreed prior to the start of the task. A copy of the SoW is included in Appendix A.1.

The business objectives and priorities, as set out in the SoW, were for this review to assess:

- *the robustness and sustainability of Network Rail's planning and delivery of vegetation management*
- *the delivery of current work programmes to recover the asset back to compliance with Network Rail's compliant vegetation profile requirements*
- *how risks and opportunities are assessed and managed*
- *how vegetation management plans and practices are aligned to business objectives and government policy within and beyond CP6*

Each Region was engaged with independently in line with the above requirements and an assessment was conducted for each of their practices. NR's Technical Authority (TA) for Lineside was consulted to obtain context for the review and to make a specific assessment of progress towards the recommendations made in John Varley's independent report to the Department for Transport on Network Rail's approach to vegetation management. Other specialists within NR's Central Function were also consulted.

1.2 Methodology

The Independent Reporter engaged with NR's five Regions and the TA through a series of workshops. Questionnaires were completed by the attendees in advance of the workshops to collate information on current practices, so that key areas of concern could be the focus of the discussions. Information was provided by the Regions and the TA to support the review in the form of documents, presentations, and data.

The findings from this review are based on evidence obtained from the following sources:

- Information requested from NR at the onset of the project
- Questionnaires returned by stakeholders consulted during the review
- Notes from meetings held with stakeholders
- Additional information provided with questionnaires and follow-up stakeholder meetings.

The review Steering Group comprised representatives from ORR, NR and the Independent Reporter. The group met at key stages in the review to agree the approach and discuss emerging findings, provide timely feedback to the Independent Reporter, and provide support where required to enable the review activities. The Steering Group also met fortnightly to review progress and agree next steps in the process.

The information from the consultation process was compiled to address each of the review themes in the SoW (see Table 2). Notes were prepared that summarised the evidence provided by each of the consultees in the form of documents, questionnaire responses and meeting notes. This process also took account of contextual information provided by the TA. This assessment was undertaken by a core Independent Reporter team involved in the workshops, supported by specialists in ecology and asset management.

The assessment process included assigning a "confidence rating" to each Region for each topic within the four review themes, with the central function also being graded for progress against the five Varley Review recommendations being considered. These ratings permit a qualitative comparison between Regions and help develop an understanding of where gaps and/or significant variations in current practice may exist.

Regional Asset Management teams were given the opportunity to review and comment on the Independent Reporter's assessment of the information provided and preliminary confidence ratings. In some cases, Regional teams were able to provide further evidential documents to improve on the preliminary low ratings. The finalised confidence ratings are included in Section 1.6.

1.3 Summary of key findings

The main body of the report provides a detailed discussion for each of the four main themes set out in the SoW:

1. Regional Management Plans and Practices (Sect 4)

2. Delivery against Varley review recommendations (chapter 5)

3. Consideration of biodiversity and habitat in works planning (chapter 6)

4. CP7 Planning (chapter 7)

The Independent Reporter's overall observations and conclusions from the review are summarised using subject headings that align with NR's Asset Management Framework, for greater ease of use by NR.

Managing the vegetation asset

This review has considered the management of NR's vegetation asset, as a distinct component of the lineside estate and taking account of its interdependencies with other assets, in its effectiveness at supporting the safe, reliable operation of the railway and the wider environment.

Vegetation has traditionally been managed as a liability that must be removed or closely controlled to limit risks to the railway. However, there are many recognised diverse stakeholder benefits in the role it plays, in stabilising slopes, providing sustainable drainage solutions, supporting lineside ecosystems and habitats and providing valuable visual and noise screening to neighbours.

Vegetation is distinct from other asset classes in a number of respects, with key parts of its asset lifecycle activities occurring entirely without human intervention. Therefore, the performance of vegetation assets, understood through inventory, condition and degradation curves, is less predictable than that of manmade assets, due to the way it becomes established and the rate at which it reaches a condition state where it poses a threat to the safety of railway operations.

John Varley's 2018 report "*Valuing nature – a railway for people and wildlife*" emphasised the value of Natural Capital. This objective needs to appear with equivalent weight alongside achieving the current business objectives of safety and performance. There is an obvious tension in equating all three in making investment decisions, however legislation in England, Scotland and Wales requires NR to meet new obligations relating to the environment. Furthermore, the 2019 DfT policy on Enhancing Biodiversity and Wildlife on the Lineside places specific expectations on NR regarding protecting the environment for future generations.

NR have developed policies and standards that are intended to deliver operational requirements relating to vegetation management, alongside meeting environmental legislation, including ambitious objectives of achieving no net loss in biodiversity on the network by 2024 and a net gain in biodiversity by 2035. A key element of this vegetation management approach is establishing a vegetation profile that reduces safety and operational risk, is easier to maintain and supports a preferred habitat that, once established, is able to maximise opportunities for biodiversity.

Planning for CP7 is well under way and these plans mark the change from reactive management to proactively creating a sustainable lineside estate. Delivery of NR's objectives regarding managing its vegetation asset needs to be informed by policies and plans at a network and regional level. There are a diverse number of external factors that need to be addressed, such as the effects of climate change, diseases such as Ash Dieback, rising costs, and supply chain capacity.

Organisational strategy and objectives

Vegetation is currently managed alongside other offtrack assets, which present efficiencies regarding use of resources, however, is not always given sufficient priority against other offtrack tasks in the management structure. A division of responsibility between environmental and asset management teams was noted at both network and regional level for the delivery of NR's strategies for vegetation management and biodiversity. The Independent Reporter observes that there should be greater clarity in these roles and is aware of organisational changes underway to address this issue, that are a work in progress within the Regions at time of writing.

NR have set out an Environmental Sustainability Strategy and accompanying Biodiversity Action Plan that include a roadmap for measures to deliver the recommendations from the Varley Review and to meet national legislation. While some of the early activities have been completed, there is limited detail or timetable for the creation of future measures that will support the delivery of NR's ambitions relating to meeting its declared environmental and biodiversity targets.

Establishing a culture within NR that encourages new ways of working is considered important to support the uptake of the company's developing approach to managing the vegetation asset. Only limited evidence was seen of individuals being assigned board responsibility for biodiversity or any change programmes that support new ways of working.

The Varley review identified that a step-up in workforce and supply chain capability was needed to deliver NR's ambitions in managing its lineside estate. NR has increased the number of ecologists within the organisation, but the regional teams interviewed considered that there was still an internal shortage. It was widely acknowledged that there was an industry shortage of ecologists and operatives due to competing requirements for skilled staff from other infrastructure owners and major projects, e.g., HS2. The wider issue of workforce capacity was not explored with the Regions, as the Modernising Maintenance review was still under way and there were sensitivities around its impact on roles.

Policies and standards

NR published a comprehensive policy for Lineside Asset Management for CP6. A corresponding policy for CP7 was still under preparation at the time of this review. While many of the components are in place, the Independent Reporter considers that there is currently a gap in the policy and/or guiding principles to drive strategic business planning at network and regional level in relation to the management of lineside vegetation and habitat. This will form an important role in establishing the Regions' approach to managing the asset for the coming control period and beyond.

NR modified its Vegetation Management Manual, that was being prepared at the time the Varley Review was published, to reflect measures to support biodiversity. This document and its various components are embedded into current practice and evidence was seen of its application. A notable exception to this is the development of Route Vegetation Management Plans, which Regions have been slow to introduce.

The accompanying Biodiversity Manual was issued in January 2022, meeting the timetable set out in the Biodiversity Action Plan. Most Regions expressed the view that they had not been well prepared for its introduction and there was no resource made available for implementing its provisions.

The Independent Reporter considers that Habitat Management Plans (HMPs) will play an important part in defining each route's approach to developing a preferred lineside habitat and meeting NR's biodiversity targets. NR is falling behind the commitment in its Biodiversity Action Plan, which was to have these in place by 2021, noting that the Biodiversity Manual that mandates their issue has only recently released.

The Independent Reporter considers that Vegetation Management Plans and Habitat Management Plans should form a central role in developing each route's whole life approach to managing vegetation risk and delivering NR's biodiversity objectives. They should also form part of establishing the approach to business planning and delivery for CP7 and management of the asset over the remainder of CP6. These plans should also align with the approach to vegetation management being developed as part of NR's new Lineside Policy.

Regional strategy and planning

The approach to investment planning and risk management has previously focussed on considerations of safety and performance. Considerations of national legislation, DfT biodiversity targets and Network Rail's responsibilities as asset stewards require these to be taken into consideration in maintaining the vegetation asset over multiple control periods.

It is not clear to the Independent Reporter how Regions' funding requirements are linked to their strategic direction in relation to vegetation management and the delivery of NR's targets for biodiversity. The Independent Reporter considers that CP7 planning, and options appraisal could be made more effective through the development of a Lineside Policy that considers vegetation as an asset and executed through aligned route Vegetation Management Plans.

Received planning assumptions for CP7 have n based on a "bottom up" approach to establishing volumes and costs. There would be a benefit from considering of potential variations in the current and changing condition of the vegetation asset on which planning assumptions are based. It was observed that a simple whole life approach was adopted for CP6. Sensitivity to other variables such as costs, resource availability and factors such as climate change and Ash Dieback should also be examined as both were identified as constraints by regional teams.

The approach to planning ongoing maintenance during CP6 adopted by all Regions broadly follows that set out in the Vegetation Management Manual and normal asset management practice: identify the condition of the asset through inspections, assess the risk relating to the railway, select interventions, prioritise the potential workbank, and then undertake the maintenance activities.

Regional teams and the TA stated that information on vegetation condition is currently incomplete due to backlog issues with inspections during the pandemic, although this is now being caught up with. Asset teams frequently observed that asset data was also out of date due to the intervals between inspections (typically three years), maintenance interventions not being logged and rapid regrowth. This hinders obtaining a complete understanding of where there are potential risks due to vegetation and planning appropriate interventions.

The quality of asset information will be improved through the introduction of the Digitised Lineside Inspection. It is anticipated that DLI availability will enable asset management teams to better understand risks and focus maintenance resource. The introduction of this tool was welcomed by Regions, but the Independent Reporter considers that its successful implementation will depend on an accompanying business change programme.

The assessment of risk relating to vegetation on the lineside and from third party trees covers a wide range of situations and potential hazards. Therefore, the Independent Reporter was only able to conduct a review of the overall approach adopted by each Region based on a sample of reports and documents. This focussed on areas of specific interest identified by the ORR using the evidence offered by NR Regions.

Creating a compliant profile involves clearance of vegetation and then undertaking regular maintenance to control regrowth. Each Region provided examples of workbanks that detail areas where clearance is planned to take place. Sites are prioritised based on risk to safety and performance, thus determining the order in which works are programmed. Workbanks span across several control periods depending on volume of work and resource availability. The approach adopted by Regions to establish the workbanks was considered to be sound based on the evidence provided.

The process evidenced by Regions to identify and prioritise sites for clearance back to the standard profile was considered to be broadly sound (except for limited information provided by Wales and Western Region). Clearance programmes are developed based on the available budget for the respective control / year and estimated costs for each site. The Independent Reporter was not provided with sufficient information to form a view on the rate at which these works had been undertaken historically, or whether future planned works can be delivered within the proposed timescales.

Both the Regions and the TA have acknowledged low confidence in the compliance dates provided to the Independent Reporter due to:

- Different definitions of what constitutes a compliant profile compared with the standard (some routes use a more conservative profile for operational reasons, e.g., clearance to overhead equipment)
- The current degree of compliance due to inspection data being unreliable or out of date
- Assumptions regarding the rate of growth following the last inspection (up to three years interval) or when clearance activities were carried out
- Uncertainty around resource and funding available to undertake clearance works at the rate assumed in the TVs and then to maintain the profile once cleared.

There was a lack of evidence presented on how compliance is being monitored, with only two Regions (Southern Region and Scotland's Railway) providing examples of comprehensive trackers. This provides limited assurance that each Region's planned rate of clearance is being achieved and a lack of data to

establish a realistic work rate for future planning. The tracker adopted by Scotland's Railway is considered to represent best practice and is the minimum that the Independent Reporter was expecting to see.

Some Regions are reporting considerable differences between compliance dates originally stated in Temporary Variations (TVs) to the standard and those currently forecasted. This is partly due to uncertainties in the current condition of the asset, but also the effectiveness of clearance works carried out to date. It has proved difficult for the Independent Reporter to establish historic volumes of clearance activities from Ellipse data to increase confidence in the estimated compliance dates. Forward planning could be improved by adopting a consistent approach to coding clearance works and retrospectively recoding those undertaken previously, at least during CP6.

Given the uncertainties outlined above, the Independent Reporter considers that the Regions' current forecasts for achieving the compliance dates set out in the TVs are for the most part unreliable. Correspondingly low confidence ratings have been assigned relating to their current roadmaps for compliance.

Work delivery

This review focussed principally on planning and management relating to the vegetation asset, rather than a detailed review of the capability of the regional organisations and work practices. Only aspects of delivery relating to the review scope have been considered.

Examples were provided of documentation that demonstrated the way that Regions were implementing the requirements of the Vegetation Management Manual, which indicated that the standard was being followed. A common feature of the information provided was the use of spreadsheets and dashboards developed by the Regions to manage and interpret asset data, rather than tools developed centrally. It is understood that decision support tools are being developed by the TA to fill this gap in capability.

The introduction of more sophisticated analysis tools places an increasing reliance on the quality of the underpinning data used. The dynamic nature of vegetation and the scale of the asset creates challenges in maintaining a dataset that represents the features of most relevance to safety, performance and biodiversity. It would be timely to review the requirements and robustness of the data inventory and information systems that support current maintenance needs and long-term planning decisions and ensure these are incorporated into the new decision support tools.

Good examples have been provided of maintenance and works specifications that reflect the requirements of Vegetation Management Manual and continuous improvement within routes and DUs. Sharing model specifications for vegetation works across the network would promote best practice and consistency in methods adopted by DUs and the supply chain.

The risk from third party trees presents a particular risk as NR does not have a role in their management until they are identified as presenting a hazard. Regional teams have established procedures for liaising with their owners to have them made safe, but often undertake the works directly to avoid protracted negotiations and to keep the railway safe.

Ash Dieback (ADB) rapidly weakens affected trees and is a serious problem that will affect all infrastructure operators over the coming years. The condition of ash trees is assessed using a process that is applied alongside the routine tree inspection process and also from surveys focussing on this species. All Regions evidenced that ADB is a significant risk to the safety and performance of the railway. There exists uncertainty regarding the number of trees affected by ADB and the resources required across the network to mitigate associated risks in terms of safety, performance, and cost. This also affects assumptions relating to CP7 planning. There is a need for better asset knowledge relating to the spread of the disease and how to make the most appropriate interventions.

Examples were provided of Regions' extreme weather plans, but not in sufficient detail to draw specific conclusions regarding their appropriateness or the way in which they were implemented. These are based on NR's business processes for reducing risk to the railway during adverse and extreme weather, which involves a network level response to severe incidents.

Regional asset teams observed that an increase in extreme weather events caused by climate change is leading to patterns of failures in trees that would previously have been considered to represent a low risk of

failure. Analysis of the details of failures of trees during storms would lead to a better understanding of the consequences of extreme weather events and how to mitigate them. This may lead to changes in the management of trees and the response to extreme weather events.

The assessment of the risk due to seasonal leaf fall is undertaken as part of the routine inspection process and considers various factors, including past incidents. Evidence was provided of the assessment process applied, along with autumn working arrangements that incorporate the risk management measures. Evidence was provided of areas with a high risk due to leaf fall being prioritised for vegetation clearance works.

In addition, the effects of climate change, such as severe storms and intense rainfall, drought and extended growing seasons were also reported as factors under consideration in managing lineside vegetation.

Good examples have been provided of maintenance and clearance works specifications and best practice that reflect the requirements of the standard and other guidance relating to habitat and biodiversity. As this is an emerging discipline within NR, the Independent Reporter considers that sharing model specifications for habitat related works across the network would promote best practice and consistency in methods adopted by DUs and the supply chain.

Offsetting will be an important feature in ensuring that there is no net loss (or preferably net gain) where unavoidable loss of habitat occurs. Routes are required to state how this is to be done in Habitat Management Plans, but there is no network guidance on how this should be achieved. The Independent Reporter considers that best practice should be incorporated into network wide guidance to avoid duplication of effort, assist in achieving biodiversity targets, and maximise positive outcomes for biodiversity.

The Independent Reporter was provided with limited evidence of cross asset working, which is a key feature of NRs draft Lineside Asset Policy. Anecdotal evidence was provided of informal cross asset working, but there was little documented evidence of how cross asset risks were treated when planning works. While many good examples of cooperation were described, the Independent Reporter has assigned a relatively low confidence rating for this topic for all Regions.

Lord Robert Mair's Earthworks Management Review following the Carmont Derailment, made recommendations that specifically relate to the importance of vegetation management on slope stability. Furthermore, the incident demonstrated how relatively small oversights in one asset class can have major consequences on another. The specific recommendations relate to vegetation techniques to improve (or not degrade) earthworks stability and the need for an integrated approach across asset disciplines. A roadmap is required, in response to these recommendations, that leads to specific measures being implemented.

The Varley Review recommended that NR should review and update its internal and external communication and engagement processes, and its materials. Good examples were provided of documents and presentations used in engagements with local communities by regional teams. Some teams observed that the level of opposition to vegetation management schemes tended to be greater in urban than rural areas and more effort was needed to communicate the intentions of the works. The involvement of disruptive activists not local to the area was also reported to be a feature of a number of public consultations.

Performance monitoring and assurance

There exists a wealth of information within Network Rail on the condition of lineside vegetation, maintenance works, external factors such as weather and incidents related to vegetation. There is currently no readily accessible means to compare leading and lagging indicators to support the assessment and planned reduction of safety and performance risk. Bringing this data together in an accessible form would develop better insights into how the asset behaves and promote measures that lead to a safer railway and more efficient use of resources.

The Independent Reporter considers that achieving a minimum compliant vegetation profile, that also reflects best practice regarding biodiversity, plays an important role in managing risks to safety and operations relating to vegetation. Regions considered that non-compliant sections of the lineside require more resource to keep safe, which is not cost-effective nor sustainable in the long term. The lack of a consistent approach to measuring and reporting profile compliance is noted above.

A significant variance was found between the actual and planned maintenance volumes across Regions across the three-year period. It is the Independent Reporter's view that where significant differences between

planned and actual volumes is observed, it is a clear indication of issues with either the planning of works or with the quality of data. There is scope to better align the various approaches to assessing vegetation condition into one or more measures to better express overall compliance with the standard, rather than simply establishing a cleared profile.

Information on delays and incidents is available from NR's management systems. Planning long term clearance activities and routine maintenance would benefit from asset teams having access to an up-to-date picture of all the components of vegetation condition used to define compliance with the standard. This would also assist in establishing causal links between condition and incidents, close call, delays, damage to other assets and events associated with extreme weather.

The target date for achieving no net loss in biodiversity of 2024 is not far away. There was no evidence of any monitoring taking place of achievement of this target at regional level beyond the annual survey published in the State of Nature Report. The Independent Reporter would have expected to have seen examples of how the trajectory to achieve this and the net gain target by 2035 were being measured. In addition to the now established annual reporting, there is a need for all Regions to evaluate and monitor net loss/gain balances on a project-by-project level in order to feed into an accurate baseline and allow for more regular measurement of the trajectory / progress towards the biodiversity target.

The Defra biodiversity metric has been used to assess habitat scores across the network. It has been noted that this approach has its limitations, particularly for linear infrastructure, and is not formally accepted in Scotland and Wales. However, the adoption of a common measure across the network permits like-for-like comparisons relating to best practice and supports achievement of NR's biodiversity targets. A common measure is also important in adopting biodiversity offsetting where unavoidable loss of habitat occurs, and improvements to compensate for this need to be made at another location.

While the Defra metric has some drawbacks, the Independent Reporter considers that its continued use and development of this measure across the Network's lineside estate can be viewed as complementary to any local systems adopted that are likely to rely on a similar data set.

Offsetting will be an important feature in ensuring that there is no net loss (or preferably net gain) where unavoidable loss of habitat occurs. Routes are required to state how this is to be done in Habitat Management Plans, but there is no network guidance on how this should be achieved. The Independent Reporter considers that best practice should be incorporated into network-wide guidance to avoid duplication of effort, assist in achieving biodiversity targets, and maximise positive outcomes for biodiversity.

1.4 Observations and improvement opportunities

The Independent Reporter has made detailed observations for each of the review topics, these are summarised above and further detailed in the remainder of this report.

Improvement opportunities have been identified following the assessment of the evidence and collated against each of the review themes and / or topics. The Independent Reporter has 'promoted' some but not all improvement opportunities to recommendations. Those that are presented as recommendations are those that, in the opinion of the Independent Reporter, are likely to yield the highest amount of benefit to the vegetation management practises of Network Rail. This, however, should not constrain ORR or Network Rail in progressing additional or alternative improvement opportunities to those that are currently linked to recommendations that were put forward by the Independent Reporter, should the two parties consider them to be appropriate and/or reasonably achievable.

The Independent Reporter's observations, together with the improvement opportunities, formed the basis for the recommendations presented in Section 1.5 of the Executive Summary.

1.5   Recommendations

The following recommendations are proposed based on the observations and improvement opportunities identified in this report. These have been discussed with the ORR and Network Rail during their development.

<div align="center">Table 1 Recommendations from the review</div>

No	Recommendation	Intent	Benefits	Evidence of Implementation	Recommendation Champion	Location in Text (Section No.)
#25932/01	Network Rail should develop a programme approach to delivering the objectives of its Biodiversity Action Plan at national and regional level. This includes achievement of the no net loss / net gain biodiversity targets. Central to this is establishing board level responsibility for the delivery of the Plan (and its regional equivalents), including establishing and sustaining changes in vegetation management practices and organisational culture.	The Independent Reporter noted that the introduction of strategies, plans and initiatives to promote biodiversity, including Habitat Management Plans, had been hampered by issues relating to resource and competing priorities. Network Rail should maintain the early momentum established in responding to the recommendations in the Varley Review through a planned approach to implementing its recommendations, and those in the 2019 DfT Lineside Policy. This would include the identification of resource to deliver the Plan's objectives and monitoring their achievement at regional and network board level. Improvement opportunity - 11, 32, 33, 40	Many of the actions within Biodiversity Action Plan and the Environmental Sustainability Strategy are central to achieving Network Rail's biodiversity targets and compliance with DfT policy and national legislation. A board focus for initiatives to implement Habitat Management Plans and investment in biodiversity measures would ensure that NR meet DfT and legislative imperatives.	Delivery programmes endorsed at network and regional board level. Resource plan for enabling measures. Programme monitoring and reporting.	Technical Authority (network level programme management). Network Rail Regions (devolved programme management aligned with local objectives)	4.5 5.5 5.8
#25932/02	Network Rail should establish clear alignment between its vegetation and habitat creation/ management plans and National Lineside Policy, to deliver Network Rail's environmental sustainability and biodiversity targets. This should also include all aspects of developing capability to manage the vegetation asset, including knowledge management, continuous improvement and risk management. The Lineside Policy is also expected to set out Network Rail's response to specific goals set out in the Biodiversity Action Plan and the 2019 DfT Lineside Policy.	The Independent Reporter was not provided with a completed lineside policy for CP7. The early draft provided was not as comprehensive as the current CP6 policy at setting out Network Rail's approach to vegetation management in the wider business context. The intent of this recommendation is to ensure that the Lineside Asset Policy is able to support Regions in aligning their planned investment and activities to the needs and expectations of the business Improvement opportunity – 33, 34, 38, 41, 44, 52	Compliance with 2019 DfT Lineside Policy issued in response to Varley Review. Clear and consistent guidance to support strategic business planning at network and regional level in relation to the management of lineside vegetation and habitat. Driver for the development of route Vegetation Management Plans that integrate with the management of related lineside assets and other railway assets. Support a consistent approach to planning for CP7 and subsequent assurance in delivery. Creates a compelling case for investment in the Lineside Asset.	Lineside policy relating to vegetation management that supports business imperatives relating to safety, performance and sustainable delivery.	Technical Authority	5.5 5.6 5.7 6.8 7.7
#25932/03	Network Rail Regions should establish detailed plans for how they will deliver vegetation management as part of the lineside asset.	The Independent received limited evidence on what goals and objectives Regions have set to deliver compliance with maintenance, habitat, and biodiversity targets moving forward. This includes the important role vegetation management plays in maintaining a safe and efficient railway. Vegetation Management Plans, as outlined by Module 3 of the NR/L2/OTK/5201, specify the key requirements for management strategies. These plans are aligned with, but do not replace, Habitat Management Plans described in NR/L2/ENV/122 (see recommendation #25932/02). This also links to the development of a Lineside Policy discussed in Recommendation #25932/02. Improvement opportunity - 7, 20, 34, 43, 54	Comply with mandatory requirement of the standard. Support the adequate resourcing and investment needs for delivering vegetation and habitat management for CP7. Sectional Asset Plans assist in understanding the asset and planning future interventions, including those relating to biodiversity.	Regions publish Route Vegetation Management Plans which they can be monitored against.	Network Rail Regions	4.4 4.7 5.6 6.8 7.7

No	Recommendation	Intent	Benefits	Evidence of Implementation	Recommendation Champion	Location in Text (Section No.)
#25932/04	Network Rail Regions should establish detailed plans for how they will consider biodiversity as part of managing the wider railway asset.	The Independent Reporter recognises the importance of developing Habitat Management Plans for the network as described in Module 2 of NR/L2/ENV/122. While related, these are distinct from Vegetation Management Plans in that they "identify options for increased biodiversity value along its extent for the purpose of allowing the necessary flexibility and choice in land management decision making." The Biodiversity Management standard is relatively new and to date there have been very few Habitat Management Plans issued. Regions need to make a commitment to produce these so they can usefully contribute to the CP7 planning cycle and put in place measures to "meet legislation and other compliance obligations to sustainably manage land and activities for biodiversity." Improvement opportunity - 43	Meet legislation and other compliance obligations. Contribute to the CP7 planning cycle. Support achievement of biodiversity no net loss / gain targets. Support maintaining / improving the lineside estate's natural capital. Provide alignment with route Vegetation Management Plans.	Issue of route Habitat Management Plans.	Network Rail Regions	6.8
#25932/05	Network Rail should provide a common framework for Regions to prepare and present CP7 funding requirements relating to vegetation management and the underlying assumptions.	A Lineside Policy and regional / route Vegetation Management Plans would provide the basis to demonstrate at a high level the funding requirements based on the long-term strategic objectives. There was limited evidence of how funding envelopes were being developed for CP7 and no clear consensus across Regions of how their proposals should be presented. The Independent Reporter could not establish an alignment between the funding envelopes and regional strategies and plans. The use of a common template to develop and summarise costs and volumes relating to vegetation management would assist in the assurance of Region's proposals. Accompanying assumptions and narratives would also assist in the interpretation and understanding of how options had been considered and residual risks inherent in the proposals. This also links to the development of a Lineside Policy discussed in Recommendation #25932/02. Improvement opportunity - 50, 51, 54	Greater investor confidence in plans and more likely to secure requested funding. Assist in preparation of accurate plans. Establish a linkage between network / Regional policies and proposals. Assurance of the plans and the underlying assumptions and investment objectives will be more straightforward.	Guidance and templates for preparing CP7 cost and volume estimates for vegetation management. Narratives setting out key assumptions and modelling approach.	Central team (provide templates and assure plans) Network Rail Regions (produce templated plans)	7.7
#25932/06	Network Rail's central and regional teams should review lineside roles at all levels to support the delivery of a compliant vegetation asset and objectives relating to biodiversity. This applies to both in-house and supply chain capability.	The Independent Reporter noted concerns expressed at all levels within the organisation relating to the level of resource and breadth of skills available to deliver current and future maintenance of the vegetation asset. Further pressures were noted in connection with responding to emerging requirements relating to habitat management. Additional pressures were noted from competing demands on resource from other infrastructure providers and major projects such as HS2. Improvement opportunity - 35, 31, 36	Mitigate a potential skills shortage in specialist roles, including ecology, at all levels of the organisation. Support the delivery of Network Rail's statutory obligations and delivery plans for CP7.	Gap analysis of required skills and competencies centrally and within Regions to meet future delivery plans. Recruitment / training programme to meet gaps in resource. Review of supply chain capability. Dialogue with supply chain to develop capability to meet future delivery requirements.	Technical Authority Network Rail Regions	5.5. 5.6

No	Recommendation	Intent	Benefits	Evidence of Implementation	Recommendation Champion	Location in Text (Section No.)
#25932/07	Network Rail should adopt a consistent approach to reporting compliance with the minimum vegetation profile requirements for the action zone specified in the vegetation management standard. This should reflect regional variations in management practice where a more conservative approach is adopted.	Compliance with a standard cross-sectional profile of lineside vegetation provides a simple measure of its potential risk to safety and operations. Under NR/L2/OTK/5201 each route must manage vegetation within the action zone where it presents a risk. Vegetation remaining within the action zone shall be subject to a plan to assure that the risk from its presence is mitigated. There are different approaches adopted across the network that sometimes go beyond the minimum requirements of the standard which means that a common definition of compliance is not practical. Greater clarity is required on whether routes are reporting compliance with the action zone profile specified in the standard or whether a different, more conservative approach is being used. This single measure can be used as a proxy to assure routes' achievement of compliance in relation to temporary variations raised against NR/L2/OTK/5201. Improvement opportunity - 1, 2, 8	Recognise differing interpretations of the term "compliant profile" used in planning long-term clearance programmes. NR is able to plan effective mitigation to manage vegetation risk to ALARP through having a clear understanding of all its vegetation-related risks. Support unambiguous reporting of profile compliance.	Definition of compliant vegetation profiles for each route. Consistent reporting of compliance profiles for each route.	Joint champions from Technical Authority and Regions	4.3 4.5
#25932/08	Network Rail should report and monitor compliance with the vegetation management standard that relate to the requirements of each intervention zone and the condition of vegetation with each of these zones.	Reporting of profile compliance alone provides a limited view of the how Regions are delivering against the requirements and intention of standard NR/L2/OTK/5201. Information on vegetation condition is currently incomplete due to backlog issues with inspections during the pandemic. This hinders obtaining a complete understanding of where there are potential risks due to vegetation and planning appropriate interventions. Inspection data captured in accordance with the standard has the potential to provide a rich picture of the state of lineside vegetation. This requires it to be captured and updated frequently enough to reflect changes due to growth and maintenance activities. Improvement opportunity - 1, 2, 22, 8	Provide confidence that vegetation is being managed to deliver a compliant condition, leading to a reduction in risk to safety and performance. Improve the understanding of progress being made at a regional and national level to achieving overall compliance with the relevant standard. Improved correlation between vegetation condition and performance metrics leading to better targeted maintenance.	Vegetation condition measures based on multiple factors. Reporting systems to make condition data readily available for routes day to day use.	Technical Authority Network Rail Regions	4.3 4.5 4.7
#25932/09	Network Rail should differentiate between different types of maintenance works during planning and reporting to support establishing and delivering an appropriate maintenance regime, both in term of volume and cost of these works.	It was not possible for the Independent Reporter to understand clearly and consistently across Regions what work was undertaken to deliver compliant profiles and what comprised maintenance. Consequently, it is not possible to understand if Regions and Routes are delivering their planned volumes and meeting their strategic goals. Assigning the appropriate maintenance type to each work item would greatly assist in understanding how budgets were assigned and spent. Any improvements in reporting should also recognise work undertaken by other disciplines responsible for vegetation management (e.g., structures, geotechnics, E&P) Improvement opportunity – 21, 23	Assist forecasting, planning and monitoring maintenance activities Increase confidence in planning long term clearance works. Better understand the cost effectiveness of clearance works carried out to date.	Ability to identify how work items are assigned to different categories of maintenance in management systems. Subsequently monitor delivery of work against budgets at DU, route and regional level.	Technical Authority Network Rail Regions	4.7 4.8

No	Recommendation	Intent	Benefits	Evidence of Implementation	Recommendation Champion	Location in Text (Section No.)
#25932/10	Network Rail should mandate the use of a common biodiversity value for monitoring lineside habitat and regularly capture and make available the features used in its calculation. Where local systems are also in use, the Defra metric should remain the primary measure.	Network Rail must comply with relevant legislation relating to habitat and biodiversity in England, Scotland and Wales. The Defra metric has been used to baseline biodiversity across the network but has not been accepted by all Regions for monitoring progress moving forward. While there may be local benefits in adopting hybrid or completely different measures, Network Rail requires a single indicator so the business can understand its progress against biodiversity targets as part of its environmental sustainability measures for CP7 and beyond. The individual features used in calculating biodiversity scores form a valuable part of monitoring and planning biodiversity initiatives at a micro and macro scale. These components can also be used in different assessment methodologies, if adopted. These measures are only useful if they are current, reliable and accessible. Improvement opportunity - 10, 12, 42	Support achievement of Network Rail's biodiversity targets. Support proposed success measures for monitoring environmental sustainability in CP7. Permit like for like comparisons relating to implementing best practice. Enable biodiversity offsetting across the network.	Agreement from Regions to commit to monitor achievement of Network Rail's biodiversity using a common metric. Features used in developing biodiversity measure is current, reliable and accessible	Technical Authority (enable capture and reporting of habitat features and construction and reporting of progress against targets) Network Rail Regions (commit to measure and collection of supporting data)	4.5 6.8
#25932/11	Network Rail should develop a time bound programme approach across the network to manage the significant risk to safety and performance from Ash Dieback (ADB) through better asset knowledge, trend analysis and targeted interventions.	All Regions evidenced that ADB is a significant risk to the safety and performance of the railway. The management of ADB is expected to represent a significant cost during CP7 and there exists some uncertainty regarding the scale of the issue. ADB is a serious problem that will affect all infrastructure operators over the coming years. Improvement opportunity - 18	Reduces the planning uncertainty regarding the number of trees affected and the resources required across the network to mitigate the risks. Potential to reduce the risk to NR in terms of safety, performance and cost. Share best practice and innovative approaches to identifying and managing affected trees.	National and regional programmes to survey and evaluate ADB risk using better data, plan interventions and undertake mitigation measures. Monitor effectiveness of measures	Technical Authority (establish programme approach) Regions Other central function	4.6
#25932/12	Network Rail should analyse details of incidents, inspection data and maintenance trends to assess potential impacts on lineside vegetation due to climate change related events. This will assist in maintenance planning and the reduction of risk to safety and performance.	An increase in extreme weather events caused by climate change is leading to patterns of failures in trees that would have previously been considered to represent a low risk of failure. Climate related changes in vegetation also has adverse consequences relating to earthworks stability, shrink / swell damage to track, extensions to growing seasons and the spread of disease. Establishing linkages between cause and effect is considered to be a network level issue requiring central surveillance and analysis Improvement opportunity - 18, 19	Better understanding of potential changes required in the management of vegetation in the response to climate change. Identification of cross asset issues relating to climate change. Improved forward planning to anticipate and manage emerging issues caused by climate change.	Programme to analyse the current and emerging effects of climate change on the lineside vegetation asset.	Technical Authority (with input from Regions)	4.6
#25932/13	The Technical Authority should provide support to Regions in developing the change plans required to embed the new Digitised Lineside Inspection (DLI) tool into their day-to-day vegetation management activities.	The potential benefits of DLI are welcomed by regional asset teams. However, there is a concern that the introduction of the tool will change how they operate both in working arrangements and the amount of information that they are expected to manage. The Independent Reporter was not provided with evidence of an accompanying business change programme beyond user testing. There was a concern expressed at regional level that improved detail will reveal more issues that require interventions. This potential for more information than can be assimilated or actioned will need to be addressed. As with any step change in information management capability, the introduction of DLI requires an accompanying business change processes to incorporate it into business as usual and share emerging best practice. Improvement opportunity - 19, 15, 16, 17	Maximise the benefits of DLI by understanding the changes to working practices. Understanding how planning work will change following the introduction of DLI. Demonstrable improvements in asset condition and resulting safety and performance benefits. Implement practical approaches to avoid information overload. Shared best practice and experience in using the tool.	Implementation / change plan with periodic monitoring at network and regional level to track achievement of benefits.	Technical Authority (change plan design) Regions (change plan implementation)	4.6

1.6   Confidence ratings

Confidence ratings have been assigned to facilitate a comparison between the approach adopted by each Region, based on the evidence provided to the Independent Reporter during the review. This helps to identify common themes and develops an understanding of where gaps and/or significant variations may exist in current practice.

The ratings, shown below, include a time-based delivery element where there are programme implications relating to the topic (for example profile compliance delivery or meeting time based KPIs).

Confidence Rating	Description
4	Evidence of a robust and sustainable approach. Progress against relevant plans is on / ahead of schedule. Examples provided of good practice.
3	Evidence of a robust approach, but with gaps, inconsistencies, or limitations in some areas. Progress generally on schedule.
2	Evidence lacking detail, or with significant inconsistencies and limitations identified in the approach. Progress behind schedule.
1	Evidence incomplete with major inconsistencies and gaps identified in describing the approach. Progress significantly behind schedule.
0	Insufficient information provided to support rating.

The evidence that supports a *robust and sustainable* approach included documents provided over the course of the review, questionnaire responses and transcripts from the workshops. A greater weighting has been given to documentary evidence.

Each Region self-selected the documents they provided to support their responses, and these are listed in Appendix A.2. Therefore, the confidence ratings have been assigned based on a sample of all possible documentation that could have been provided. A relatively low rating may indicate that the Independent Reporter was not provided with sufficient evidence to support a more favourable assessment. Wherever possible, Regions and the TA were given the opportunity to provide further information where this was felt to be the case.

The rationale for the ratings for each Region is provided in Appendix A.2 and summarised in the report by Region and theme. Rationale is also provided for rating of the Technical Authority in relation to the progress of the Varley Recommendations as a part of Theme 2.

Table 2 below summarises the ratings for each Region across all the review themes.

Table 2 Summary of confidence ratings

Review reference		Confidence Rating					
Theme	Topic	Central function	Eastern	North West and Central	Scotland's Railway	Southern	Wales and Western
1 Regional management plans and practices	(a) Compliance roadmap		1	1	1	2	1
	(b) Compliance delivery		2	2	2	3	1
	(c) Key performance indicators		2	2	2	3	2
	(d) Risk management		3	3	3	3	2
	(e) Maintenance planning and reporting		2	2	2	2	2
	(f) Cross asset working		2	2	2	2	2
2 Delivery against Varley recommendations	2 Appropriate governance must be put in place at organisation, route and project level.	3	2	3	3	4	2
	3 NR should publish an ambitious vision for the lineside estate.	2	3	2	2	4	2
	4 NR must value and manage its lineside estate as an asset.	2	3	3	3	3	2
	5 NR must improve its communication with communities and key stakeholders.	3	4	3	3	4	3
	6 NR should lead a cultural change for valuing nature and the environment across the organisation.	2	2	2	2	3	2
3 Habitat management and biodiversity	-		3	3	2	3	2
4 CP7 planning	-		2	2	2	2	1

1.7   Acknowledgements

The Independent Reporter would like to thank Network Rail's Regional Asset Management teams and the Technical Authority, along with the ORR, for their support over the course of this review. We are also grateful for the time offered by John Varley in providing his insights to help shape our findings.

We hope that all parties have and will find the outcomes informative and help drive best practice.

2.   Introduction

2.1   Mandate aims and requirements

The detailed scope of the review is set out in the Statement of Work (SoW), which is included in Appendix A.1. The Independent Reporter conducted a review of the NR's vegetation management across the range of themes and topics summarised below:

1. *Robustness of Regions' vegetation management plans and practices with respect to:* **[Theme 1]**

   a) *Compliance roadmap*
   b) *Compliance delivery*
   c) *Key performance indicators* **[Topics relating to Theme 1]**
   d) *Risks from vegetation*
   e) *Maintenance targets and reporting*
   f) *Cross asset working*

2. *Progress with delivery against the following recommendation areas from the Varley Report, both at a central function and regional level within Network Rail:* **[Theme 2]**

   - *V2 Governance*
   - *V3 Strategy and vision*
   - *V4 Lineside estate as an asset* **[Topics relating to Theme 2]**
   - *V5 Engaging with stakeholders*
   - *V6 Cultural change*

3. *Consideration of habitat and biodiversity in works planning and the measurement of Regions' progress towards biodiversity targets.* **[Theme 3]**

4. *Regions' CP7 plans for vegetation management.* **[Theme 4]**

5. *Identify challenges and opportunities relating to vegetation management which Regions are/will be taking.*

> Risks and challenges identified by the stakeholders have been summarised against each review topic based on information provided in questionnaires from the Technical Authority (TA), Regional asset teams and representatives from selected delivery units (DUs).

The scope of the assessment covered vegetation assets on both NR's land and those that pose a threat or opportunity to railway operations from land belonging to outside parties.

The SoW suggested the following be engaged with during the review:

- Network Rail Off-Track (lineside) asset management team of all routes across five Regions
- Front line staff (such as Off-Track section managers, Off-Track Maintenance Engineer/ Track Maintenance Engineer and seasonal delivery specialists)
- Environment specialists and ecologists involved in the management of biodiversity from each Region.
- Network Rail central functions including Network Technical Head of Lineside, Biodiversity Strategy Manager and Operations Lead.
- John Varley - to provide the context behind his work in 2018 and provide valuable insight not only into his thoughts at the time, but also those three years later.

3. Methodology

3.1 Overview

The high-level approach to the review was adapted from that used in previous Independent Reporter reviews and is illustrated in Figure 1.

Familiarisation	Evidence Collection & Assessment	Moderation	Reporting
Inception meeting	Review documents in initial submission and circulate questionnaires	Gather further evidence	Compile evidence pack
Agree the review framework	Review evidence and responses to framework questions	Play back to the Regions the results of the review and initial findings	Produce draft review report and present findings
Develop approach to information gathering	Meet with Regional Asset Management / MDUs to discuss evidence provided	Final assessment of each Region's approach	Produce final report with agreed recommendations

Figure 1 Review approach

A tri-partite Steering Group from ORR, NR and the Independent Reporter team was established to provide oversight to the review, including setting direction, providing progressive assurance and feedback at each of the key stages, and monitoring progress.

NR provided a dedicated administrator to co-ordinate the collection of evidence to support the review and to set up meetings with key stakeholders.

3.2 Familiarisation

3.2.1 Inception Meeting

An Inception Meeting was held to:

- Introduce the Independent Reporter
- Describe the approach proposed for the review
- Agree the review programme
- Agree the approach to engaging with NR stakeholders
- Develop an approach for managing document control
- Agree project management and reporting arrangements

3.2.2 Review framework

The Independent Reporter had identified a degree of overlap between some of the review topics set out in the SoW. It was decided that the information gathering phase would adopt a structured approach that was aligned with framework provided in NR's Asset Management Policy 2018, shown below.
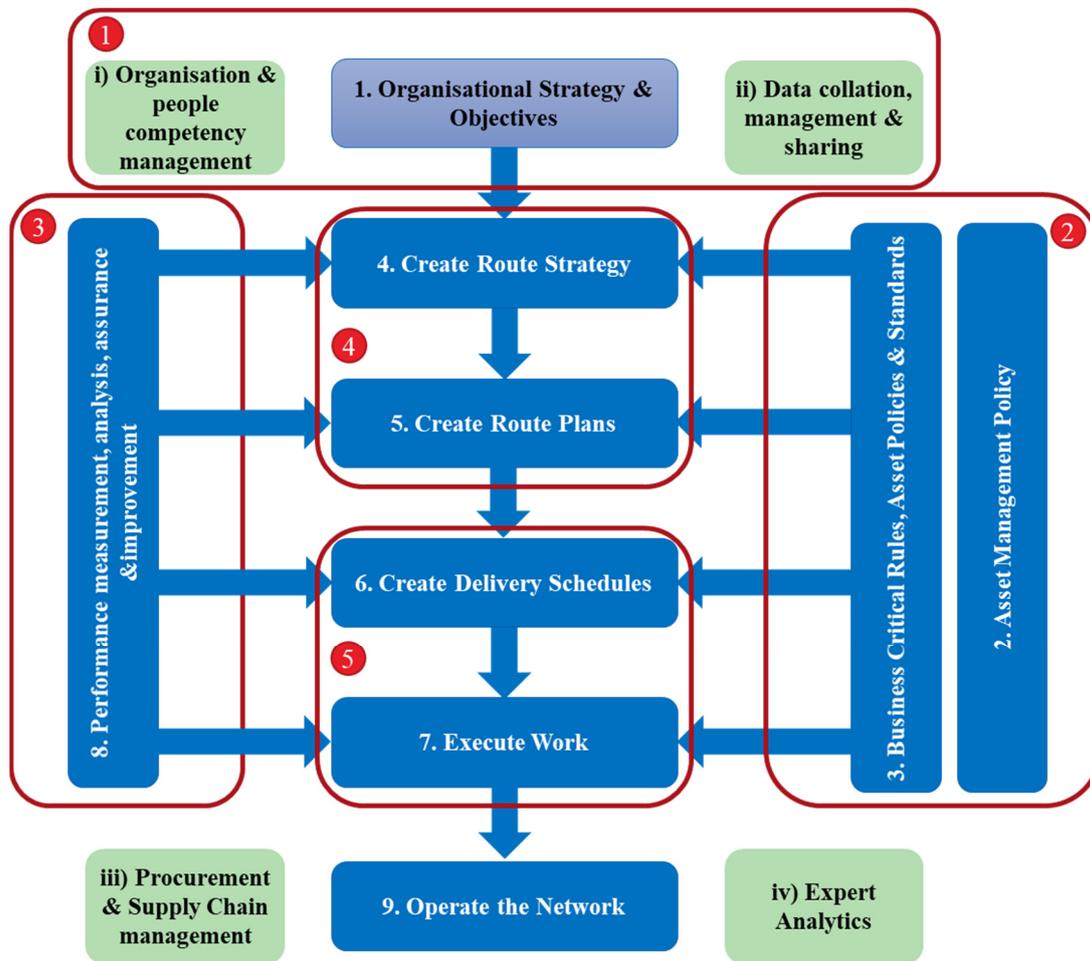
Figure 2 Framework for evidence collection (based on NR Asset Management Policy, 2018)

Five subject areas were chosen to structure the evidence collection phase:

1. Organisational strategy and objectives
2. Policies and standards
3. Performance monitoring and assurance
4. Regional strategy and planning
5. Work delivery

The review themes and sub-topics were cross-referenced to this framework. This also provided a useful check for aspects of vegetation management not explicitly covered in the SoW that the Independent Reporter felt were relevant to the review.

3.2.3 Engagement with NR's Central Function and Regional representatives

The Independent Reporter engaged with each of NR's five Regions during two-hour workshops. These were attended by representatives from regional and route asset management teams, and relevant specialists, to discuss their approach to vegetation management.

Workshop attendees were asked to complete a questionnaire in advance of the workshops so that the meetings could focus on specific areas of interest or where the responses required elaboration. The range of individuals present at the workshops reflected that described in the SoW, subject to availability of the relevant post holders.

Separate meetings were also held with representatives from two Delivery Units (DUs) selected from each Region that reflected different characteristics in terms of lineside environment, shown in Table 3. Meetings were also held with the Technical Authority to set the context for the review and discuss specific aspects regarding Varley Theme 2, biodiversity strategy, vegetation management strategy, etc.

Table 3 Delivery units selected for consultation

Region	Route	Delivery unit
Eastern	Anglia	Tottenham
	North and East	Sheffield
	Central	Lancs & Cumbria
	West Coast	Stafford
	Scotland	Motherwell
		Perth
Southern	Kent	Ashford
	Wessex	Wessex Inner
	Wales	Cardiff
	Western	Western West

3.2.4 Information gathering approach

This review is based on evidence obtained from a number of sources:

- Information requested from the initial list included in the Independent Reporter's proposal
- Questionnaires returned by NR Regional and central teams consulted during the review
- Notes from meetings and workshops
- Additional information provided with questionnaires and follow-up stakeholder meetings

Information provided by NR included written documents, dashboards, and data files. These were catalogued by Region and for the central NR function.

Evidence provided by NR for this review is summarised in Appendix A.2.

3.3 Evidence collection and assessment

3.3.1 Initial document review

Some documents had been provided sufficiently early in the review to help shape the evidence collection process. These were useful in targeting the initial areas of inquiry and development of the review questionnaires.

It was noted that the documents provided at this stage varied in type and coverage of the review topics. Requests for specific examples were made during the review.

3.3.2 Questionnaire development

Questionnaires created a framework within which consultees were guided in collating relevant evidence from across their organisations for each theme. These were specifically tailored for Regional Asset Management teams, Delivery Unit representatives and the TA.

The process for developing the questionnaires is summarised below:

- Identify information sought against each SoW topic
- Organise information against asset management headings discussed in Section 3.2.2
- Draft individual questions

- Validate question set using existing information, to ensure that responses support development of conclusions in line with SoW requirements
- Steering Group review questionnaires and feedback incorporated
- Create targeted questionnaires for the three stakeholder groups.

3.3.3 Initial consultation process

The initial consultation process followed the steps below:

- Issue questionnaires to NR regional teams, selected DU's and TA
- Review responses alongside evidence provided
- Develop detailed follow up questions to fill in gaps in information
- Conduct workshops, documenting responses and requesting additional documentation if applicable

The questionnaires were shared with regional and DU teams to complete in advance of the workshops to provide the Independent Reporter sufficient time to review them alongside evidence documents already provided.

Online meetings were held with John Varley and representatives from the TA prior to the workshops with Regional Asset Management teams.

Each meeting was attended by at least two members from the Independent Reporter. The meetings were recorded with the permission of the attendees and on the understanding that the recordings would not be circulated and would be deleted once the meeting notes were prepared.

A lead from each Region was identified for future liaison with the Independent Reporter to facilitate the provision of further supporting evidence and to handle any follow up queries.

3.3.4 Review of evidence documents

The documents provided from the initial request for information were supplemented with the information gathered through the questionnaires, workshops and meetings, and have been aligned to each review theme, with some relevant to multiple topics, as detailed in in Appendix A.2.

The approach to managing the lineside asset varies from Region to Region, and even between routes within individual Regions. Therefore, a modified methodology to compare approaches was adopted. Summaries of typical documents that reflect "what good looks like" were drawn up for each topic, which are included in the observation sections of this report.

Regions were asked to provide specific evidence for key topics such as compliance delivery and CP7 planning, where the Independent Reporter sought to establish a more detailed view of approaches and consistency in these areas of planning and management.

It is beyond the scope of this review to assess the adequacy of each document or undertake a thorough analysis of the data provided. Some sample documents were reviewed in detail, as described in this report, and key items of data extracted to support the Independent Reporter's observations.

3.3.5 Assessment

The information from the consultation process was compiled to address each of the review themes in the SoW. Notes were prepared that summarised the evidence provided by each of the consultees in the form of documents, questionnaire responses and meeting notes. This process also took account of contextual information provided by the TA and from third party documentation.

This assessment was undertaken by the core Independent Report team involved in the workshops supported by specialists in ecology and asset management from within Arup.

The assessment process included assigning a "confidence rating" to each Region for each topic within the four review themes, with the TA also being graded for progress against the five Varley Review recommendations being considered. This helps to identify common themes and to develop an understanding of where gaps and/or significant variations may exist in current practice.

The ratings, shown below, include a time-based delivery element where there are programme implications relating to the topic (for example profile compliance delivery or meeting time based KPIs).

<p style="text-align:center; color:red;">Table 4 Confidence ratings</p>

Confidence Rating	Description
4	Evidence of a robust and sustainable approach. Progress against relevant plans is on / ahead of schedule. Examples provided of good practice.
3	Evidence of a robust approach, but with gaps, inconsistencies, or limitations in some areas. Progress generally on schedule.
2	Evidence lacking detail, or with significant inconsistencies and limitations identified in the approach. Progress behind schedule.
1	Evidence incomplete with major inconsistencies and gaps identified in describing the approach. Progress significantly behind schedule.
0	Insufficient information provided to support rating.

The evidence that supports a *robust and sustainable* approach could take a number of forms and varies across each of the topics considered. The results from the final assessment presented in Appendix A.2 includes a summary of the type of evidence expected for each of the review topics, either documentary or revealed through discussions. It is acknowledged that each regional team made their own interpretation regarding the documents they provided to support their responses and some judgement has been used in developing the confidence ratings using the "what good looks like" approach discussed in Section 3.3.4. The ratings consider responses in questionnaires and during the workshops, but greater weighting has been given to documentary evidence.

3.4   Moderation

Each of the Regional Asset Management teams was given the opportunity to review the Independent Reporter's assessment of the information provided and preliminary confidence ratings. These were provided as a table that summarised the evidence provided against each topic and the basis for each rating. This aligned to the SoW definitions, cross referenced to the original questionnaire numbering.

"Playback meetings" were held to discuss the findings with each Region and explore areas where low ratings had been provided. In some cases, preliminary low ratings related to the absence of evidential documents relevant to a particular topic and regional teams were given the opportunity to provide these.

The Independent Reporter also identified several topics where Regions needed to provide a comparable set of information to inform the review findings. This related in particular to vegetation profile compliance and CP7 planning. Again, the regional teams were given the chance to provide further details relating to these areas of the review. Clarification discussions were held with the TA to better understand a number of contextual and data related issues.

Additional information provided by the Regions and the TA has been considered in deriving the final observations and confidence ratings presented in this report. These have been reviewed for consistency by SMEs within the Independent Reporter and the project director for the commission.

3.5   Reporting

An Interim Findings presentation was made to the Steering Group that summarised the Independent Reporter's immediate observations on the evidence provided and consultations with stakeholders. While the regional workshops were still ongoing at this point, this session was useful in identifying emerging areas of concern and useful feedback was obtained regarding areas of specific interest to the ORR and NR.

A Draft Findings meeting was subsequently held with the Steering Group to present preliminary observations against each of the review topics and confidence ratings. Areas where the Independent Reporter had identified improvement opportunities were discussed. These would form the basis for the formal recommendations from this review.

The remainder of this report details the findings of the review, opportunities for improvement and recommendations. Supporting information, including that used to develop the confidence ratings, is included in Appendix A.2.

4.   Theme 1 Regional management plans and practices

4.1   Introduction

This review theme required the Independent Reporter to *"assess and comment on the robustness of the Regions' vegetation management plans and practices"* in relation to six sub-topics. It is noted that a number of these topics are interlinked within this theme and with other themes considered in the review, so some cross referencing has been made for brevity.

Reference is made to the relevant NR standards and procedures and evidence of how these are implemented by the Regions. It is acknowledged that requirements of some of these standards are subject to Temporary Variations; this is further discussed in Section 4.3.4.

4.2   Vegetation maintenance definitions

Throughout the review, the Independent Reporter observed differences in the terminology used to describe the various maintenance activities undertaken by NR. While practices vary between Regions and individual routes, these activities broadly fall into four categories:

Reactive/Emerging work – Usually undertaken by DU maintenance teams. This work is usually limited in scope and is in response to: signal sighting issues, sighting at level crossings, tree strikes to trains, blocked access routes, complaints from the public and responding to storm damage.

Maintenance of vegetation at high-risk locations – Undertaken by DU maintenance teams, these are maintenance plans developed over time in response to emerging works / good practice. This will include **cyclic maintenance** to maintain signal sighting, sighting at level crossings, high-risk leaf fall/spad locations, and to keep access facilities clear and safe to use.

Maintenance of a compliant profile – In most routes this is project managed and procured by Works Delivery (or equivalent) in areas where vegetation is to be **cleared to a compliant profile**. In some routes this work is delivered by DU maintenance teams.

Location specific vegetation management requirements – this work is managed by Route Engineering teams and is most likely to be delivered by Works Delivery, this includes cyclic removal of inappropriate vegetation from rock slopes, high risk soil slopes, and structures.

4.3   Compliance roadmap – Topic 1(a)

4.3.1   Scope of review

The scope of this topic is summarised below:

> *Assess and comment on the robustness of the Regions' vegetation management plans and practices with respect to Regions' current roadmap for full compliance with Network Rail Lineside Vegetation Management Manual under Temporary Variation and their current status (i.e., compliance levels).*

A number of issues needed to be considered in fully understanding how Regions are approaching compliance with the relevant standard. A number of these are central to the way that vegetation is managed in the context of the broader lineside asset, namely:

- The consideration of safety and performance of the railway
- Maintaining biodiversity
- Use of asset information to support risk assessment and prioritisation
- Defining what is meant by compliance
- Approach to forward planning and resource allocation.

4.3.2   Compliance with the standard

The four modules of NR/L2/OTK/5201 cover the full range of NR's vegetation management activities. From discussions with the ORR, the TA and the regional stakeholders, **profile compliance is a particular issue of concern** and has been the focus of this review topic.

NR's manual for vegetation management (NR/L2/OTK/5201) defines compliance in terms of the characteristics of lineside vegetation within zones immediately adjacent to and at increasing distances from the track. Interventions are required if inspections or other reports identify the presence of non-compliant vegetation or hazardous trees, with timescales for immediate and corrective responses dependent on the risk to track or OLE.

The standard defines the intervention zones using a geometric profile within which the presence of trees and other vegetation needs to be controlled. Establishing and maintaining a profile entirely clear of woody vegetation has safety and performance benefits in limiting vegetation encroaching on the line, a reduced potential for trees and branches to fall on the track and elimination of sighting issues. The standard provides some flexibility in the way Regions can manage vegetation within these zones to sustain biodiversity while not compromising safety and performance.

Module 2 of the standard identifies three intervention zones (see Figure 3) along with interventions to be undertaken relating to vegetation within each zone. NR/L2/OTK/5201 provides some limited guidance on environmental and habitat issues.
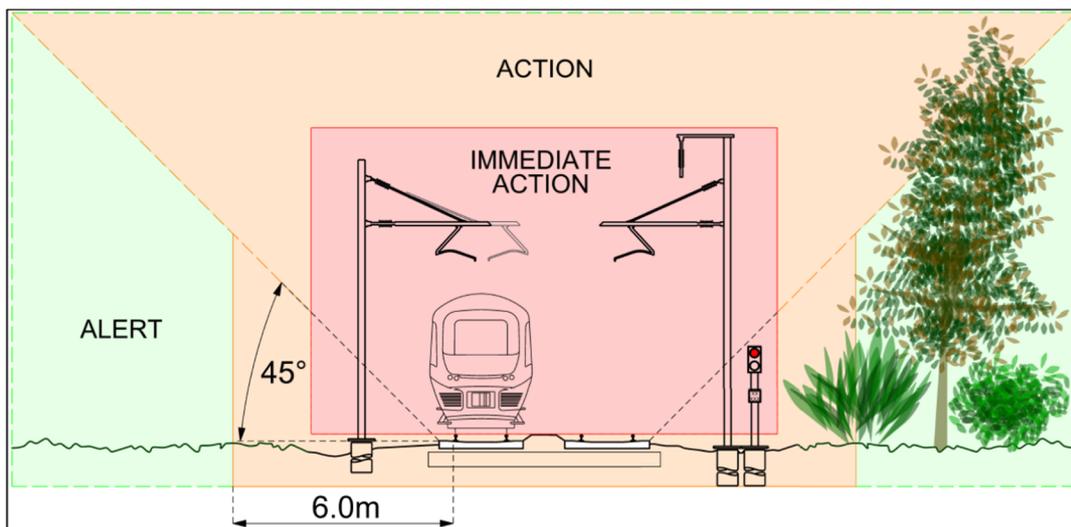
Figure 3 Principles and requirements of the intervention zone (from Figure 1 - NR/L2/OTK/5201 Module 2)

The approach to managing vegetation within each intervention zone is summarised below

Table 5 Management approach for vegetation within each intervention zone (adapted from Table 1- NR/L2/OTK/5201 Module 2)

Intervention Zone	Management approach brief description	Management interventions
Immediate Action	The standard details specific actions to be taken in the event of vegetation being found within the Immediate Action Zone, with timescales for dealing with hazardous trees defined in addendums to the standard.	a) Remove vegetation to, at least, the action zone
Action	The standard prescribes a risk-based approach to developing a compliant profile beyond the immediate action zone. This leaves it up to the Region / route to develop their own criteria to determine what the risk profile is and how they wish to manage that risk.	a) Intervene where inspection identifies that action is required. b) Prevent growth towards the immediate action zone. c) Manage potentially hazardous trees d) Prevent trees growing large enough that they would pose a derailment risk.

Intervention Zone	Management approach brief description	Management interventions
		e) Treat vegetation on a cyclic basis to control growth.
		f) Prevent the establishment of trees within 6 metres where they do not already exist.
Alert	The standard describes the management of the alert zone, the protection of other assets (including embankments, cuttings and structures) and various vegetation management techniques.	a) Manage vegetation to protect against specific safety or performance issues to NR or third parties.
		b) Control invasive and non-native species (INNS) requiring intervention.

Independent Reporter's observation

The Independent Reporter considers that achieving a minimum compliant vegetation profile, that also reflects best practice regarding biodiversity, is an essential part of managing operational safety and performance risk from vegetation failure. The Independent Reporter found that Regions recognised non-compliant sections of the lineside require more resource to keep safe, which is not cost-effective nor sustainable in the long term.

4.3.3   Interpretation of compliance by Regions

As noted in Section 4.3.2, each Region can develop their own approach to managing risk in the action and alert zones shown in Figure 3, based on their appetite for risk, as long as they meet the requirements of NR/L2/OTK/5201.

Each Region was asked to confirm the assumptions they had made in determining their overall level of compliance and these are summarised in Table 6 for at-grade track. These relate to the desired profile of the action zone, and it is noted that different assumptions are usually made where the ground level in the action zone is sloping.

Table 6 Compliance profile assumptions for each Region and route (action zone at grade)

Region	Route	Basic profile assumption for at grade track
Eastern Region	Anglia	Based on NR/L2/OTK/5201/02 Figure 1 with 6m action zone and 45-degree alert zone
	East Coast	Based on NR/L2/OTK/5201/02 Figure 1 with action zone cut back to 6.5m
	East Midlands	Based on NR/L2/OTK/5201/02 Figure 1 with 6m action zone and 45-degree alert zone
	Northeast	Based on NR/L2/OTK/5201/02 Figure 1 with an action zone cut back to 6.5m
Northwest & Central Region	All Routes	Based on NR/L2/OTK/5201/02 Figure 1 with 6m action zone and 45-degree alert zone
Scotland's Railway	All Routes	Based on NR/L2/OTK/5201/02 Figure 1 with 6m action zone and 45-degree alert zone
Southern Region	Kent and Sussex	Cut back to 7m from the nearest running rail to the NR boundary, with risk-based management to remove hazardous trees further out
	Wessex	Based on NR/L2/OTK/5201/02 Figure 1 with 6m action zone and 45-degree alert zone
Wales and Western Region	Wales Route	Based on NR/L2/OTK/5201/02 Figure 1 with 6m action zone and 45-degree alert zone
	Western Route	Cut back to 8m, from the nearest running rail to the NR boundary, with risk-based management to remove hazardous trees further out

It can be seen from the above table that the assumptions vary between Regions and even routes within Regions. For example, Wales Route have assumed a profile based on that shown in the standard, whereas Western Route specify that vegetation is cut back to 8m from the running line, which is understood to ensure that vegetation is kept well clear of OLE to avoid encroachment and help limit the need for isolations during routine maintenance.

Independent Reporter's observation

Greater clarity is required defining compliance with the action zone profiles specified in the standard, or whether a different, more conservative approach is being used (which in turn could have an adverse impact on biodiversity values). This single measure can be used as a proxy to assure Regions' achievement of compliance in relation to TVs raised against NR/L2/OTK/5201.Potential improvements to the way in which compliance is reported are considered in the discussion on KPIs in Section 4.5.2.

4.3.4   Temporary variations

Shortly after the introduction of NR/L2/OTK/5201 in 2018, each route issued a temporary variation (TV) against one or more aspects of the standard regarding maintaining the vegetation profile. The TVs detail timescales and estimated resources to comply with the standard. Measures to maintain a safe railway are detailed in each TV. The Independent Reporter has seen evidence that several routes had already had TVs in place regarding maintaining the vegetation profile specified in the superseded standard NR/L2/TRK/5201 [the current standard now being in its 5th issue], which suggests there are long-running issues with non-compliances.

Each NR route has issued one or more Temporary Variations against the standard regarding their ability to comply with certain requirements of NR/L2/OTK/5201 that are designated green and amber[1]. The approach taken by each route is broadly similar, but there are some variations, notably around the action timescales, for interventions to take place.

Table 7 summarises the TVs that each route has sought and been granted by the TA with respect to compliance. Each TV sets out the date by which a route aims to achieve compliance to the stated profile and risk mitigation measures to be taken prior to compliance being fully achieved. The table also details the sections within the standard that the TV was raised against.

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[1] As with all NR standards, the requirements are classified regarding the degree to which variations are permitted:
• Red requirements – no variations permitted
• Amber requirements – variations permitted subject to approved risk analysis and mitigation
• Green guidance – to be used unless alternative solutions are followed

Table 7 Temporary variations issued against NR/L2/OTK/5201

Region	Route / DU	Date of Issue	Compliance by	Relevant section in NR/L2/OTK/5201 Module 2
Eastern	East Midlands	2020	2035	Clause 2.3 Figure 1 Table1
	East Coast	2020	2035	Clause 2.3 Figure 1 Table1
	North East	2020	2035	Clause 2.3 Figure 1 Table1
	Anglia	2019	2029	Clause 2.3 Figure 1 Table1
North West & Central	All Routes	2019	2039	Clause 2.3 Figure 1 Table1
Scotland	Edinburgh	2019	2029	Clause 2.5 –Managing vegetation within the Immediate Action Zone. Clause 2.6 –Managing vegetation within the Action Zone.
	Glasgow	2019	2029	Figure 1 and Table 1 -
	Motherwell	2019	2029	Clause 2.3 Figure 1 Table 1 (intervention zones)
	Perth	2019	2029	Clause 2.5 Managing vegetation within the immediate action zone. Clause 2.6 Clearance within the action zone. Manage vegetation with the action zone where it presents a risk
Southern	Kent	2019	2027	Clause 2.3 Figure 1 Table 1
	Sussex	2019	2027	Clause 2.3 Figure 1 Table 1
	Wessex	2019	2034	Clause 2.3 Figure 1 Table 1
Wales and Western	Cardiff and Shrewsbury	2019	2039	Clause 2.3 Table 1
	Western	2019	2029	Clause 2.3 Figure 1 Table 1

The TVs provide each route's approach to mitigation risks from vegetation up until full compliance is achieved. These follow the recommendations in NR/L2/OTK/5201 regarding inspection, risk assessment and maintenance.

Each route also provided an estimate of the cost to achieve compliance. These have not been reviewed as it would not be possible to establish a reliable means of validation or comparison given the large numbers of factors involved in estimating the type and volume of work required and resource required.

4.3.5   Plans and strategies to work towards compliance

We have investigated each Region's approach to achieving compliance based on documents provided and discussions during the workshops. As per the NR/L2/OTK/5201 standard the Independent Reporter was looking to the Route Vegetation Management Plans to provide the strategy that routes have set out how they are planning to move from a position of non-compliance to compliance by the target compliance dates shown in Table 7.

Only one Route was able to provide a Vegetation Management Plan and that was in draft form and not a complete document. Consequently, to establish an understanding of Routes plans and strategies to move towards compliance the following documents, Table 9, provided the best sources of information on regional and route strategies and plans.

Table 8 Strategies for vegetation clearance works

Organisation	Document describing vegetation clearance strategy
Eastern Region	**Anglia Compliance Vegetation Management** – Timeline to compliant profile and works delivery strategy. **Vegetation Clearance Programme LNE & EM** – Prioritisation approach and Workbank.
North West & Central Region	**North West and Central Route Vegetation Strategy Plan** – Inspection requirements and strategy, required competency, plan for undertaking compliance clearance works and associated plan, approach to maintenance of the network and the Regions environmental and sustainability approach. **Vegetation Deep Dive North West & Central** – Risk Management and Identification, Risk Profiling and a Management Strategy.
Scotland's Railway	**Scotland Route Vegetation Management Strategy** – not used as it was produced in 2015 before the introduction of NR/L2/OTK/5201.
Southern Region	**Wessex Route Vegetation Strategy** – outline the Regions high level approach to the management of risk, performance, and alignment with the NR/L2/OTK/5201 Module 3. **Wessex Route Vegetation Plan (May 2019)** – major clearance site programme, risk management approach due to noncompliance, 15-year compliance delivery plan cost and volume and program management approach. **Sussex Vegetation Maintenance Strategy** – risk-based site prioritisation approach, scope of work to meet compliant profile set by the route, other asset vegetation clearance approach, inspection approach, approach to create/maintain compliance profile, approach to Alert Zone management and the cost and volume of the Routes maintenance and clearer programme for CP6. **Kent Vegetation Maintenance Strategy** outlines a vision to treat vegetation as an asset form CP6 onwards. The strategy does not look to address habitat and biodiversity, offsetting but does address the following subjects: Introduction requirements, prioritisation, intervention types, maintenance improvements, community engagement, funding and monitoring. **Kent Vegetation Management Plan** was supplied as draft and provides the routes view against the 14 points that are required as part of the standard. Uses a lot of the information from the strategy where applicable.
Wales and Western Region	**Wales and Western Vegetation Management Strategy** – highlight progress through CP6, high level compliance profile and approach to move to a Cut and Manage approach

NR/L2/OTK/5201 Module 03 stipulates that a Vegetation Management Plan should define how the Route will sustainably manage the lineside, improve the condition and safety of the lineside estate, while demonstrating how this will protect and enhance biodiversity, support the planning and implementation of habitats within the lineside. Key requirements of these documents are to provide examples of how Regions/Routes will assess, record and monitor the condition and safety of the lineside vegetation based on assessment of 1/8th sections being categorised against the profile zones outlined in the standard.

The documents reviewed where Vegetation Management Plans were not available for a Region/Route did not demonstrate that these requirements of the Module 3 of OTK5201 are currently being met. Evidence provided by the Technical Authority highlights that when Module 03 of the NR/L2/OTK/5201 was introduced a temporary variation was put in place at a national level to allow Regions time to develop the plans. With the Temporary Variation lifted in April 2021, all Regions should have had time to produce the required documents to set out their strategic vision for delving complaint profiles.

Outside of the evidence provided by the Southern Region Routes which demonstrated to the Independent Reporter a forward strategy, plan of workbanks, monitoring of current delivery against forecasts and links between achieving an end state profile and current delivery volumes; the independent reporter could not establish clear evidence of regional or route level delivery plans and how these are being monitored. Regions did provide tactical level workbanks that detail sites that have planned clearance activities (see Table 9).

As part of module NR/L2/OTK/5201 Module 03 prioritisation methodologies should be stipulated which should reflect Module 01 & 02 of the standard. Given the Temporary Variations in place across all Regions to meet the standards requirements Regions/Routes have outline other risk mitigation measures to ensure a safe and operable network. These measures are set out in Temporary Variations or in the Documents listed in Table 9.

To mitigate non-compliance and move towards a position of compliance sections are prioritised to determine the order in which works should be undertaken based on the following factors:

- Common Consequence Tool (CCT) scores – reflects passenger safety risk at a location in event of a derailment
- Consequence of derailment from treefall for high speed and high tonnage long distance services
- Presence of Tier One and Two Trees
- Leaf Fall Category
- Delay Attribution
- Vegetation WSF reported through TEF3064 (see Section 4.6.3)
- Presence of User Worked Crossings (UWC)
- Cab Survey data
- SDS Priority Site
- History of failure (fallen trees)
- Risk to OLE
- TOC/FOC Complaints

Given the extent to which Regions and Routes are currently non-compliant to the standard these prioritised workbanks are planned to extend across several control periods. Apart for the evidence provided by Southern Region there was no evidence provided to demonstrate how these workbanks were being monitored to show how progress towards a compliant profile network.

Independent Reporter's observation

Creating a compliant profile requires initial clearance of vegetation followed by regular maintenance to control regrowth. Each Region provided examples of workbanks that detail areas where clearance is planned to take place. Clearance programmes are prioritised based on train safety and performance risk. Workbanks span across several control periods depending on volume of work and available resource. The approach adopted by Regions to establish the workbanks was considered to be sound based on the evidence provided.

4.3.6   Roadmaps and current status

Regions were asked to provide their roadmaps for full compliance and current and future workbanks in the initial request for information. This was followed up during the workshops and playback sessions where details had not been received. Table 9 summarises sample evidence received relating to workbanks and how past and future compliance is being tracked.

Table 9 Documents provided relating to clearance workbanks and progress to date

Region	Route	Workbank	Progress tracker
Eastern	Anglia	No evidence provided	Anglia Compliance Vegetation Management
	East Midlands	Vegetation Prop Register v3 June 2020	No evidence provided
	East Coast	Vegetation Prop Register v3 June 2020	No evidence provided
	North East	Vegetation Prop Register v3 June 2020	No evidence provided
North West & Central	All Routes	Long term Vegetation Clearance Programme updated Feb 2022	No evidence provided

Region	Route	Workbank	Progress tracker
Scotland's Railway	All DUs	Scotland Vegetation Workbank v4	Scotland Vegetation Compliance Tracker v5
Southern	Kent and Sussex	CP6 K&S Veg Work Plan 2022 unconstrained ORR	Compliance Tracker Veg Kent and Sussex 2
	Wessex	Wessex Route Vegetation Management to Compliance - 15Yr - V6.4	No evidence provided
Wales and Western	Wales	No evidence provided	No evidence provided
	Western	CP6 Western Vegetation Plan	No evidence provided

Most of the workbanks identify which control period clearance works for specific sections are expected to be undertaken. These are used to develop forward plans for each control period and individual years. With the exception of Southern (for Kent and Sussex Routes), none of the Regions provided a tracker that showed past progress in terms of the degree to which compliance had been achieved.

Scotland's compliance tracker (see Figure 4) shows the status of its vegetation clearance as compliant to current standard, compliant to the old standard or non-compliant. The Tracker shows the latest LiDAR survey date for each section and the status of the section at the point of survey date going back to 2013/14. The Independent Reporter observed that currently the Region has cleared an estimated 42% of the sections, which is in line with their 45% estimated total compliance estimate provided. The Region evidenced that some of the sections that have been cleared since 2013/14 have regressed and are no longer compliant - they believe this to be about 7% of the cleared sites. This brings regional compliance to 35% at the time of the review, as shown on the figure.
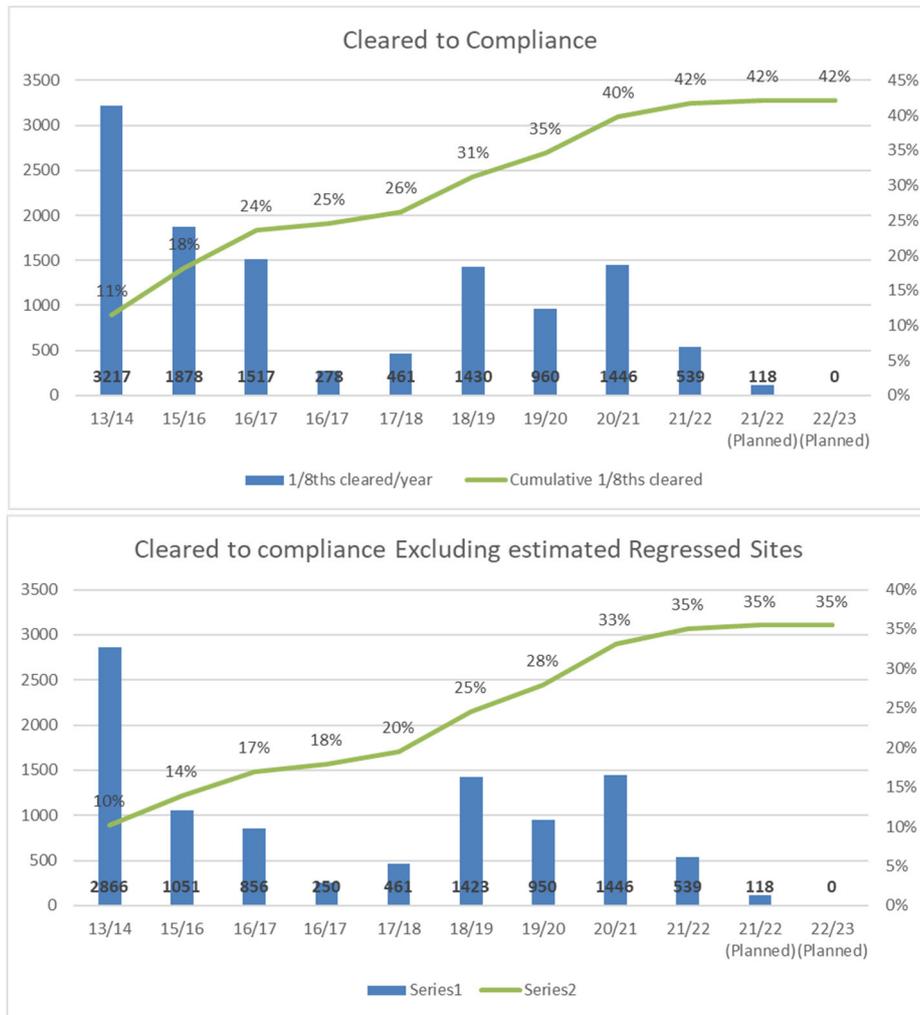
Figure 4 Example compliance trackers produced and used by Scotland Region

The Independent Reporter team has not been able to provide a clear link between Scotland's tracker and their clearance workbank. The tracker does not provide estimates of when a section will become compliant and hence a forward trajectory cannot be estimated to be compared against the compliance dates in the TV. The Independent Reporter was not able to explore the tracker with Scotland as the tracker was only provided after the follow up feedback session.

In the absence of documents that could be referred to, the Independent Reporter asked each Region to provide specific details of their roadmap using a simple template, including the current level of compliance and the dates for full compliance based on the TV and their current forecast. The responses to this request are shown in Table 10.

Table 10 Estimates of current compliance and forecast achievement of full compliance

Region	Route / DU	Estimated current compliance	Estimated date for full compliance	
			TV	Current Forecast
Eastern Region	Anglia	12.63%	Tottenham DU - 2029	2044
			Romford DU - 2033	Not provided
	East Midlands	22%	2035	2035
	East Coast	60%	2035	2035
	North East	55%	2035	2035
North West & Central Region	Central	12%	2039	2039
	North West	19%	2039	2039
	West Coast	27%	2039	2032
Scotland's Railway	Edinburgh	45%	2029	2042
	Glasgow			
	Motherwell			
	Perth			
Southern Region	Kent	35.9%	2027	2029
	Sussex	44.6%	2027	2029
	Wessex	41.1%	2034	Not provided
Wales and Western Region	Wales	Not Provided	2039	Not Provided
	Western	Not Provided	2029	Not Provided

The range of forecast compliance dates provided by Regions varies between 2027 (Kent and Sussex) and 2044 (Anglia), representing a period of 17 years for all Regions to become compliant to the standard.

The estimates of current compliance positions provided by the Regions ranges from 13% (Anglia) to 60% (East Coast). However, it was generally acknowledged by Regions that these estimates were in many cases approximate due to inspection data being incomplete or out of date. Region's use the best available data from surveys, inspections and clearance works delivered to understand their current position. Some Regions assumed cleared sites have maintained a compliant profile since the intervention and vegetation regrowth is not considered. The Independent Reporter sees the current compliance position estimates provided as best estimates. Regions do not have accurate up to date data available across the whole network to understand their true current compliance position. The measurement of compliance is further discussed in Section 4.5.2.

The volumes of work required to achieve compliance can be estimated from the workbanks. However, it was not possible to confirm the Regions' ability to achieve these as there is no reliable data available on the historic rates of clearance. This is due to unavailability of this data prior to CP6 and issues with identifying volumes from Ellipse.

The compliance roadmap for all routes is shown graphically on Figure 5, which identifies when TVs against compliance were first issued (v), the issue date of current TVs (i), compliance dates stated in current TVs (c) and updated forecasts of compliance provided as part of this review (u).

Region	Route/MDU	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044
Eastern	Anglia									V	I																									U
Eastern	North and East							V			I															C										
Eastern	East Coast							V			I															C										
Eastern	East Midlands							V			I															C										
Northwest and Central	Central							V			I																			C						
Northwest and Central	North West																													C						
Northwest and Central	West Coast					V					I											U								C						
Scotland	Edinburgh										V/I										C														U	
Scotland	Glasgow										V		I								C														U	
Scotland	Motherwell								V		I										C														U	
Scotland	Perth										V										C														U	
Southern	Kent							V			I									C	U															
Southern	Sussex							V			I									C	U															
Southern	Wessex										I																C									
Wales and Western	Western										V/I										C															
Wales and Western	Wales							V			I																					C				

Figure 5 Summary of vegetation profile compliance for all routes

The West Coast Route have brought their estimated compliance date forward. Anglia Route and Scotland Region have significantly extended their forecast dates for full compliance by 15 years and 13 years respectively, with Kent and Sussex slipping by two years.

The TA observed that the Regions are not on track for delivery of a compliant vegetation profile within the current CP. They considered that the level of work required in each non-compliant 1/8th (of a mile section of line) does not tally with the maintenance volumes planned (or previously delivered). Once a more repeatable and reliable source of data is deployed in the business, then regular periodic data can be collated on encroachment within immediate action zones and action zones. This data could then be presented to identify priority 1/8ths. The Digitised Lineside Inspection tool (DLI - described in Section 4.6.3) will allow for this automated data collation using both forward facing video and aerial imagery.

Monitoring compliance is discussed in Section 4.5.2.

Independent Reporter's observations

Both the Regions and the TA have acknowledged uncertainty in the compliance dates provided to the Independent Reporter due to:

- Different definitions of what constitutes a compliant profile compared with the standard (some routes use a more conservative profile for operational reasons, e.g., clearance to overhead equipment)
- The current degree of compliance due to inspection data being unreliable or out of date
- Assumptions regarding the rate of growth following the last inspection (up to three years interval) or when clearance activities were carried out
- Resource and funding available to undertake clearance works at the rate assumed in the TVs and then to maintain the profile once cleared.

There was a lack of evidence presented on how compliance delivery is being monitored, with only two Regions (Southern Region and Scotland's Railway) providing examples of comprehensive trackers. This hinders assurance that each Region's planned rate of clearance is being achieved or a clear record of an

achievable rate of work. The tracker adopted by Scotland's Railway is considered to represent best practice and is the minimum that the Independent Reporter was expecting to see.

Some Regions are reporting considerable differences between compliance dates originally stated in Temporary Variations and those currently forecasted. This is partly due to uncertainties in the current condition of the asset, but also the effectiveness of clearance works carried out to date. It has proved difficult for the Independent Reporter to establish historic volumes of clearance activities from available Ellipse data to increase confidence in the estimated compliance dates. Forward planning would be improved by adopting a consistent approach to coding clearance works and retrospectively recoding those undertaken previously, at least during CP6.

The Independent Reporter considers that achieving a minimum compliant vegetation profile, that also reflects best practice regarding biodiversity, plays an important role in managing risks to safety and operations relating to vegetation.

Given the uncertainties outlined above, the Independent Reporter considers that the Regions current forecasts for achieving the compliance dates set out in the TVs are for the most part unreliable. Correspondingly low confidence ratings have been assigned relating to their current roadmaps for compliance.

4.3.7 Risks and challenges

Specific risks and challenges were raised by all Regions during the workshops and focussed on:

- Insufficient information to support current estimates of compliance and forecasts for completion
- Achieving compliance to the Vegetation Management Manual in the agreed timescales
- Resource (internal and supply chain) to deliver long term clearance programmes.
- Access constraints, including new track worker safety standard

4.3.8 Compliance roadmap – Confidence ratings

Appendix A.2 presents the basis for the Independent Reporter's assessment of the confidence ratings for this topic, which are summarised below. The following evidence, documented or otherwise are typical of those considered in the assessment:

- Achievement of dates for full compliance set out in TV
- Approach aligned with Region / route vegetation strategy / management plan
- Clear assumptions regarding what profile is being used to define compliance
- Projected compliance date in line with that stated in TV
- Clarity of assumptions in TV, including cost of compliance
- Assumptions of current profile compliance
- Sites identified in workbanks and prioritisation approach
- Current projections of compliance

Table 11 Assessment of robustness of Regions' compliance roadmap

Region	Confidence ratings and basis for assessment	
Eastern	• Evidence provided lacks the detail to understand why compliance dates have moved since they were first established. • Position of current compliance is available based on historic underlying data. • Evidence provides an incomplete picture of how the Regions would address the causes of non-compliance and the plans in place to mitigate them. • Overall Region compliance has slipped by several years from initial estimates.	1
North West & Central	• Evidence provided lacks the detail to understand why compliance date have or have not moved since first established. • Only a high-level position of compliance is available, no underlying data. • Evidence provided an incomplete picture of how the Regions would address the causes of non-compliance and the plans in place to mitigate them.	1
Scotland's Railway	• Evidence provided shows sectional break down of work completed to date and compliance levels based on historic survey data. • No clear evidence to understand a forward plan of the compliance trajectory.	1

	• Evidence provided an incomplete picture of how the Regions are addressing the causes of non-compliance and the plans in place to mitigate them. • Overall Region compliance has slipped several years from initial TV estimates.	█
Southern Region	• Roadmaps provided for all routes shows understanding of delivery program and current delivery progress. • Evidence provided an incomplete picture of how the Region is addressing the causes of non-compliance and the plans in place to mitigate them. • Kent and Sussex forecast date for compliance slipped by two years. • Not clear what latest forecast date is for Wessex.	**2**
Wales and Western Region	• Evidence provided lacks the detail to understand why compliance date have or have not moved since first established. • Only a high-level position of compliance is available no underlying data. • Evidence provided an incomplete picture of how the Regions would address the causes of non-compliance and the plans in place to mitigate them.	**1**

4.3.9   Compliance roadmap – Improvement opportunities

The following improvement opportunities have been identified in relation the Regions' roadmap to full compliance with the Lineside Vegetation Management Manual

<div align="center">Table 12 Compliance roadmap – Summary of improvement opportunities</div>

Improvement Opportunity Ref (New)	Summary of improvement opportunity
I-01	There are differing approaches across the network being used to report compliance against the vegetation profile that defines the intervention zones described in NR/L2/OTK/5201. This single measure is a useful proxy for the overall risk to safety and operations from lineside vegetation. Greater clarity is required on whether routes are reporting compliance with the action zone profile specified in the standard or whether a different, more conservative approach is being used. It may be beneficial to adopt a simple common measure that can be used as a proxy to assure routes' achievement of compliance in relation to temporary variations raised against NR/L2/OTK/5201. Also refer to the discussion on compliance performance metrics in Section 4.5.2
I-02	There is currently no consistent approach to tracking trends in compliance with the desired vegetation profile. Monitoring and reporting profile compliance would provide a more complete picture of progress at Region and network level and provide progress data to support forward planning.

4.4   Compliance delivery – Topic 1(b)

4.4.1   Scope of review

The scope of this topic is summarised below:

> *Assess and comment on robustness of Regions' vegetation management plans and practices with respect to how works in the vegetation plan are being delivered by each Region towards full compliance in the following areas:*
> * *creating sites with compliant vegetation profile*
> * *maintaining previously cleared sites*
> * *undertaking reactive works*
> * *changes in access that may have an impact on compliance.*

The process for achieving full compliance with the Vegetation Management Standard is summarised in Figure 6. To be compatible with terminology in common use, the expression "clearance" will be used to describe the process whereby a compliant profile is created. This is sometimes also referred to as "vegetation management", but this term is not used in this report to avoid confusion.
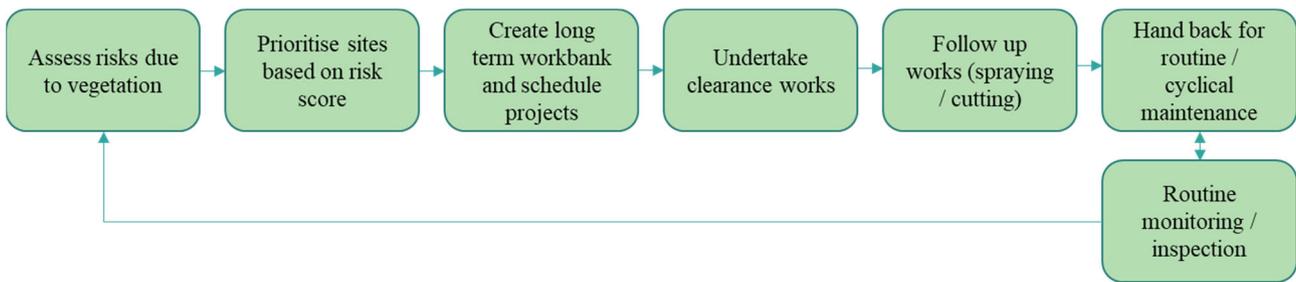
Figure 6 Example compliance delivery process

4.4.2 Vegetation Management Plans

NR's ambition for a lineside estate that complies with the Lineside Vegetation Management Manual involves a combination of the clearance works and ongoing maintenance to control regrowth and emerging vegetation. This also involves measures to manage risks from third party trees, invasive species, pests, diseased such as Ash Dieback and emerging effects caused by climate change (also discussed under Topic 1(d)).

It is a requirement of the Manual that Route Asset Managers develop Vegetation Management Plans to support the sustainable management of the lineside estate and its habitats. These plans are intended to form a strategy to meet safety, performance, and environmental targets, detailing maintenance interventions to achieve a habitat that satisfies safety risk considerations, while protecting and enhancing biodiversity. Vegetation Management Plans also complement route Habitat Management Plans, discussed under Theme 3.

Vegetation Management Plans are intended to cover all aspects of compliance delivery and other topics within this overall review theme, and specifically:

a) Provide a structured way to plan the sustainable management of the lineside
b) Improve the condition and safety of the lineside estate whilst protecting and enhancing its biodiversity
c) Establish the accountability for the asset
d) Support the planning and implementation of work within lineside habitats.

Accompanying Sectional Asset Plans are required that set out the management activities required for each 1/8th of a mile of the lineside asset that is subject to an intervention. Details that are to be recorded are provided in Module 3 of NR/L2/OTK/5201.

Habitat Management Plans (discussed in Section 6.2) complement Vegetation Management Plans and the Sectional Asset Plans are intended to capture habitat information.

The Independent Reporter requested that Regions' Vegetation Management Plans be provided as evidence to support this review. The only example received was a draft version for the Kent Route. An example Sectional Asset Plan was provided by Scotland's Railway.

Some Regions have prepared vegetation strategies that fulfil some aspects of a Vegetation Management Plan. However, the Independent Reporter considers that these Plans should play a central role in developing each route's whole life approach to managing vegetation risk and delivering NR's biodiversity objectives. This includes the approach to planning and delivering sites with compliant profiles, maintaining cleared sites and undertaking reactive works. Responsibility for developing these plans is also discussed under Varley Recommendation 2 relating to governance.

Independent Reporter's observations

The Independent Reporter received limited evidence on what goals and objectives Regions have set to deliver compliance, maintenance, habitat, and biodiversity targets moving forward. This includes the important role vegetation management plays in maintaining a safe and efficient railway.

The Independent Reporter considers that the Vegetation Management Plans and accompanying Habitat Management Plans should form a central role in developing each route's whole life approach to managing

vegetation risk and delivering NR's biodiversity objectives. They should also form part of establishing the approach to business planning and delivery for CP7 and management of the asset over the remainder of CP6. These plans should also align with the approach to vegetation management being developed as part of NR's new Lineside Policy.

The approach to risk management in NR/L2/OTK/5201 and investment planning previously focussed on considerations of safety and performance. Considerations of national legislation, DfT biodiversity targets and Network Rail's responsibilities as asset stewards require these to be taken into consideration in maintaining the vegetation asset over multiple control periods. Future planning would benefit from a whole life cost approach to managing vegetation as part of wider lineside assets that values biodiversity alongside safety and performance.

4.4.3   Creating sites with compliant profiles

It is normal practice to undertake clearance works as discrete packages of work, as they require significant resource and access to the lineside involving possessions or line blockages. In most Regions, clearance is undertaken though contracts procured by Works Delivery, or equivalent part of each route organisation, except for Wales Route where most of these works are carried out in-house.

The nature of clearance works vary from site to site, depending on topography, type of vegetation present and the presence of OLE. Interventions vary by zone and can include the following activities:

- Remove woody vegetation
- Reduce, pollard or remove trees
- Remove dead, dying and dangerous trees, including third party trees
- Herbicide treatment
- Eco-plug stumps to prevent regrowth (after removing any coppice re-growth present)
- Removal of noxious/injurious/ invasive non-native weeds

Habitat related works are described in Section 6.4.

The scheduling of clearance works is based on workbanks established using the approach described in Section 4.3, with annual programmes of work agreed with Regional Asset Management teams. Monitoring progress against these plans is discussed in Section 4.6.10.

Supervisory inspections before and after vegetation management works are described in NR/L2/OTK/5201 Module 1 and recorded using *NR/L2/OTK/5201/F3269 Supervisory inspection of lineside vegetation report.*

The project management and supervision of the clearance packages is usually carried out independently by Works Delivery. Ecological survey work associated with clearance works is usually coordinated by Works Delivery as discussed in Section 6.4.

Examples were provided of specifications for clearance works that incorporate the provisions of NR/L2/OTK/5201:

Table 13 Example specifications for vegetation clearance works

Region	Clearance works specification
Eastern	Particular Specification V14 - Scope of Works for use on all East Coast & North & East Routes Vegetation Management Sites (2021)
North West & Central	Vegetation Management Specification
Scotland	Scotland Route - Vegetation Clearance Specification (2018)
Southern	Wessex Route CP6 Year 1 - Vegetation Management Site Specification

The degree of involvement of Regional Asset Management teams and delivery units during clearance works varies between Regions and Routes. In some cases, DUs are involved in checking of contractor's work while clearance is ongoing, while in other cases they would only get access to the sites following hand back, with monitoring undertaken by Works Delivery Project Managers. No evidence was provided that enabled

the Independent Report to draw an observation on which approach was better at sustaining compliance and handover of cleared sections.

Evidence was provided of completion of clearance works being recorded in the relevant workbank database. The time taken for this to be updated could not be assessed from the information provided.

Hand back from the works contractor to the DU usually takes place once chemical treatment of stumps and spraying to supress re-growth has taken place. In some cases, this treatment is undertaken by the DU straight after clearance works.

Some DUs reported that the sites were not always handed back in accordance with the specification which meant that follow up visits were required by the contractor, or they had to make good the defects themselves, diverting resource away from other activities.

Independent Reporter's observations

The process evidenced by Regions to identify and prioritise sites that required clearance back to a standard profile was considered to be broadly sound (except for limited information provided by Wales and Western Region). Programmes are developed based on safety and performance risk. They are constrained by budget. The Independent Reporter was not provided with sufficient information to form a view on the rate at which these works had been undertaken historically, or whether future planned works can be delivered within the proposed timescales.

Good examples have been provided of maintenance and works specifications that reflect the requirements of NR/L2/OTK/5201 and continuous improvement within Routes and DUs. Sharing model specifications for vegetation works across the network would promote best practice and consistency in methods adopted by DUs and the supply chain.

There is a risk that delivering clearance works and routine maintenance by separate parts of the asset management organisation may lead to coordination issues. This approach does have the advantage that Asset Managers project management expertise to manage contractors and works scheduling. The Independent Reporter considers that the delivery of clearance works should be managed in a fashion that best suits each Region's delivery model, provided that the works are planned and coordinated in conjunction with the relevant lineside teams.

4.4.4   Maintaining sites that have been cleared

Once a site has been cleared and handed back it is then inspected and maintained in accordance with NR/L2/OTK/5201. Regions' approach to planning and monitoring cyclical maintenance is discussed in Section 4.6.10. The TA has clarified that temporary variations put in place do not apply to cleared sites.

North West and Central are extending their Vegetation Management Specification (VMS) that sets out the work to be carried out in the Route Vegetation Clearance Programme to cover the management of sites post clearance.

It was observed in some discussions with regional teams that compliant profile is both safer and easier to maintain as there is less vegetation left adjacent to the track. However, some DU teams felt that cleared areas require more resource to keep new growth down than just undertaking reactive maintenance. This was due to a perceived increase in rate of growth of the cut back vegetation, although no data was provided to support this view. This was reported to increase the corresponding volume of cyclical maintenance required over and above that undertaken previously to keep the railway safe. There was no data presented to support this view.

Cleared areas were reported as presenting lower risk overall as vegetation is further away from the line and dead, dying, diseased trees will have been removed. There is also a much-reduced likelihood of vegetation encroaching on the railway, sighting issues and adhesion issues due to leaf fall. While there was some anecdotal evidence, no data was provided in the form of counts of incidents before and after clearance works had taken place.

A number of route asset management teams and DU representatives noted that the benefits of clearance would be lost if there was insufficient funding available to allow routine cyclic maintenance and those areas were permitted to re-grow.

A Southern Region DU commented that they were endeavouring to maintain a compliant profile on all previously cleared sections, but with the resource available is an uphill battle. The expectation is that each ELR would need to be cleared every 2 years and they have approximately 50% of the resource required to do that. They did comment that some really good work had taken place across the route with regards to clearance and maintenance work.

Independent Reporter's observations

It seems reasonable that cleared areas should present a lower risk in terms of vegetation encroaching on the railway, sighting issues and adhesion issues due to leaf fall. Better information to confirm these observations and rates of regrowth would support planning maintenance activities.

4.4.5   Reactive works

Maintaining compliance requires management of areas where clearance has not taken place and regrowth after establishing a compliant profile. This is undertaken through planned cyclical maintenance described in Section 4.6.10 and reactively managing situations where inspections identify what interventions are required, as described in Section 4.6. Reactive works typically relate to, but not confined to, situations affecting the immediate action zone identified from inspections or reports by operators.

Reactive work is undertaken by DU maintenance teams and typically planned on a weekly basis. This work is usually limited in scope and is typically in response to signal sighting issues, sighting at level crossings, tree strikes to trains, blocked access routes and complaints from the public. Responding to storm damage also falls into this area.

There is a potential for work to be delivered in a reactive manner against specific identified vegetation defects rather than proactively to create a compliant profile.

During summer months there tends to be more reactive work due to increased growth rates, which results in less planned maintenance work taking place. Responding to fallen trees and vegetation encroachments following storms also diverts resource away from planned work.

Independent Reporter's observations

Other than anecdotal evidence regarding the benefits of large-scale clearance, there has been little or no data provided that substantiates the considerable investment being undertaken. The Independent Reporter considers that useful insights could be obtained from before and after comparisons of incidents, close calls, WAIFs, etc., for cleared areas. A review of achievement of these benefits could also inform future prioritisation of clearance works.

4.4.6   Access issues

Lineside access to safely undertake inspections and maintenance work and limit disruption to rail traffic is a key consideration and an inevitable constraint on how much activity can be undertaken. Access issues were reported relating to the ability to undertake inspections and maintenance in red zones, those requiring OLE isolations and daytime working.

Eastern Region noted that there is a cost increase to compliance (works delivery) work as they are now having to access much more through third-party land or risk workers being trapped on site. They are relying on planning as far out as possible to take advantage of blockades and long access opportunities. Recently they "piggybacked" on a large blockade at Leeds station and were able to deliver productive and efficient lineside management work on the Harrogate line.

North West & Central Region noted that current worksite times are very short due to the time it takes to set up the possession and isolations. On some ELRs they reported that they have had around one hour to undertake the work, which also includes getting the chipper on track and to site and back. It was considered that achievement of CP7 objectives would be dependent on improvements in streamlining possessions / isolations or improving possession times.

Southern Region observed that recent track worker safety restriction on open line working have put additional pressure upon the DUs while the amount of maintenance undertaken is increasing. The restrictions that have been caused by the removal of the ability to access red zone sites have reduced productivity

significantly (equivalent to 20% reduction in volume for the last six periods of last year) and will continue to hinder productivity moving forward through the remainder of CP6 and beyond.

Wales and Western Region also confirmed that it was becoming more and more difficult to gain access to the railway to undertake maintenance work. They have made use of blockades alongside other asset disciplines and purely for vegetation maintenance. They were also making more use of access through third party land.

Independent Reporter's observations

All the Regions considered access as an increasing challenge, affecting their ability to undertake inspections and maintenance in red zones, those requiring OLE isolations and daytime working.

Examples were provided of how vegetation management can take a lower priority during blockade working leading to access issues and maintenance objectives not being achieved. A review of the approach to coordinating these works may lead to vegetation management activities making better use of these access opportunities. A review of the approach to coordinating blockade working could lead to vegetation management activities making better use of these access opportunities.

4.4.7   Risks and challenges

Risks and challenges identified in questionnaires by the TA and Regional asset teams in connection with this review topic are quoted below:

> *"Inadequate management of vegetation maintenance regimes (inability to deliver compliance):*
> - *Lack of resource*
> - *Conflicting priorities*
> - *Lack of accountability*
> - *Lack of clear requirements / guidance*
> - *Lack of risk-based decision making*
> - *A lack of track access / access from 3rd party land"*

> *"Current amount of work orders in the work bank makes it harder to prioritise the work"*

> *"Insufficient funding (initial and due to reallocation) - Budgetary allocation / constraints"*

> *"Resource & Funding Challenge - Lack of funding and resource to deliver mechanised and efficient cyclical maintenance."*

> *"Unit Rates – limited supplier base pushing up prices"*

> *"Prioritisation of vegetation management due to the combined effects of changing the way we inspect (DLI) and the significant OpEx pressure the business is under."*

> *"Moving away from a reactive activity to more strategic approach"*

> *"Inadequate management of vegetation maintenance regimes (inability to deliver compliance)"*

> *"General encroachment – not enough funding or resource to maintain on regular cyclic lineside vegetation."*

> *"RZP prohibition continues to make access and maintenance difficult in certain areas"*

> *"Access:*
> - *More and more difficult to gain access to the railway to maintain.*
> - *Access availability due to topography of infrastructure*
> - *Access limitations (TWS) and planning. Reduced access on key routes.*
> - *Access availability due to topography of infrastructure*
> - *Current worksite times are very short due to the time it takes to set up the possession and isolations*
> - *Red zone prohibition*
> - *Track access with isolations - especially since the Red Zone directive was introduced."*

4.4.8   Confidence ratings

Appendix A.2 presents the basis for the Independent Reporter's assessment of the confidence ratings for this topic, which are summarised below. The following evidence, documented or otherwise are typical of those considered in the assessment:

- Assumptions regarding the profile used to define compliance
- Incorporation of works into period / annual workbanks
- Approach to planning, procuring, and managing clearance works
- Specifications for clearance works

Table 14 Assessment of Regions plans and practices for compliance delivery

Region	Confidence ratings and basis for assessment	
Eastern	• Evidence found of robust approach to developing work banks but not observed across all routes. • Where they exist, current workbanks and forward workbanks are understood and prioritised by a sound risk prioritisation approach, however they do not exist across all routes. • Risks to delivery understood and are well documented.	**2**
North West & Central	• Approach to developing work banks described and evidenced but could benefit from further clarity. • Current workbanks and forward workbanks understood and prioritised with a risk prioritisation approach. • Key risks identified but limited evidence provided as to how these risks are being managed/mitigated.	**2**
Scotland's Railway	• Sound approach to planning and delivering compliant sites described. • Sound approach to undertaking reactive works, including sites awaiting clearance back to a compliant profile. • Concerns exist relating to ability to undertake work to maintain sites to keep to schedule.	**2**
Southern Region	• Sound approach to developing work banks described and evidenced. • Workbanks clearly understood and prioritised by a sound risk prioritisation approach. • Risks to delivery understood and are well documented.	**3**
Wales and Western Region	• Planning and prioritisation process not fully described. • No evidence provided on the current work to date workbank not provided. • Key risks identified but limited evidence provided as to how these risks are being managed/mitigated.	**1**

4.4.10   Compliance delivery – Improvement opportunities

The following improvement opportunities have been identified in relation to how works in the vegetation plan are being delivered by each Regions towards full compliance

Table 15 Compliance delivery – Summary of improvement opportunities

Improvement Opportunity Ref	Summary of improvement opportunity
I-03	Some Regions are reporting considerable differences between compliance dates originally stated in Temporary Variations and those currently forecast. This is partly due to uncertainties in the current condition of the asset, but also the effectiveness of clearance works carried out to date. It has proved difficult for the Independent Reporter to establish historic volumes of clearance activities from available Ellipse data to increase confidence in the estimated compliance dates. Forward planning would be improved by adopting a consistent approach to coding clearance works and retrospectively recoding those undertaken previously, at least during CP6.
I-04	The potential benefits of establishing a compliant vegetation profile in terms of risk to safety and performance and maintenance effort are well understood. However, there has been little or no evidence provided that substantiates the considerable investment being undertaken. This could take the form of before and after comparisons for cleared areas and comparisons with other, similar sites. This would consider incidents, incursions, close calls, poor adhesion issues, frequency of WAIFs, etc. A review of achievement of measurable benefits could also inform future planning of clearance and maintenance works.
I-05	Good examples have been provided of maintenance and works specifications that reflect the requirements of NR/L2/OTK/5201 and continuous improvement within routes and DUs. Sharing model specifications for vegetation works across the network would promote best practice and consistency in methods adopted by DUs and the supply chain.
I-06	Examples were provided of how vegetation management can take a lower priority during blockade working leading to access issues and maintenance objectives not being achieved. A review of the approach to coordinating these works may lead to vegetation management activities making better use of these access opportunities.
I-07	Vegetation Management Plans (as defined in NR/L2/OTK/5201 Module 3) have the potential to play an important part of how routes define their approach to managing the vegetation asset. Preparation of these is mandatory and they form an important role in defining route policy for CP7 and creating detailed Sectional Asset Plans to assist in understanding the asset and planning future interventions, including those relating to biodiversity. To date there have been very few of these issued. Vegetation Management Plans also complement Habitat Management Plans. Regions need to make a commitment to produce these documents and associated Sectional Plans so they can usefully contribute to the CP7 planning cycle and management of the asset over the remainder of CP6.

4.5   Key performance indicators – Topic 1(c)

4.5.1   Scope of review

The scope of this topic is summarised below:

Assess and comment on the appropriateness of key performance metrics or indicator(s) used by Regions to measure their compliance positions, delays caused by vegetation, and improvement in habitat and biodiversity.

The three topics relating to this theme are discussed below, together with a further KPI relating to NR's achievement of carbon net zero.

4.5.2   Compliance positions

The discussion on compliance in Section 4.3.3 concluded that there is not a consistent approach across the Regions to assess and report on compliance to the vegetation profile within each intervention zone. Regions have evidenced differing interpretations of the profile used in clearing lineside vegetation (see Table 6).

A broader interpretation of compliance can be taken that covers all aspects of the requirements of Figure 1 and Table 1 of NR/L2/OTK/5201 Module 1 regarding the condition of vegetation within the Immediate Action Zone and the Action Zone. The extent of these zones is defined using a set of geometric rules as suggested in Figure 1.

The TA have developed a dashboard that summarises a number of aspects of vegetation condition from inspections in graphical form for each Region and by type (see also the discussion on inspections later in Section 4.6.3 and Table 18). An example of this dashboard is shown on Figure 7.

Figure 7 Lineside assurance pack - Vegetation condition

The Ellipse data that this dashboard (dated 07/01/22) is based on is incomplete, pending completion of the full three-year inspection cycle. Each of the pie charts shows the proportion of all eighths where the feature reported has been assessed and the condition of the feature. The condition "no answer provided" refers to eighths where the condition score is not relevant, for example where there are no level crossings.

The histogram shows a weighted summary of each measure for each Region that require action. The basis for the weighting has not been provided. Note that the "no action" and "no answer provided" are coloured the same, hindering interpretation. The overall compliance indicator is dynamic as it depends on works completed and inevitable vegetation growth.

The TA observed that, while the data came straight from Ellipse and reflects latest inspections, any work that had been undertaken to co

+mplete corrective actions needs to be recorded on the system to clear the item. This is particularly important given the interval between foot inspections.

It is considered that this approach could be extended to produce a much more detailed indicator of overall compliance once the inspection cycle is complete and as tools such as DLI begin to deliver more frequent assessments of condition. Selecting conditions relating to the presence of woody vegetation that is not allowed within the action zone or poses a risk could be used as an indicator of whether clearance had been undertaken.

There remains the question of defining the geometry of the action zone, which has been found to vary between Regions. Additionally, some assumptions regarding the extent of the action zone relate to topography adjacent to each side of the track. This could potentially be coded as a field in Ellipse but, as noted by some regional teams, features such as cuttings and embankments do not neatly divide up to 220-yard (1/8th mile) segments.

Independent Reporter's observations

The lack of a consistent approach to measuring and reporting profile compliance is noted above, and a corresponding recommendation has been made. However, the Independent Reporter considers that a single criterion for defining compliance is limited in establishing a full understanding of the multiple factors that define compliance with the risk assessment criteria established for each intervention zone.

The Vegetation Management Manual describes a risk-based approach to assessing the condition of individual trees based on a detailed assessment of multiple attributes and the potential consequence of failure. A risk-based approach is also adopted when considering leaf fall. However, the assessment the overall condition of lineside vegetation adopts a binary "yes / no" approach to reporting the presence or otherwise of vegetation requiring action, based on proximity to the railway. This is then reflected in the standard that places an emphasis on the actions required if a certain condition is not met within each intervention zone, rather than the range of acceptable conditions within each zone. This includes permitting some trees within the action zone providing they do not pose a risk to the railway.

There is a potential to better align the various approaches to assessing vegetation condition into one or more measures that better expresses overall compliance with the standard than simply establishing a cleared profile. In the short term The Independent Reporter considers that better use could be made of the information currently collected through inspections.

A range of condition parameters are currently captured through routine inspections and an example of a simple dashboard to monitor these was provided by the TA. There was no evidence provided by regional asset teams of a network wide system to extract and use this information in managing the vegetation asset. Asset management teams frequently noted that they needed to set up their own dashboards and GIS applications to interrogate inspection data.

Planning long term clearance activities and routine maintenance would benefit from asset teams having access to an up-to-date picture of all the components of vegetation condition used to define compliance with the standard. This would also assist in establishing causal links between condition and incidents, close call, delays, damage to other assets and events associated with extreme weather (discussed below).

4.5.3   Delays and other incidents

Incidents, including those caused by vegetation are recorded on Control Centre Incident Log (CCIL) which provides real time updates of all railway related incidents. These can be reviewed at route, Regional or network level. Figure 8 shows an extract from the Lineside Assurance Pack produced by the TA that shows for each period in CP6 the total number of incidents, broken down by type, together with derailment risk and corresponding delay minutes.

Figure 8 Vegetation incidents with derailment risk and delay minutes (07/01/22)

Examples of similar charts showing rates of incidents were also provided by some of the Regions. These demonstrate that incidents relating to vegetation often show pronounced seasonal increases, often due to leaf fall or storms. However, their value in planning or assessing the causes of incidents is limited without additional context regarding the location of the event and causal factors such as species, condition and topography. It is not known whether consideration of these lagging indicators alongside the leading indicators that DLI will be capturing (see Section 4.6.3) will be a feature in decision support tools under development, for example the Workbank Management Tool, currently.

The TA advised that they intend to carry out a study into the relationship between extreme weather events and tree incursions together with the effects on safety and performance. They acknowledged the difficulty in normalising trend due to the range of factors that cause failures.

Route level reviews into seasonal performance and response to storm events are used to influence workbanks in following years.

Independent Reporter's observations

Information on delays and incidents is available from NR's management systems and there was evidence provided of its use in planning clearance works and routine maintenance, including response to seasonal leaf fall. The examples provided were developed within each Region and there was no evidence seen of a network wide approach to compare safety and performance data with information relating to vegetation condition.

There exists a wealth of information within Network Rail on the condition of lineside vegetation, maintenance works, external factors such as weather and incidents related to vegetation. There is currently

no readily accessible means to compare leading and lagging indicators to support the assessment and reduction of safety and performance risk and planning. Bringing this data together in an accessible form would develop better insights into how the asset behaves and promote measures that lead to a safer railway and more efficient use of resources.

4.5.4   Habitat and biodiversity

Legislative context

National biodiversity policy is evolving in different ways across the UK. However, there is a clear commitment within each nation to contribute to the delivery of positive biodiversity outcomes. These differences are recognised in NR's Network Rail Biodiversity Action Plan (see Section 5.3), which includes the introduction of relevant national legislation in its implementation timeline.

In England, current planning policy states that planning decisions should minimise impacts on and provide net gains for biodiversity. This National Planning Policy Framework (NPPF) is then implemented at the local level through local planning policy and local plans, by local District and Borough councils. In addition, the Environment Act (2021) will mandate Biodiversity Net Gain (BNG) into legislation. Therefore, there is a requirement to consider and address BNG in order to pre-empt legislative requirements and to comply with current policy, as a material consideration of any planning application. A 10% increase in biodiversity value is considered as the proposed threshold to achieve BNG.

In Wales, mandatory BNG is a feature of the Welsh planning system, but the approach taken is rather different to that in England. Section 6 of the Environment (Wales) Act 2016 places a general duty on public authorities to, *"seek to maintain and enhance biodiversity in the exercise of functions… and in so doing promote the resilience of ecosystems"*. Planning policy then provides guidance on how planning authorities should comply with the Section 6 duty, but it does not specify the use of metrics or a particular target level of enhancement.

Scotland addresses BNG through planning that supports 'Positive Effects for Biodiversity' and, like Wales, does not require the use of a particular metric or a targeted level of gain.

Biodiversity metric

In response to the Varley Review and the 2019 DfT policy statement, NR's Environmental Sustainability Strategy (2020) has set targets of achieving no net loss of biodiversity by 2024 and biodiversity net gain by 2035. This required a biodiversity metric to be developed and then a process to baseline the network and regularly assess changes with time. The metric can also be used to assess measures to offset unavoidable biodiversity loss through creating appropriate habitats elsewhere, on or beyond the NR estate.

NR's approach to identifying and implementing the biodiversity metric is described in detail in the State of Nature Report, published in January 2022. This report describes the methodology adopted and presents baseline information for each Region, along with details of ongoing and future initiatives relating to biodiversity management.

NR have adopted the methodology to assess habitat and biodiversity used by the Department for Environment, Food and Rural Affairs (Defra), described in the Natural England document *Biodiversity Metric 3.0 Auditing and accounting for biodiversity user guide (2021)*. NR's adoption of the Biodiversity Metric 3.0 represented best practice at that time, with it being the standard tool recommended for use by Natural England, noting that the metric has subsequently been updated to version 3.1 (released April 2022).

The Biodiversity Metric 3.0 was designed to measure both on-site and off-site biodiversity changes for a project or development and can be used to measure the change in biodiversity achieved by different land management interventions. The metric also accounts for some of the risks associated whenever new habitat is created or existing habitat is enhanced. The metric calculates the change in biodiversity resulting from a project or development by subtracting the number of pre-intervention or 'baseline' biodiversity units (i.e., those originally existing on-site and off-site) from the number of post-intervention units (i.e., those projected to be provided after the development or change in land management). The guidance for the use of the metric notes that its outputs are not absolute values but provide a proxy for the relative biodiversity worth of a site pre- and post-intervention.

The metric uses habitat as a proxy for wider biodiversity with different habitat types scored according to their relative biodiversity value. This value is then adjusted, depending on the condition and location of the habitat, to calculate 'biodiversity units' for that specific project or development (Figure 9). The metric incorporates separate calculations for linear habitats that require a different method of measurement such as hedgerows and lines of trees, rivers and streams and urban trees.

> *Biodiversity metric 3.0 uses habitats, the places in which species live, as a proxy to describe biodiversity. These habitats are converted into 'biodiversity units'. These biodiversity units are the 'currency' of the metric.*
>
> *Biodiversity units are calculated using the size of a parcel of habitat and its quality. The metric uses habitat area (measured in hectares) as its core measurement, except for linear habitats (hedgerows and lines of trees and rivers and streams) where habitat length (measured in kilometres) is used.*
>
> *To assess the quality of a habitat Biodiversity Metric 3.0 scores:*
>
> - *Habitats of different types, such as woodland or grassland, according to their relative biodiversity value or distinctiveness. Habitats that are scarce or declining typically score highly relative to habitats that are more common and widespread.*
> - *The condition of a habitat. Scoring the biodiversity value of the habitat relative to others of the same type.*
> - *Being 'better' and 'more joined-up' are important facets of habitats that can contribute to halting and reversing biodiversity declines, so the metric also accounts for whether or not the habitat is sited in an area identified, typically in a relevant local strategy or plan, as being of strategic significance for nature.*

Figure 9 Calculation of metric (Biodiversity Metric 3.0 Auditing and accounting for biodiversity user guide, 2021)

The TA commissioned the UK Centre for Ecology and Hydrology (UK CEH) to undertake a remote sensing survey of the rail network through aerial Light Detection and Ranging (LiDAR). This produced a 10m pixel land cover map showing 21 habitat types across the whole rail network. This exercise was undertaken during late 2019, early 2020. Habitat types were adapted from land cover classes based on the *UK-Habitats Classification System (2020)* to take account of their value on a Regional basis.

All habitat data collected by UK CEH is available for viewing by those within NR who have access to the Geo-RINM Viewer (GRV); these data extend to 1 kilometre beyond the red-line boundary. Uploads of environmental survey data collected by the business and its contractors are made on a 6-monthly basis which are also available to view in GRV.

The first State of Nature Report presented a habitat biodiversity baseline for all Regions based on the UKCEH data. This comprises total habitat units for each habitat type along with the total area of each assessed habitat. This forms a starting point to monitor No Net Loss / Net Gain at Regional level but needs "ground truthing" based on field observations. One Region noted that they may have to utilise a locally procured GIS solution to support habitat mapping and planning, but at this time no decisions have been made.

NR intend to repeat the calculations annually to enable the trajectory towards no net loss and net gain of biodiversity to be determined. The State of Nature reports will be published on an annual basis and will provide the narrative of activity that has been carried out on the network and help to explain the biodiversity metric calculations.

The metric is also being used at a local level to conduct before and after biodiversity assessments, as discussed in Section 6.5.

Implementation by Regions

The implementation of the biodiversity metric was discussed with all of the regional asset teams. It was generally acknowledged that use of the metric was in its infancy in terms of assessing net loss / gain and its potential use in offsetting.

One Region observed that the business may have massively underestimated how it goes about calculating biodiversity and habitat management, including offsetting requirements, and that there is still a lot of work to do in terms of the competencies required.

Another noted that the baseline surveys undertaken by TA are not detailed enough to inform site-level management plans. It was felt that the Defra tool was not that helpful because it is focussed on development activity and not really suitable in practice for linear infrastructure with small but regular interventions. A more detailed tool is needed to comply with the standard and to inform the development of Vegetation Management Plans and Habitat Management Plans.

It was also noted that within Capital Delivery (not the standard delivery framework), the methodology for the calculation of biodiversity impact is very new and, at a project level, it can be quite tricky to undertake assessment at this time. The Defra process was considered to be quite new and requires work especially given the extent of the linear asset base.

Southern Region

Southern Region presented some useful observations and reported that they had reached the position of no net loss from April 2021. Another review will take place at the end of the current control period and, by 2035, they expect to have demonstrated net gain against the April 2021 baseline position.

The baseline was gathered through remote sensing (by UK CEH) but there are plans to ground truth the data to establish whether results are an accurate representation of the true baseline. The Region acknowledged the challenges due to the size of the network, which is also one of the limitations and challenges of the Varley report on how biodiversity can be assessed at scale with consideration to funding requirements.

The objective for this year is to use a blockade program where significant stretches of lines are closed to carry out surveys to get a feel of ground truthed data against the remote sensing data. There are also ongoing considerations for the measurement of net gain, so currently that is being tied to capital delivery implementation schemes reporting on losses and gains. The Region acknowledges the fact that ground truth survey might differ from remote sensing survey results, noting that species diversity has not been baselined as it is very complicated to assess. In the meantime, the Region is pushing the technical capability of remote sensing by using higher resolution satellite imagery that should give better results.

Scotland's Railway

Transport Scotland adopted the Varley Review findings, but the Scottish Government have not set a biodiversity target and the planning system has not adopted Biodiversity Net Gain. The asset management team felt that this makes adopting a metric challenging in Scotland.

The detailed habitat baseline has not been established and it was considered there is not yet a viable tool or methodology for use on linear infrastructure nor the finance to produce one. Even if there were a tool and methodology available, it was considered that there is not yet the competency or resource to be able to complete the calculation. This has been highlighted and discussed with the TA, NatureScot, the ORR and Transport Scotland. The Region does have the Habitat / Biodiversity Improvement/ Loss surveys, tracked and reported by the TA via remote sensing. This is a useful big picture assessment but does not provide the level of clarity and accuracy desired.

As an interim measure, the Region has trialled a Scotland based metric that focuses on the area impacted outside of the immediate action zone, taking into account restocking a proportion of that area to mitigate vegetation removal and to facilitate a change in vegetation structure that adds more desirable woody species. The Region is also considering ringfencing funding to deliver offsetting work. They also intend to try some enhancement inside the boundary before CP7. The intention is to blend these approaches until the Region has a clear metric that works for the regulators in Scotland and the TA are happy with.

Wales and Western

In Wales, NR (as a Public Company) have adopted the 'Biodiversity and Ecosystems Resilience Duty' under the Environment (Wales) Act 2016. In 2019, the Wales & Borders Route completed their 'Section 6 summary report', which has received excellent feedback from key stakeholders from the Welsh Government and Natural Resources Wales (NRW).

The Region noted that Biodiversity Net Gain is not recognised by the Welsh Government or NRW. However, the Region is currently proceeding with the metric even though they do not consider it to be wholly suitable to linear assets. NRL and GOV are looking at natural account metrics to be used instead which advocates an enhance and maintain approach over no net loss. The Region has trialled the Defra metric on pilot site projects and the Region has "considered it to be unsatisfactory" (although the circumstances were not described).

The Region also noted that, apart from new layers on GeoRINM, there is not yet an ecology database to store the results, constraints, permission requirements or the descriptors that will be generated by the Habitat Management Plans and Vegetation Management Plans. This 'Ecology Database' is referenced in the Network Rail Biodiversity Action Plan but has not yet been delivered.

CP7 Outcomes Framework

NR's corporate balanced scorecard does not currently reflect achievement or progress towards the biodiversity targets for 2024 and 2035. The ORR have proposed environmental sustainability success measures for the CP7 Outcomes Framework that include a "Biodiversity Unit". This will complement the proposed One Planet Index that considers resource consumption and measures relating to carbon emissions. Incorporating a biodiversity measure at network and regional level would encourage a board focus for initiatives to drive implementation of the Biodiversity Action Plan, Habitat Management Plans and investment in biodiversity measures that meet DfT and legislative imperatives.

Net zero and carbon reduction

The UK is one of only a few countries to have domestic carbon standards in place for woodland creation and peatland restoration. Comprising the Woodland Carbon Code and the Peatland Code. Through these standards, woodland creation and peatland restoration can generate carbon credits for the voluntary market.

The Southern Region has completed their first natural capital assessment on the railway using data compiled from arboricultural assessments and canopy cover data to produce a valuation for the ecosystem services provided by the trees and shrubs (albeit limited by only accounting for these two habitat types). By scaling up their headline findings, and assuming 20,000 miles of linear lineside, they have calculated that NR's tree stock could:

- Sequester 69,000 tonnes of carbon every year, worth around £4,780,000
- Store 860,000 tonnes of carbon, worth around £59,340,000
- Remove 433,000 tonnes of pollutant every year, worth around £11,380,000.

NR could create woodland or restore peatland on land it owns or has some right over to raise funds for additional habitat creation/enhancement schemes through the sale of carbon credits. Subject to the necessary conditions of additionality and permanence being met, NR could apply for carbon units through these codes. Carbon credits could then be sold, via the voluntary market, to organisations looking to address their carbon footprint. Investing in net gain biodiversity schemes has the potential to generate carbon credits which would be of additional value to NR and reduce the cost of offsetting emissions and make progress towards net zero. However, this alone is considered unlikely to prove a method for delivering a net gain in biodiversity for NR, given they NR itself is a net emitter of carbon.

Independent Reporter's observations

The Defra biodiversity metric has been used to assess habitat scores across the network. It has been noted that this approach has its limitations, particularly for linear infrastructure, and is not formally accepted in Scotland and Wales. However, the adoption of a common measure across the network permits like for like comparisons relating to best practice and supports achievement of NR's biodiversity targets. A common measure is also important in adopting biodiversity offsetting where unavoidable loss of habitat occurs, and improvements to compensate for this need to be made at another location.

While the Defra metric has some drawbacks, the Independent Reporter considers that its continued use and development of this measure across the Network's lineside estate can be viewed as complementary to any local systems adopted that are likely to rely on a similar data set.

The biodiversity baseline was established by remote sensing and work is under way to "ground truth" the habitat data through surveys on the ground to complete the information used in deriving the biodiversity metric. This is an activity that Regions report is only just starting and revealing some inconsistencies with the remote sensing data. Full habitat surveys are undertaken before and after all major works on the railway.

There is a need for a central information system to record characteristics used in calculating biodiversity scores ("ecology database") that is aligned with other asset data systems used in vegetation management. This would support demonstration of achievement of biodiversity targets. This data can also be used to assess changes due to natural causes or manmade interventions to support appropriate management of the lineside estate and undertaking offsetting calculations. This data would also form part of the information on habitat in sectional plans described in Module 2 of NR/L2/OTK/5120.

The introduction of a biodiversity measure is considered to represent a useful step in achieving recognition of the importance of NR's natural capital.

The Independent Reporter considers that there is an additional opportunity to obtain a return from investment in net gain biodiversity schemes by generating carbon credits. This would be of additional value to NR and reduce the cost of offsetting emissions and make progress towards net zero.

4.5.5 Risks and challenges

No additional risks and challenges were identified by stakeholders in connection with this topic in the questionnaire responses.

4.5.6 Confidence ratings

Appendix A.2 presents the basis for the Independent Reporter's assessment of the confidence ratings for this topic, which are summarised below. The following evidence, documented or otherwise are typical of those considered in the assessment:

- Regional / route dashboard / tracker
- Inspection data to support compliance assumptions
- Standard defining information to collect
- Information systems use to collect information
- Use of CCIL data
- Processes to review and act upon information (see also 1(d))
- State of Nature report (network wide and regional appendices)
- Information systems to capture biodiversity metrics
- Dashboard etc to report on net loss / gain progress

Table 16 Assessment of appropriateness of KPIs used by Regions

Region	Confidence ratings and basis for assessment	
Eastern	- Approaches to defining profile compliance vary between routes but are in line with standard. - Reported extent of profile compliance suffers from issues relating to currency of inspection data. - Maintenance works planning described which takes into account incidents and WSFs - Some progress on biodiversity measurement, but unclear how net loss / gain are being measured and tracked. - Use of habitat data and biodiversity baseline published in State of Nature Report.	2
North West & Central	- Common approach to defining profile compliance used across all routes which complies with the standard. - Use of compliance tracker described but not seen. - Maintenance works planning described which takes into account incidents, but no documents provided. - Progress being made in biodiversity measurement, including ground truthing.	2

	• Approach developed to monitor and record biodiversity net gain. • Use of habitat data and biodiversity baseline published in State of Nature Report.	
Scotland's Railway	• Common approach to defining profile compliance used across the Region which complies with the standard. • Compliance tracker provided. • Maintenance works planning described which takes into account incidents, but no documents provided. • Biodiversity baseline using Defra metric published in State of Nature Report. • Investigating alternatives to Defra measure for use in Scotland. • Approach developed to monitor and record biodiversity offsetting.	**2**
Southern Region	• Different approaches to defining profile compliance used in Wessex, but all broadly comply with the standard. • Compliance tracker provided. • Maintenance works planning described which takes into account incidents, but no documents provided. • Good progress on biodiversity measurement. • Use of habitat data and biodiversity baseline published in State of Nature Report.	**3**
Wales and Western Region	• Different approach to defining profile compliance in Wales and Wessex, although both broadly comply with the standard. • Compliance tracker not provided. • Maintenance works planning described which takes into account incidents, but no documents provided. • Biodiversity baseline using Defra metric published in State of Nature Report. • Investigating alternatives to Defra measure for use in Wales.	**2**

4.5.7 Key performance indicators – Improvement opportunities

The following improvement opportunities have been identified in relation to the appropriateness of key performance metrics / indicators used by the Regions

Table 17 Key performance indicators – Summary of improvement opportunities

Improvement Opportunity Ref	Summary of improvement opportunity
I-08	There are differing approaches being used to report overall compliance of lineside vegetation with the requirements of NR/L2/OTK/5201. This is due to issues relating to how compliance is defined and reliable data to support progress in meeting each route's strategic objectives. Establishing a consistent picture of the condition of vegetation within each intervention zone would assist in establishing a link between clearance and maintenance activities and vegetation related incidents, including close calls and interventions. This requires appropriate data to be gathered and interpreted at sufficiently regular intervals to support planning and take account of re-growth. This would also support better measurement of the progress being made in achieving compliance against the route's long term maintenance programmes and achievement of network performance targets.
I-09	There exists a wealth of information within Network Rail on the condition of lineside vegetation, maintenance works, external factors such as weather and incidents related to vegetation. There is currently no readily accessible means to compare leading and lagging indicators to support the assessment and reduction of safety and performance risk and planning. Bringing this data together in an accessible form would develop better insights into how the asset behaves and promote measures that lead to a safer railway and more efficient use of resources.

Improvement Opportunity Ref	Summary of improvement opportunity
I-10	The Defra biodiversity metric has been used to assess habitat scores across the network. It has been noted that this approach has its limitations and is not formally accepted in Scotland and Wales. However, the adoption of a common measure across the network permits like for like comparisons relating to best practice and supports achievement of Network Rail's biodiversity targets. The continued use and development of this measure across the Network's lineside estate can be viewed as complementary to any local systems adopted that are likely to rely on a similar data set.
I-11	NR will be able to demonstrate its commitment to meeting its biodiversity targets through adoption of a measure in its Outcomes Framework. Consideration should be given to ensuring that this measure is reflected in regional scorecards and that the trajectory to meeting the targets is assessed at regular intervals.
I-12	There is a need for a central information system to record characteristics used in calculating biodiversity scores that is aligned with other asset data systems used in vegetation management. This would support demonstration of achievement of biodiversity targets. This data can also be used to assess changes due to natural causes or manmade interventions to support appropriate management of the lineside estate and undertaking offsetting calculations. This data would also form part of the information on habitat in sectional plans described in Module 2 of NR/L2/OTK/5201
I-13	There is an opportunity to obtain a return from investment in net gain biodiversity schemes by generating carbon credits. This would be of additional value to NR and reduce the cost of offsetting emissions and make progress towards net zero.

4.6   Risk from vegetation – Topic 1(d)

4.6.1   Scope of review

The scope of this topic is summarised below:

Assess and comment on the robustness of the Regions' vegetation management plans and practices with respect to how they identify, manage and mitigate risks arising from vegetation – these include, but are not limited to, tree falling on the line, ash dieback tree disease (see Appendix B for the Tree Council Report "Ash Dieback Disease - a Toolkit for Network Rail"), leaf fall, extreme weather, etc.

4.6.2   Network Rail's approach to the management of vegetation risk

The core document of NR/L2/OTK/5201 sets out NR's approach to managing risks relating to vegetation and introduces loss of habitat as a consideration:

The key principle that underpins this standard is that risk from lineside vegetation should be understood so that appropriate controls can be selected and applied. Risk may be related to safety, performance, loss of habitat, cost or reputation.

Risks from lineside vegetation are identified, assessed and action is taken to control them. This is a continuous process, using the results of inspections and the full range of lineside vegetation information available.

An early draft of NR's latest Lineside Asset Policy V0.1 introduces an approach to prioritising interventions that will incorporate consideration of risk to safety, service, structures, and the environment.

Independent Reporter's observations

NR adopt a risk-based approach in managing the vegetation asset, which is described in the Vegetation Management Manual and its various modules and reporting processes. The Independent Reporter did not undertake a detailed review of the applicability of the standard but considers the overall approach to maintaining safety is appropriate. Some inconsistencies exist across the assessment approaches relating to different types of risk, as discussed above, and would benefit from future improvement.

The assessment of risk relating to vegetation on the lineside and from third party trees covers a wide range of situations and potential hazards. Therefore, the Independent Reporter was only able to conduct a review of the overall approach adopted by each Region based on a sample of reports and documents. This focussed on areas of specific interest identified by the ORR using the evidence offered by NR Regions.

A review of the top risks identified by each Region showed that there was no formal way to collect and review these at network level. There would be a safety and performance benefit in establishing a structured approach to identifying and assessing reported risks and issues and merging trends in incidents that have implications across the network.

4.6.3 Role of inspections in identifying risk

Type of inspections and frequency

NR's approach to identifying risks associated with vegetation are described in *NR/L2/OTK/5201 Module 01 Lineside vegetation inspection and risk assessment*. The principal types of inspections and required frequencies are shown in Table 18.

Table 18 Types of inspection and frequency (from Table 1 in NR/L2/OTK/5201 Module 1)

Type and Form	Extent	Method	Minimum Frequency	Maximum Interval
Vegetation on-foot inspection NR/L2/OTK/5201/F3079 Lineside vegetation inspection	All Operational ELRs Disused and closed lines, and other non- operational land	On foot	36 months	44 months
Cab ride of lineside vegetation NR/L2/OTK/5201/F3270 Cab ride of lineside vegetation report	All operational ELRs	Cab or video	12 months	16 months
Remote Survey	All Operational ELRs Disused and closed lines, and other non- operational land	Remote survey facilities To identify trees within falling distance of the railway and outside party land	60 months	68 months
Tree inspection NR/L2/OTK/5201/F3077 Tree hazard risk evaluation and treatment system	All Operational ELRs Disused and closed lines, and other non- operational land	On foot	30 months	36 months
Leaf fall inspection NR/L2/OTK/5201/F3076 Leaf fall risk assessment	All Operational ELRs	On foot	60 months	68 months

The inspection of hazardous trees is discussed further in Section 4.6.4 and those affected by ash dieback in Section 4.6.5. The assessment of risks from leaf fall is discussed in Section 4.6.6.

The standard defines qualifications for undertaking different levels of assessment. Timescales for immediate response and corrective action relating to the condition of the lineside vegetation are assigned by the inspector as described in the standard.

Some Regions noted they had measures in place to undertake inspections more frequently than the three-year interval prescribed by the standard. This was noted as being situations where rapid growth takes place and/or disease causes vegetation to deteriorate rapidly.

On foot inspections

On-foot inspections record information on vegetation in the Immediate Action and Action zones shown on Figure 3. Inspections must be carried out in daylight and at specified times of the year.

Vegetation inspectors use Field Data Manager (FDM) to complete the inspections and raise Work Arising Information Forms (WAIFs). This is then reviewed by the section manager (or equivalent) who then assigns the appropriate priority. Information may also be collected using the MyWork App and Pole Star (Hazardous Tree, including Ash Dieback, and Leaf Fall Survey) and uploaded and held in Ellipse to manage vegetation maintenance works.

The vegetation asset condition records within Ellipse are required to be updated following inspection or any activity that results in a change to the asset within 28 days of the inspection.

Cab-ride inspections

Cab ride inspections are undertaken during daylight hours to record, where identified:

- Vegetation obstructing sighting of signals and level crossings
- Vegetation encroachment on ole
- Location of hazardous trees
- Vegetation within the ballasted area
- Vegetation leading to blocking or obstructing walkways, cess paths, refuges or places or safety
- Invasive non-native species (INNS) present
- Vegetation within proximity of contacting rail vehicles.

NR/L2/OTK/5201 Module 01 notes that

- Video may be used as an alternative to cab ride inspections
- Cab riding is not required in the year that the vegetation on-foot inspection is carried out
- The results from the inspections are recorded in *NR/L2/OTK/5201/F3270 Cab ride of lineside vegetation report.*

Covid-19 dramatically reduced the ability of inspectors to undertake cab ride inspections and has contributed to a backlog in information so support the assessment of compliance.

One Region noted that carrying out inspections in train cab travelling at between 70 and 90 mph and recording observations for every 1/8th had its limitations in terms of accuracy and repeatability.

Train borne video

Video is being increasingly used to complement observations made by inspectors on foot or during cab rides. Observing playbacks avoids details being missed but is time consuming to analyse. Artificial intelligence tools such as the Automated Intelligent Video Review (AIVR) system and Hubble are being used in identifying hazards to assist in the planning and assessment of reactive works in response to encroachments and incident response. Video capture can also be used to assess condition parameters that can are used to assess compliance.

A frequent comment was that the artificial intelligence tools had a tendency to falsely identify vegetation as presenting a hazard where an inspector would have disregarded it. However, a degree of caution was felt to be acceptable.

Other survey tools

Regions reported the increasing use of drones to undertake surveys much more rapidly and safely than on foot and without the limitations of viewing from a train cab. Drone surveys were reported to be particularly useful in identifying DDD trees, ash dieback and assessing compliance to the vegetation standard.

The use of LiDAR and aerial survey has already been referenced in Section 4.5.4 in connection with collecting habitat data.

A common view expressed by regional consultees was that having better and more detailed information from video and LiDAR may reveal more hazardous or diseased trees than had been previously known about.

Interpreting inspection and survey data

The issue of interpreting the data from routine inspections and video surveys was raised during the workshops. Regions noted development their own analysis tools, use of GIS applications and dashboards to analyse the type, extent, and condition of vegetation alongside data relating to incidents and delays.

NR is currently introducing its web based digitised lineside inspection (DLI) tool that is intended to integrate the interpretation of all forms of data relating to vegetation. The TA noted that the roll out of DLI in late CP6 and early CP7 will be instrumental in improving NR's vegetation management practices. It is intended to deliver a regularly updated quantitative assessment of compliance and provide information on tree health, allowing more comprehensive prioritisation of interventions.

Information from the TA outlines the following features that will be available in DLI:

- Web-based application that can be used to complete vegetation inspections
- Consistently refreshed and countrywide Forward Facing Video Data (both as video and still frames) – based on AIVR and measurement fleets (PLPR & NMT)
- Aerial Survey 'LiDAR' data and vegetation encroachment detection model
- Hyperspectral data – to indicate tree health and vitality – note: will also become available with early tactical release when ready
- Integration with asset data held in Ellipse
- Ability to complete inspection 'Work Orders' on DLI
- Tree Risk Model information
- Machine Learning capabilities

A number of Regions reported that they had been involved in the development and trials of DLI. Its introduction was eagerly awaited and was seen as offering a step change in capability in interpreting the large amount of inspection data becoming available, to support risk management and compliance with the relevant vegetation standards.

Other sources of information

Safety risks relating to vegetation may also be advised through:

- Signalling and Telecom (S&T) reports relating to signal sighting
- Level Crossing inspections
- 12 weekly overhead line inspections.
- Fault control
- Train driver reports
- Complaints from TOC/FOCs (damage to trains)
- Scenic View Clearance (HLOS) commitment (Scotland only)
- Close call system.
- Community Relations Service requests
- Walking Route surveys

This review did not consider the response to encroachments in the immediate action zone in detail. Examples were provided by Regions of encroachment incident trends (count and delay minutes) and wrong side failures in regional dashboards. Encroachment incidents are summarised in the in TA's lineside assurance pack (see Section 4.5.3.

Independent Reporter's observations

The extent and condition of the vegetation asset is defined using a number of parameters collected through inspections and safety related reports. Remote sensing technology is being increasingly used to improve the frequency that information is collected and its quality.

Inspection schedules and sample reports were provided to the Independent Reporter. This was not sufficiently detailed to permit a detailed review of whether inspection frequency targets are being met.

Regional teams and the TA stated that information on vegetation condition currently incomplete due to backlog issues with inspections during the pandemic, although this is now being caught up with. Information provided by the TA showed that Regions were ahead of inspections for Period 11 for 2021/22, but this did not show long term trends.

Asset teams frequently observed that asset data was also out of date due to the intervals between inspections (typically three years), maintenance interventions not being logged and rapid regrowth. This hinders obtaining a complete understanding of where there are potential risks due to vegetation and planning appropriate interventions.

The Independent Reporter considers that improvements in interpreting asset information are only of benefit if appropriate data are gathered and interpreted at sufficiently regular intervals to support planning and take account of re-growth. This would also support better measurement of the progress being made in achieving compliance against route's long-term programmes.

The introduction of more sophisticated analysis tools places an increasing reliance on the quality of data they rely on. The dynamic nature of vegetation and the scale of the asset creates challenges in maintaining a dataset that represents the features of most relevance to safety, performance, and biodiversity. It would be timely to review the requirements and robustness of the data inventory and information systems that support current maintenance needs and long-term planning decisions.

There are many different sources of information currently being used by asset teams in managing the lineside asset. It has been noted that this is often difficult to review in developing a complete picture of asset status / condition at different levels of granularity. Regions are developing their own dashboards and GIS tools to process and view data. There are benefits in combining condition, maintenance, and incident data in one place to facilitate the identification of risks and maintenance planning.

The assessment of asset information will be improved through the introduction of the Digitised Lineside Inspection (DLI) tool which enable asset management teams to better understand risks and focus maintenance resource. The introduction of this tool was welcomed by Regions, but the Independent Reporter considers that its successful implementation will depend on an accompanying business change programme.

Evidence was provided by the TA of future programmes to complement improvements in capturing and presenting asset data with decision support tools to assist in investment planning.

4.6.4 Risks from falling trees

Trees are routinely inspected and managed in accordance with NR/L2/OTK/5201 Module 4 Tree Management. This module covers:

a) Collecting data on trees (greater than 3m in height or equivalent stem diameter >150mm)
b) Using data to evaluate the risk and to understand impact of interventions
c) Establishing a consistent approach to tree management planning and undertaking work
d) Requirements for tree planting
e) Establishing a consistent approach to applying contingency measures to manage emerging and immediate threats.

Routine on-foot vegetation inspections are used to identify trees that are within falling distance of the running line or third parties. Any trees identified as being potentially hazardous, with the capability to cause derailment or harm, are assessed and recorded using *NR/L2/OTK/5201/F3245 Tree risk evaluation and control by non-arboriculturists*. This form uses the Tree Hazard: Risk Evaluation and Treatment System (THREATS) approach to consider factors relating to likelihood of failure, nature of the adjacent railway (multiple lines and line speed) and potential impact. These are combined to derive a risk score and threat category, each with a corresponding control measure. A tree may require further inspection by a qualified arboriculturist, who will record the relevant details and recommendations for its management using *NR/L2/OTK/5201/F3077 Tree hazard risk evaluation and treatment system*.

Where an incident of tree or tree branch failure occurs and causes death / injury, derailment, damage, or train delay the details are recorded using *NR/L2/OTK/5201/F3211 Fallen Tree Incident Form.* This captures details of the vegetation involved and causes of the failure, line type, photos, and hazard scores.

If a tree is located on third party property, then arrangements are made for the necessary intervention, either undertaken by its owner or directly be NR. This requires formal notifications using standard letters *NR/L2/OTK/5201F3244A/B*.

Examples were provided in the evidence packs of:

- Tree inspection plans
- Detailed inspections of individual tree and groups of trees
- Spreadsheets used to score individual trees
- Master summaries of tree inspections
- Hazardous tree registers

Spreadsheets were provided with details of tree inspections, the derived hazard scores, deadlines for action and any trees where the action was overdue. For example, a summary of surveys from Eastern Region showed that out of a total of 4365 trees surveyed, 185 had a risk score of 4 or higher and of these 20 of those with risk score of 4 had actions outstanding.

All Regions described issues around managing trees on neighbouring land that needed felling or trimming to protect the railway. Examples were provided of the procedures that are followed to contact the tree owners to carry out the work. Some Regions noted that, while NR can insist on the owners carrying out the works, it was often more expedient for the DU to carry out the works themselves than face the risk of a tree falling onto the tracks or OLE.

Monitoring incidents due to trees falling on the line are discussed in Section 4.5.3.

Independent Reporter's observations

All Regions provided evidence that the risk assessment approach described in the relevant sections of the standard relating to individual trees was being followed. There appeared to be a reliance on locally developed spreadsheets and dashboards to post process inspection information from the database (Ellipse).

The risk from third party trees presents a particular risk as NR does not have a role in their management until they are identified as presenting a hazard. Regional teams have established procedures for liaising with their owners to have them made safe, but often undertake the works directly to avoid protracted negotiations and to keep the railway safe.

Evidence was provided of interventions assigned to trees that presented a significant risk, timescales for the action to be completed and completion of the relevant works.

The Independent Reporter did not identify any evidence to suggest that there are particular concerns relating to this risk management process.

4.6.5   Ash Dieback Disease

Ash dieback disease is caused by a fungal pathogen called Hymenoscyphus fraxineus, also known as Chalara fraxinea, and is the most significant tree disease to affect the UK since Dutch elm disease in the 1960s and 1970s. It is likely to lead to the decline and death of most ash trees in Britain over the coming decades.

The Tree Council produced *Ash Dieback Disease – A toolkit for Network Rail (2020)* that sets out the basis for Route-Based Ash Dieback Action Plans to manage the spread of the disease.

The toolkit provides a simple framework for assessing the condition of trees based on canopy density and management approaches corresponding to each of five "health classes" or risk categories, with zero corresponding to no action requires, to 5 requiring immediate action to protect trains and the public. Note that trees of Category 3 and higher require a THREATS assessment as described in Section 4.6.4

Examples were provided of databases of trees with ash dieback and dashboards monitoring the management of affected trees. Ash dieback was identified as a significant risk or challenge by most Regions, and they were asked to comment specifically on this issue.

Eastern

The Region had started to use drones to survey ash trees, in particular for ash dieback. An example was provided where along a 50-mile section of track conventional inspection methods had identified fewer than

50 hazardous trees, compared with 849 identified by drone. This creates concerns around understanding the true scale of the problem and resources needed to manage it. Ash Die Back mitigation was considered to represent challenges both in terms of funding availability and industry capacity to undertake mitigation works.

North West & Central

Ash Dieback programme is currently at the Year 1 survey stage and risk is currently managed in line with NR/L2/OTK/5201 and the Ash Dieback Toolkit. An action plan will be generated on completion of first survey following the Toolkit guidance document. Some top-down modelling of estimated number of ash dieback trees has been undertaken which is being verified through the Vegetation Asset Management System (VAMS) survey.

Scotland

Some top-down modelling of the estimated number of ash dieback trees has been undertaken which is being verified through the VAMS survey. Ash dieback has become an emergent risk during this control period. More has been learned about it from other Regions where it is at a greater stage of decline. The risk profile for CP7 will be dependent on funding.

Southern

The Region plans that all ash trees that are Category 3 or worse will have all been removed by the end of CP6, after that management will reach a steady state. The assumption for the CP7 submission is that ash die back will be passed back to the DUs to inspect and manage. It was noted that there are other diseases that also need to be considered as well as ash dieback. The biggest risk to vegetation in the south was considered not to be disease, but climate change as growing season is getting longer.

Wales and Western

It was noted that there had been a rapid development of ash dieback. The Region once believed it would take five years to go through the inspection and assessment cycle, but that is now closer to one to two years. If not treated within correct timescales it becomes dangerous for staff to remove the trees and so therefore costs more and takes longer. An Ash Dieback Action Plan has been produced based on the Toolkit and the Region is proactively dealing with ash trees in Category 2.

Independent Reporter's observations

Ash Dieback (ADB) rapidly weakens affected trees and is a serious problem that will affect all infrastructure operators over the coming years. The condition of ash trees is assessed using a process that is applied alongside the routine tree inspection process and also from surveys focussing on this species. All Regions evidenced that ADB is a significant risk to the safety and performance of the railway.

There exists uncertainty regarding the number of trees affected by ADB and the resources required across the network to mitigate associated risks in terms of safety, performance, and cost. This also affects assumptions relating to CP7 planning. There is a need for better asset knowledge relating to the spread of the disease and how to make the most appropriate interventions.

An appreciation of the significant biodiversity losses resulting from large-scale ash removal needs to be used to temper any programmes for that removal.

4.6.6   Leaf fall

Seasonal leaf fall can lead to low adhesion between train wheels and the rail.

The RSSB document, *Rail Industry Standard RIS-8040-TOM Managing Low Adhesion* sets out a framework to develop, implement, monitor, and review the effectiveness of site-specific plans to manage low adhesion at identified high-risk sites, which the procedures adopted by NR described below broadly follow.

NR's approach to managing this issue is covered in *Business Process – High risk sites for wrong side track circuit failures in leaf fall areas and for low rail adhesion NR/L2/OPS/095* and associated modules covering risk assessment and management.

NR/L2/OTK/5201 Module 1 describes the inspection and assessment process relating to leaf fall. Inspections are carried out to assess the severity of leaf fall expected during the Autumn period on operational lines for each eighth of a mile section. The assessment covers the risk from trees beyond the operational boundary. The form *Leaf fall risk assessment NR/L2/OTK/5201/F3076* is used to record the results of the inspection and assign a leaf fall risk score based on the following factors:

- Main Species, with the highest score attributed to ash, sycamore, horse chestnut, sweet chestnut, poplar and lime
- Tree Size
- Surrounding Land
- Distance From Rail, including overhanging trees
- Other Vegetation
- Topography
- Atmosphere
- Tree Density

The corrective actions suggested for each leaf fall category are shown in Table 19. If the leaf fall risk score is 3, 4 or 5 complete a WAIF stating the work is required to reduce the risk score. On completion of the work the site should be re-scored, and the details updated in Ellipse.

Table 19 Leaf fall action for each risk category (from Table 3 in NR/L2/OTK/5201 Module 1)

Leaf fall category	Description	Corrective action
5	High risk throughout the leaf fall period	Twelve months
4	High risk during peak leaf fall period and wet conditions	Mitigate by the beginning of the second growing season
3	Moderate risk during peak leaf fall period and wet conditions	Mitigate by beginning of third growing season
2	Low Risk	No mitigation required.
1	Negligible risk	

All sites of high risk for wrong side track circuit failures or of low rail adhesion are assessed using an adhesion risk matrix NR/L2/OPS/095/F01 which uses a combination of probability and impact to derive a site risk score. Mitigation measures include reducing the source of the problem through vegetation clearance, as well as measures to inspect and treat the rail head.

Completion of the risk assessment process and decisions on appropriate mitigations are carried out by the Operational Risk Manager, based within the Regional Asset Management team, and supported by the Seasonal Delivery Specialists and in conjunction with operators.

Eastern Region noted the seasonal review processes feeds into vegetation plans in following years as it highlights trends in leaf fall and tree fall, allowing these factors to be considered when forward planning. Failures are also tracked as part of the period reporting process. Liaison with the TOCs and FOCs as part of ongoing communication allows emerging issues to be identified and targeted for intervention.

Cardiff and Shrewsbury DUs (Wales Route) issued TVs relating to leaf fall surveys in May 2021 and June 2020 respectively as the five-year deadline to complete these had lapsed. Compliance dates of May 2022 and June 2023 were agreed, with sites with a high risk of leaf fall being prioritised for inspections as part of routine tree surveys.

Areas with record of low adhesion incidents and species whose leaves are particularly prone to cause low adhesion are usually prioritised for clearance works (see also 1(b)).

Rail head treatment plans typically consider sites of Risk Category 5 and locations that had experienced multiple SPADs or station run throughs in the last three years.

Examples of Autumn Working Arrangements prepared using the document standard NR/L3/OPS/021/01 were provided by all Regions except for Wales and Western. These documents include provision of measures relating to leaf fall.

North West & Central provided an example of how leaf fall risk score is calculated from raw data collected in accordance with NR/L2/OTK/5201/F3076 for over ten thousand individual 1/8ths. Of these, 3% fell in High Risk Category 4 and 0.4% in High Risk Category 5.

Independent Reporter's observations

The assessment of the risk due to seasonal leaf fall is undertaken as part of the routine inspection process and considers a number of factors including past incidents. Evidence was provided of the assessment process being applied and autumn working arrangements that incorporate measures to manage the risk.

Evidence was provided of areas with a high risk due to leaf fall being prioritised for vegetation clearance works.

There was insufficient detail presented in the document provided to draw any conclusions regarding the overall effectiveness of short- or long-term measures or the management approach. However, the Independent Reporter did not see any evidence to suggest that there are particular concerns relating to the overall risk management process.

4.6.7 Extreme weather

The NR document *NR/L2/OPS/021 Business - Process Weather – Managing the Operational Risks* defines the term *Adverse / Extreme Weather* as:

A period of weather that is outside the normal range that includes periods of prolonged and / or intense rainfall, prolonged dry and / or hot periods and periods of repeated freezing and thawing. These events can result in scour, storms, flooding, high tides, desiccation or high groundwater levels, increasing the likelihood that an asset may fail, suffer performance loss or experience accelerated degradation.

The principal hazard relating to extreme weather that directly affect vegetation is high wind speeds. However, heavy rainfall and freezing temperatures can cause slope failures that indirectly cause damage to or the failure of trees. The relationship between vegetation and slopes and cuttings is further discussed in Section 4.8.

It is noted that the potential for long periods of drought or hot weather to increase the likelihood of lineside vegetation catching fire are considered in the appendix to NR/L2/OPS/021.

NR/L2/OPS/021 mandates how Network Rail:

a) Prepares, manages and responds to operational risks arising from adverse and extreme weather events;
b) Prepares for, mitigates and manages seasonal weather-related activities.

In addition, it provides guidance to train and freight operators on their actions to manage weather hazards.

NR/L2/OPS/021 applies to:

a) Forecasting of weather to manage:
    Routine preparation, planning and response to weather hazards
    Seasonal weather preparation and its management
    Near real-time monitoring of weather hazards.
b) Recovery and lessons learnt from weather hazard responses
c) Weather hazard contingency planning, plan rehearsal and exercising
d) Vulnerable asset response planning.

The business process describes the role of Route Control Managers and DUs in planning for and managing extreme weather events. An Extreme Weather Action Teleconference (EWAT) is convened by the route Current Operations Manager (COM) to:

- Assess the impact of extreme weather on the infrastructure

- Agree appropriate mitigation, monitoring and contingency plans as detailed in the integrated weather management plan
- Communicate actions and decisions.

When two or more routes activate the Extreme Weather Response process for a weather event the status of alert is referred to as double red. When a double red status is declared, the National Operations Centre (NOC) will decide whether a national EWAT is required to prepare for and manage the weather event. The national EWAT is led by the NOC Duty Controller and shall involve all affected Routes and TOCs / FOCs.

Route's arrangements for seasonal management are included in their seasonal working arrangement documents for the following seasons:

- Summer - 1 April to 30 September
- Autumn - 1 October to 13 December (but may be modified based on prevailing conditions)
- Winter - 1 October to 31 March

Trees with a risk score of 3 or higher should be reinspected after storms (Force 10+).

Examples of Autumn Working Arrangements prepared using the document standard NR/L3/OPS/021/01 were provided by all Regions except for Wales and Western. Eastern Region and North West & Central Region also provided examples of their Summer and Winter arrangements, with Southern providing their summer arrangements.

Examples of extreme weather plans or processes were provided by Eastern and North West & Central Regions and Scotland's Railway.

North West & Central Region noted an increase in storms, rainfall, extreme adverse weather, exceptional flows etc. The potential effects of these are considered in prioritising in planning clearance works, particularly where they may affect third party trees because there is limited ability to deal with them preventatively.

Scotland's Railway observed that the 2021 Storm Arwen and 2022 Storm Malik and Corrie created a significant risk to railway operations. Between these two storm events more than 150 trees came down with approximately 50% of these being from outside the boundary. Less than five of these trees had been identified during inspections, although the survey had not been completed on some of the affected routes. Many of the trees that came down were healthy trees. Subsequent smaller storms saw trees fail that could have been weakened by the larger storms. Reactive works to manage these fallen trees diverted funds from planned works. Schedules of trees affected have been provided that include instances of trains colliding with the trees themselves or branches.

An issue with storms Eunice and Franklin was reported where the wind initially came from the prevailing direction and then from the other direction, knocking down trees that had survived the preceding (and other) storms.

Independent Reporter's observations

Examples were provided of Regions' extreme weather plans, but not in sufficient detail to draw specific conclusions regarding their appropriateness or the way in which they were implemented. These are based on NR's business processed for dealing with adverse and extreme weather, which involves a network level response to severe incidents.

Regional asset teams observed that an increase in extreme weather events caused by climate change is leading to patterns of failures in trees that would previously been considered to represent a low risk of failure. Analysis of the details of failures of trees during storms would lead to a better understanding of the consequences of extreme weather events and how to mitigate them. This may lead to changes in the management of trees and the response to extreme weather events.

Examples were provided of unexpected damage occurring to trees during storms that were not considered a cause for concern. Analysis of the details of these failures would lead to a better understanding of the consequences of extreme weather events and how to mitigate them.

In addition to effects climate change such as severe storms and intense rainfall, drought and extended growing seasons were also reported to be factors to be taken into account in managing lineside vegetation.

4.6.8 Risks and challenges

Risks and challenges identified in questionnaires by the TA and regional asset teams in connection with this review topic are quoted below:

Climate Change:
- *"Increasing incidence of high wind events. Lengthening and improvement in growing conditions for many tree species, so increased increment each season not maintained or cleared.*
- *"Potential loss of some trees in times of drought."*
- *"Management of trees during storm events"*

Ash Dieback:
- *"Highest risk with a high percentage being 3rd party. Specialist inspections by the Waterman Group and managed by the DU."*
- *"Access to the railway to deal with this risk"*
- *"Ash dieback constitutes the biggest area of risk on the railway moving through the end of CP6 and into CP7"*
- *"Ash Dieback – increase cost"*
- *"Rapid development of ash dieback, we once believed it would take 5 years to go through cycle however now we are looking at 1 – 2 years. If not treated within correct timescales it becomes "dangerous for staff to remove the trees and so therefore costs more money, planning and time.*
- *"Hazardous tree removal – ash die back, rapid progression of disease, finding 1000s of tree that's needed to be removed."*

"Increased likelihood of imported tree pests and diseases, such as Emerald Ash Borer, Asian Longhorn Beetle, Xylella bacterial wilt and Phytophthora derivatives."

"3rd Party Trees – High cost and long timescales for engagement, restocking requirements where large volumes need to be removed as part of felling licences"

"Management of outside party trees "

"Dead dying diseased trees / tree failures during weather (derailment) – identified through the Lineside Tree Survey (LTS), management process still being defined in some delivery unit areas budget and resource constraints make are a constraint"

4.6.9 Confidence ratings

Appendix A.2 presents the basis for the Independent Reporter's assessment of the confidence ratings for this topic, which are summarised below. The following evidence, documented or otherwise, are typical of those considered in the assessment:

- Strategies / policies
- Standards for inspection, risk assessment, prioritisation and maintenance
- Regional / route dashboard
- Escalating risks within organisation
- Individual reports / WAIFs
- DDD schedules
- Approach to dealing with third party trees
- Survey data
- Databases of affected trees
- Individual tree reports
- Work plans to manage affected trees, including assumptions
- Seasonal working arrangements
- Leaf fall risk assessment database
- Regional / route extreme weather plans
- Specific effects of extreme weather events

Table 20 Assessment of Regions' management of risks arising from vegetation

Region	Confidence ratings and basis for assessment	
Eastern	• Sound approach demonstrated. • Assumed risk assessment approach as per standards. • Clear Risk based prioritisation approach.	**3**
North West & Central	• Sound risk management processes evidenced. • Examples of processes used to manage seasonal vegetation issues and extreme weather provided. • Clear Risk based prioritisation approach.	**3**
Scotland's Railway	• Sound approach to risk management and good examples of seasonal and extreme weather management. • Clear risk-based prioritisation approach.	**3**
Southern Region	• Sound approach demonstrated. • Assumed risk management approach as per standards. • Clear risk based prioritisation approach.	**3**
Wales and Western Region	• Sound risk management processes evidenced. • Examples of processes used to manage seasonal vegetation issues and extreme weather not seen. • Unclear risk based prioritisation approach.	**2**

4.6.10 Risk from vegetation – Improvement opportunities

The following improvement opportunities have been identified in relation to the appropriateness of how Regions identify, manage and mitigate risks arising from vegetation.

Table 21 Risk from vegetation – Summary of improvement opportunities

Improvement Opportunity Ref	Summary of improvement opportunity
I-14	There was no evidence of an organised system to capture and assess risks relating to lineside vegetation. There would be a safety and performance benefit in establishing a structured approach to identifying and assessing reported risks and issues and merging trends in incidents that have implications across the network.
I-15	There is an ambitious programme to roll out the Digital Lineside Inspection system and other asset management tools. There is a risk that the benefits of these initiatives could be diminished, and their implementation becomes a burden on already over-stretched asset teams. The success of their roll out would be improved if they are accompanied by a parallel business change programme.
I-16	There are many different sources of information currently being used by asset teams in managing the lineside asset. It has been noted that this is often difficult to review in developing a complete picture of asset status / condition at different levels of granularity. Regions are developing their own dashboards and GIS tools to process and view data. There are benefits in developing tools to combine condition, maintenance, and incident data in one place to facilitate the identification of risks and maintenance planning.
I-17	The introduction of more sophisticated analysis tools places an increasing reliance on the quality of data they rely on. The dynamic nature of vegetation and the scale of the asset creates challenges in maintaining a dataset that represents the features of most relevance to safety, performance, and biodiversity. It would be timely to review the requirements and robustness of the data inventory and information systems that support current maintenance needs and long term planning decisions.
I-18	All Regions evidenced that ADB is a significant risk to the safety and performance of the railway. The management of ADB is expected to represent a significant cost during CP7 and there exists some uncertainty regarding the scale of the issue. There is a need for better asset knowledge relating to the spread of the disease and how to make the most appropriate interventions.

Improvement Opportunity Ref	Summary of improvement opportunity
I-19	An increase in extreme weather events caused by climate change is leading to patterns of failures in trees that would previously been considered to represent a low risk of failure. Analysis of the details of failures of trees during storms would lead to a better understanding of the consequences of extreme weather events and how to mitigate them. This may lead to changes in the management of trees and the response to extreme weather events.

4.7 Maintenance targets and reporting – Topic 1(e)

Scope of review

The scope of this topic is summarised below:

Assess and comment whether Regions' maintenance targets and reporting are aligned with their vegetation management plans and KPIs to make progress towards compliance and manage risks.

The Independent Reporter team has looked to establish how Network Rail Regions' vegetation maintenance targets and reporting is undertaken for following work type activities:

- Creating sites with compliant profiles (capital works)
- Maintaining sites that have been cleared to compliant profiles (routine works)

The review looked to understand how maintenance targets and reporting for the above works types were aligned to regional vegetation management plans (or similar strategies), KPIs to make progress towards compliance and enabling Regions to manage risks.

4.7.1 Maintenance works planning

From an Asset Management perspective planned maintenance works delivers the most effective management regime once a compliant profile has been achieved. For this to be accomplished, accurate and up to date network data and knowledge is required to understand the current state, and subsequent maintenance activities planned. Planned maintenance avoids the need for the immediate response and reactive work which is more costly and can be a symptom of the asset being in an undesirable condition.

The NR standard describes how information and data received from inspections and reactive reports should be analysed to understand and determine the work required, Inspectors play a key role assigning corrective action timeframes that may be required to inform maintenance actions.

No Route Vegetation Management Plans (or similar strategy documents), which the Independent Reporter team was expecting to outline how maintenance works are planned and delivered to achieve its regional objectives were provided to the reporter team. Consequently, it is not clear how the maintenance targets and reporting are aligned to any regional strategy.

The Independent Reporter team looked to gather a summary of each Region's CP6 planned and actual maintenance volumes, as per the initial request for information. The evidence provided by each Region varied in format and quality. Different file format, evidence provided included Excel spreadsheets or charts, Word or PDF documents and PowerPoint slides, these were reviewed as part of the desktop study. In general, evidence did not clearly summarise the maintenance volumes figures planned and delivered during CP6 so far, or those planned in the remaining years.

An early observation by the Independent Reporter team identified that maintenance volume data provided did not always break down the work delivered or planned by activity type. It was difficult to understand whether maintenance volumes delivered were undertaken as capital or routine works. Due to limitations of using the information provided by Regions, detailed analysis of maintenance data was not undertaken. Data quality issues, and variations in formats, could not allow for suitable and comparable assessment.

4.7.2   Delivery of Maintenance works

Maintenance works have been found to be delivered by Delivery Units (DU) within the routes however the model for delivery varies between in house and external contractors undertaking the work. The workshops with DU provided evidence that external contractors are used to increase delivery capacity and undertake specialist works such as tree climbing.

Regional and Delivery units outlined that clearance works are undertaken by external contractors with schemes managed as projects. This is the case for all routes apart from Wales where clearance works are undertaken by in house team within the Delivery Units within the routes.

4.7.3   Maintenance Volumes (Ellipse data)

The Independent Reporter team requested maintenance volume data, stored within Ellipse, directly from the Technical Authority. The data was provided in a excel sheet format for the first three years of CP6 and was received after all regional workshops had been completed, therefore any analysis could not be discussed in detail with the regional stakeholders. Limitations of the Ellipse data provided was noted by the TA prior to the Independent Reporter's analysis being undertaken, these were:

- Job numbers which Regions currently record maintenance volumes against do not differentiate between capital or routine maintenance works. As a result, volumes provided could not be aligned to any regional reporting targets that may have been provided.
- Maintenance volumes delivered by WD or MDU may not always be recorded accurately or in a timely manner, therefore volumes delivered may not reflect the period they are currently recorded against.

The above highlighted the need to significantly improve reporting into Ellipse at a regional level. The analysis undertaken by the Independent Reporter team, presented in the following sections raised question on the quality of the data provided, when the TA was asked about these issues, they confirmed that they had not undertaken a data cleaning exercise to ascertain the validity of the data provided by Regions.

4.7.4   Analysis of all Maintenance Volume data

Maintenance volumes recorded in Ellipse using the MNT0170 and MNT0171 job codes have been analysed to establish trends and observations at a national level for the first three years of CP6, summary tables and charts are presented below. The data summarised is a combination of all recorded capital and routine maintenance works as these could not be differentiated. The underlying job numbers included in MNT0170 and MNT0171 utilise different units for recording volume the analysis in the following sections has looked at those job numbers recorded in square meters.

Table 22 National planned and actual maintenance volume data from Ellipse CP6 (Y1 - Y3)

Route	Actual / Planned	Planned and actual maintenance volumes (m^2)					
		CP6 Y1 19/20		CP6 Y2 20/21		CP6 Y3 21/22	
		Volume	Variance between actual vs planned	Volume	Variance between actual vs planned	Volume	Variance between actual vs planned
Anglia	Actual	5,860,838	13%	9,246,013	39%	9,582,722	7%
	Planned	5,193,941		6,630,338		8,985,983	
East Coast	Actual	2,047,267	24%	3,462,633	29%	11,660,582	1371%
	Planned	1,655,751		2,687,874		792,558	
East Midlands	Actual	1,190,628	50%	1,064,491	-26%	1,210,903	13%
	Planned	791,402		1,434,329		1,068,560	
North and East	Actual	1,543,217	n/a	2,108,670	440%	2,565,913	135%
	Planned	-		390,653		1,093,411	

Route	Actual / Planned	Planned and actual maintenance volumes (m²)					
		CP6 Y1 19/20		CP6 Y2 20/21		CP6 Y3 21/22	
		Volume	Variance between actual vs planned	Volume	Variance between actual vs planned	Volume	Variance between actual vs planned
Kent	Actual	1,678,575	55%	2,499,214	-3%	2,807,730	14%
	Planned	1,082,080		2,587,387		2,472,199	
LNW north	Actual	1,426,220	36%	2,343,879	151%	1,915,814	20%
	Planned	1,046,452		933,558		1,590,890	
LNW south	Actual	1,608,894	120%	2,419,872	115%	2,638,676	30%
	Planned	731,099		1,125,504		2,031,092	
Scotland	Actual	1,850,109	47%	2,636,435	25%	5,831,775	73%
	Planned	1,258,451		2,108,264		3,379,232	
Wessex	Actual	1,062,205	66%	2,115,348	231%	3,574,798	438%
	Planned	639,796		639,796		664,549	
Sussex	Actual	1,978,790	135%	2,056,869	287%	3,372,871	37%
	Planned	841,642		531,305		2,455,140	
Wales	Actual	5,561,722	22%	3,832,100	16%	4,946,892	35%
	Planned	4,564,671		3,307,763		3,657,659	
Western	Actual	2,425,009	113%	1,460,635	6%	2,027,298	118%
	Planned	1,136,824		1,376,173		932,020	
National Average (% Variance between actual and planned maintenance volumes)		62%		109%		191%	
Data for job codes MNT170 & MNT171, comprising job numbers 009199, 009656, 009657, 009658, 009659, 009661, 009662, 009663, 009664, 009665, 009666, 009667, 009668, 009686, 009687, 009690, 009916							

The above analysis shows clear differences in the planned and actual volumes recorded in Ellipse over the first three years of CP6 for each route. Summarising at a national level each year of CP6 has seen routes recorded considerably more volume of work than they had planned to undertake in each year. Some routes have evidenced delivering up to 100% more volume than what they planned for with only one route stating that they had underdelivered during a year.
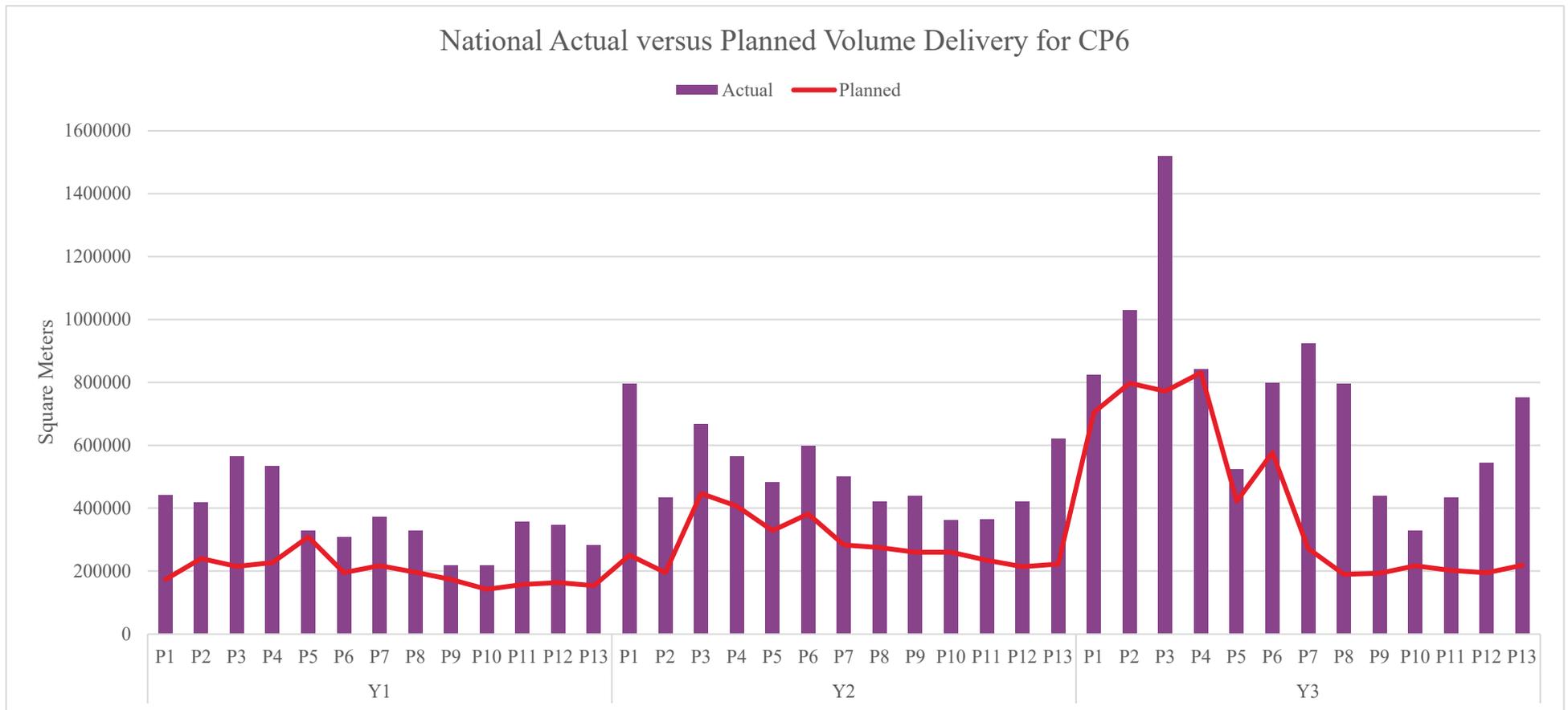
Figure 10: Planned and actual maintenance volumes during CP6 Y1 to Y3 – National Comparison

Figure 10 highlights the gradual progress that Routes have made over CP6 in increasing delivery volumes and shows how activity in the space has increased despite the challenges presented by Covid-19 in year Y1 and early parts of Y2. Spikes in delivery are observed in I the early parts of each year as works are undertaken in early spring (P13-P3).

Independent Reporter's observations

The analysis summarised in Table 24 highlights a significant variance between the actual and planned maintenance volumes across Regions across over the three-year period. It is the Independent Reporter's view that where significant differences between planned and actual volumes is observed it is a clear indication of issues with either the planning of works or with the quality of data. This raises questions around how effective the current regional planning was when assessing the level of maintenance work required on the network. but given the delay in receiving the data it was not possible to investigate this with Regions.

The Independent Reporter team observed potential issues with calculation of planned maintenance volumes within Regions given the lack of up-to-date knowledge on the state of the network. As a result, situations could arise where actual work delivered is significantly more than planned. Again, this highlighted a knowledge gap for Regions having accurate and reliable knowledge about the vegetation asset across the network. The Independent Reporter team appreciates that Regions are currently constrained with their asset knowledge and work is in place to rectify. This reiterates the need for Regions to have appropriate tools available to them. The significant inconsistences in the planned vs actual volumes delivered brings in to question the ability of Regions to robustly plan future delivery volumes using historic data.

4.7.5 TARR and Non-TARR Maintenance Volumes

Regions stated maintenance targets (RAM and MDU volumes) are set using regional factors and their understanding of the network, the approach is varied within each Region. Regional stakeholder meetings with RAM and MDU teams with all Regions were undertaken separately, as agreed at the start of the review, discussions around alignment of the target volumes could be not addressed. The Independent Reporter noted priority across all Regions being given to delivery of the TARR volumes, where appropriate the target was reviewed to reflect any resource and budget challenge. The provision of data from the TA allowed analysis to be undertaken and understand how Planned and Actual volumes were being reported by routes and Regions as part of their drive to improve the safety of the network.

TARR measures aim to reduce the train accident-related risk. At a national level TARR is a weighted composite score card based on regional contributions weighted for each Region. Vegetation accounted for 13% of the National TARR contribution in Year 3 of CP6 and is measured as the delivery of planned vs actual cumulative volume delivered. There have also been changes to the standard jobs that make up the TARR targets over the course of CP6.

Note, this review did not assess how TARR volumes were calculated and whether they were appropriate but noted clear priority and aspiration by Regions to ensure these were achieved. The data analysis has focused on understanding the variation of the planned and actual volumes delivered by each Region and observe if planned targets are achieved.
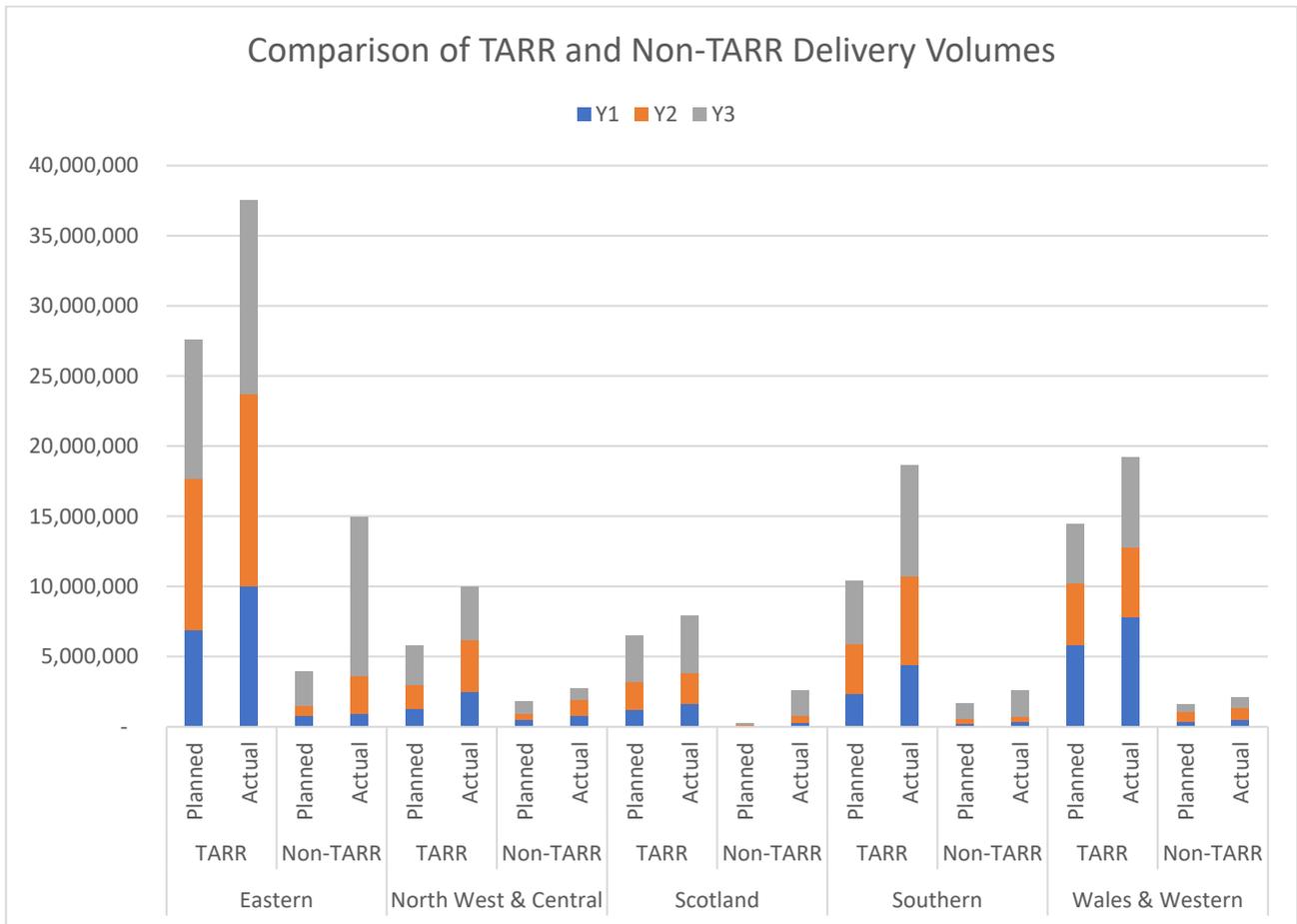
<div align="center">**Figure 11 - TARR and Non-TARR Delivery Volumes**</div>

The analysis shows a trend of Regions increasing their delivery of TARR volumes over each year of CP6 with smaller increases observed in the delivery of Non-TARR volumes over the analysis period. As highlighted earlier Regions are delivering higher volumes of work than they had planned to undertake in each year of CP6. There is a large variation between Region's volume of delivery with Eastern Region delivery the most volume for both TARR and Non-TARR activities, circa 40% of all TARR volume and 60% of Non-TARR volume delivered during the first three years of CP6. Increasing the volume of TARR work in each year of the analysis period gives the indication that the risk presented by Vegetation to the safe operation of network is being managed by the Regions, though it is not clear to the Independent Reporter as to who is delivering this volume and hence if this is delivering compliant profiles, reactive maintenance to mitigate risk or as pre planned work to proactively reduce risk. This extends to the fact that the Independent Reporter cannot draw a conclusion on who is undertaking the work within a Region – the Delivery Units or Works Delivery.

4.7.6   Regional maintenance reporting tools

Evidence to show how Regions were tracking maintenance works being delivered was shown to be undertaken within bespoke regional templates. These were briefly discussed within stakeholder meetings. The examples provided included spreadsheets and Power BI dashboards developed at a regional level, some included information on the type of work to be delivered, as well as the specification works would be delivered too.

The Independent Reporter team noted some good examples where prioritisation of sites had been recorded within regional trackers of maintenance works. Scotland Region provided an example that included RAM and MDU priority and included narrative for why work was required at specific sites. Kent route within Southern Region had developed their own bespoke Power BI dashboard that graphically monitored progress. NWC included the average CCT score against sites to be cleared, as it was used as part of their site prioritisation in addition to estimated cost to clear sites. However, the inconsistency in trackers highlighted the need to potentially bring in some sort of national consistency to undertake regional reporting.

Network Rail would benefit from sharing regional best practice of trackers that have been created, this will ensure ideas can be adopted, and where appropriate, made more consistent in recording key information that is important for national assurance.

4.7.7   Maintenance Volumes vs Compliance KPI

From evidence provided, the Independent Reporter team believes any regional KPI to monitor how maintenance works being delivered is addressing the Regions overall compliance position will not currently be accurate. As identified by the TA, Regions do not currently have the repeatable and reliable source of data to understand encroachment within immediate action zones and action zones. Monitoring the compliance position of a Region against maintenance work planned or delivered will not provide a true reflection against the true current state of the network as vegetation grows.

Network Rail requires more repeatable and reliable source of regular data to develop a baseline position. When this is available, maintenance work being delivered can be assessed with more confidence. The aspiration from the TA and Regions is that the Digitised Lineside Inspection (DLI) tool will provide more regular and automated data collection (forward facing video and aerial imagery).

4.7.8   Lineside Assurance – National Level

The Independent Reporter team was provided with evidence from the TA showing lineside assurance of vegetation maintenance reporting, for both planned and actual volumes at a national level. An example assurance report, in a PDF format as shown in Figure 12.

The planned and actual volumes summarised within the report are sourced from Ellipse, and the separate RAM target sourced from values derived using the ABP tool. These have been used to create dynamic Power BI reports. The three measures displayed for reporting are summarised:

- RAM Target Volume – derived from using ABP Tool.
- MDU Planned Volume – sourced from Ellipse
- MDU Actual Volume – sourced from Ellipse as recorded against MNT171.

The Independent Reporter was not able to access the Power BI report directly, however it provided a useful snapshot of maintenance volumes planned and being delivered for specific periods. The independent reporter found this to be a valuable way of assessing reporting at a national level. Discussions with Regions noted use of the lineside assurance pack within national ATR forums to track progress, therefore it was being used to communicate progress between the Regions and the TA.

Variances are apparent between the RAM and MDU planned targets shown in the Lineside Assurance example provided. It is not clear to the Independent Reporter team whether planned targets set by RAM and MDUs were aligned, but also consistent to achieve the same objectives and goals, this detail was not provided in the evidence collated.
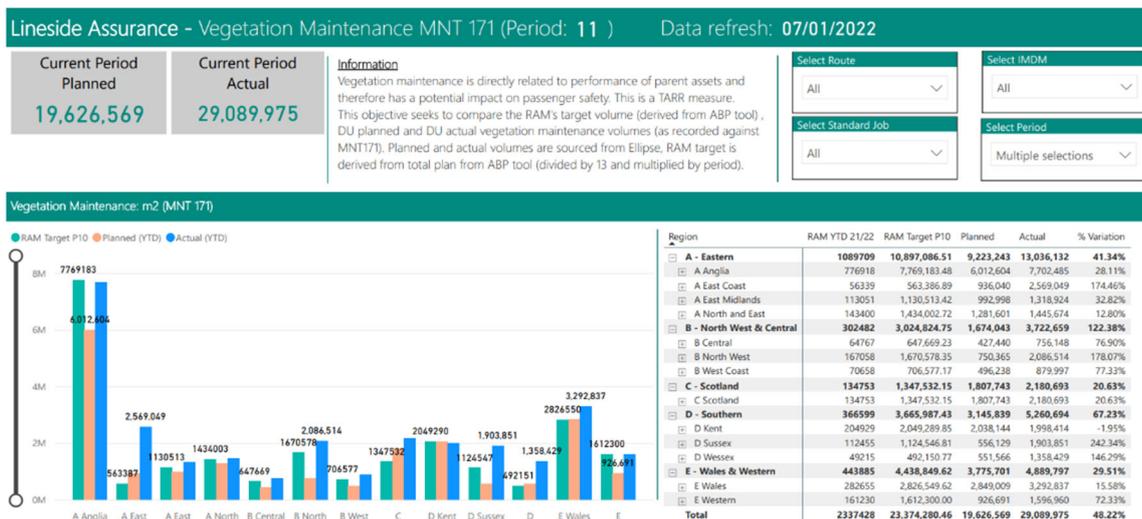

Figure 12 Example Lineside Assurance Report

Independent Reporter's observations

The Independent Reporter team views clear benefits using, and further developing of the Lineside assurance report. It provides an easy-to-understand method of reporting and monitoring maintenance volume delivered.

The inclusion of a compliance progression metric to understand how vegetation maintenance, planned or being delivered, would provide additional benefits, as would the ability to differentiate between routine and capital works. The report provides clarity to understand work delivered against targets set however, the Independent Reporter understands this will be limited by the quality of data stored in Ellipse. The compliance baseline, against which maintenance works should be measured, needs to be realistic to ensure it is a true reflection of the network state.

4.7.9 Risks and challenges

Risks and challenges identified in questionnaires by the TA and regional asset teams in connection with this review topic are quoted below:

"Inadequate management of vegetation maintenance regimes (inability to deliver compliance):
- *Lack of clarity around volume delivery / recording*
- *Poor quality delivery*
- *Maintenance targets are being set based on poor quality data"*

"Lack of cyclical maintenance and lack of financial and physical resource to deliver the maintenance and renewal works"

"Severely hindered by the lack of any cyclical or proactive maintenance on any meaningful scale"

"Proactive maintenance is largely not planned as it cannot be resourced"

"DU Maintenance targets are managed via Ellipse. This relies on manual measurement and transfer into Ellipse. There is extremely limited audit, and the system is not easy to interrogate"

"The maintenance of sites previously cleared is currently challenging"

"A more robust process of setting targets and reporting on delivery is in development, and this requires Works Delivery to migrate to using ellipse to forecast delivery and to report works delivered"

4.7.10 Confidence ratings

Appendix A.2 presents the basis for the Independent Reporter's assessment of the confidence ratings for this topic, which are summarised below. The following evidence, documented or otherwise, are typical of those considered in the assessment:

- Regional / route strategy
- TARR measures – national and regional
- Approach to inspection and maintenance planning
- Prioritisation, resourcing and scheduling (annual and within control period)
- Reporting process
- Reported volumes (detailed)
- Dashboards presenting actual versus planned volumes
- Progress against TARR measures
- Progress against compliance targets

Table 23 Assessment of Regions' approach to use of maintenance targets and reporting in managing risk

Region	Confidence ratings and basis for assessment	
All Regions	Assessment comments applicable across all Regions: • No clear alignment of maintenance targets against Vegetation Management Plans or similar regional strategies to understand level of work to be delivered. • Regions provided evidence they are meeting the required annual volume of work to meet their Train Accident Risk Reduction metric for each year of the Analysis period to manage locations deemed to present most risk. • Evidence provided of regional trackers being used to track and report maintenance volumes being delivered, however these varied in quality and level detail recorded. Regional tracking and monitoring of delivery of maintenance and capital works unclear and not understood. • Regions unable to provide summarised maintenance volume data, delivered or planned, for CP6 with no clear alignment to specific regional targets which are also unclear. • Significant data quality issues with volumes recorded in Ellipse with gaps in recording work delivered by some delivery teams. • Large variances between the planned vs actual maintenance volumes across all Regions does not give confidence in future planning. • No evidence of assurance activities being undertaken to address data quality issues at a regional level when issues are known and understood.	2

4.7.11 Maintenance targets and reporting – Improvement opportunities

The following improvement opportunities have been identified in relation to the Regions maintenance targets and reporting alignment with their vegetation management plans and KPIs

Table 24 Maintenance targets and reporting – Summary of improvement opportunities

Improvement Opportunity Ref	Summary of improvement opportunity
I-20	Regions require a clear vegetation management plan (strategy) that outlines the principles of how maintenance work will be delivered for the CP. The plan should provide clarity in regional targets to be delivered and achieved, how they have been set, and show clear alignment to achieving the regional objectives of maintaining a safe and reliable rail network.
I-21	Regions need to improve the quality of reporting maintenance volumes, both planned and delivered, within Ellipse. Uncertainty in the type of maintenance work being delivered (routine or capital) does not allow for effective planning of future volume and cost requirements. This will remove challenges for Regions and TA in tracking and monitoring the delivery of works against defined targets.
I-22	The delivery of maintenance works, and its impact on the overall compliance position of Region should be improved. As noted by the TA, the level of work required in each non-compliant 1/8th section does not reflect to the maintenance volumes planned (or that have been previously delivered) across Regions, a view the Independent Reporter team would agree with. This can only improve once a more reliable baseline dataset is available that provides a more accurate state of the network.

4.8 Cross asset working - Topic 1(f)

4.8.1 Scope of review

The scope of this topic is summarised below:

4.8.2   Identification of cross asset dependencies

Vegetation can have an adverse effect on other asset classes, including OLE, track, structures, earthworks and drainage, as illustrated on Figure 13.

	Drainage	Vegetation	Fencing	Track	E&P	Signalling	Train Ops
Buildings		Structural damage from roots					
Stations	Station Flooding						
Structures	WSFs due to condition of culverts	Structural damage from roots					
Earthworks	WSFs due to drainage failure	Erosion protection, soil strength, structural damage		Embankments: SMD, ballast shoulder retention, access, track quality, cuttings – obstruction on line	Embankment support	Embankments: trough support, foundations	WSFs - Service Safety
Drainage		Vegetation damaging ditches / pipes		Flooding, track circuits, wet beds, cyclic top	WSF due to water ingress in cables		WSF - Service Reliability – Flooding
Vegetation			Interchangeable boundary measures	Shrink swell through dessication	Encroachment on OLE	WSFs due to loss of signal sighting and adhesion	Leaf fall and Tree Fall, objects on line

Figure 13 Interdependencies between asset types

4.8.3   Risk management and opportunities from closer working

There was a limited amount of evidence provided regarding cross asset working, although this was discussed during the workshops and some information was provided in the questionnaires. Issues relating to seasonal working and extreme weather were discussed in Sections 4.6.6 and 4.6.7.

Regional teams described working with other asset teams in coordinating works and managing risks relating to:

- OLE
- Earthworks
- Track
- Structures
- Level crossings

Eastern Region undertakes work hand in hand with OLE teams to ensure that their inspections and plans are captured with all issues going into Ellipse and to direct to section managers to take action. Level crossing teams record inspections and pass information to the section mangers for action and these are planned as required and work volume capture. They noted that the needs of the geotechnical asset are fully considered as part of the wider vegetation management programme through an integrated plan that will provide a tool to manage biodiversity more proactively.

Eastern Region provided an example of a programme to remove large trees on clay cuttings and embankments, or where large trees are leaning or unstable to improve or maintain condition. The 421 "thirsty" trees that were causing slope desiccation were removed during the first two years of CP6.

Scotland's Railway had considered bioengineering options to improve earthworks but had not been comfortable with the added risk on these assets. This is an area they would like to discuss further with the biodiversity working group and geotechnics RAM in future as steep cuttings require the most vegetation removal, it would be beneficial to have an agreeable restocking strategy that is railway safe.

Southern Region reported on works to remove trees that were causing loss of track geometry due to Soil Moisture Deficit (SMD) during summer months.

Anecdotal evidence was provided of informal cross asset working but there was little documentary evidence of how risks were considered in planning works. While many good examples of cooperation were described, the Independent Reporter was provided with limited evidence that described these initiatives and has assigned a relatively low confidence rating for this topic for all Regions. It is noted that cross asset working is a key feature of NR's draft Lineside Asset Policy.

There is a significant interrelationship between vegetation and other assets, including drainage, boundary assets, structures, earthworks, OLE and track. It would be beneficial if NR undertook a mapping exercise of risks and benefits from lineside to other assets and undertake to engage other specialists and capital delivery on how other asset works affect the lineside asset and how lineside works affect other assets. This would improve the management of cross asset risks.

It was noted that vegetation management work is carried out by other disciplines such as structures, geotechnics, and E&P. It is not always the case that work undertaken by these teams is recorded properly on Ellipse. Better recording of this work would avoid lineside teams scheduling maintenance work that had already been undertaken.

4.8.4 Recommendations from Lord Mair's Review

Lord Mair's review following the Carmont derailment in 2020, where three persons died, focussed on

"...NR's capability and methodology for the management of railway cuttings and embankments. The aim of review is to equip NR with the expertise and competence in order that it can better manage earthworks in the future, particularly taking into account effects of climate change".

The review recommended that:

".. further work is done by NR to develop and implement vegetation management and bioengineering techniques to stabilise earthwork slopes as a cost-effective preventative and remedial intervention technique." ... *"This recommendation is particularly timely as NR move (post Varley Review) to a cut and maintain / replace vegetation management strategy, rather than the previously commonplace "cut and forget" approach."*

"..NR progressively adopt a broader and more integrated approach to the management of Earthworks, Drainage and Vegetation, taking account of changing weather patterns, and breakdown of the historic silos between these interdependent assets across the organisation to support the delivery of a safe, cost effective and sustainable railway infrastructure into the future".

Several recommendations were made in the Mair Review following the Carmont Derailment that specifically relate to vegetation management. This accident was an example of how relatively small oversights relating to one type of asset can have major consequences to a range of assets. The recommendations relate to techniques to improve (or not degrade) earthworks stability and development of an integrated approach across asset disciplines. A roadmap is required to develop a response to these recommendations that leads to specific measures being implemented.

4.8.5 Risks and challenges

Risks and challenges identified in questionnaires by the TA and regional asset teams in connection with this review topic are quoted below:

"OLE Structures / Equipment / OHL (Reds/Super Reds) – identified by the OLE team, where possible we will undertake clearance as part of vegetation clearance programme otherwise it is managed by the route OLE teams using existing off-track resource to clear problem sites. This is also being monitored by the ORR."

"Super Red sites – Work closely with the OLE dept and these are prioritised into 3 categories. High percentage previously completed by the DU."

"The safe disposal of vegetation waste:

- *Disrupting drainage function*
- *Incentives for trespass and vandalism*
- *Contaminating track and ballast*
- *Affecting Earthwork stability*
- *Affecting lineside neighbours"*

4.8.6   Confidence ratings

Appendix A.2 presents the basis for the Independent Reporter's assessment of the confidence ratings for this topic, which are summarised below. The following evidence, documented or otherwise, are typical of those considered in the assessment:

- Identification of cross asset dependencies
- Risk management
- Opportunities from closer working

Note that for this topic the Independent Reporter had not requested specific information in advance of the workshops. Only a limited number of supporting documents were later received, or commentaries provided in the questionnaires. All the Regions have been assigned a rating of "2" which reflects the lack of evidence to support a higher score, rather than their performance relating to cross asset working being deficient.

Table 25 Assessment of Regions' approach to cross asset working

Region	Confidence ratings and basis for assessment	
Eastern	• Positive and negative aspects of vegetation in relation to other asset classes did not emerge from the discussions or in information provided.	**2**
North West & Central	• Positive and negative aspects of vegetation in relation to other asset classes did not emerge from the discussions or in information provided. • Approach described, with some examples of cross asset working provided.	**2**
Scotland's Railway	• Positive and negative aspects of vegetation in relation to other asset classes did not emerge from the discussions or in information provided. • Approach described, with some examples of cross asset working provided.	**2**
Southern Region	• Positive and negative aspects of vegetation in relation to other asset classes did not emerge from the discussions or in information provided.	**2**
Wales and Western Region	• Positive and negative aspects of vegetation in relation to other asset classes did not emerge from the discussions or in information provided. • Approach described, with some examples of cross asset working provided.	**2**

4.8.7   Cross asset working – Improvement opportunities

The following improvement opportunities have been identified in relation to the Regions management of opportunities and risks arising from work planning between vegetation and other affected asset groups.

Table 26 Cross asset working – Summary of improvement opportunities

Improvement Opportunity Ref	Summary of improvement opportunity
I-23	It was noted that vegetation management work is carried out by other disciplines such as structures, geotechnics, and E&P. It is not always the case that work undertaken by these teams is recorded properly on Ellipse. Better recording of this work would avoid lineside teams scheduling maintenance work that had already been undertaken.
I-24	Several recommendations were made in the Mair Review following the Carmont Derailment that specifically relate to vegetation management. These relate to techniques to improve (or not degrade) earthworks stability and development of an integrated approach across asset disciplines. A roadmap is required to develop a response to these recommendations that leads to specific measures being implemented.

Improvement Opportunity Ref	Summary of improvement opportunity
I-25	Good examples were provided of informal cross asset working but there was little evidence of formal means of considering risks and planning. Regions should consider better liaison between offtrack disciplines, including those responsible for vegetation management and other asset teams. The TA may have a useful role in facilitating this process.
I-26	There is a significant interrelationship between vegetation and other assets, including drainage, boundary assets, structures, earthworks, OLE and track. It would be beneficial if NR undertook a mapping exercise of risks and benefits from lineside to other assets and undertake to engage other specialists and capital delivery on how other asset works affect the lineside asset and how lineside works affect other assets. This would improve the management of cross asset risks.

5. Theme 2 Delivery against Varley Review recommendations

5.1 Varley Review

The scope of this topic is summarised below:

Assess and comment on progress with delivery against recommendations 2, 3, 4, 5 and 6 from the Varley Report, both at a central function and regional level within Network Rail.

5.2 Department for Transport Policy

The first of John Varley's recommendations was that:

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

While it is not within our scope to comment on this policy, Network Rail's response to its provisions is considered relevant to this review.

DfT's policy document *Enhancing Biodiversity and Wildlife on the Lineside* was issued in July 2019. This states:

"By implementing the recommendations outlined in John Varley's report, we can become the first generation to leave the lineside environment in a better state than we found it and pass on to the next generation a natural environment protected and enhanced for the future."

The policy sets a number of expectations relating to habitat management, biodiversity, monitoring and stakeholder management.

5.3 Network Rail's response to review recommendations

Following the publication of the Varley Review, NR issued the document *Valuing nature a railway for people and wildlife - Response to the review of our vegetation management*. This predated the DfT policy document and set out a number of actions NR intended to deliver in response to the review's recommendations.

NR has since published its Biodiversity Action Plan in 2020, together with the Lineside Vegetation Management Manual (2018 onwards) and Biodiversity Manual earlier this year (2022). These outline Network Rail's ambitions for their biodiversity assets, and how they intend to protect, manage, and enhance their condition over the current five-year Network Rail funding cycle and beyond.

5.4 Varley Recommendation 2 – Appropriate governance

5.4.1 Recommendation from Varley Review
This recommendation is:

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

The specific points raised in this recommendation are covered below, except for one relating to works in the nesting season, which the Independent Reporter considered more of a maintenance issue.

The Independent Reporter considers that the examples of good governance identified in the Varley Review underpin a sound asset management system. The discussion on how the lineside estate should be managed as a distinct asset is further discussed in Section 5.5.9.

5.4.2 Board champion
NR's initial response to the recommendation regarding the appointment of an existing or new Network Rail non-executive director with responsibility for natural capital was to provide all board members with training

on a range of sustainability issues, including natural capital, enabling the senior leadership to better understand the importance of sustainability and lead culture change within the organisation. It is also understood that NR's chair, Sir Peter Hendy, takes an active role in championing biodiversity at board level.

Details of board responsibilities for vegetation management and biodiversity were not provided by the Regions.

Responsibility for different aspects biodiversity often appeared to be divided between offtrack asset management teams and sustainability teams.

Independent Reporter's observations

While NR have committed to providing board members with awareness training regarding sustainability issues, the Independent Reporter considers that this falls short of the original intention for a board champion responsible for the Network's Natural Capital. Similarly, there was not a consistent approach within the Regions to assigning board level responsibility for biodiversity.

5.4.3   Route level KPIs

The Varley Review recommended that KPIs be established that initially focussed on the development of Habitat Management Plans (HMPs) and asset policies. The Independent Reporter has not seen any evidence of a network wide KPI or target for HMPs or policies relating to habitat or biodiversity.

NR's response to the review states that *"The vegetation management performance of all Regions is now regularly assessed against KPIs at the end of each four-week period."* Examples of management dashboards, the Lineside Assurance Pack for example, have been provided relating to vegetation management, as discussed in Section 4, but these do not include measures relating to biodiversity.

The recommendation also refers to the development of outcome-based indicators and the response document does refer to the development of the biodiversity metric, whose derivation is discussed in Section 4.5.4. The use of this metric in measuring progress towards NR's biodiversity targets is discussed in Section 6.5.

Referring to a number of goals relating to biodiversity, the 2019 DfT policy note states that *"The Government expects Network Rail to publish annual reports on its activity and on progress towards meeting these goals using recognised reporting metrics, which it would need to agree in advance with the Government and its key environmental stakeholder groups."* The Independent Reporter has not seen evidence, at regional level or centrally, of how NR intends to track progress towards its ambition regarding no net loss / net gain in biodiversity by 2024 and 20235 respectively, beyond establishing the baseline.

Independent Reporter's observations

NR provided evidence of regular review of performance KPIs relating to vegetation management. However, the intention of this element of the recommendation related to the delivery of process measures such as the creation of habitat management plans (HMPs) and asset policies. A high-level timetable was set out NR's Biodiversity Action Plan. No evidence was provided of the delivery of these being monitored at a network level and the issue of HMPs has only just started (see also Section 6.2). The ORR have proposed that a biodiversity measure be included in NR's outcomes framework for CP7.

5.4.4   Review the standard

The Varley Review recommended that *"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…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."*

By January 2022, NR had issued an updated version of the Lineside Vegetation Management Manual and the new Biodiversity Manual. It is understood from the TA that there had been a desire to incorporate these into a single standard, but these proceeded separately, with the former placing an emphasis on managing risk to safety and performance, with the latter focussing on biodiversity and habitat. This creates a tension between how to evaluate these three considerations in decision making, which is understood to be addressed in the new Lineside Policy currently under preparation.

Lineside Vegetation Management Manual

The Lineside Vegetation Management Manual (NR/L2/OTK/5201) was already being updated at the time of the Varley Review and some changes were introduced to reflect its recommendations, notably a change in approach to managing vegetation within the action and alert zones and the format of Vegetation Management Plans, which are discussed in Section 4.4.2.

The requirements of NR/L2/OTK/5201 are discussed in detail in relation to a number of the topics covered in Section 4.

Biodiversity Manual

This new manual, NR/L2/ENV/122, was first issued with a compliance date of 1 January 2022. The purpose of the manual is to define *"...the requirements for Network Rail and its contractors to meet legislation and other compliance obligations to sustainably manage land and activities for biodiversity."* It goes onto state that *"Constraints from protected sites, habitats and species are controlled by survey, mitigation, management and monitoring. Undertaking these actions will reduce the risk of breaches of wildlife legislation occurring."*

The core document sets out the key principles for managing biodiversity and requires that responsibilities for biodiversity should be embedded at all levels of NR, from the Board to operational teams. The head of each business unit is required to identify and document the responsible manager(s) to comply with the requirements in the manual. The competencies of the responsible manager and individuals dealing with complex, specialist or non-standard tasks or deviations from this manual are defined.

Introduction of the standards

The vegetation management standards have been briefed to the Regions through the process described in *NR/CAT/STP/001 Catalogue of Network Rail Standards*. The Route Asset Managers (RAMS) are required to receive a technical briefing from TA, who then cascade briefings to their routes including the DUs. The electronic Standards Briefing Systems was used brief the standard. In addition, the Technical Lead holds briefing sessions with all RAMs at the Asset Technical Review.

Regional asset teams considered that there had been extensive consultation during the roll-out of Lineside Vegetation Management Manual (NR/L2/OTK/5201), which was developed over several years. Conversely, the view was expressed that the Biodiversity Manual (NR/L2/ENV/122) had been implemented quite rapidly, with limited opportunity to develop an approach to meeting its requirements. Awareness of the requirements of the Biodiversity Manual was reported as varied within the regional organisations and a number of the DUs who took part in the review felt that they had not yet been fully briefed on its requirements.

Eastern Region noted that there are issues with the two standards that are quite open to interpretation. Within the Biodiversity Manual, there were specific aspects that that are challenging to manage, and the team felt they did not have the skills within it to meet them at the current time. The Region was working to meet the two standards, but they felt very underprepared for the Biodiversity Manual's introduction and understanding the skills required. This was in contrast to standards in other disciplines, where they were able to prepare a lot more prior to going live.

It was noted that a post implementation review of NR/L2/ENV/122 was scheduled to take place at the end of May 2022 (delayed due to lockdown).

It is understood from discussions with the TA one Region expressed an intention to issue a TV against NR/L2/ENV/122 regarding the resource required to implement its requirements. However this was not confirmed by any regional TV being submitted during this review.

Independent Reporter's observations

NR modified the Vegetation Management Manual, that was being prepared at the time the Varley Review was published, to reflect measures to support biodiversity. The Biodiversity Manual was issued in January 2022 and met the timetable set out in the BAP.

Issues with compliance with the Vegetation Management Manual are discussed in Section 4.3, and in relation to Vegetation Management Plans in Section 4.4.2. These hinder the realisation of the full benefits that the new approach to managing lineside vegetation might otherwise bring.

The implementation of Habitat Management Plans appears to be slower than anticipated. This may affect implementing measures to support achievement of NR's biodiversity targets and the rate of progress towards those targets.

5.4.5   Risks and challenges

No additional risks and challenges were identified in connection with this topic in the questionnaire responses.

5.4.6   Confidence ratings

Appendix A.2 presents the basis for the Independent Reporter's assessment of the confidence ratings for this topic for each Region and NR's Central Function, which are summarised below. The following evidence, documented or otherwise, are typical of those considered in the assessment:

- Descriptions of board responsibilities relating to vegetation and habitat management
- Board terms of reference
- Organisation charts
- Programme for implementing VMPs and HMPs against Biodiversity Action Plan

Table 27 Assessment of Network Rail's delivery of Varley recommendation relating to governance

Central function / Region	Confidence ratings and basis for assessment	
Central function	- Board level accountability addressed through leadership training in sustainability. - Evidence of board level champion, but end to end responsibility not clear - Vegetation Management Manual updated to reflect Varley Review - Biodiversity Manual issued in line with timeline in Biodiversity Action Plan No corporate KPI for biodiversity to assist in monitoring progress in achieving targets - No evidence of process related measures to monitor delivery of management plans at regional level	3
Eastern	- Board responsibilities not clear - Management responsibilities for vegetation management and biodiversity described, but no organisation chart provided - The way in which the different workstreams involved in vegetation management fit together is unclear from information provided and subsequent discussions. - TV issued in respect of ENV/122 with resourcing a major factor.	2
North West & Central	- Developing management processes for vegetation as an asset. - Evidence of clarity in organisation arrangements - Briefing on ENV/122 still under way at DU level.	3
Scotland's Railway	- Governance processes developing and organisation and RACI charts provided. - Cross asset working to implement biodiversity measures - Implementation of ENV/122 slowed down due to resource issues.	3
Southern Region	- Robust and sustainable approach demonstrated. - DOT Management Strategy and other initiatives provide examples of best practice. - Good examples of briefing on standards.	4
Wales and Western Region	- Developing management processes for vegetation as an asset. - Board level responsibility / KPIs not clear.	2

5.4.7　Improvement opportunities – Governance

The following improvement opportunities have been identified in relation to the Network Rail's progress with delivery against Varley's Recommendation 2

Table 28 Governance – Summary of improvement opportunities

Improvement Opportunity Ref	Summary of improvement opportunity
I-27	While NR have committed to providing board members with awareness training regarding sustainability issues, the Independent Reporter considers that this falls short of the original intention for a board champion responsible for the Network's Natural Capital. Similarly, there was not a consistent approach within the Regions to assigning board level responsibility for biodiversity.
I-28	The Independent Reporter identified that responsibility for the delivery of the recommendations from the Varley Review tended to be split across different parts of NR's business. For example, vegetation management is undertaken by offtrack asset teams whereas habitat management is usually the responsibility of environmental and sustainability teams. There would be a benefit in establishing clarity in coordinating the implementation of habitat management initiatives with management of the lineside asset, taking into account potentially competing priorities.
I-29	The Biodiversity Action Plan lacks a detailed timetable for the delivery of outcomes relating to biodiversity. A clear delivery programme would help to maintain the early momentum established in responding to the recommendations in the Varley Review and reporting on activity and on progress towards meeting these goals.
I-30	It is noted that there is no formal approach to continuous improvement and knowledge transfer in relation to vegetation management. An appropriate method to capture, assess and disseminate ideas and development opportunities could avoid duplication of effort, lead to improved efficiencies and assist in achieving biodiversity targets.

5.5　Varley Recommendation 3 – Strategy and vision

5.5.1　Recommendation from Varley Review

This recommendation is:

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

This recommendation covers not only the strategy and vision, but core enablers relating to establishing a partnership approach with national bodies and creating a framework for assessing habitat across the network.

Independent Reporter's observations

The Independent Reporter considers that the delivery of a lineside vision, policy and strategy to fully meet the recommendations of the Varley Review require a commitment to adopt the consideration of Natural Capital as a fundamental principle in planning and management. The flow down of this principle through all levels of policies and plans would help maintain focus on biodiversity and habitat related initiatives.

5.5.2　Ambitious vision

NR published its Environmental Sustainability Strategy in 2020 that declared the organisation's commitment to delivering a sustainable railway. Central to the strategy is the vision statement:

"Our vision is to serve the nation with the cleanest, greenest mass transport. We want to put passengers first, help passengers and freight users to make green choices, support local communities and be a good neighbour."

Four core priorities were identified to deliver this vision:

1. A low-emission railway
2. A reliable railway service that is resilient to climate change

3. Improved biodiversity of plants and wildlife
4. Minimal waste and sustainable use of materials

Four key milestones were set in relation to biodiversity, shown in Table 29 along with the status of their progress.

Table 29 Progress against biodiversity milestones in Environmental Sustainability Strategy

Milestone	Progress
1. Publish national biodiversity standard by end of 2021. Use the outputs to inform guidance to Network Rail asset managers on optimal habitat management interventions for biodiversity and train performance	NR/L2/ENV/122 Biodiversity Manual issued on 6 March 2021 with a compliance date of 1 January 2022. The manual and modules on Habitat Management Plans and the Management of Biodiversity are currently being implemented with the Regions. (see Section 5.4.4)
2. Establish the biodiversity baseline, map all relevant data and make available to our supply chain by 2024 (please note the IR did not seek or receive specific evidence of progress towards the 2024 milestone)	Biodiversity baseline mapped using remote sensing and a well-respected metric. Data published in State of Nature report in January 2022. (see Sections 4.5.4 and 6.5)
3. Increase ecological capability in Network Rail and in our supply chain to 2024	Ongoing – see Section 5.6.5
4. Achieve no net loss of biodiversity across the network by 2024 and net gain by 2035	Baseline established. Approach to monitor under development - see Section 6.5
5. Recognition as a leader in land management by 2030	Achievement against this milestone not assessed

The Strategy confirmed the overarching targets are no net loss of biodiversity by 2024, and biodiversity net gain by 2035. The introduction of annual natural capital reporting against a defined baseline was set for 2024.

An online Railway Sustainability Design Guide has been produced that offers guidance on implementing each of the Strategy's four core priorities. This is still in preparation, but the section on Biodiversity is complete and presents a useful overview of NR's approach to vegetation and habitat management.

The objective to monitor performance against metrics in a Biodiversity Action Plan was stated, which would be delivered by regional and route-based Habitat Management Plans and Vegetation Management Plans. Progress against these targets would be reported in regional / route State of Nature reports annually.

The Biodiversity Action Plan was issued and is discussed in the next section. Route Vegetation Management Plans and Habitat Management Plans and have not yet been created as discussed in Sections 4.4.2 and 6.2. Regional State of Nature reports were presented as appendices to the main State of Nature report.

Independent Reporter's observations

Network Rail's Environmental Sustainability Strategy sets out the organisation's priorities relating to biodiversity and key milestones to achieve them. This document confirms the targets of achieving no net loss in biodiversity by 2024 and net gain by 2035. The strategy sets an objective to monitor these objectives through the State of Nature Report and for their implementation to be supported through the delivery of route-based Habitat Management Plans and Vegetation Management Plans. As observed in other sections of this report, creation of these plans is behind schedule. Individual Regions have responded with their own sustainability strategies and plans and are beginning to embed biodiversity principles into their day-to-day businesses.

5.5.3   Strategy and plan

Biodiversity Action Plan

This recommendation was fulfilled through publication of NR's Biodiversity Action Plan which complements the objectives described in the Environmental Sustainability Strategy. The Action Plan states that it is *"...the first step in achieving our vision of a lineside managed sustainably for safety, performance, the environment, our customers and our neighbours."*

The Biodiversity Action Plan is not a standard and, as such, is not a mandatory requirement. It sets the scene regarding the management of the lineside estate and introduces the recommendations of the Varley Review. The role of biodiversity on the rail network is considered and the concept of natural capital is introduced. The policy and legislative background to managing biodiversity are discussed, followed by a high-level view of how NR's vision is to be delivered.

The delivery model underpinning the strategy is comparable to the asset management model shown on Figure 2. This is illustrated on Figure 14 and brings together many elements of NR's approach to the management of vegetation and biodiversity discussed elsewhere in this report.
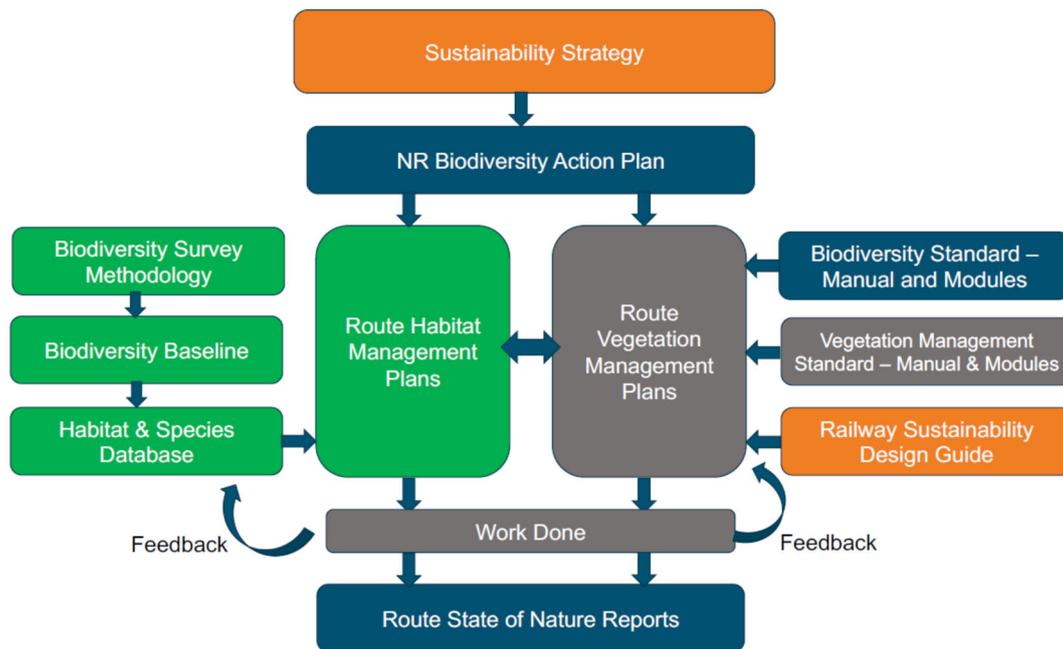

Figure 14 Biodiversity planning within Network Rail (from Biodiversity Action Plan)

The Biodiversity Action Plan summarises key the UK legislation and policy focused on biodiversity conservation, which includes the different governing legislation in England, Scotland and Wales.

The TA noted that one specific goal within the UK Government's 25 Year Environment Plan (2018) is thriving plants and wildlife. The new biodiversity standard requires the right information to be collected in advance of works to enable the correct decisions to be made with regard to biodiversity, in so doing front line colleagues can reduce the risk of breaching legislation as well as contributing to the aims of the Plan. It was acknowledged that the 25 Year Environment Plan is relevant to England only. In a similar way, by following the biodiversity standard colleagues in Wales can achieve the requirements of the Environment (Wales) Act 2016. In Scotland, the same applies to work to work towards to Nature Conservation (Scotland) Act 2004 and the Wildlife and Natural Environment (Scotland) Act (2011).

The NR Regions have taken different approaches in setting out their plans relating to biodiversity as discussed below.

Eastern Region

Eastern Region have published their own Environmental Sustainability Strategy, and also a Biodiversity Action Plan that sets the following targets:

1. Achieve no net loss in biodiversity on our lineside estate by 2024, and achieve biodiversity net gain of 10% in each Region by 2040
2. Mitigate unavoidable loss of biodiversity requirements into our planning and decision making at all levels
3. Mainstream biodiversity requirements into our planning and decision making at all levels
4. Deliver a Network Rail estate that connects and supports biodiversity across Britain
5. Increase awareness and understanding of our work managing biodiversity
6. Provide open and transparent annual reports on performance on biodiversity through the Route level action plans

North West & Central Region

North West & Central Region have a Vegetation Strategy but did not provide an Environmental Sustainability Strategy. The Region does not have Route Biodiversity Action Plans as the Region felt that these would add little value and duplicate the Network Biodiversity Action Plan. Instead, the Region will draft Habitat Management Plans (HMPs) that will be aligned to workbanks so that priority areas where vegetation management is undertaken will follow the guidance.

Scotland's Railway

Scotland's Railway have published their own Environmental Sustainability Strategy that sets the following objectives relating to biodiversity and creating a *"green and resilient railway"*:

- Deliver a community forest pilot scheme
- Deliver a series of training events that upskill relevant staff across Scotland's Railway
- Establish a process to undertake biodiversity calculations of non-emergency works
- Deliver an Invasive Species Management Plan
- Trial new, sustainable methods of managing the biodiversity of our lineside estate
- Publish a biodiversity action plan for Scotland's Railway
- Increase the track miles with viable and contemporaneous survey data

The goal to achieve no net biodiversity loss by 2024 and achieve biodiversity net gain by 2035 is also stated in the strategy. The document did not refer to the development of a Biodiversity Action Plan.

Southern Region

The stated vision in place for Kent and Sussex Routes is *'We treat vegetation as an asset where we manage the risk to the operational railway, reduce its impact on performance and on our lineside neighbours and improve the lineside habitat for all."*

Southern Region did not provide an Environmental Sustainability Strategy. The Region is currently undergoing an organisational change within their off-track division and reported that the development of a Biodiversity Action Plan was on hold. Vegetation Strategies were provided for Kent and Sussex.

It was noted that *"through our 'horizon scan' work of the legal landscape, we have identified that NERC Act duty is set to be strengthened. When the new strengthened duty comes into force, the scope of the duty will expand and this will trigger a review of our objectives and strategies, which will be required by law every five years."*

Wales and Western

Wales and Western Region have issued a Sustainability Delivery Plan that sets out objectives relating to biodiversity, recognising the recommendations of the Varley Review:

- We will be developing Habitat and Vegetation Management Plans to define actions for meeting government requirements and commitments
- Recognising the needs required by the new standard, we will be reviewing methods for introducing this into the Wales & Western Region.
- We have committed to achieving No Net Loss Biodiversity by 2024. Over the next three years biodiversity monitoring will be undertaken to measure against this target to keep us on track.

- To provide transparency we will be publishing annual regional State of Nature Report. Using the data collected across the Region, these reports detail progress against defined actions and a snapshot view of the state of our biodiversity.

Independent Reporter's observations

The publication of NR's Biodiversity Action Plan is considered to meet the recommendation to create a strategy to deliver the vision, which comprises the objectives described in the Environmental Sustainability Strategy. This document establishes a delivery model that defines the key building blocks of NR's strategy, including Vegetation Management Plans, Habitat Management Plans, the new standards, biodiversity monitoring, works delivery and the State of Nature Reports. A timeline is presented that covers the period up to 2022 in detail, but lacks detail on achievement of implementing the plan, including how achievement of the biodiversity targets will be delivered at a regional level. The Biodiversity Action Plan does not describe how accountability and responsibility for different aspects of its delivery is to be shared across Network Rail, both centrally and at a regional level.

5.5.4 Partnership approach

NR works alongside neighbours, nature conservation groups, community groups, suppliers, contractors, and landowners in delivering the vision for managing their lineside estate.

In addition, NR has Regular meetings with the environmental regulators in all three countries.

The TA represents NR on Defra's Nature Recovery Network Partnership group and Natural England's Major Landowners' Group.

The Nature Recovery Network offers a significant opportunity for NR. Local Nature Recovery Strategies are a new, England-wide system of spatial strategies that will establish priorities and map proposals for specific actions to drive nature's recovery and provide wider environmental benefits. It is likely that they will be created at a county level and local planning authorities will be appointed as the responsible authority to lead their preparation. It is also highly likely that organisations such as NR will become a key point of input to the development of these strategies.

They offer several opportunities to NR, including the opportunity for delivering required biodiversity gains outside of the rail estate within a strategically significant area, and for parts of the lineside estate becoming a component of a wider local nature recovery network, and a receptor for positive biodiversity action (including that instigated by third parties).

This relates directly back to Points 7 and 8 of DfT's Policy on Enhancing Biodiversity (see Section 5.2) that sets an expectation for NR to look for opportunities to create strategically significant priority habitats and work in partnership with key stakeholders in their delivery.

The company is also part of a TIES Living Lab community of practice with East West Rail, TfL, HS2, and National Highways.

Evidence was provided of Regions working closely with organisations such as the Tree Council, Forestry Commission, Arboricultural Association, Woodland Trust, Forestry England, Natural England and the Rivers Trust.

Engagement with other stakeholders is discussed in Section 5.6.10

Independent Reporter's observations

The Varley Review recommended that NR should establish how it will work in partnership with neighbours, conservation groups and suppliers, including other landowners. NR's involvement in the Nature Recovery Network offers a significant opportunity to become a leader in promoting and implementing biodiversity initiatives. Some examples of interactions with representative bodies were described by the TA and links with national and local organisations detailed by some of the Regions. The Independent Reporter did not consider this to be an area of concern.

5.5.5 State of Nature report

NR report on performance against the KPIs agreed with Defra on an annual basis by Region.

The first State of Nature report was published in January 2022. This comprehensive document presents individual reports for each Region, together with an overview of the network wide approach to measuring biodiversity. Each Regional appendix details the findings from the habitat baseline survey described in Section 4.5.4, case studies and future plans for habitat management.

NR intend to update the report annually.

Independent Reporter's observations

The first edition of the State of Nature Report was published in January 2022 and is considered to be a valuable first step in setting out the methodology and establishing the biodiversity baseline. Appendices set out plans and aspirations for each Region. The Independent Reporter would expect to see future annual versions of this report containing details of Regions' plans in delivering aspects of NR's Environmental Sustainability Strategy that relate to biodiversity, in particular the targets for 2024 and 2035.

5.5.6 Timeline to achieve biodiversity targets

A timeline is presented in the Biodiversity Action Plan that covers the period up to 2022 in detail, but lacks detail on achievement of implementing the plan, including how achievement of the biodiversity targets will be delivered at a regional level. This is broadly in line with the timeline in the Environmental Sustainability Strategy.

Independent Reporter's observations

The Varley Review suggested a timeline for the achievement of 'no net loss' of biodiversity by 2024, and a net gain by 2040 that refers to a number of its recommendations. The Independent Reporter notes that a number of these relating to detailed aspects of delivering these targets are not included in the Biodiversity Action Plan. There is a risk that these targets may not be met without a coordinated approach being adopted. A recommendation has been made relating to achieving these targets through a programme approach across all NR's Regions.

5.5.7 Risks and challenges

Risks and challenges identified in questionnaires by the TA and regional asset teams in connection with this review topic are quoted below:

> *"Level and rate of change:*
> - *Internal within NR*
> - *Climate change*
> - *Modernisation*
> - *GBR"*

> *"Development of overarching vegetation strategy – workshops currently ongoing."*

5.5.8 Confidence ratings

Appendix A.2 presents the basis for the Independent Reporter's assessment of the confidence ratings for this topic for each Region and NR's Central Function, which are summarised below. The following evidence, documented or otherwise, are typical of those considered in the assessment:

- Biodiversity action plans including timetables – national and regional
- National strategies / policies
- Regional strategies
- Incorporation of strategies into asset policies
- Partnership working
- State of Nature Report (National and Regional Appendices)

Table 30 Assessment of Network Rail's delivery of Varley recommendation relating to strategy and vision

Central function / Region	Confidence ratings and basis for assessment	
Central function	• Biodiversity Action Plan reflects recommendations in review. • BAP also aligns with Environment Sustainability Strategy.	**2**

	• Lineside Asset Policy to be updated to reflect strategies. • High level targets set for NNL and BNG and approach to how this should be measured established centrally. • Timeline set out in ESS and BAP - behind schedule for HMP delivery and not clear if NNL / BNG targets will be met. • Involvement with national groups noted. • Contribution to national targets regarding habitat creation not clear. • State of Nature Report first issued in early 2022, to be re-issued annually."	
Eastern	• Sound approach that follows that in NR BAP but with more detail. • RBAP focusses on biodiversity / habitat and not clear how approach interfaces with overall management of the lineside asset. • Progress on phases described not provided • Region State of Nature Report issued.	3
North West & Central	• Commitment to biodiversity principles demonstrated. • Strategy and timetables not seen so progress cannot be evaluated • Implementation of habitat management measures in VMSs. • Progress described in recording BNG on projects. • Region State of Nature Report issued.	2
Scotland's Railway	• Vegetation and habitat management strategies / plans not yet introduced. • Region State of Nature Report issued.	2
Southern Region	• Robust and sustainable approach demonstrated. • Sustainable Land Use Board established. • DOT Management Strategy and other initiatives provide examples of best practice. • Implementation timetable provided for sustainability plan • Ecology management team set up • Good progress on developing approach to achieving biodiversity standards. • Region State of Nature Report issued.	4
Wales and Western Region	• Commitment to biodiversity principles demonstrated. • Strategy and timetables not seen. • Issues with biodiversity metrics as discussed above. • Region State of Nature Report issued.	2

5.5.9 Improvement opportunities - Varley recommendation relating to strategy and vision

The following improvement opportunities have been identified in relation to the Network Rail's progress with delivery against Varley's Recommendation 3

Table 31 Improvement opportunities - Strategy and vision

Improvement Opportunity Ref	Summary of improvement opportunity
I-31	The Independent Reporter noted that the introduction of strategies, plans and initiatives to promote biodiversity, including Habitat Management Plans, had been hampered by issues relating to resource and competing priorities. Network Rail should maintain the early momentum established in responding to the recommendations in the Varley Review through a planned approach to implementing its recommendations, and those in the 2019 DfT Lineside Policy.
I-32	The Independent Reporter received limited evidence on what goals and objectives Regions have set to deliver compliance, maintenance, habitat, and biodiversity targets moving forward. This includes the important role vegetation management plays in maintaining a safe and efficient railway. Many of the actions within the Biodiversity Action Plan and the Environmental Sustainability Strategy are central to achieving Network Rail's biodiversity targets and compliance with DfT policy and national legislation.

Improvement Opportunity Ref	Summary of improvement opportunity
I-33	Delivery of a lineside vision, policy and strategy to fully meet the recommendations of the Varley Review requires a commitment to adopt the consideration of Natural Capital as a fundamental principle in planning and management. The flow down of this principle through all levels of policies and plans would help maintain focus on biodiversity and habitat related initiatives.

5.6 Varley Recommendation 4 – The lineside estate as an asset

5.6.1 Recommendation from Varley Review

This recommendation is:

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

This recommendation made specific reference to the development of an asset database, habitat management plans, skills programmes and demonstration projects. We have also considered the broader implications of this recommendation from an asset management perspective.

5.6.2 Asset management approach

Most manmade assets managed by NR have a physical lifecycle (*acquire – operate – maintain – dispose*) that to a greater or lesser extent is fairly predictable.

Unless planned planting has taken place, vegetation usually becomes established without human intervention and then grows on its own accord until it dies of its own accord or is removed. Over its lifetime the behaviour of vegetation is less predictable than that of manmade assets due to the nature in which it establishes and the rate at which it reaches a state where it poses a risk. This can be many times faster than the rate at which other types of assets degrade, wear out or otherwise become obsolete. Up until recently the value of vegetation has not been accounted for and it has been overly managed or removed of when it poses a risk to safety or the operation of the railway.

The asset management model used by Network Rail and presented on Figure 2 includes all of the elements normally associated with man-made assets and was used to structure the evidence collection phase of this review. The processes described in the Vegetation Management Manual and other documents reviewed, broadly fit into this model regarding the management of safety and performance.

John Varley confirmed to us that he selected the title of his review very carefully and named it "Valuing nature – a railway for people and wildlife". This places an emphasis on the value of natural capital, which is a factor that needs to appear alongside achieving the business objectives of safety and performance. This might present difficulties in equating all three in making investment decisions, however legislation in all three countries requires NR, as an operator, to meet a number of obligations relating to the environment. Furthermore, the 2019 DfT policy sets out several expectations of NR regarding biodiversity that will be reflected in their licence for CP7.

John Varley also expressed the view that there exists an opportunity to promote NR's initiatives regarding biodiversity to improve the railway's reputation generally, to improve passenger experience and for the company to position itself as an industry leader.

The delivery model presented in the Biodiversity Action Plan (see Figure 14) provides a useful structure to make sure the components are in place to ensure that the outcomes set out in the Plan, and in legislation, can be delivered alongside requirements to keep the railway safe and maintain performance. However, the management of vegetation in general and biodiversity in particular only form part of the overall management of the lineside asset, which was the focus of this recommendation from the Varley Review.

We have been provided with a draft copy of NR's Lineside Asset Policy, which is being updated to replace the 2017 version (expected May 2022). This covers vegetation, boundaries and access facilities and offers a framework that considers the asset lifecycle of these components together that considers them in the context of safety, performance, the environment and reputation. While this is still under preparation the Independent

Reporter considers that this offers a sound approach to meeting this recommendation from the Varley Review.

Case history - Southern Region's approach to managing biodiversity as an asset

Southern Region presented the background to their approach to establishing a biodiversity management framework which is described in this section as it is similar to that outlined above. This approach also takes the asset lifecycle into account, considering Planning, Asset Creation, Asset Operation and Maintenance, and Disposal. For example, tree planting may be planned, then the trees are planted, managed and then removed when they die, become unsafe or as part of other infrastructure works.

It is argued that woodland habitat is an example of a type of an asset class that can be described and measured, and the asset also delivers functions, the performance of which can be inspected, and the level assessed. If the function performance is poor, corrective maintenance action can be taken to restore to an acceptable level. If the condition is satisfactory, interventions can be made to conserve the asset at its current condition, or even choose to enhance its condition.

With respect to biodiversity, Southern Region recognises two core types of assets: habitat assets and species diversity. Biodiversity Standard ENV/122/02 and Lineside Standard OTK/5201 outline principles of asset management that should be applied to the former for its effective and efficient management. For species diversity, Southern believes this is not yet adequately covered by Policy or Standards but has developed its own in-house ecology team to address this aspect in the short-term.

Safety outcomes and smooth running of the railway still take precedence and considerations are given to biodiversity. It is the aspiration of the Region that both aims can be achieved. Traditionally, off-track asset forms part of the P way asset but there is a transition going on in the delivery unit structure. Based on the traditional structure of vegetation management being a part of off -track which is part of P-way asset, vegetation management can get lost in the scheme of things.

The requirements for managing biodiversity as an asset, is data intensive and it is recognised that significant improvements are required to the way biodiversity asset data is captured, stored and used, and to upgrade asset knowledge through elimination of significant data gaps.

Southern note that the backbone of a good asset management system is a logical connection between strategic objectives and the daily activities of all those involved. The Region is in the process of developing this 'line of sight' through a Biodiversity Management Framework linking high level objectives, on-the-ground works delivery and, through monitoring and review, feedback and learning to help inform future strategy.

Independent Reporter's observations

The Varley Review only considered specific aspects of managing the lineside estate, not the acquire – operate – maintain – dispose lifecycle that is associated with other types of assets. While it is recognised that this model requires adaptation for the specific case of vegetation management, the broad principles still apply. The delivery model presented in the Biodiversity Action Plan provides a structure to ensure that its outcomes can be delivered alongside requirements to keep the railway safe and maintain performance. This model reflects NR's general approach to managing all of its asset classes.

While many of the components are in place, the Independent Reporter considers that there is currently a lack of clear and consistent policy guidance to support strategic business planning at network and regional level in relation to the management of lineside vegetation and habitat. A clear line of sight will be improved through a dedicated Lineside Policy and the implementation of route Vegetation and Habitat Management Plans.

5.6.3   Asset database

Ellipse is the primary database used by NR to manage lineside information. We did not investigate developments to incorporate habitat related data into this system, although it is noted that NR/L2/OTK/5201 Module 3 describes basic information to be recorded in Ellipse (discussed Section 6.2). Several Regions considered that that Ellipse is not an ideal tool to capture habitat information

Habitat data collected by UK CEH is currently available for viewing by those within NR who have access to the Geo-RINM Viewer (GRV).

5.6.4 Route specific habitat management plans

NR committed to Habitat Management Plans being in place by 2021 which would have set out how each Region intended to manage habitats and encourage biodiversity at a local level. These would move towards a 'cut and maintain / replace' approach, as opposed to the 'cut and forget' approach that NR had been accused of adopting in the past.

Route Habitat Management Plans, along with Vegetation Management Plans, form an important part of the overall biodiversity planning process, as discussed in Section 5.5.3 and illustrated on Figure 14. Progress in developing these has not met the intended programme and is further discussed in Section 6.2.

5.6.5 Skills programme (and resource)

Resourcing was not a specific topic identified in the SoW but was a sub-topic within this recommendation of the Varley Review. It was mentioned frequently during engagements with NR and their observations are included in this section. The Independent Reporter did not receive any documentation specific to this aspect of the recommendation, so an analysis of regional capability and shortfalls in resource could not be undertaken.

Central function

The TA advised the Independent Reporter that, as part of the sustainable land use programme training has been developed aimed at introductory level and front-line staff. The number of ecologists in the organisation has increased ten-fold since John Varley published his review in 2018. The framework for external ecological contractors was held nationally and the framework was extended a number of times. At point of renewal the Regions opted to own this framework and to manage the procurement of their own ecological support. The fencing and vegetation framework had, for the first time, specific requirements aligned to ecology and environment to provide support wen undertaking those activities.

There is not yet a comprehensive training programme for Drainage or Lineside. The TA are working to create the training content; however, the delivery of the training is still at risk within NR Training. The new Off-Track Apprenticeship scheme was piloted in May 2020 with 12 cohorts. The latest request for new apprentices was only six apprenticeship bids from one Route only. No other Routes asked for Off-Track Apprentices which would give operatives with qualifications and certifications to support vegetation/tree management. Therefore, the second cohort was not yet begun as we were unable to fill the 12 seats required. This example shows the low prioritisation and uptake of what is needed for vegetation management.

The TA noted that the current re-organisation within NR had resulted in a reduction in head count within their core team, affecting their ability to deliver a number of ongoing initiatives.

Each Region was asked to comment on resourcing and their observations are summarised below:

Eastern Region

- Off Track capability review on going
- Competency framework for people in the off-track community is currently under development by the central team and the Region is contributing to it

- Currently under resourced, but acknowledged that there is a lack of skills nationally, particularly regarding ecological expertise and experience of the railway sector

North West & Central

- The Region recognised that competence is an issue with an overheating of supply chain and limited resources.
- The National Competence framework is due to launch in September 2022 and will be promoted and supported across the Routes.
- Habitat mapping started in 2021 with resource put in place for the 2022 season - plans for three contract ecologists working for NR full time, and a further five staff available on a call off basis to cover survey and incoming data.
- Challenge identified regarding capacity of project management resource to deliver an increasing workbank.

Scotland's Railway

- Internal route ecology resource in place since 2017 to deliver key elements of the biodiversity delivery plan.
- Funding for specialist resource such as arborists and ecologists to write habitat and vegetation management plans and for restocking and offsetting considered to be a challenge. Currently exploring the opportunity with specialist suppliers to develop a feasibility study for undertaking this work.
- At present there are no BAP or HMPs in place and no associated management processes and org structures to complete these. We have plans for their production but not the finance or resource to deliver them until CP7.
- The planned PPF RAM [Lineside & Drainage] organisation is currently not fully resourced.
- There are five Asset Engineer posts all of which are vacant with one currently in active recruitment. There are four Specialist Ecology posts currently only in the Works Delivery organisation two of which are currently vacant.
- There is no specialist Ecology resource in Delivery Unit organisations at present. Specialist Arboricultural resource is not available in any departments at present.
- The Region has grown ecology and environmental specialist resource across the control period, but more ecologists and arborist are required.
- Maintenance DU teams in Scotland are under resourced to be able to maintain cleared vegetation as well as undertaking reactive maintenance in terms of both head count and funds.
- Insufficient resource to collate data on and analyse the data on healthy trees that came down during recent storms.
- Lack of funding and resource to deliver mechanised and efficient cyclical maintenance

Southern Region

- Biodiversity asset management is a complex subject and meta-discipline, requiring high levels of expertise and resources to plan, design, create and maintain desirable biodiversity profiles on railway estate.
- Recognition of the need for access to professional competence in ecology to effectively manage biodiversity as an asset and also to manage the impacts of engineering and operational activity on this asset.
- Ideal situation is to have a dedicated in-house resource serving the Region - a future aspiration for CP7 is to establish permanent templated roles within our organisation.
- Resource constraints in the DUs are currently being offset by the delivery of works and inspections via capital expenditure mechanisms.
- In terms of delivery resource, there is a shortage of workers - there is ongoing work to understand the requirements of the new standards and the resource improvements required to fulfil their requirements.

Wales and Western

- Insufficient capability to undertake maintenance it is combination of access, resource and consequently people resource

- Follow up maintenance is an issue on cleared sections due to constrained resource in DUs and budget limitations if external suppliers are used.
- Challenge identified regarding pressure on funding and lack of resources in a cost constrained environment
- Internal resource required to capture corporate memory and build relationships with external stakeholders.
- Bio/ecological skills are lacking, including supply chain issues due to previous focus on protected species rather than habitat. Insufficient time to provide training at the moment.

Supply chain

The capacity of the supply chain was raised a number of times during the workshops. There are competing demands for technical specialists such as ecologists and operatives to undertake arborial work, tree climbing for example. This is due to an increasing workload within other organisations such as HS2 and National Highways who are facing similar requirements to deliver habitat and biodiversity outcomes to NR. As well as availability, a concern was expressed a number of times regarding the level of competency of personnel working for contractors and the need to supervise their work.

Independent Reporter's observations

The Varley review identified that a step-up in capability across the workforce and supply chain was needed to deliver NR's ambitions in managing the lineside estate. In responding to the recommendation. NR committed to undertake "a review of skills needed and skills-gap analysis, develop appropriate elements to existing competency-based management system and undertake a comprehensive programme of recruitment and training". It was acknowledged that NR had increased the number of ecologists within the organisation, but it was generally considered that there was still a need to use external staff. The wider issue of workforce capacity was not explored with the Regions in any detail as the Modernising Maintenance review was still under way and there were sensitivities around its impact on roles. It was widely acknowledged that there was an industry shortage of ecologists and operatives due to competing requirements for skilled staff from other infrastructure providers and the HS2 project.

5.6.6 Demonstration projects

NR's initial response to the recommendation was to establish demonstration projects in all of the English and Welsh Regions, to give teams insight into the most effective methods for promoting biodiversity on the estate, while running a safe and reliable railway for passengers.

Demonstration projects were showcased in the State of Nature Report appendices for each Region and good examples were provided of other projects being used to develop habitat management techniques.

While feedback from pilot projects is being used to inform the development of good practice within Regions, there was little evidence of how this is being shared across the network.

Independent Reporter's observations

Demonstration projects that delivered aspects of the Varley Review's recommendations have been completed and reported in the State of Nature Report. Evidence of further pilot projects was provided. The Independent Reporter considers that further work is needed to share learning from these and other biodiversity initiatives within NR.

5.6.7 Continuous improvement

Continuous improvement was not a specific recommendation from the Varley Review; however, it is an important element of good asset management. Regions were asked to describe their approach to continuous improvement in the questionnaires and in the workshop discussions.

From the responses there did not seem to be a network-wide system for capturing, assessing, and disseminating opportunities for improvement outside of the process to take action from formal recommendations following accidents or other incidents. It was noted that the ideas are exchanged at regular Asset Technical Reviews (ATR) which have a standing agenda item for sharing asset-related best practices and ideas for improvement.

5.6.8 Risks and challenges

Risks and challenges identified in questionnaires by the TA and regional asset teams in connection with this review topic are quoted below:

"Modernising maintenance."

"CP7 improvement that would require redeployment of staff from other disciplines into Off Track as an outcome from modernising maintenance."

"Staff levels - Lack of staff with the required skills and knowledge to maintain vegetation to the requirements of the standard."

"Lack of Ecologist - The MDU have no expertise to undertake ecology surveys and therefore, there is a substantial risk that Environmental legislation could be broken. No training or advice has been provided on what constitutes a habitat. Currently requesting Ecologists for locations such as where bats could be roosting etc. Awaiting to see if we are to get an Ecologist in CP7 or before."

"Insufficient specialist resource within NR maintenance (own workforce)

- *Skills and competence gap*
- *INNS / ash die back and other diseases*

"Ageing workforce"

"Competence and capability within current maintenance environment"

"Training and competency"

"Staff capacity to manage to vegetation management programme, with restricted headcount and limited funding available to bolster teams with contractor resource"

"Capacity of management team to produce integrated management plans, this is new activity, to be delivered with existing staff"

"Capacity of PM resource to deliver an increasing workbank, both in terms of volume and complexity"

"Capacity of contractor market to deliver increasing workbank, as volume and complexity of workbank increases"

"Resource, overheating supply chain and depletion of skills due to large projects such as HS2"

"Insufficient specialist resource in external supply chain:
- *Too few vegetation management suppliers*
- *Increased competition across NR*
- *More complex than other industries"*
- *Emerging premium rates*
- *Reluctance to tender."*

5.6.9 Confidence ratings

Appendix A.2 presents the basis for the Independent Reporter's assessment of the confidence ratings for this topic for each Region and NR's Central Function, which are summarised below. The following evidence, documented or otherwise, are typical of those considered in the assessment:

- Strategy documents
- Plans and policies
- Asset database
- Habitat Management Plans
- Resource plans

- Demonstration projects

Central function / Region	Confidence ratings and basis for assessment	
Central function	- Elements of a functioning asset management approach to managing the lineside estate in general, and vegetation in particular, are in place. - Lineside Asset Policy currently under development. - The Lineside Technical Strategy has not been created yet. - Overall structure of management of vegetation assets and responsibility for biodiversity currently not clear within central function. - Habitat Management Plan format developed - Database to manage habitat data with other asset data not completed - Resource constraints noted in light of ongoing restructuring within organisation. - Skills / apprenticeship programmes have been set up, but uptake reported to be disappointing. No central approach to biodiversity accounting. - Demonstration projects described in documentation, but no clear approach to sharing feedback across organisation. Role of ATRs in sharing knowledge noted. - No evidence of formal CI or process improvement approaches being applied.	2
Eastern	- Region BAP is a useful start but not clear how / if it is intended to manage the lineside estate as an asset as suggested in Varley review. - Integrating biodiversity plan with vegetation management approach, including development of VMPs - Resource planning under way within constraints of current review - Concerns regarding effort needed to implement biodiversity measure - Good progress being made through pilot and demonstration projects. - Region State of Nature Report issued.	3
North West & Central	- Sound approach to delivering components of managing vegetation as an asset. Not clear if this is fully joined up at all levels. - Strategic documents for vegetation management not seen - Example draft HMP provided (only example seen in review) - Concern expressed regarding resource to deliver habitat benefits - Demonstration and pilot projects delivered	3
Scotland's Railway	- Good examples of work to develop approach to managing habitat and introducing relevant biodiversity measures. - Linkage between offtrack and sustainability teams to deliver habitat plans. - Progress hampered by lack of resource. - Examples of demonstration and pilot projects provided.	3
Southern Region	- Robust and sustainable approach demonstrated. - DOT Management Strategy and other initiatives provide examples of best practice. - Resource issues being addressed - Need for specialist resource understood but challenges in filling posts. - Limitations of asset data understood with measures being developed to improve this (national and regional). - Examples of demonstration and pilot projects provided.	3
Wales and Western Region	- Sound approach to delivering components of managing vegetation as an asset in the future. Not clear if this is fully joined up at all levels. - Vegetation Action Plan being prepared. - Resource being increased to meet demand for ecologists - Examples of demonstration and pilot projects provided	2

5.6.10 Improvement opportunities - The lineside estate as an asset

The following improvement opportunities have been identified in relation to the Network Rail's progress with delivery against Varley's Recommendation 4

Table 33 Improvement opportunities - The lineside estate as an asset

Improvement Opportunity Ref	Summary of improvement opportunity
I-34	There is currently a lack of clear and consistent policy guidance to support strategic business planning at network and regional level in relation to the management of lineside vegetation and habitat. A clear line of sight will be improved through a dedicated Lineside Policy and the implementation of route Vegetation and Habitat Management Plans.
I-35	This review identified a potential skills shortage in ecology at all levels of the organisation. Lineside roles should be reviewed at all levels to ensure adequate vegetation and ecological expertise is available to support critical decision making.
I-36	Regions described a lack of capacity within the supply chain to deliver increasing workload. Pressures on external suppliers were noted from competing demands on resource from other infrastructure provides and major projects such as HS2. There exists a need to critically review industry capacity to deliver work planned for CP7 to avoid the risk to delivering NR's objectives to manage risk and protect habitat.

5.7 Varley Recommendation 5 – Engaging with communities and key stakeholders

5.7.1 Recommendation from Varley Review

This recommendation is:

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

5.7.2 Engagement initiatives

NR have committed to producing a new suite of template notification letters and leaflets to ensure that lineside neighbours and stakeholders are kept updated both before and after work takes place to manage vegetation on the railway. Communications teams have provided updated guidance to on-site personnel when engaging with our neighbours during vegetation works. A new mapping system has been set up to log and track areas that are receiving high volumes of complaints.

Example letters to third party tree owners are included in the Vegetation Management Manual suite of documents. Examples of pre-notification letters regarding works and information used in local meetings were provided. Maintenance Protection Coordinators (MPCs) deal with service requests and local authorities

For larger projects, the importance of public engagement "town hall" sessions involving local stakeholders was recognised.

A common observation was that attitudes to large scale clearance maintenance works on the lineside tended to vary between urban and rural areas, with neighbours outside of towns and cities more accepting of the need to control vegetation. An emerging trend was also noted for non-local pressure groups to be involved in objecting to works as well as those directly affected.

We were not provided with any direct evidence of a process to share experiences of communications best practice outside of individual Regions. This links in with the observations on continuous improvement discussed in Section 5.6.7.

Independent Reporter's observations

The Varley Review recommended that NR should review and update its internal and external communication and engagement processes, and its materials. Good examples were provided of documents and presentations used in engagements with local communities by regional teams. Some teams observed that the level of

opposition to vegetation management schemes tended to be greater in urban than rural areas and more effort was needed to communicate the intentions of the works. The involvement of disruptive activists not local to the area was also reported to be a feature of a number of public consultations.

There was also a recommendation that learning from engagements be shared across NR. The Independent Reporter did not see any evidence of an organised approach to this outside of individual Regions.

5.7.3   Risks and challenges

Risks and challenges identified in questionnaires by the TA and regional asset teams in connection with this review topic only yielded one observation, quoted below:

"Adverse stakeholder reaction from vegetation management activities."

5.7.4   Confidence ratings

Appendix A.2 presents the Independent Reporter's detailed observations on questionnaires responses, workshop discussions and evidence provided by the TA and each Region. These form the basis for assessing confidence ratings for each Region, which are summarised below. The following evidence, documented or otherwise, are typical of those provided in relation to this topic:

- Engagement in England / Scotland / Wales
- Regional groups
- Local engagement on specific projects
- Network level guidance on stakeholder engagement
- Approach to capturing and disseminating lessons learned

Table 34 Assessment of Network Rail's delivery of Varley recommendation on engaging with communities and key stakeholders

Central function / Region	Confidence ratings and basis for assessment	
Central function	- Role of ATRs in sharing knowledge noted. - No evidence of formal knowledge transfer or process improvement approaches being applied. - National engagements noted. - Updated communications approach with local stakeholders in OTK/5201 documents. - No clear mechanism for sharing best practice from local engagements.	3
Eastern	Good evidence of active engagement with stakeholders and incorporation of relationship management in works planning.	4
North West & Central	- Sound approach to stakeholder management described - Examples provided of engagement materials	3
Scotland's Railway	Examples of good practice provided (in questionnaire)	3
Southern Region	Good progress on stakeholder management with many examples provided.	4
Wales and Western Region	Sound approach to stakeholder management but lacking documented examples.	3

5.7.5   Engaging with stakeholders - Improvement opportunities

The following improvement opportunities have been identified in relation to the Network Rail's progress with delivery against Varley's Recommendation 5

Improvement Opportunity Ref	Summary of improvement opportunity
I-37	Sharing examples of good practice in stakeholder management across the network would promote best practice and potential avoid confrontations that are costly to manage and adversely affect Network Rail's reputation.
I-38	Examples of good practice in stakeholder management were provided in evidence packs. It was noted that different approaches are needed depending on the locality and nature of the works. Sharing examples of these across the network would promote best practice and potential avoid confrontations that are costly to manage and adversely affect Network Rail's reputation.
I-39	Evidence was provided relating to interventions by national pressure groups when engaging with local stakeholders. It would help to reduce potential conflict if Network Rail worked with these organisations, so they better understand the approach being taken to undertake vegetation maintenance and the initiatives being taken regarding biodiversity and habitat management,

5.8 Varley Recommendation 6 – Cultural change

5.8.1 Recommendation from Varley Review

This recommendation is:

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

5.8.2 National initiatives

NR have committed to putting these recommendations into practice, both in establishing new processes across NR, and in building a culture dedicated to enhancing natural habitats, continue to look at where we can go further and demonstrate our leadership on this issue.

The TA identified a number of initiatives to promote cultural change:

- Internal webinars have been given to the business to discuss work that has been produced throughout the sustainable land use programme
- Support to the business and the executive leadership team
- Products delivered as part of the sustainable land use programme that have been briefed to the business
- Workstream to assist the Regions with further dissemination.
- Ten-fold increase in roles with ecology in the job title
- Introduction of biodiversity initiatives as part of business as usual by frontline colleagues

5.8.3 Regional initiatives

Most Regions commented on an emerging change in culture regarding biodiversity, although this was more through the introduction of new working practices than through a dedicated change programme. This was increasing within the DUs who were implementing habitat protection and improvement measures as part of their day-to-day work.

One exception was Southern Region, who have implemented a change programme within their organisation. They have also recognised the importance of measuring culture change as part of this process but noted that this was best carried out in two-year cycles in order to see any noticeable change.

Southern's approach has been informed by maturity model approaches, with the following key elements:

- Compliance - 'ecology conversations' light-touch compliance engagement at worksites and office locations; topic inspections
- Communication - through Connect, reports and cascade briefings, team meetings, external meetings, biodiversity conversations and feedback.
- Competency - training courses; topic briefings.

- Individual behaviours - modelling what good looks like on maintenance jobs
- Working environment - design in biodiversity management to maintenance works planning; 'quick wins' as part of blockade works; access to tools and guidance
- Supply chain - specifications for biodiversity; sharing good practice

Independent Reporter's observations

There was evidence of emerging cultural change in relation to biodiversity and habitat creation within the Regions, although this did not seem so well embedded within the DUs consulted. There was some limited evidence of change programmes relating to biodiversity. For the most part change was being implemented on an ad hoc basis through on site guidance and presentations.

There is no formal approach to implementing cultural change across the organisation, which formed part of this recommendation. Some examples from Regions were noted. Implementation of the new approaches to habitat management would benefit from a network wide initiative for cultural change that could be adapted as required by the Regions that considered. It is considered that establishing board champions is a key part of ensuring that this change filters down from the top to the bottom of the organisation. …add examples of ideas from Arup of best practice.

5.8.4 Risks and challenges

Some issues that relate to the management of lineside vegetation may be rooted in the organisation's culture. However, no specific risks and challenges were specifically identified by stakeholders in connection with this topic in the questionnaire responses.

5.8.5 Confidence ratings

Appendix A.2 presents the Independent Reporter's detailed observations on questionnaires responses, workshop discussions and evidence provided by the TA and each Region. These form the basis for assessing confidence ratings for each Region, which are summarised below. The following evidence, documented or otherwise, are typical of those provided in relation to this topic:

- Staff briefings
- Training materials
- Steering group terms of reference

Table 36 Assessment of Network Rail's delivery of Varley recommendation relating to cultural change

Central function / Region	Confidence ratings and basis for assessment	
Central function	- No evidence of a cultural change programme for valuing nature and the environment. - Change in attitudes being accomplished through introducing working practices and new roles in organisation.	2
Eastern	- Acknowledgement from regional team that more work needs to be done in promoting cultural change. "Internal stakeholders" are referred to in the Region BAP.	2
North West & Central	- Cultural change spreading "top down". Not clear if DUs are fully engaged.	2
Scotland's Railway	- Sound approach noted, but progress limited by resource.	2
Southern Region	- Good progress on cultural change. - Formal change management approach taken.	3
Wales and Western Region	- "Cultural change spreading ""top down"". - No formal change programme, but some initiatives being delivered."	2

5.8.6 Cultural change – Improvement opportunities

The following improvement opportunities have been identified in relation to the Network Rail's progress with delivery against Varley's Recommendation 6

Table 37 Cultural change – Summary of improvement opportunities

Improvement Opportunity Ref	Summary of improvement opportunity
I-40	There is no formal approach to implementing cultural change across the organisation, which formed part of Recommendation 6 from the Varley Review. Some examples in Regions were noted. Implementation of the new approaches to habitat management would benefit from a network wide initiative for cultural change that could be adapted as required by the Regions. The Varley Review provided examples from previous NR programmes where culture change had been facilitated through a programme approach.

6.   Theme 3 Consideration of habitat and biodiversity in works planning

6.1   Scope of review

The scope of this topic is summarised below:

Assess and comment on how habitat management and biodiversity are considered when planning activities / works for vegetation, for example: how lineside asset management team works with biodiversity team at Region level, and any monitoring system in place to measure Regions' progress towards biodiversity targets.

NR's overall approach to taking biodiversity into account when planning, designing, and implementing rail infrastructure works is covered in NR/L2/ENV/122 Biodiversity Manual and associated modules. This covers all works undertaken by NR that might affect biodiversity, but its application has only been considered in this review in the context of vegetation management.

6.2   Habitat Management Plans

NR/L2/ENV/122 Module 02 Habitat Management Plan contains the key principles for the management and enhancement of biodiversity and prescribes requirements for producing Habitat Management Plans (HMPs) for the rail network. It is applicable to all work on NR controlled infrastructure and work by NR or its contractors that takes place outside of the NR controlled infrastructure.

HMPs are intended to provide a set of interventions for maximising biodiversity in the light of other constraints to:

a) Define the management required for a given habitat type and, where necessary, identify changes required to existing habitats to enable transition to a preferred habitat
b) Establish the accountability for the habitat within a route / Region
c) Support the planning and interventions required aligned with asset management requirements.

NR/L2/ENV/122 Module defines a preferred habitat as one that, once established, is able to maximise opportunities for biodiversity, while also taking account of other considerations (safety, performance, drainage, carbon storage, soil management, stakeholder appeal). The preferred habitat may already be present or may be a habitat type that can be created.

Only North West & Central Region provided an example of a regional HMP. Other Regions had included elements that would be expected in an HMP in other documents such as vegetation management strategies or sustainability strategies.

It was evident that habitat management has only recently started to be coordinated at a strategic level with the management of lineside vegetation. However, there was evidence of the application of the requirements of NR/L2/ENV/122 in the specifications for individual clearance projects (see Section 6.4) and working practices adopted by off-track teams.

Southern Region identified limitations in the current approach to managing vegetation and biodiversity (see also 5.6.2). They considered that there is currently no single strategic system that captures and facilitates compliance to biodiversity policy, standards, and work instructions. They acknowledged that multiple applications and methods were in use throughout the Region for holding biodiversity data, recording, and reporting asset information and interventions, and for ecology attributable incidents and issues. The Region has proposed a Biodiversity Management Plan that recognises the drivers for biodiversity management, and the importance of a whole-lifecycle approach, and will proactively work to deliver optimum performance through use of an integrated approach for biodiversity asset management.

Independent Reporter's observations

The Independent Reporter considers that Habitat Management Plans (HMPs) will play an important part in defining each Region's approach to developing a preferred lineside habitat and meeting NR's biodiversity targets. NR is falling behind the commitment in its Biodiversity Action Plan to have these in place by 2021,

6.3   Responsibilities for habitat management and biodiversity

Each Region was asked to provide details of how vegetation management was organised, including responsibilities for biodiversity. A variety of approaches to this were described but few organisation charts were provided that covered all aspects of vegetation management. We note that most routes have been in a state of flux pending current re-organisation of NR's maintenance operations, which may be a factor in details not being forthcoming.

North West & Central Route provided a comprehensive organisational chart that covered the entire Drainage and Off-track organisation, including regional management, route asset management teams, DUs and Works Delivery. Other Regions provided organisational charts that were very high level or did not cover all aspects of vegetation management within their organisations.

Generally, off-track teams are responsible for drainage and other lineside activities such as vegetation, access points and vegetation. Some routes / DUs have workforce dedicated to particular roles but, in most cases, work is undertaken by non-specialists, which provides flexibility in allocating tasks, especially where work is seasonal. Specialist tasks, such as arboricultural work, tend to be subcontracted out.

Large scale clearance works are typically contracted out and managed by Works Delivery (or equivalent), as discussed in Section 4.4.2. Works Delivery teams are responsible for procuring and managing clearance works and often have their own vegetation management and ecology specialists.

Ultimate responsibility for vegetation management typically rests with the Route Asset Manager. Within the maintenance delivery function, either a dedicated Off-Track Maintenance Engineer (OTME) reports to the Track Maintenance Engineer (TME) or directly to the Infrastructure Maintenance Delivery Manager (IMDM), or the off-track resource has no specific lead, with TME taking this role.

The provision of in-house ecological expertise to support vegetation management activities varies across the network. Individual organisations are developing their own models to deliver strategic guidance, including Habitat Management Plans, and support maintenance and works delivery teams. Ecological expertise may therefore be present in different parts of the regional organisation, for example within Environment and Sustainability, Works Delivery and off-track teams.

There is rarely any ecological and environmental expertise in individual DUs at this time, which was reported to make the teams feel vulnerable at times when works on site required ecological checks and environmental processes required. It is understood that some Regions intend to increase the ecological resource within DUs in the future, subject to funding being made available.

Ecological expertise, particularly for site specific surveys is often contracted in to supplement in-house resources.

A general shortage in ecology specialists is discussed in Section 5.6.5.

Independent Reporter's observations

The way in which specialist ecological advice is provided to lineside asset teams varies across NR's Regions. This is generally provided through a mix of in-house specialists and external consultants. In-house expertise was usually provided from environmental teams, but was sometimes embedded in asset management teams, works delivery and, occasionally, in DUs. The general view from regional asset teams was that resource was scarce and this could sometimes hold up development and delivery of schemes.

Some Regions have made progress in identifying preferred habitat types appropriate to their localities. These may be common across some parts of the network. It would aid the development of Habitat Management Plans if the definition of these and the approach to their maintenance could be shared between different parts of the organisation.

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6.4   Works planning

The implementation of measures that consider habitat and biodiversity are being introduced into specifications for clearance works that include requirements of both NR/L2/OTK/5201 and NR/L2/ENV/122 Module 1. Examples were provided of specifications for clearance works by Eastern Region and Southern Region.

Contractors are required to provide a Preliminary and Post Works Ecological Appraisal (PEA / PWEA) of lineside habitats from the cess to the network boundary. Surveys are undertaken according to CIEEM guidance for PEAs, consisting of a Desk Study (including LERC records) and a focus on habitats, using UK Habitat Classification and undertaking biodiversity calculations on the most up-to-date Defra metric.

Eastern Region commission ecological surveys to check for compliance with protected species and are now asking for biodiversity calculations to be undertaken so that they will have a clearer understanding of ecological values present in advance of works, as well as those present following works.

Wales and Western Region provided an example of Minimum Ecology requirements for use by Works Delivery when planning clearance works.

Post project reports were provided by several Regions that demonstrated the application of habitat related measures, mostly related to clearance works. Many of these related to demonstration and pilot projects discussed in Section 5.6.6 and represent the development of best practice in habitat management.

All of the DUs reported an increase in awareness of habitat friendly measures when undertaking maintenance works, which were being established as business as usual.

Wales and Western Region provided an example of their Rapid Response procedure that includes requirements for an ecologist to be consulted to advise on measures relating to reactive works. The Region also provided their recommendations for planning of future works which include large scale vegetation clearance (such as block access works).

Evidence was provided by all Regions of initiatives being adopted during clearance works and maintenance activities, including:

- Checks for bird nesting, badger setts or signs that bats may be roosting in trees These may warrant a specialist survey
- Use of thermal imaging to assist with locating nesting birds
- Reduction in the number of contractors used through the summer season to avoid vegetation clearance in the bird nesting season
- Selective felling and recognising the importance of standing wood, in particular leaving slow growing trees to flourish where safe to do so
- Retention of "railway friendly species", e.g., blackthorn, and felled materials on site to create insect habitats
- Reduction in use of flailing as a maintenance tool to avoid unnecessary damage to the environment
- Limiting removal to hazardous vegetation only - felled materials are retained on site or chipped to bank to create insect habitats
- Use of eco piling / Bird boxes / Bat boxes / Brash piles / Windrow - Eco piling now has a standard job no and will be entered into ELLIPSE to monitor volumes
- Not fully chipping all cleared vegetation on site
- Not eco-plugging stumps beyond 6m from the line to allow for coppice regrowth
- Raking chippings and spreading them out evenly so that they do not shade desirable ground flora when left in piles
- Use of signage to show Eco-Pile areas
- Reducing the potential for vandalism by wiring together piles to prevent them being moved
- Leaving dead trees to allow for use by the local wildlife as a "home" and for other species to use a form of food outlet.

Consideration of nesting birds was a specific recommendation from the Varley Review. Scotland Region described a typical approach:

"Nesting season is mitigated using the Network Rail breeding bird protocols. Works Delivery have ecologists involved in their workbank and they can undertake thorough hand searches if works must occur in tricky habitat. Ideally, we phase works where dense and tricky areas are left until August/Sept onwards. March/April is easier due to the lack of ground cover early in the season. May-July inclusive is the most difficult part of the year. It is most challenging for the DUs as they are dealing with safety of the line issues like signal and level crossing sighting, but they should not leave these areas such that they need to remove dense cover it should generally be minor pruning."

Independent Reporter's observations

Good examples have been provided of maintenance and clearance works specifications and best practice that reflect the requirements of NR/L2/ENV/122 and other guidance relating to habitat and biodiversity. As this is an emerging discipline within NR, the Independent Reporter considers that sharing model specifications for habitat related works across the network would promote best practice and consistency in methods adopted by DUs and the supply chain.

Preliminary and Post Works Ecological Appraisals are mandated for vegetation management projects, which report loss or gain of biodiversity due to the works. The Independent Reporter considers that sharing examples of these across the network would promote best practice and consistency in methods adopted by in-house ecologists and the supply chain.

6.5 Monitoring progress towards biodiversity targets

The adoption of a biodiversity metric to measure progress towards NR's target of no net loss in biodiversity by 2024 and net gain by 2035 is discussed in Section 4.5.4. In order to meet these targets, NR will need to be able to demonstrate progress in terms of this metric (or an equivalent approach).

6.5.1 Network and Regional progress

The TA noted that the biodiversity baseline data has only recently been published in the State of Nature report (2022) and will be measured on an annual basis. They felt that it is not possible to currently give an assessment as to how on track the organisation is. It is not known what progress is being made to repeat the remote sensing exercise that was used to develop the baseline in the first edition of this report.

The discussion on the biodiversity metric in Section 4.5.4 concludes that there is still work remaining to create an effective means of recording habitat related information in Ellipse based on remote sensing and surveys on the ground.

The potential for introducing scorecard measures to monitor achievement of NR's biodiversity targets is discussed in Section 6. However, this requires a robust approach to capturing and interpreting habitat data to support its derivation.

Eastern Region has started a programme of habitat mapping to establish baseline biodiversity value to ensure that there is no net loss of biodiversity when work is undertaken in the future. This work started in 2021 to establish methodology, with resource put in place for the 2022 season, with plans for three contract ecologists working for NR full time, and a further five staff available on a call off basis to cover survey and incoming data.

Scotland Region considered that they were not mature enough to monitor progress beyond accepting the TA biodiversity net gain score from the remote sensing activity delivered by UK CEH. They observed that the Defra tool exempts habitat loss that recovers within two years and that the NR standard exempts biodiversity net gain calculations on jobs with a footprint smaller than 1500m^2. They concluded that most of their work was therefore exempt from calculations, and this would hinder a proportionate or practicable biodiversity net gain calculation for all work undertaken.

6.5.2 Project delivery

NR/L2/ENV/122 Module 1 requires existing (pre works) and post works biodiversity values to be calculated and recorded in the PEA to help determine whether the works will lead to a loss or gain of biodiversity once they are completed. The metric to be used is not specified in any of the NR/L2/ENV/122 family of documents, with only a note that *"Habitat condition should be graded in accordance with the relevant metric for biodiversity value"*. It is assumed that the Defra metric is being used by default.

The Independent Reporter had not specifically requested examples of PEAs for individual sites, but the process was discussed at the workshops.

Eastern Region noted that projects are undertaking biodiversity accounting and doing their best to achieve no net loss. They highlighted the need in the future for a regional approach to accommodate instances where projects cannot achieve no net loss, for example where space is at a premium.

North West & Central's Vegetation Strategy and Requirements supports NR's target for no net biodiversity loss by 2024 and specifies a minimum 10% net gain requirement to be specified for project delivery. There are several route trial projects in Heysham, Dutton and Harbury Cutting (SSSI) where biodiversity objectives and recommended outcomes will be implemented and monitored. The Region's Vegetation Management Specification is in further development to introduce long-term maintenance guidelines that will ensure no net loss in maintenance activities.

6.5.3   Offsetting

NR's Biodiversity Action Plan defines biodiversity offsetting as improving *"...biodiversity elsewhere on our estate where it is not practical or safe to mitigate habitat loss on the lineside".* Initially this seems a simple calculation whereby loss of biodiversity units in one place is mitigated by creating a compatible number of units elsewhere. However, the approach to be taken is not described in NR/L2/ENV/122 and Regions seem to have developed their own local procedures to manage offsetting.

Wales and Western provided an example of a project at Okehampton where mitigation works were undertaken on a site outside the NR boundary. They considered that this was an expedient solution to meet a planning requirement, but it created issues regarding the long-term maintenance of the site where the habitat creation took place.

North West and Central Region described how net gain is tracked on their Capital Delivery performance dashboard and some very large programmes such as East West Rail and Transpennine Route Upgrade (TRU) are delivering 10% biodiversity net gain already.

Southern Region noted that there has been a lot of conceptual thinking around offsetting and the challenge is how to include it in business plans and strategies. They currently have a programme with the Tree Council where offsetting is done outside of NR land, but the Region understands the offsetting cannot be done continuously off the railway and pockets of lands to do offsetting have to be identified. The only way to determine how much to offset is by knowing how much biodiversity has been lost in the first place, which is currently being reviewed.

Scotland Region considered that irreplaceable habitats within the boundary are incredibly rare and that most designated sites are outside their boundary. They felt that once the Habitat Management Plans are in place, this will be covered in detail in the sectional plans for these areas and inform decisions in advance of the work, rather than in reaction.

In addition to implementing offsetting measures elsewhere on the NR estate, NR will need to be mindful of the development of Local Nature Recovery Strategies across each of the Regions. Those strategies should identify networks of receptor sites within which to focus regional biodiversity action in order to generate the optimal biodiversity outcomes for that Region. NR could positively contribute to those networks through offsetting actions and may wish to prioritise those over other third-party opportunities (that may not be of equivalent strategic significance).

Independent Reporter's observations

Issues relating to defining an appropriate biodiversity metric are discussed in Section 4.5.4. The target date for achieving the no net loss in biodiversity of 2024 is not far away. There was no evidence of any monitoring taking place of achievement of this target at regional level beyond the annual survey published in the State of Nature Report. The Independent Reporter would have expected to have seen examples of how the trajectory to achieve this and the net gain target by 2035 were being measured. In addition to the now established annual reporting, there is a need for all Regions to evaluate and monitor net loss/gain balances on a project-by-project level (as required by Module 1) in order to feed into an accurate baseline and allow for more regular measurement of the trajectory/progress towards the biodiversity target.

Offsetting will be an important feature in ensuring that there is no net loss (or preferably net gain) where unavoidable loss of habitat occurs. Routes are required to state how this is to be done in Habitat Management Plans, but there is no network guidance on how this should be achieved. The Independent Reporter considers that best practice should be incorporated into network wide guidance to avoid duplication of effort, assist in achieving biodiversity targets, and maximise positive outcomes for biodiversity.

6.6 Risks and challenges

Specific risks and challenges identified by stakeholders in connection with this topic include:

Risks and challenges identified in questionnaires by the TA and regional asset teams in connection with this review topic are quoted below:

> *"Network Rail does not fully understand land management or Ecology. It is a heavy Engineering company that is driven by real time customer performance. Perceived safety, performance and reputational risks are seen as higher (/ understood better) on other asset groups."*

> *"Ecology is beginning to be increase in maturity but is still a long way behind in surveying. This has a significant impact on precautionary ways of working in some areas. Further to this the use of machines for vegetation clearance is currently limited due to lack of ecology maturity."*

> *"Biodiversity standards have not previously been treated as important as they are now; this means more funding and more specialist resources are required to adhere to the Varley report and meet net zero gain target."*

> *"Enabling a maintenance organisation that can manage and deliver cut and maintain"*

> *"HMPs and supporting work need to be undertaken by trained Ecologists with previous experience and knowledge and these staff are difficult to recruit in an overheated market with heavy demand for ecologists."*

> *"The DUs have no expertise to undertake ecology surveys and therefore, there is a substantial risk that the environmental legislation could be broken. "*

> *"No training or advice has been provided to the DU on what constitutes a habitat."*

> *"Additional work from biodiversity standards."*

6.7 Confidence ratings

Appendix A.2 presents the basis for the Independent Reporter's assessment of the confidence ratings for this topic, which are summarised below. The following evidence, documented or otherwise, are typical of those considered in the assessment:

- Roles and responsibilities (national and regional)
- Availability of expert resource
- National and regional strategies and plans
- Habitat Management Plans at regional and project level
- Specifications for vegetation management
- Engagement with in-house teams and contractors
- Supervision of works
- Project reports
- Continuous improvement / sharing best practice
- Capturing KPIs and baselining
- Roadmap for achieving targets (National and regional approaches)
- Biodiversity accounting

Table 38 Assessment of how Regions consider habitat and biodiversity in works planning

Region	Confidence ratings and basis for assessment	
Eastern	• Good progress in terms of strategy and guidance documents. • Few examples of application in practice	**3**
North West & Central	• Sound progress in beginning to implement HMPs at Region and route level. • Some evidence of monitoring achievement of biodiversity targets and offsetting.	**3**
Scotland's Railway	• Sound progress in considering habitat and biodiversity noted across a number of areas, as noted in response to Varley recommendations in #2. • Progress in implementing ENV/122 and HMPs stated to be behind schedule due to resource limitations. • Issues noted with adoption of biodiversity metric in Scotland.	**2**
Southern Region	• Sound approach described in questionnaires • Vegetation management plans and strategies provided for all routes. • Substantial number of ecology and planning documents provided for a number of projects. • Uncertainties around how net loss / gain are to measured and tracked are acknowledged and practical approaches being developed.	**3**
Wales and Western Region	• Examples provided of initiatives to promote best proactive. • No examples of HMPs at route or project level. • Limited examples of specifications of habitat / ecology related work.	**2**

6.8   Habitat and biodiversity in work planning- improvement opportunities

The following improvement opportunities have been identified in relation to how habitat and biodiversity are considered in Network Rail's planning activities or works for vegetation

Table 39 Consideration of habitat and biodiversity in works planning – Summary of improvement opportunities

Improvement Opportunity Ref	Summary of improvement opportunity
I-41	Good examples have been provided of maintenance and works specifications that reflect the requirements of NR/L2/ENV/122 and other guidance relating to habitat and biodiversity. Sharing model specifications for habitat related works across the network would promote best practice and consistency in methods adopted by DUs and the supply chain.
I-42	The target date for achieving the no net loss in biodiversity of 2024 is not far away. There is no evidence of a standardised approach to monitoring achievement of biodiversity targets at project, route and network level to support targets and offsetting. A programme approach roadmap is needed to enable key NNL / BNG activities to be identified and planned so that these important corporate objectives can be met at regional and network levels.
I-43	Habitat Management Plan (as defined in NR/L2/ENV/122 Module 02) complement Vegetation Management Plans and contain the key principles for the management and enhancement of biodiversity. Preparation of these is mandatory and they form an important role in defining how each route will undertake habitat related activities that will be funded for the first time in CP7. To date there have been very few of these issued. Regions need to make a commitment to produce these so they can usefully contribute to the CP7 planning cycle and contribute to Network Rail's biodiversity targets.
I-44	Examples of good practice in producing specifications for vegetation clearance works were provided in evidence packs, including measures relating to biodiversity and protecting habitats. Sharing examples of these across the network would promote best practice and consistency in methods adopted by the supply chain.

Improvement Opportunity Ref	Summary of improvement opportunity
I-45	Some Regions have made progress in identifying preferred habitat types appropriate to their localities. These may be common across some parts of the network. It would aid the development of Habitat Management Plans if the definition of these and the approach to their maintenance could be shared between different parts of the organisation.
I-46	Preliminary and Post Works Ecological Appraisals are undertaken for vegetation management projects. Sharing examples of these across the network would promote best practice and consistency in methods adopted by in-house ecologists and the supply chain.
I-47	Offsetting will be an important feature in ensuring that there is no net loss where unavoidable loss of habitat occurs. Routes are required to state how this is to be done in Habitat Management Plans, but there is no network guidance on how this should be achieved. Best practice should be adopted in providing network wide guidance to avoid duplication of effort, assist in achieving biodiversity targets, and maximise positive outcomes for biodiversity.
I-48	Examples of good practice in preserving habitats and encouraging biodiversity during routine maintenance were provided in evidence packs. Sharing examples of these across the network would promote best practice and consistency in methods adopted by DUs and the supply chain.
I-49	Sharing examples of Preliminary and Post Works Ecological Appraisals across the network would promote best practice and consistency in methods adopted by in-house ecologists and the supply chain.

7.   Theme 4 CP7 Planning

7.1   Scope of review

The scope of this topic is summarised below:

> *Review Regions' CP7 plans (proposed costs and volumes) for vegetation management including, but not limited to, ash dieback actions, biodiversity and habitat management. Based on evidence collected and assessment of the above requirements (1) to (3), comment on Regions' management approach, assumptions and methodology of planning used to inform their CP7 plans, for example, whether Regions sufficiently articulate and justify their plans with clear breakdown; and the consequential impacts on CP7 plans.*
>
> *The assessment should identify good practices observed and areas for improvements. The assessment should also recognise CP7 plans are in early development, the volume that is required to tackle vegetation management plans and the associated costs of deliver this work are still relatively immature and therefore subject to change.*

Over the period of this review Regions were in the process of completing their submissions for Round 5 of CP7 planning. While some information on planning was made available from Round 4.5, this did not contain much detail regarding vegetation management, and we have only been able to discuss the general approach taken.

7.2   CP7 Lineside Policy

A Lineside Asset Policy is currently being prepared to support CP7 planning. This supersedes the policy prepared for CP6 and is expected to set out clear principles for workbank development. This new policy will have an accompanying Lineside Technical Strategy, which has not been created yet.

The NR TA noted that the Cost and Volume template to be used for CP7 planning (owned by Business Review Team) has been amended to include Lineside as an asset. This is the first time Lineside will have its own cost and volume category (previous was under 'Track Other'). Included in the amendment is a Key Volume Line for Land Management (number of schemes). This will allow Regions to request CapEx funds for the first time to support land development schemes. The Independent Reporter was not shown any evidence of Cost and Volume template being used by Regions for CP7 planning.

7.3   Development of plans

Central function

The Regions provided bottom-up analysis of the funding they require. This is collated centrally by the CP7 Business Review Team who are building the overall business plan. There is currently no central template or tool to develop OpEx / CapEx requirements for vegetation management and Regions are developing funding requests independently.

The Independent Reporter was not provided with any examples of guidance or templates given to the regional teams detailing the information to be provided or approach to preparing Vegetation Management Plans. This may be due to vegetation management only comprising a single budget line in off track proposals or due to planning being in early phases of development. Consequently, there appears to be a lack of consistency in the summary information that Regions are preparing and the way in which they are building the funding lines.

Discussions with the TA and Regions revealed the following:

- The current process is reliant on the old (CP6) lineside policy and business review spreadsheet / table which asks Regions for funding levels required and volume to be delivered. The spreadsheet includes narrative justification but does not contain bottom-up detail to support assurance. No evidence was provided that these have been completed from the CP7 perspective.
- The TA stated that there is no detailed guidance available because there is a lack of up to date and accurate data on the vegetation asset.

- In considering the lineside as an asset for the first time in CP7, Regions are expected to identify capital delivery schemes that will ensure clearance/provision of a compliant lineside profile with consideration to increasing biodiversity, improving habitat, addressing ash dieback and projects with a social or environmental benefit.
- The TA confirmed the Cost and Volume template being used for CP7, has been amended to include Lineside as an asset to request CapEx funds. This is the first time Lineside will have its own cost and volume category, previously this was under recorded under 'Track Other'.

Evidence was provided by the TA of a Workbank Management Tool (WMT) under development for Off Track to assist in long term decision making. The tool was being developed as part of the wider Network Rail Intelligent Infrastructure Programme under the drainage workstream. A roadmap for WMT deployment within the business was provided by the NR TA showing a first version release date of June 22. The WMT deployment date was after all regional stakeholder engagements had been completed. Consequently, the Independent Reporter was unable to confirm if the tool had been successfully deployed to engage in more detailed discussion. From the document evidence provided by the TA, the Independent Reporter understands this decision support tool will provide the following benefits:

- Scenario modelling of capital and operational risks
- Whole-life cost modelling and forecasting
- Long term asset risk planning – reliability, safety, maintainability, and availability
- Understanding of socio-economic benefit
- Asset performance forecasting
- Improved workbank planning.

Regions

The Regional workshops allowed the Independent Reporter to explore the challenges the Regions have identified in the delivery of maintenance and clearance works in CP7 and the key risks identified.

There was limited evidence provided by Regions on the planning process for CP7. The evidence collated by the Independent Reporter has relied on workshop sessions and historical evidence to understand the process for CP6. It should be noted that the CP7 planning process is still in the early stage of development and as such Regions have had limited input at this time.

CP7 planning had already been through four rounds at the start of this review, with round five taking place during the review. Regions reported having had little engagement in the process until Round 4b where some have provided feedback to the CP7 planning team on the funding that had been identified. This has been at a high level, considering overall funding envelopes with little engagement with DUs to provide maintenance volumes.

Evidence provided by Regions states that CP7 planning will use all available data, including LiDAR and imagery, records of cleared locations, unit rates, National Habitat Baseline Survey (NHBS) data, lineside tree survey data, autumn risk assessments, Ash dieback surveys, Ellipse (F3079). Core planning will be based on clearance to compliance, relevant offsetting, then cyclical maintenance. Interim actions will be reactive maintenance and operational restrictions during weather events or spot DDD issues. Regions consistently advised the Independent Reporter that DLI will be a critical tool to assist with planning and assessment but that it may not be ready for CP7 planning.

Timescales for submission of CP7 estimates conflict with current understanding of the need of the asset base. The roll out of DLI will change regional understanding of the asset base by providing them with better quality and repeatable data that they can use to understand maintenance and clearance requirements going forward. Providing estimates for CP7 before the roll out of DLI means that the requirements of the asset base may change. Regions have expressed concern that if the data from DLI means that they are less compliant than current estimates this could lead to a position where the funding does not reflect the asset need.

Work will continue to build on CP6 engagement with key external neighbours / stakeholders to manage their tree risks to Network Rail.

It is understood that for Round 5 Regions have been providing bottom-up estimates of maintenance volumes based on the ABP tool and Ellipse data.

Regions have all indicated the need for an increase in maintenance volumes that will arise from undertaking clearance work to ensure they can better comply with the requirements of the vegetation standard. There was no evidence provided to show how they would address this issue and ensure funding reflects the growing maintenance need and how they were developing volumes to account for this. The Independent Reporter was not provided with any regional Vegetation Management Plans or central regional strategy document which clearly outlined how this maintenance challenge will be addressed. The Independent Reporter views this as a significant gap for future planning that needs clarity across all Regions to clearly understand what can be delivered within current resource and budget availability. This will also help manage risk to the network, prioritising where maintenance work should be delivered. In addition, it will provide justification for any future increases in resource and budget that may be required to ensure national or regional vegetation management objectives can be met.

The Independent Reporter asked for further detail on how Regions were undertaking CP7 planning after the playback sessions. This was specifically intended to understand the budget lines they were expecting to provide as part of their CP7 plans and scale where available. When feedback was provided, the following headline items were consistent across Regions:

- Routine cyclical inspections and maintenance
- Works to achieve compliant vegetation profile with the Vegetation Management Manual
- Management of DDD trees,
- Management of Ash Die Back
- Embed Biodiversity and Habitat Management requirements as detailed by NR/L2/ENV122

The Independent Reporter understands from the stakeholder engagement DUs will provide bottom-up maintenance volume estimates which route teams will cost using the ABP tool for CP7. This review did not look the ABP tool in detail, however the approach was discussed with stakeholders. The tool looks at the activity required to maintain each asset; covering the labour, plant and materials which may be required to deliver the maintenance activity and associated costs. This approach aims to allow Network Rail to obtain a clearer view of how costs are linked to specific maintenance activities and was used by most routes to build CP6 maintenance plans.

Regions outlined how the current funding model does not allow longer term planning due to it being covered within OpEx funding which prevents engaging the supply chain with longer term plans. Eastern Region evidenced that this is preventing the supply chain from developing more resources to meet the requirements of undertaking the clearance programme and increasing maintenance requirements with resource becoming increasingly scare given the national demand. This point was also made by North West & Central who expressed concerns around the ability of the supply chain to delivery their vegetation management requirements due to High Speed Two demand on the market. Wales and Western elaborated on this point, the stability and growth of the supply chain was a risk moving to CP7 as they increase their activity with the additional funding that they are requesting during the planning process given other major construction projects being undertaken and demand on the sector.

Regions intend to continue with delivery of the clearance programmes discussed in Section 4.3.5 moving into CP7. For Regions to achieve their assumed rate of clearance, at maintain current compliance dates, they have expressed that this will depend on the current levels of funding being maintained. However, Regions all expressed during workshops that the impact of increasing costs would increase the funding requirements needed to meet their assumed clearance rates.

Eastern Region described undertaking scenario planning based on different levels of funding to undertake their clearance workbanks to understand how the different funding envelopes. However, no further evidence or clarity was provided to show how this was done.

The increase of ash dieback and the risk posed to the network has resulted in the agreement of an additional funding line to undertake the required works consequently Regions are making funding requests for CP7 under a separate line item to address this need. Regions are hoping for circa £20m per Region to enable them to mitigate the risk posed by ash trees but the full funding envelope is still unclear given the early stage in planning. The independent reporter could not establish what this additional funding would enable Regions to achieve, rough cost for ash tree removal were provided (circa £3,000 for removal through climbing and circa £12,000 for felling) which can be used for a rough estimate of the number of ash trees that can be treated

with this additional funding. There we as no clear strategy provided by any Region for how they would be addressing ash trees moving forward.

Eastern, Southern, North West & Central have identified the need to ensure that they are sufficiently funded to undertake hazardous tree and leaf fall surveys. These Regions have submitted funding requests as part of the round 5 request, however other Regions have either not provided evidence or did not include this in their evidence packs. Southern Region provided an indication of the level of funding that they would need to embed Biodiversity and Habitat Management into the funding envelop for CP7.

While it is understood that the planning processes applied by all the Regions are broadly similar there has been no evidence provided of a consistent process to build up the different funding lines for CP7. Within some Regions there are inconsistencies in the approach taken to build up plans at route level to form regional tasks. This lack of evidence means that the Independent Reporter is not able to comment on the regional management approach, assumptions and methodology used to inform their CP7 plans and how effective and appropriate they are.

Independent Reporter's observations

Evidence provided by Regions does not allow a consistent view of their proposed costs and volumes for CP7 to be reached at this time. While this reflects the early stage of the development that CP7 planning has reached, there was very limited evidence provided that shows how funding lines were being built up to create a sustainable budget.

It is not clear to the Independent Reporter how Regions' funding requirements are linked to their strategic direction in relation to vegetation management and the delivery of NR's targets for biodiversity. The Independent Reporter considers that CP7 planning, and options appraisal could be made more effective through the development of a network Lineside Policy that considers vegetation as an asset and route Vegetation Management Plans. Line of sight between strategy and funding.

Risks relating to Ash Dieback in planning for CP7 are discussed in Section 4.6.5. It is also noted that new items relating to implementing biodiversity initiatives and rolling our DLI are included in most Region's plans.

There would be a benefit from all routes using a common template and guidance to develop costs and volumes for vegetation management. This would make assurance of the plans and the underlying assumptions and investment objectives more straightforward. This would incorporate changes in approach to how vegetation works are considered in terms of capital expenditure.

7.4 Current CP7 budget estimates

A few examples of CP7 cost and volumes plans were provided, but these were work in progress and there was not enough detail to allow a detailed review of the assumptions and build up to be undertaken.

The most detailed example of CP7 planning was provided by Southern Region. This comprised a build-up of budget costs for Kent, Sussex and Wessex Routes that compared CP7 estimates with CP6 levels of funding. The document provides a build-up of the different funding lines for maintenance, clearance, DDD, ecology, biodiversity, implementation of DLI, etc. The Independent Reporter observed differences in approaches taken to make-up of the budget lines for Kent and Sussex Routes compared with that undertake by Wessex Route. The budget lines for vegetation maintenance have then been aggregated for each route and carried forward to provide as part of a regional off-track summary. The budget lines at this aggregated level are for vegetation maintenance and what the Independent Reporter has assumed is funding to undertake clearance works. It was unclear to the independent reporter how the bottom-up totals had been built from first principles for the CP7 funding estimate put forward by Southern. The Independent Reporter observed discrepancies between the different funding lines presented by the different Routes within Southern Region.

Several Regions stated that there is a lack of data to support planning and hence a clear understanding of the current state of the vegetation asset base. Wales and Western noted that they are currently developing their workbank for CP7 and are awaiting specialist analysis of LiDAR data to gain understanding of current compliance which will inform the workbank.

Scotland's Railway are also currently awaiting on the results of their latest LiDAR surveys to inform their understanding of the current compliance position and enable the development of their clearance and maintenance requirements for the future. This will form the basis of the Regions work in CP7, however it was unclear as to how the results of these will be incorporated in to CP7 funding request and planning.

Regions have stated that the level of funding requested is higher than that received in the current Control Period. The evidence provided also showed that off track scenario modelling has been undertaken at a high level by the central CP7 planning function which including lines for CP6. Eastern Region provided evidence that the central CP7 planning function were also considering funding provisions at levels of 10% and also 20% lower than that granted for CP6. A relative reduction in funding between CP6 and CP7 is of concern given the step change that is required in how Network Rails is undertaking vegetation management based on the introduction of the Vegetation Management and Biodiversity standards.

Independent Reporter's observations

The development of a whole life approach to investment planning would yield benefits in achieving a balance between major vegetation clearance works and maintenance through consideration of safety risk, performance of the railway and habitat management. This would involve the consideration of investment scenarios that spanned multiple control periods.

Planning assumptions for CP7 would benefit from a consideration of potential variations in the current and changing condition of the vegetation asset on which they are based. It was observed that a simple whole life approach was adopted for CP6. Sensitivity to other variables such as costs and resource availability should also be examined as both were identified as constraints by regional teams.

As has been noted DLI is expected to provide a much-needed improvement in the data available to Regions to undertake their maintenance planning and to form a baseline for their programmes to achieve compliance. However, as stated previously, this tool has yet to be rolled out and may not be able to deliver results in time to support CP7 planning. This then leaves the Regions with significant uncertainties in the information upon which there planning is based. Until such time as the data improvements are made and access to repeatable and consistent data is available the introduction of tools such as the Workbank Management Tool will be

7.5   Risks and challenges

Risks and challenges identified in questionnaires by the TA and regional asset teams in connection with this review topic are quoted below:

"Staff capacity to manage to vegetation management programme, with restricted headcount and limited funding available to bolster teams with contractor resource."

"Lack of staff with the required skills and knowledge to maintain vegetation to the requirements of the standard. Being subsidised with additional specialist contractors with the relevant skills. CP7 improvement would require redeployment of staff from other disciplines into Off Track as an outcome from modernising maintenance."

"Long term of availability of op-ex funding. More focus on op-ex funding will be pursued in the next rounds of CP7 planning submissions to give some stability for the next 5 years. However, the funding model does not allow longer term financial security, this is a particular challenge for OpEx spend"

"Current contracting strategy may not be suitable for delivery of more complex workbanks, NR have tentatively opened conversations with procurement re contracting strategy for CP7, acknowledging that good plans are needed to facilitate good procurement strategy."

"CP7 funding requests do not align to the strategic aims and objectives of the business."

"CP7 challenges will be huge with Ash Dieback, and the Larch disease (Phytophthora Ramorum) and correct funding will be imperative as costs will increase as the Ash trees deteriorate meaning that they can't be climbed and will need dealt with by MEWPs."

"Unit Rates – limited supplier base pushing up prices"

7.6 Confidence ratings

Appendix A.2 presents the basis for the Independent Reporter's assessment of the confidence ratings for this topic, which are summarised below. The following evidence, documented or otherwise, are typical of those considered in the assessment:

- Network level guidance to inform CP7 planning
- Latest estimates of costs and volumes
- Scenarios considered
- Basis for estimates
- Statement of planning assumptions and risks

Table 40 Assessment of how Regions are undertaking CP7 planning

Region	Confidence ratings and basis for assessment	
Eastern	• Current funding lines provided with some evidence of funding envelopes presented. • No information provided on assumptions used to develop proposed funding envelop. • Evidence of central scenario planning provided. scenarios with inconsistency. • No link to how funding will impact on long term goals and objectives.	2
North West & Central	• Current funding lines provided with evidence of funding envelopes presented. • No information provided on assumptions for developing funding envelopes. • No link to how funding will impact on long term goals and objectives.	2
Scotland's Railway	• Current funding lines provided with some evidence of funding envelopes presented. • No information provided on assumptions used to develop proposed funding envelop. • No link to how funding will impact on long term goals and objectives.	2
Southern Region	• Current funding lines provided with evidence of funding envelopes presented though inconsistencies between routes. • No information provided on assumptions used to develop proposed funding envelop. • No link to how funding will impact on long term goals and objectives.	2
Wales and Western Region	• Evidence that some planning has been undertaken but funding estimates are from October 2021. • No information provided on assumptions used to develop proposed funding envelop.	1

7.7 CP7 Planning – Improvement opportunities

The following improvement opportunities have been identified in relation to the Regions' CP7 plans for vegetation management

Table 41 CP7 Planning – Summary of improvement opportunities

Improvement Opportunity Ref	Summary of improvement opportunity
I-50	There would be a benefit from all routes using a common template to develop costs and volumes for vegetation management. This would make assurance of the plans and the underlying assumptions and investment objectives more straightforward.
I-51	The development of a whole life approach to investment planning would yield benefits in achieving a balance between major vegetation clearance works and maintenance through consideration of safety risk, performance of the railway and habitat management. This would involve the consideration of investment scenarios that spanned multiple control periods.
I-52	CP7 planning and options appraisal could be made more effective through the development of a network Lineside Policy that considers vegetation as an asset and route Vegetation Management Plans. Line of sight between strategy and funding.
I-53	There is a risk that data on which planning assumptions are based are not reliable. Planning assumptions for CP7 would benefit from a consideration of potential variations in the condition of the vegetation asset on which they are based.
I-54	Vegetation aspects of CP7 planning are not aligned with policy at network or regional / route level. This means that the assessment of investment options may not be supported by consideration of asset needs and impact of decisions on safety, performance and biodiversity. The approach to options appraisal would be made more consistent through the development of a network Lineside Policy that considers vegetation as an asset and route Vegetation Management Plans.

8. Summary of Confidence ratings reflecting current practice

Table 42 shows the gradings for each Region for all the review themes is shown below. This also includes gradings for Network Rail's Central Function in relation to progress of recommendations from the Varley Review.

Table 42 Summary of Confidence ratings

Review reference		Confidence Rating						Region range	
Theme	Topic	Central function	Eastern	North West and Central	Scotland's Railway	Southern	Wales and Western	Lowest	Highest
1 Regional management plans and practices	(a) Compliance roadmap		1	1	1	2	1	1	2
	(b) Compliance delivery		2	2	2	3	1	1	3
	(c) Key performance indicators		2	2	2	3	2	2	3
	(d) Risk management		3	3	3	3	2	2	3
	(e) Maintenance planning and reporting		2	2	2	2	2	2	2
	(f) Cross asset working		2	2	2	2	2	2	2
2 Delivery against Varley recommendations	2 Appropriate governance must be put in place at organisation, route and project level.	3	2	3	3	4	2	2	4
	3 NR should publish an ambitious vision for the lineside estate.	2	3	2	2	4	2	2	4
	4 NR must value and manage its lineside estate as an asset.	2	3	3	3	3	2	2	3
	5 NR must improve its communication with communities and key stakeholders.	3	4	3	3	4	3	3	4
	6 NR should lead a cultural change for valuing nature and the environment across the organisation.	2	2	2	2	3	2	2	3
3 Habitat management and biodiversity	-		3	3	2	3	2	2	3
4 CP7 planning	-		2	2	2	2	1	1	2

9.   Recommendations

The Independent Reporter has made detailed observations for each of the review topics, these are detailed in the preceding sections of this report.

Improvement opportunities have been identified following the assessment of the evidence and collated against each of the review themes and / or topics. The Independent Reporter has 'promoted' some but not all improvement opportunities to recommendations. Those that are presented as recommendations are those that, in the opinion of the Independent Reporter, are likely to yield the highest amount of benefit to the vegetation management practises of Network Rail. This, however, should not constrain ORR or Network Rail in progressing additional or alternative improvement opportunities to those that are currently linked to recommendations that were put forward by the Independent Reporter, should the two parties consider them to be appropriate and/or reasonably achievable.

The Independent Reporter's observations, together with the improvement opportunities, formed the basis for the proposed recommendations listed below. These have been discussed with the ORR and Network Rail during their development.

Table 43 Review recommendations

No	Recommendation	Intent	Benefits	Evidence of Implementation	Recommendation Champion	Location in Text (Section No.)
#25932/01	Network Rail should develop a programme approach to delivering the objectives of its Biodiversity Action Plan at national and regional level. This includes achievement of the no net loss / net gain biodiversity targets. Central to this is establishing board level responsibility for the delivery of the Plan (and its regional equivalents), including establishing and sustaining changes in vegetation management practices and organisational culture.	The Independent Reporter noted that the introduction of strategies, plans and initiatives to promote biodiversity, including Habitat Management Plans, had been hampered by issues relating to resource and competing priorities. Network Rail should maintain the early momentum established in responding to the recommendations in the Varley Review through a planned approach to implementing its recommendations, and those in the 2019 DfT Lineside Policy. This would include the identification of resource to deliver the Plan's objectives and monitoring their achievement at regional and network board level. Improvement opportunity - 11, 32, 33, 40	Many of the actions within Biodiversity Action Plan and the Environmental Sustainability Strategy are central to achieving Network Rail's biodiversity targets and compliance with DfT policy and national legislation. A board focus for initiatives to implement Habitat Management Plans and investment in biodiversity measures would ensure that NR meet DfT and legislative imperatives.	Delivery programmes endorsed at network and regional board level. Resource plan for enabling measures. Programme monitoring and reporting.	Technical Authority (network level programme management). Network Rail Regions (devolved programme management aligned with local objectives)	4.5 5.5 5.8
#25932/02	Network Rail should establish clear alignment between its vegetation and habitat creation/ management plans and National Lineside Policy, to deliver Network Rail's environmental sustainability and biodiversity targets. This should also include all aspects of developing capability to manage the vegetation asset, including knowledge management, continuous improvement and risk management. The Lineside Policy is also expected to set out Network Rail's response to specific goals set out in the Biodiversity Action Plan and the 2019 DfT Lineside Policy.	The Independent Reporter was not provided with a completed lineside policy for CP7. The early draft provided was not as comprehensive as the current CP6 policy at setting out Network Rail's approach to vegetation management in the wider business context. The intent of this recommendation is to ensure that the Lineside Asset Policy is able to support Regions in aligning their planned investment and activities to the needs and expectations of the business Improvement opportunity – 33, 34, 38, 41, 44, 52	Compliance with 2019 DfT Lineside Policy issued in response to Varley Review. Clear and consistent guidance to support strategic business planning at network and regional level in relation to the management of lineside vegetation and habitat. Driver for the development of route Vegetation Management Plans that integrate with the management of related lineside assets and other railway assets. Support a consistent approach to planning for CP7 and subsequent assurance in delivery. Creates a compelling case for investment in the Lineside Asset.	Lineside policy relating to vegetation management that supports business imperatives relating to safety, performance and sustainable delivery.	Technical Authority	5.5 5.6 5.7 6.8 7.7
#25932/03	Network Rail Regions should establish detailed plans for how they will deliver vegetation management as part of the lineside asset.	The Independent received limited evidence on what goals and objectives Regions have set to deliver compliance with maintenance, habitat, and biodiversity targets moving forward. This includes the important role vegetation management plays in maintaining a safe and efficient railway. Vegetation Management Plans, as outlined by Module 3 of the NR/L2/OTK/5201, specify the key requirements for management strategies. These plans are aligned with, but do not replace, Habitat Management Plans described in NR/L2/ENV/122 (see recommendation #25932/02). This also links to the development of a Lineside Policy discussed in Recommendation #25932/02. Improvement opportunity - 7, 20, 34, 43, 54	Comply with mandatory requirement of the standard. Support the adequate resourcing and investment needs for delivering vegetation and habitat management for CP7. Sectional Asset Plans assist in understanding the asset and planning future interventions, including those relating to biodiversity.	Regions publish Route Vegetation Management Plans which they can be monitored against.	Network Rail Regions	4.4 4.7 5.6 6.8 7.7

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No	Recommendation	Intent	Benefits	Evidence of Implementation	Recommendation Champion	Location in Text (Section No.)
#25932/04	Network Rail Regions should establish detailed plans for how they will consider biodiversity as part of managing the wider railway asset.	The Independent Reporter recognises the importance of developing Habitat Management Plans for the network as described in Module 2 of NR/L2/ENV/122. While related, these are distinct from Vegetation Management Plans in that they "identify options for increased biodiversity value along its extent for the purpose of allowing the necessary flexibility and choice in land management decision making." The Biodiversity Management standard is relatively new and to date there have been very few Habitat Management Plans issued. Regions need to make a commitment to produce these so they can usefully contribute to the CP7 planning cycle and put in place measures to "meet legislation and other compliance obligations to sustainably manage land and activities for biodiversity." Improvement opportunity - 43	Meet legislation and other compliance obligations. Contribute to the CP7 planning cycle. Support achievement of biodiversity no net loss / gain targets. Support maintaining / improving the lineside estate's natural capital. Provide alignment with route Vegetation Management Plans.	Issue of route Habitat Management Plans.	Network Rail Regions	6.8
#25932/05	Network Rail should provide a common framework for Regions to prepare and present CP7 funding requirements relating to vegetation management and the underlying assumptions.	A Lineside Policy and regional / route Vegetation Management Plans would provide the basis to demonstrate at a high level the funding requirements based on the long-term strategic objectives. There was limited evidence of how funding envelopes were being developed for CP7 and no clear consensus across Regions of how their proposals should be presented. The Independent Reporter could not establish an alignment between the funding envelopes and regional strategies and plans. The use of a common template to develop and summarise costs and volumes relating to vegetation management would assist in the assurance of Region's proposals. Accompanying assumptions and narratives would also assist in the interpretation and understanding of how options had been considered and residual risks inherent in the proposals. This also links to the development of a Lineside Policy discussed in Recommendation #25932/02. Improvement opportunity - 50, 51, 54	Greater investor confidence in plans and more likely to secure requested funding. Assist in preparation of accurate plans. Establish a linkage between network / Regional policies and proposals. Assurance of the plans and the underlying assumptions and investment objectives will be more straightforward.	Guidance and templates for preparing CP7 cost and volume estimates for vegetation management. Narratives setting out key assumptions and modelling approach.	Central team (provide templates and assure plans) Network Rail Regions (produce templated plans)	7.7
#25932/06	Network Rail's central and regional teams should review lineside roles at all levels to support the delivery of a compliant vegetation asset and objectives relating to biodiversity. This applies to both in-house and supply chain capability.	The Independent Reporter noted concerns expressed at all levels within the organisation relating to the level of resource and breadth of skills available to deliver current and future maintenance of the vegetation asset. Further pressures were noted in connection with responding to emerging requirements relating to habitat management. Additional pressures were noted from competing demands on resource from other infrastructure providers and major projects such as HS2. Improvement opportunity - 35, 31, 36	Mitigate a potential skills shortage in specialist roles, including ecology, at all levels of the organisation. Support the delivery of Network Rail's statutory obligations and delivery plans for CP7.	Gap analysis of required skills and competencies centrally and within Regions to meet future delivery plans. Recruitment / training programme to meet gaps in resource. Review of supply chain capability. Dialogue with supply chain to develop capability to meet future delivery requirements.	Technical Authority Network Rail Regions	5.5. 5.6

No	Recommendation	Intent	Benefits	Evidence of Implementation	Recommendation Champion	Location in Text (Section No.)
#25932/07	Network Rail should adopt a consistent approach to reporting compliance with the minimum vegetation profile requirements for the action zone specified in the vegetation management standard. This should reflect regional variations in management practice where a more conservative approach is adopted.	Compliance with a standard cross-sectional profile of lineside vegetation provides a simple measure of its potential risk to safety and operations. Under NR/L2/OTK/5201 each route must manage vegetation within the action zone where it presents a risk. Vegetation remaining within the action zone shall be subject to a plan to assure that the risk from its presence is mitigated. There are different approaches adopted across the network that sometimes go beyond the minimum requirements of the standard which means that a common definition of compliance is not practical. Greater clarity is required on whether routes are reporting compliance with the action zone profile specified in the standard or whether a different, more conservative approach is being used. This single measure can be used as a proxy to assure routes' achievement of compliance in relation to temporary variations raised against NR/L2/OTK/5201. Improvement opportunity - 1, 2, 8	Recognise differing interpretations of the term "compliant profile" used in planning long-term clearance programmes. NR is able to plan effective mitigation to manage vegetation risk to ALARP through having a clear understanding of all its vegetation-related risks. Support unambiguous reporting of profile compliance.	Definition of compliant vegetation profiles for each route. Consistent reporting of compliance profiles for each route.	Joint champions from Technical Authority and Regions	4.3 4.5
#25932/08	Network Rail should report and monitor compliance with the vegetation management standard that relate to the requirements of each intervention zone and the condition of vegetation with each of these zones.	Reporting of profile compliance alone provides a limited view of the how Regions are delivering against the requirements and intention of standard NR/L2/OTK/5201. Information on vegetation condition is currently incomplete due to backlog issues with inspections during the pandemic. This hinders obtaining a complete understanding of where there are potential risks due to vegetation and planning appropriate interventions. Inspection data captured in accordance with the standard has the potential to provide a rich picture of the state of lineside vegetation. This requires it to be captured and updated frequently enough to reflect changes due to growth and maintenance activities. Improvement opportunity - 1, 2, 22, 8	Provide confidence that vegetation is being managed to deliver a compliant condition, leading to a reduction in risk to safety and performance. Improve the understanding of progress being made at a regional and national level to achieving overall compliance with the relevant standard. Improved correlation between vegetation condition and performance metrics leading to better targeted maintenance.	Vegetation condition measures based on multiple factors. Reporting systems to make condition data readily available for routes day to day use.	Technical Authority Network Rail Regions	4.3 4.5 4.7
#25932/09	Network Rail should differentiate between different types of maintenance works during planning and reporting to support establishing and delivering an appropriate maintenance regime, both in term of volume and cost of these works.	It was not possible for the Independent Reporter to understand clearly and consistently across Regions what work was undertaken to deliver compliant profiles and what comprised maintenance. Consequently, it is not possible to understand if Regions and Routes are delivering their planned volumes and meeting their strategic goals. Assigning the appropriate maintenance type to each work item would greatly assist in understanding how budgets were assigned and spent. Any improvements in reporting should also recognise work undertaken by other disciplines responsible for vegetation management (e.g., structures, geotechnics, E&P) Improvement opportunity – 21, 23	Assist forecasting, planning and monitoring maintenance activities Increase confidence in planning long term clearance works. Better understand the cost effectiveness of clearance works carried out to date.	Ability to identify how work items are assigned to different categories of maintenance in management systems. Subsequently monitor delivery of work against budgets at DU, route and regional level.	Technical Authority Network Rail Regions	4.7 4.8

No	Recommendation	Intent	Benefits	Evidence of Implementation	Recommendation Champion	Location in Text (Section No.)
#25932/10	Network Rail should mandate the use of a common biodiversity value for monitoring lineside habitat and regularly capture and make available the features used in its calculation. Where local systems are also in use, the Defra metric should remain the primary measure.	Network Rail must comply with relevant legislation relating to habitat and biodiversity in England, Scotland and Wales. The Defra metric has been used to baseline biodiversity across the network but has not been accepted by all Regions for monitoring progress moving forward. While there may be local benefits in adopting hybrid or completely different measures, Network Rail requires a single indicator so the business can understand its progress against biodiversity targets as part of its environmental sustainability measures for CP7 and beyond. The individual features used in calculating biodiversity scores form a valuable part of monitoring and planning biodiversity initiatives at a micro and macro scale. These components can also be used in different assessment methodologies, if adopted. These measures are only useful if they are current, reliable and accessible. Improvement opportunity - 10, 12, 42	Support achievement of Network Rail's biodiversity targets. Support proposed success measures for monitoring environmental sustainability in CP7. Permit like for like comparisons relating to implementing best practice. Enable biodiversity offsetting across the network.	Agreement from Regions to commit to monitor achievement of Network Rail's biodiversity using a common metric. Features used in developing biodiversity measure is current, reliable and accessible	Technical Authority (enable capture and reporting of habitat features and construction and reporting of progress against targets) Network Rail Regions (commit to measure and collection of supporting data)	4.5 6.8
#25932/11	Network Rail should develop a time bound programme approach across the network to manage the significant risk to safety and performance from Ash Dieback (ADB) through better asset knowledge, trend analysis and targeted interventions.	All Regions evidenced that ADB is a significant risk to the safety and performance of the railway. The management of ADB is expected to represent a significant cost during CP7 and there exists some uncertainty regarding the scale of the issue. ADB is a serious problem that will affect all infrastructure operators over the coming years. Improvement opportunity - 18	Reduces the planning uncertainty regarding the number of trees affected and the resources required across the network to mitigate the risks. Potential to reduce the risk to NR in terms of safety, performance and cost. Share best practice and innovative approaches to identifying and managing affected trees.	National and regional programmes to survey and evaluate ADB risk using better data, plan interventions and undertake mitigation measures. Monitor effectiveness of measures	Technical Authority (establish programme approach) Regions Other central function	4.6
#25932/12	Network Rail should analyse details of incidents, inspection data and maintenance trends to assess potential impacts on lineside vegetation due to climate change related events. This will assist in maintenance planning and the reduction of risk to safety and performance.	An increase in extreme weather events caused by climate change is leading to patterns of failures in trees that would have previously been considered to represent a low risk of failure. Climate related changes in vegetation also has adverse consequences relating to earthworks stability, shrink / swell damage to track, extensions to growing seasons and the spread of disease. Establishing linkages between cause and effect is considered to be a network level issue requiring central surveillance and analysis Improvement opportunity - 18, 19	Better understanding of potential changes required in the management of vegetation in the response to climate change. Identification of cross asset issues relating to climate change. Improved forward planning to anticipate and manage emerging issues caused by climate change.	Programme to analyse the current and emerging effects of climate change on the lineside vegetation asset.	Technical Authority (with input from Regions)	4.6
#25932/13	The Technical Authority should provide support to Regions in developing the change plans required to embed the new Digitised Lineside Inspection (DLI) tool into their day-to-day vegetation management activities.	The potential benefits of DLI are welcomed by regional asset teams. However, there is a concern that the introduction of the tool will change how they operate both in working arrangements and the amount of information that they are expected to manage. The Independent Reporter was not provided with evidence of an accompanying business change programme beyond user testing. There was a concern expressed at regional level that improved detail will reveal more issues that require interventions. This potential for more information than can be assimilated or actioned will need to be addressed. As with any step change in information management capability, the introduction of DLI requires an accompanying business change processes to incorporate it into business as usual and share emerging best practice. Improvement opportunity - 19, 15, 16, 17	Maximise the benefits of DLI by understanding the changes to working practices. Understanding how planning work will change following the introduction of DLI. Demonstrable improvements in asset condition and resulting safety and performance benefits. Implement practical approaches to avoid information overload. Shared best practice and experience in using the tool.	Implementation / change plan with periodic monitoring at network and regional level to track achievement of benefits.	Technical Authority (change plan design) Regions (change plan implementation)	4.6

A.1 Statement of Work

Independent Reporter Framework
Statement of Works (Updated)

1.0 COMMISSION INFORMATION	
Project Name:	Review of Vegetation Management
Bravo Sourcing Request Number:	#25932
Network Rail Contact:	Kara Chester
Network Rail Department:	Planning & Regulation
SoW Number:	0014
Network Rail PO Number:	[insert NR PO# when available]
Commission Value:	[insert the SoW value after this has been agreed with the supplier]
Supplier Name:	[insert the name of the selected supplier after appointment]
Main Supplier Contact:	[name and email address of the main supplier contact]

This Statement of Work (SoW) is the contractual vehicle for defining, authorising and commissioning a piece of work to be undertaken under the Independent Reporter Framework. The SOW has six sections:

1 *Commission Information*
2 *Commission Overview*
3 *Scope of Services and Deliverables*
4 *Knowledge Transfer*
5 *Resource & Commercial Details*
6 *Invoicing*

This SoW is entered into under and in accordance with the terms of the Independent Reporter Framework dated 1 February 2020 between Network Rail, the Office of Rail and Road, and the Supplier and includes and incorporates any special Terms and Conditions and any other amendments captured in this SoW.

Any dispute surrounding this SoW will be resolved in accordance with the Terms and Conditions outlined in the Framework Agreement.

Ownership and use of any Intellectual Property Rights shall be in accordance with the Framework Agreement Terms and Conditions.

Change control procedures are to be applied as set out in the Terms and Conditions of the Framework Agreement.

2.0 COMMISSION OVERVIEW

Supporting Documents and additional information shared as part of the tender process:

- John Varley s independent report to the Department for Transport on Network Rail s approach to vegetation management https://www.gov.uk/government/publications/network-rail-vegetation-management-review-valuing-nature-a-railway-for-people-and-wildlife

- Enhancing Biodiversity and Wildlife on the Lineside", July 2019, published by DfT https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/935370/enhancing-biodiversity-and-wildlife-on-the-lineside.pdf

- Network Rail published its Biodiversity Action Plan in December 2020 https://www.networkrail.co.uk/wp-content/uploads/2020/12/Network-Rail-Biodiversity-Action-Plan.pdf

- 11   Document accessibility guidance for Consultants

- 12   Blank temporary variation form

- 13   Tree Council Report (File named Network Rail Ash Dieback Toolkit June 2020)

2.1 Background	Trees and other vegetation can be a serious safety hazard especially when trees fall in high winds and block the line. This is a potential cause of derailments and creates delays for passengers. Autumn leaf fall causes adhesion problems with associated safety risks and also leads to significant delay for passengers. In addition, the health of lineside trees is being affected by diseases such as the one causing ash dieback. As a result, extreme weather and emerging threats from pests and diseases need to be front and centre of vegetation management on the railway network. Following the Government review into vegetation management published in 2018 ['Varley Review[1]], Departments for Transports' policies, including the Department for Transport (DfT) policy[2] set out how the Government expects Network Rail to protect and enhance the UK's lineside environment, while maintaining the safety of railway assets, passengers and services. The Government expects Network Rail to achieve no net loss in biodiversity on its existing lineside estate by 2024 and to achieve biodiversity net gain on each route by 2040, a target that Network Rail is seeking to achieve by 2035. Hence, the efforts to deliver train performance with improved customer service through safety and reliability needs to be coupled with the delivery of these biodiversity targets. There needs to be the recognition that management of the lineside estate to improve safety and performance will

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[1] John Varley's independent report to the Department for Transport on Network Rail's approach to vegetation management - https://www.gov.uk/government/publications/network-rail-vegetation-management-review-valuing-nature-a-railway-for-people-and-wildlife
[2] "Enhancing Biodiversity and Wildlife on the Lineside", July 2019, published by DfT - https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/935370/enhancing-biodiversity-and-wildlife-on-the-lineside.pdf

need to take account of a significant range of different habitats and biodiversity.

We would like to undertake a detailed review of how Network Rail undertakes vegetation management. This review will involve the collation and analysis of a range of management information, procedures and data, together with an assessment of how this demonstrates good management of asset performance and passenger safety, whilst protecting, maintaining and enhancing biodiversity through improved habitat management. Part of this work will involve reviewing how Network Rail is implementing the recommendations of the Varley Report.

2.2 Business Objectives and Priorities	Proactive management of vegetation assets can reduce risks for the railway operation posed by pests and diseases, and extreme weather. It is important to evaluate the effectiveness of Network Rail's vegetation management practice and how Network Rail is planning for Control Period CP7 ahead of the next periodic review PR23. It is important for this review to assess: • the robustness and sustainability[3] of Network Rail's planning and delivery of vegetation management; • the delivery of current work programmes to recover the asset back to compliance with Network Rail's compliant vegetation profile requirements; • how risks and opportunities are assessed and managed; and • how vegetation management plans and practices are aligned to business objectives and government policy within and beyond CP6

3 .0 SCOPE OF SERVICE AND DELIVERABLES	
3.1 Key requirements	The independent reporter shall be expected to engage with the following stakeholders from Network Rail to collect evidence to support its assessment: • Network Rail Off-Track (lineside) asset management team of **all routes** across five regions, front line staff (such as Off-Track section managers, Off-Track Maintenance Engineer/ Track Maintenance Engineer and seasonal delivery specialists); and environment specialists and ecologists involved in the management of biodiversity from each region • Network Rail central functions including Network Technical Head of Lineside, Biodiversity Strategy Manager and Operations Lead. The assessment shall cover vegetation assets on both Network Rail's land and those that pose a threat or opportunity to railway operations from land belonging to outside parties. In addition, the independent reporter shall be expected to meet with John Varley. This discussion will provide the context behind his work in 2018 and provide valuable insight not only into his thoughts at the time, but also those three years later. To support a safe, operational railway whilst protecting the environment and habitats, Network Rail is required to create a balanced vegetation (including

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[3] "Sustainability" relates to the quality of being sustainable. It is different from sustainable development.

trees) asset management framework. The creation, management and monitoring of the vegetation management plans is key element in ensuring that Network Rail is prioritising risk appropriate while also complying to standards and legislation and addressing the shocks and stress within the control period. The main objective of this commission is to conduct a review of the NR's vegetation management by delivering the following:

1. Assess and comment on robustness of regions' vegetation management plans and practices with respect to:

   a) Regions' current roadmap for full compliance with Network Rail Lineside Vegetation Management Manual[4] under Temporary Variation[5] and their current status (i.e. compliance levels).
   b) How works in vegetation plan are being delivered by each region towards full compliance in the following areas:
      - creating sites with compliant vegetation profile;
      - maintaining previously cleared sites;
      - undertaking reactive works; and
      - changes in access that may have an impact on compliance.
   c) Appropriateness of key performance metrics or indicator(s) used by regions to measure their compliance positions, delays caused by vegetation, and improvement in habitat and biodiversity;
   d) How regions identify, manage and mitigate risks arising from vegetation – these include, but are not limited to, tree falling on the line, ash dieback tree disease (see Appendix B for the Tree Council Report "Ash Dieback Disease - a Toolkit for Network Rail"), leaf fall, extreme weather etc.
   e) Whether regions' maintenance targets and reporting are aligned with their vegetation management plans and KPIs to make progress towards compliance and manage risks.
   f) Management of opportunities and risks arising from work planning between vegetation and affected asset groups such as Electrification and Plant (Power), earthworks, signalling, structures.

2. Assess and comment on progress with delivery against recommendations 2, 3, 4, 5 and 6 from the Varley Report, both at a central function and regional level within Network Rail.

3. Assess and comment on how habitat management and biodiversity are considered when planning activities/ works for vegetation, for example: how lineside asset management team works with biodiversity team at region level, and any monitoring system in place to measure regions' progress towards biodiversity targets.

4. Review regions' CP7 plans (proposed costs and volumes) for vegetation management including, but not limited to, ash dieback actions, biodiversity and habitat management. Based on evidence collected and assessment of the above requirements (1) to (3), comment on regions' management approach, assumptions and methodology of planning used

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[4] Lineside vegetation management manual: Standard NR/L2/OTK/5201 issued by Network Rail
[5] A temporary variation (TV) authorises a defined part of Network Rail not to comply with specified requirements in a standard or control document for a predetermined period of time. For vegetation management, each route within the five regions has its own Temporary Variation and accompanying plan.

to inform their CP7 plans, for example, whether regions sufficiently

consequential impacts on CP7 plans.

The assessment should identify good practices observed and areas for improvements. The assessment should also recognise CP7 plans are in early development, the volume that is required to tackle vegetation management plans and the associated costs of deliver this work are still relatively immature and therefore subject to change.".

5. Identify challenges and opportunities relating to vegetation management which regions are / will be taking.

Upon completion, the Independent Reporter will be expected to provide recommendations for improvement with proposed action owners and point out areas of best practice.

NOTE: Assessments are deemed to be desk based.
For the purpose of this review, it is recognised that some face-to-face meetings may be beneficial. The supplier should ensure that the appropriateness of face-to-face meetings is considered and explained in their methodology and approach (Q2).

If in the event access to Network Rail Infrastructure is found to be a necessity, the supplier will require a Visitor Pass. Visitors to all sites must be accompanied by a Network Rail employee at all times.

3.2 Key skills	It is essential that the successful Bidder has the resource with the desired skills and experience for this project. Bidders will need to demonstrate how they meet the key following skills and experience: • have access to suitable tools and software in order to provide the detailed analysis • technical experience and application of data accuracy and reporting • capable of producing a reliable and efficient method for analysis and assessment • experience of assessing high-speed infrastructure interaction with the conventional network • the ability to work collaboratively with key stakeholders at all levels • The ability to draft and finalise high quality reports
3.3 Key deliverables	The required deliverables are: • two weekly progress update reports; • an interim presentation of findings to be discussed at a meeting with Network Rail and ORR in **w/c 25th April 2022.** • a presentation of draft findings and any recommendations to be discussed at a meeting with Network Rail and ORR in w/c **6th June 2022;** • a draft report (for comment by ORR and Network Rail) covering the issues set out in the scope section above, to be provided **by 17th June 2022**; and • a final report by **15th July 2022** that addresses comments provided by ORR and Network Rail on the draft report - the final report is required to meet web accessibility requirements

(https://www.gov.uk/service-manual/helping-people-to-use-your-service/understanding-wcag). This includes the use of charts, tables, maps and colours.

3.4 Proposed approach	*[Insert at contract award stage]* [Demonstrate and detail the proposed approach for the project, covering all areas of the projects scope and clearly state the requirement(s)]
3.5 Schedule & timings	Contract Start Date: 14 February 2022* Contract End Date: 31 July 2022* *These are indicative dates and will be agreed once the contract has been awarded and the PO has been approved.*
3.6 Relationship applicable for performing the duties under this statement of works contract	Data Controller and Data Processor. The only processing that the Supplier is authorised to do is listed as in Appendix 1 and may not be determined by the Supplier.

4.0 KNOWLEDGE TRANSFER	
4.1 Knowledge Transfer	*[Insert at contract award stage]* [Explain and detail how knowledge transfer is to be enabled throughout the commission and how the final output will be delivered and presented to Network Rail and ORR.]

5.0 RESOURCE & COMMERCIAL DETAILS	
5.1 Supplier Resource	*[Insert at contract award stage]* [Key personnel which will be engaged in the commission, along with their responsibilities. Details should include sub-contractors, if sub-contractors are being utilised for the delivery of this contract commission] In the event of "key personnel" becoming unavailable the supplier agrees to provide a replacement of equal standard and status within 48 hours of notice.
5.2 Pricing Schedule	This contract is based on a Time charged basis and will be capped at the price set out in the suppliers' proposal (Cell G32). Invoicing is monthly in arrears.

	All prices detailed are exclusive of VAT which will be charged at the prevailing rate.
5.3 Payment Milestones	n/a
5.4 Place of work	There is potential for work at the Quadrant:MK, Elder Gate, Milton Keynes MK9 1EN or other appropriate Network Rail sites (dependent upon the sample proposed). Network Rail will be following the very latest guidance set by the Government in relation to COVID-19 measures. Currently Network Rail is utilising remote working facilitated by video-conferencing platforms such as Microsoft Teams. Therefore, it is anticipated that the Supplier will be able to adapt to similar measures.
5.5 Expenses	Business Travel Expenses to UK locations other than Milton Keynes may be claimed, subject to prior agreement and in accordance with Network Rail 's Business Travel and Expenses Policy. The Supplier shall endeavour to minimise travel and expense costs throughout the duration of the contact.
5.6 Contract Variations	Variations to this Statement of Work contract may be permitted in accordance with Clause 88 of the Utilities Contract Regulations (modification of contracts during their term). All variations to this Statement of Work contract must be agreed in writing under a restated statement of works document, duly signed by all parties

6.0 INVOICING	
6.1 Invoice Details	Network Rail operates a strict "NO PO – NO PAYMENT" policy. Invoices are to be raised on completion of the contract or in accordance with the milestone payments [where applicable] set out in this SOW. Invoices should contain the following information as a minimum: • Purchase Order number • SOW number as detailed in Section 1.0 • Project Title and description Business expenses should be invoiced as a separate line and supported with receipts, as described in terms and conditions of the framework agreement and the Network Rail Business Expenses Policy. Please be aware that failure to provide the information above may potentially cause a delay in processing the invoice.

Our preference wherever possible, is for invoices to be submitted via EDI. Alternatively, invoices may be submitted
By email - invoices@networkrail.co.uk
By post – Network Rail Accounts Payable, PO Box 4145, Manchester M60 7WZ

A.2 Assessment of evidence provided by key stakeholders

ORR Review of NR's Vegetation Management
Final gradings summary
Links to individual sheets
National Heatmap

Review reference		Confidence Rating						Region range		Key	
Theme	Topic	Central function	Eastern	North West and Central	Scotland's Railway	Southern	Wales and Western	Lowest	Highest		
1 Regional management plans and practices	(a) Compliance roadmap		1	1	1	2	1	1	2		
	(b) Compliance delivery		2	2	2	3	1	1	3		
	(c) Key performance indicators		2	2	2	3	2	2	3		
	(d) Risk management		3	3	3	3	2	2	3		
	(e) Maintenance planning and reporting		2	2	2	2	2	2	2		
	(f) Cross asset working		2	2	2	2	2	2	2		
2 Delivery against Varley recommendations	2 Appropriate governance must be put in place at organisation, route and project level.	3	2	3	3	4	2	2	4		
	3 NR should publish an ambitious vision for the lineside estate.	2	3	2	2	4	2	2	4		
	4 NR must value and manage its lineside estate as an asset.	2	3	3	3	3	2	2	3		
	5 NR must improve its communication with communities and key stakeholders.	3	4	3	3	4	3	3	4		
	6 NR should lead a cultural change for valuing nature and the environment across the organisation.	2	2	2	2	3	2	2	3		
3 Habitat management and biodiversity	-		3	3	2	3	2	2	3		
4 CP7 planning	-		2	2	2	2	1	1	2		

Key

Confidence Rating	Description
4	Evidence of a robust and sustainable approach. Progress against relevant plans is on / ahead of schedule. Examples provided of good practice.
3	Evidence of a robust approach, but with gaps, inconsistencies, or limitations in some areas. Progress generally on schedule.
2	Evidence lacking detail, or with significant inconsistencies and limitations identified in the approach. Progress behind schedule.
1	Evidence incomplete with major inconsistencies and gaps identified in describing the approach. Progress significantly behind schedule.
0	Insufficient information provided to support rating.

ORR Review of Network Rail's Vegetation Management
Final evidence and observations

Eastern Region

Review reference					
Theme	**Topic**	**Documents reviewed**	**Notes from questionnaires and meetings**	**Confidence rating**	**Final Basis for Confidence Rating**
1 Regional management plans and practices	(a) Compliance roadmap	Presentation Anglia Vegetation Managment.pptx ORR - Vegetation Clearance Programme LNE EM.pdf NE Vegetation Plan.pdf Copy of Eastern TV - Veg 1.xlsx TR59523.pdf TR59540.pdf TR59542.pdf	Observation made that "compliance is only useful if it's delivering outputs that the business wants". Temporary variations issued against NR/L2/OTK/5201/02 in December 2020 , first identified in September 2019 for previous version of the standard. through the seasons review process, high risk leaf fall/spad locations are identified annually, and workbank reviewed to accommodate. Each area is prioritised for vegetation management in line with business objectives, based on history of train strike, current compliance, history of trees on the line, spad and other local factors. There is also a programme targeting DDD trees identified from the ADAS tree survey. The long term aim to achieve a compliant lineside vegetation profile is being pursued largely through a prioritised programme of vegetation management, to compliant profile, with work let to contractors, the same contractor pol are then employed to maintain that profile in following years. Full compliance expected in May 2035 in North & East, East and, East Midlands. 2029 for Anglia - though they are in the process of assessing this. It was noted in the meetings that the region was not compliant to the old standard (NR/L2/TRK/5201) Noted that there are upward cost pressures on the vegetation industry that may make it more challenging to achieve these dates, and the need to concentrate on Ash Die Back mitigation may also provide additional challenges both in terms of funding availability and industry capacity to support the plans. Establishing compliance position was hindered by COVID-19 as couldn't undertake cab ride surveys. Anglia have undertaken a scenario planning exercise based on a yearly budget of £3m for works delivery to clear known work sites this would produce compliance for these sites by 2039. Evidence from DU and Region outlines that acceleration of the clearance programme is not possible due to access constraints and supply chain constraints. Long term trend is improving compliance position but region cant pick it out from the data as it is not always something that measure in the past. Region have no data on level of compliance at this time and are not monitoring against an improvement profile. Anglia compliance date pushed back significantly and the review team does not understand the regions current trend in compliance and how the region is monitoring this progress.	1	Evidence provided lacks the detail to understand why compliance dates have moved since they were first established. Position of current compliance is available based on historic underlying data. Evidence provides an incomplete picture of how the regions would address the causes of non compliance and the plans in place to mitigate them. Overall region compliance has slipped by several years from initial estimates.
1 Regional management plans and practices	(b) Compliance delivery	Presentation Anglia Vegetation Managment.pptx V14.5 - 2021 EC NE Veg Management Contract Requirements - Particular Specification Final 09-09-21.pdf Vegetation Maintenance.mp4 Vegetation Management Guidelines v1.6.pdf Burley Park to Horsforth Christmas Work.pdf ORR - Vegetation Clearance Programme LNE EM.pdf VM - Sustainable Asset 2021.pdf 1. East Coast MBR P11.pptx 1. North East MBR P11.pptx EM DOT MBR P11 VEG.pptx Vegetation Management Weekly Report.xlsx Copy of Eastern TV - Veg 1.xlsx TR59523.pdf TR59540.pdf TR59542.pdf Eastern Region Biodiversity TV.msg Leeds NW urgent veg work.pptx	Vegetation management plans and sectional plans under preparation. Useful summary in ORR - Vegetation Clearance Programme LNE EM document. Cyclic works delivered by DU maintenance teams is largely delivered by NR staff, but contractors will be used to bolster teams when required. Emerging/Reactive works will be delivered by a Mix of DU staff and contractors depending on scale, with small day to day works largely delivered by staff, and contractors used to support recovery efforts after severe weather. These contractors will be employed by DU teams. High risk leaf fall/spad locations are identified annually, and workbank reviewed to accommodate. Each area is prioritised for vegetation management in line with business objectives, based on history of train strike, current compliance, history of trees on the line, spad and other local factors. There is also a programme targeting DDD trees identified from the ADAS tree survey. The long term aim to achieve a compliant lineside vegetation profile is being pursued largely through a prioritised programme of vegetation management, to compliant profile, with work let to contractors, the same contractor pol are then employed to maintain that profile in following years. Client for clearance work is within the route engineering teams and is managed via Works Delivery. Vegetation Management specification covers all aspects of works. Once large clearance works have been undertaken WD keep the site for number of spraying cycles (2-3) depending on the need. Sites are then handed back to Delivery Units at this point to manage as standard practices. Maintenance teams concentrate on cyclic & reactive maintenance of vegetation to maintain signal sighting, sighting at level crossings, and staff access. MDUs also undertake maintenance and small scale clearance i.e single trees or small areas that are non compliant. Larger clearance undertaken by Route Works Delivery teams who are funded separately. Clearance work reduced the scope of work the DUs have to undertake once a site has been handed back. Long term planning enable larger works to be undertaken and better access can be arranged, route have a long term workbank of prioritised schemes. Region use CCT as part of their work bank prioritisation methodology which is then combined with risk scores for the following factors to provide a total risk score 1-14. UWC/FP, Tier 1/2 trees, leaf fall category, SDS priority and history of fallen trees. Regions contract requirements accurately reflect the needs of the standard. Vegetation Management Guidelines document outline requirements to undertake bio diversity and habitat improvement as part of the site compliance clearance works and give example of the skills required to do this. Noted that reliant on DLI and other II workstreams being delivered to provide an adequate way to store digital information about the lineside environment. May have to utilise a locally procured GIS solution to support habitat mapping and planning, but at this time no decisions have been made. Region considering to build capability in Works Delivery to use Ellipse in a more comprehensive way so that we are able to track planned and delivered work in one system.	2	Evidence found of robust approach to developing work banks but not observed across all routes. Where they exist, current workbanks and forward workbanks are understood and prioritised by a sound risk prioritisation approach, however they do not exist across all routes. Risks to delivery understood and are well documented.
1 Regional management plans and practices	(c) Key performance indicators	Eastern Region Biodiversity Plan 20.01.2021_v1_DC_AM.pub Follow Up Year 3 Weekly Report - Cutting.xlsx ORR - Vegetation Clearance Programme LNE EM.pdf Vegetation Management Weekly Report.xlsx VM - Sustainable Asset 2021.pdf Vegetation Risk Score Sheet.xls	Route level reviews into seasonal performance, and response to storm events do take place and learnings are used to influence workbanks in following years. All wrong side failures that score over 20 are investigated by DU teams, Route Engineering teams review wrong side failures over 20 as part of their periodic meeting structure, regional reporting around these failures is planned for this financial year. Learnings from wrong side failures are, and will be used to influence future workbanks, and how risks are targeted for other mitigation. The seasonal review processes feeds into vegetation plans in following years as it highlights trends in leaf fall and tree fall, allowing these factors to be considered when forward planning. Failures are also tracked as part of the period reporting process. Liaison with the TOCs and FOCs as part of ongoing communication allows emerging issues to be identified and targeted for intervention. Started a programme of habitat mapping to establish baseline biodiversity value - work started in 2021 to establish methodology, with resource put in place for the 2022 season. No net loss is being targeted at the project level in the short term, longer term we will have an integrated asset management approach allowing no net loss (as a minimum) to be achieved at a macro level, in line with local context.	2	Approaches to defining profile compliance vary between routes, but are in line with standard. Reported extent of profile compliance suffers from issues relating to currency of inspection data. Maintenance works planning described which takes into account incidents and WSFs/ Some progress on biodiversity measurement, but unclear how net loss / gain are being measured and tracked. Use of habitat data and biodiversity baseline published in State of Nature Report.
1 Regional management plans and practices	(d) Risk management	Presentation Anglia Vegetation Managment.pptx ORR - Vegetation Clearance Programme LNE EM.pdf VM - Sustainable Asset 2021.pdf 2018 and 2021 MASTER Tree summary 15 06 2021.xlsx East Midlands DDD Survey Week 30 Update.xlsx BKS_117228.pdf … etc 21-22 LNEEM TARR measures final (Refer to Share Point).xlsx 2021 N&E EM Summer Working Arrangement V1.1 FINAL Signed.pdf 2021 Winter Working Arrangements North and East V1.0.pdf Autumn Assurance Panel MASTER.pdf East Mids Autumn Working Arrangements 2021 Final (1).pdf EMR and NR Joint Autumn Plan 2021 1.0 FINAL.docx Extreme Weather Report 221021 v2.docx Local area Autumn plan 2021 York Central.pdf North East Autumn Working Arrangements 2021 Final.pdf OMSTME 2021 Middlesborough PDF v1.1.pdf Route Engineer Off Track Presentation Autumn 2022.pptx Winter Working Arrangements East Midlands FINAL.pdf Eastern Region Biodiversity TV.msg Leeds NW urgent veg work.pptx	Maintenance falls into four broad categories: - Reactive/Emerging work – Undertaken by DU maintenance teams and planned in line with business need. This work is usually limited in scope and is in response to, signal sighting issues, sighting at level crossings, tree strikes to trains, blocked assess routes and complaints from the public. Responding to storm damage also falls into this area. - Maintenance of vegetation at high-risk locations – Undertaken by DU maintenance teams, and maintenance plans developed over time in response to emerging works/good practice, this will include cyclic maintenance to maintain signal sighting, sighting at level crossings, work to maintain vegetation at high risk leaf fall/spad locations, and cyclic maintenance to keep access facilities clear and safe to use. - Maintenance of a compliant profile – In East Coast, North & East & East Midlands routes this is remitted to Works Delivery in areas managed to a compliant profile. In Anglia this work is delivered by DU maintenance teams. - Location specific vegetation management requirements – this work is managed by Route Engineering teams and us most likely to be delivered by Works Delivery, this will include cyclic removal of inappropriate vegetation from rock slopes, high risk soil slopes, and structures. Use of Hubble survey data noted. The roll out of DLI (digital lineside inspection) in late CP6 & early CP7 considered to be instrumental in improving o vegetation management practices, as this will deliver a regularly updated quantitative assessment of compliance, current inspection practice is qualitative to a degree and is undertaken at a maximum frequency of once per year, making it difficult to spot emerging issues, or effectiveness of interventions. DLI will also provide information on tree health, allowing a more comprehensive prioritisation to be employed. Noted that these workstreams are not formally coordinated, but liaison between off-track teams and route engineers reduces risk of duplication. Examples provided of most aspects of risk management process, including seasonal working arrangements and extreme weather plans. Examples provided of survey data, progress against plan, management dashboards, TARR measures etc. Region track removal of DDD trees. Each Route provided reports on volumes undertaken in CP6 Y3 reports show a total volume targets against MST Code 170.	3	Sound approach demonstrated. Assumed risk assessment approach as per standards. Clear Risk based prioritisation approach.

Eastern Region

Review reference				Confidence rating	
Theme	**Topic**	**Documents reviewed**	**Notes from questionnaires and meetings**	**Confidence rating**	**Final Basis for Confidence Rating**
1 Regional management plans and practices	(e) Maintenance planning and reporting	00 Vegetation Prop Register v3 June 2020.xls DEAM Opex Progs Yrs3-5 Devolution.xlsx Follow Up Year 3 Weekly Report - Cutting.xlsx ORR - Vegetation Clearance Programme LNE EM.pdf Vegetation Management Weekly Report.xlsx VM - Sustainable Asset 2021.pdf Year 3 4 & 5 budgets.xlsx 2018 and 2021 MASTER Tree summary 15 06 2021.xlsx East Midlands DDD Survey Week 30 Update.xlsx 1. East Coast MBR P11.pptx 1. North East MBR P11.pptx 21-22 LNEEM TARR measures final (Refer to Share Point).xlsx Copy of Actual vs Annual Plan P11 Opex.xlsx EM DOT MBR P11 VEG.pptx EM DOT TARR Actual vs Annual Plan (On Demand)_30_2386837007552195188.xlsx EM TARR Measures 2021-22 (1).xlsx Follow Up Year 3 Weekly Report - Cutting.xlsx TARR by DU.xlsx Vegetation Management Weekly Report.xlsx Tree desiccation Anglia .pptx	Examples provided of maintenance targets and reporting across the range of vegetation management activities. Targets for CP6 Y4 were set based on delivery in CP6 Y3, but a more robust process for setting targets for CP6 Y5, and for CP7 is in development, this will include both headline volume targets and TARR targets. In the remainder of CP6 robust reporting of works delivered by both DU teams and Works Delivery will be embedded. A more robust process of setting targets and reporting on delivery is in development, and this requires Works Delivery to migrate to using ellipse to forecast delivery and to report works delivered.	2	Examples of sound processes for maintenance management. Planning linked to TARRs but no specific examples at work item level. Large variance of planned vs actual maintenance delivery. Unable to distinguish between compliance delivery and maintenance delivery. Evidence was provided by region of setting maintenance targets and local reporting. However, the reporter team is unable to confirm clear alignment to Vegetation Management Plans and regional KPIs to understand progress against current compliance position. Evidence presented by regions is that understanding the current network 'state', to determine true level of maintenance work required ,requires more robust and accurate data. Data inaccuracies and issues of reporting regional works planned and completed within Ellipse requires improvements.
1 Regional management plans and practices	(f) Cross asset working	Tree Desiccation Anglia .pptx	More work considered to be required to develop an integrated plan that meets all business objectives, and coordinates activity to maximise efficiency, including ensuring that the needs of the Geotech asset are fully considered as part of the wider vegetation management programme. This integrated plan will provide a tool to more proactively manage biodiversity.	2	Positive and negative aspects of vegetation in relation to other asset classes did not emerge from the discussions or in information provided.
2 Delivery against Varley recommendations	2 Appropriate governance must be put in place at organisation, route and project level.	Eastern Region Biodiversity Plan 20.01.2021_v1_DC_AM.pub	**General governance approach** Overall linkage between management of different vegetation - maintenance, works delivery, ecology, sustainability - not clear. Region covers a large area. Noted that it is a recent construct, with Anglia not formerly part of the old route. So differences in practices to begin with. The Regional Principal Engineer DOT is responsible for setting regional direction, and the minimum specification for vegetating management plans. The lead on developing the Regional Biodiversity Action plan sits with the lead ecologist, integrating the biodiversity plan into a wider vegetation management approach also sits with the Regional Principal Engineer DOT. Route Engineers (DOT) are responsible for producing route vegetation management plans inline with regional direction, and meeting the needs of local stakeholders. The process for producing these route plans will be developed in line with the wider regional strategy. **Standards** New standards (OTK/5120 and ENV/122) communicated through: - Standards briefing process. - Region and route lead attendance at ATR. - Cascade through normal periodic meetings. The region are working to meet the two standards, but felt very underprepared for the bio standards introduction and understating the skills needed. Noted that there are issues with the two standards being quite open to interpretation DUs observed that they hadn't been briefed on ENV/122 DUs have draft guidance for they should be working with regards to biodiversity.	2	Board responsibilities not clear Management responsibilities for vegetation management and biodiversity described, but no organisation chart provided The way in which the different workstreams involved in vegetation management fit together is unclear from information provided and subsequent discussions. TV issued in respect of ENV/122 with resourcing a major factor.
2 Delivery against Varley recommendations	3 Network Rail should publish an ambitious vision for the lineside estate.	Eastern Region Biodiversity Plan 20.01.2021_v1_DC_AM.pub Eastern_Environmental_Strategy_2021update.pdf	**Strategy** Pulling together plans that link regional approaches together, especially as only recently joined up. Noted that the Region's biodiversity action plan was put together to implement the strategy developed by the centre in response to Varley Report. Plan provides details of: - NR Biodiversity Action Plan (BAP) - Approach to delivering BNG - Asset management approach (as per BAP) - "Landscape" approach to managing the lineside environment - Increasing awareness of management of biodiversity - Delivery plan: 1. Establish ecology team 2. Stakeholder engagement 3. Production of RBAPs, HMPs, VMPs 4. Assurance process for offset proposals **Timetable** - Set out in Regional BAP Sought a Technical Variation for a year against the biodiversity standard. **Biodiversity targets** 1. Achieve no net loss in biodiversity on our lineside estate by 2024, and achieve biodiversity net gain of 10% in each Region by 2040 2. Mitigate unavoidable loss of biodiversity requirements into our planning and decision making at all levels 3. Mainstream biodiversity requirements into our planning and decision making at all levels 4. Deliver a Network Rail estate that connects and supports biodiversity across Britain 5. Increase awareness and understanding of our work managing biodiversity 6. Provide open and transparent annual reports on performance on biodiversity through the Route level action plans	3	Sound approach that follows that in NR BAP but with more detail. RBAP focusses on biodiversity / habitat and not clear how approach interfaces with overall management of the lineside asset. Progress on phases described not provided. Region State of Nature Report issued.
2 Delivery against Varley recommendations	4 Network Rail must value and manage its lineside estate as an asset.	Eastern Region Biodiversity Plan 20.01.2021_v1_DC_AM.pub Eastern_Environmental_Strategy_2021update.pdf Vegetation Enhancement Presentation.pptx V14.5 - 2021 EC NE Veg Management Contract Requirements - Particular Specification Final 09-09-21.pdf Vegetation Maintenance.mp4 Vegetation Management Guidelines v1.6.pdf FW Presentation from yesterday.msg	**General** Overall approach to meet NR vision not felt to be fully developed. Establishing a coherent regional plan that meets the needs of the standards, but need to ensure that we are still delivering the needs of the business. Approach outlined in Region BAP. The Regional Principal Engineer DOT (Hector Kidds) is responsible for setting regional direction, and the minimum specification for vegetating management plans. The lead on developing the Regional Biodiversity Action plan sits with the lead ecologist, integrating the biodiversity plan into a wider vegetation management approach also sits with the Regional Principal Engineer DOT. Route Engineers (DOT) are responsible for producing route vegetation management plans inline with regional direction, and meeting the needs of local stakeholders. The process for producing these route plans will be developed in line with the wider regional strategy. All aspects of asset management covered in review questions. **Resources and skills** Region BAP includes high level plan to develop resource. Lead ecologist is to be supported by 3 contract ecologists, who in turn will be supported by 5 further ecologists. Projects employ ecologists as required. Off Track capability review on going. Competency framework for people in the off track community is currently under development by. the central team and region contribute to it. Currently going through the off track optimization program because we're dodging around professionalization because you can't cast dispersions and modernization because that's been taken by modernizing maintenance.	3	Region BAP is a useful start but not clear how / if it is intended to manage the lineside estate as an asset as suggested in Varley review. Integrating biodiversity plan with vegetation management approach, including development of VMPs Resource planning under way within constraints of current review Concerns regarding effort needed to implement biodiversity measure Good progress being made through pilot and demonstration projects. Region State of Nature Report issued.

ORR Review of Network Rail's Vegetation Management
Final evidence and observations

Eastern Region

Review reference				Confidence rating	
Theme	Topic	Documents reviewed	Notes from questionnaires and meetings	Confidence rating	Final Basis for Confidence Rating
			Asset data Considered that region is currently few years from a robust process to enable them to map biodiversity at a project delivery level. Effort to calculate biodiversity, habitat management and offsetting considered to have been massively underestimated. DEFRA metric felt to be "work in progress". **Demonstration projects** See: SoN report. Environmental Strategy Update 2021 Region BAP **Continuous improvement** No clear approach to CI described.		
2 Delivery against Varley recommendations	5 Network Rail must improve its communication with communities and key stakeholders.	Eastern Region Biodiversity Plan 20.01.2021_v1_DC_AM.pub ORR - Vegetation Clearance Programme LNE EM.pdf VM - Sustainable Asset 2021.pdf FW_ Network Rail Vegetation Management b.msg Hertford Loop .msg Information Event - Burley Park to Horsforth.pptx Information Event Dates.docx Letter.pdf Plaudits for revised vegetation management approach on the Wharfedale Line.msg Report on site visit to Leeds - August 9th .msg Re_ Plaudits for revised vegetation management approach on the Wharfedale Line.msg Walk on the Wild Side.docx [Untitled].pdf	Vegetation Management specification covers stakeholder management. Examples in ORR - Vegetation Clearance Programme LNE EM document. Good examples of stakeholder engagement activities. Engagement with Wildlife Trust. Engagement undertaken with local communities' to communicate the need for vegetation work, and to accommodate their needs is recognised as an increasingly important area, and we need to improve the way we undertake this proactively. The support of the tree council in planning comms is valued. Route Engineering teams take the lead on flagging sites where liaison with lineside neighbours is required, and support project teams in undertaking that communication. This is an informal processes. Neighbours are informed about all railway works in line with NR standards, this process is not two way, and is therefore not adequate for works with a large impact on amenity. Project teams communicate with professional partners in line with regulations. There is very limited capacity to undertake liaison over and above that mandated in law in Network Rail, or in organisations such as Natural England or Local Authorities due to headcount pressures.	4	Good evidence of active engagement with stakeholders and incorporation of relationship management in works planning.
2 Delivery against Varley recommendations	6 Network Rail should lead a cultural change for valuing nature and the environment across the organisation.	Vegetation Enhancement Presentation.pptx Vegetation Maintenance.mp4 VM - Sustainable Asset 2021.pdf	Regional team felt they were "immature" in this area. Noted that regional and route engineering teams understand the need to make the change, and the regional strategy needs to provide that direction. The fundamental change that needs to happen is that we switch mindset from 'vegetation needs to be controlled' to 'we know what vegetation we want and we are working towards getting there'. Working on training packages to upskill delivery teams. Briefings from the RAM team and Safety team down to all team members. Environmental training course being developed. E-Learning available for staff to undertake.	2	Acknowledgement from regional team that more work needs to be done in promoting cultural change. "Internal stakeholders" are referred to in the Region BAP.
3 Habitat management and biodiversity	-	Eastern Region Biodiversity Plan 20.01.2021_v1_DC_AM.pub V14.5 - 2021 EC NE Veg Management Contract Requirements - Particular Specification Final 09-09-21.pdf Vegetation Maintenance.mp4 Vegetation Management Guidelines v1.6.pdf VM - Sustainable Asset 2021.pdf	Further details covered under Varley implementation in #2. Works delivered by Works Delivery or Capital Delivery are managed in line with NR processes, ensuring that appropriate licenced ecologists are employed to survey sites before work begins, and agreed mitigations deployed, including where required ecologist supervision during works. All works are caried out in line with standards, and ecology support is engaged as required. When work is planed proximity to sensitive sites is a standard part of the project management process. Vegetation Management specification covers biodiversity aspects of works (briefly). Further details in Vegetation Management Guidelines. When we commission ecological surveys to check for compliance with protected species we're now asking for those biodiversity calculations to be undertaken so that we'll have an understanding of what's there in advance of us going in so that we can have a better understanding in what's there when we leave. Nesting surveys undertaken, mainly safety works in nesting season. Bird nesting survey video shared with staff in team brief as reminder of good practice Ecologically sensitive information, SSSI, Environmental sites logged in hazard directory Maintenance teams have access to ecology support should they require advice or should their work require supervision. Projects currently undertaking biodiversity accounting, and are felt to be doing their best to achieve no net loss, but there is a need in the future for projects to operate with a wider framework, it may be that projects can not achieve no net loss, as sometimes space is at a premium at a project location, and there needs to be a macro approach taken, in line with the as yet undeveloped regional approach. Noted that no net loss is being targeted at the project level in the short term, longer term we will have an integrated asset management approach allowing no net loss (as a minimum) to be achieved at a macro level, in line with local context. High level approach to offsetting described in Region BAP.	3	Good progress in terms of strategy and guidance documents. Few examples of application in practice.
4 CP7 planning	-	RE CP7 Route Review Drainage and Off Track EAST MIDLANDS Jan 22 FINAL.pdf RE CP7 Route Review drainage and offtrack East Coast.pptx RE CP7 Route Review drainage and offtrack North & East.pptx	Region currently bidding for funding for CP7, and can only comment on how robust our plans are when the funding settlement is agreed. Due to the OpEx pressures Network Rail is under, there is a risk that these targets may need to be re-set. CP7 plans are bottom up, and are principally targeted at achieving; -Compliance with the Vegetation Management Manual, -Management of DDD trees, -Management of Ash Die Back. There are upward cost pressures on the vegetation industry that may make it more challenging to achieve these dates, and the need to concentrate on Ash Die Back mitigation may also provide additional challenges both in terms of funding availability and industry capacity to support out plans. Region felt hadn't yet met overall timetable for CP7 planning. Examples provided from Round 4 (not for Anglia) - showed some option development, albeit at a fairly high level for vegetation management. CP7 Planning is still in early phase of development and currently immature. Within CP7 planning journey biodiversity is being given prominence when talking about vegetation, talk about vegetation management and its effects on habitat and biodiversity. Across the three route documents provided indication is a reduced budget or vegetation management compared to CP6. Region have fed back on the current funding assumptions highlighting the following risks; compliance delivery date pushed back, damage to rolling stock and not meting biodiversity requirements. Region have outlined the need for a step change in how vegetation is funded to meet the challenge of compliance. Only undertaken Top Down analysis and have completed stage 4.5 now starting to engage with DUs as part of stage 5. DUs feed up feed up core maintenance plans but there is less ability to feed up the proactive work that needs to be undertaken. CP7 planning needs to embed biodiversity into the funding for Vegetation management. Region have identified market captainy to undertake volume of work in CP7 as a risk. Volumes target will be based on three year rolling average. Ash Die back a major risk for CP7 and region are developing ADP to manage the risk. The need for separate funding has been identified to mange this risk.	2	Current funding lines provided with some evidence of funding envelopes presented. No information provided on assumptions used to develop proposed funding envelop. Evidence of central scenario planning provided. scenarios with inconsistency. No link to how funding will impact on long term goals and objectives.

North West and Central Region

Review reference					
Theme	Topic	Documents reviewed	Notes from questionnaires and meetings	Confidence rating	Final Basis for confidence rating
1 Regional management plans and practices	(a) Compliance roadmap	Vegetation Management BAC Deep Dive.pptx Long term Vegetation Clearance Programme updated Feb 2022.xlsx TR44112 (Veg Profile).pdf TR44113 (Survey).pdf (08) Long term Vegetation Clearance Programme updated Feb 2022.xlsx (14) NW Route Vegetation Management Strategy (002).docx	Temporary variations issued against NR/L2/OTK/5201/02 in May 2019 for LNW route (don't have others), but variation first identified in July 2016 for previous version. So compliance was an ongoing issue when standard changed in 2019. Full compliance expected in April 2039. Also have TV for survey work covering all routes. Bar chart provided showing expected achievement of compliance by control period - West Coast South by end of CP8 (2032) and Central and North by end of CP9 (2039). Current level of compliance assessed to be 20% (28% by end of CP6). Compliance position is monitored in TA Tracker (not provided). Precise figure uncertain and no historic information available. Better data (DLI, hyperspectral surveys etc) should improve estimates in the future. Little opportunity to accelerate clearance programme due to requirements to collect survey data, achieve safe access, maintain safe operations. avoid destabilising earthworks and availability of specialist contractor resource. Noted that additional funds were made available to reduce risks associated with the Commonwealth Games. Noted that challenges to meet compliance include accessibility, increased costs, and skilled labour shortages (HS2 drain) in the marketplace. Clearance programme provided (updated Feb 2022) Noted that compliant profile is safer and easier to maintain See 1(d) for info from Deep Dive that covers compliance.	1	Evidence provided lacks the detail to understand why compliance date have or have not moved since first established. Only a high level position of compliance is available no underlying data. Evidence provides an incomplete picture of how the regions would address the causes of non compliance and the plans in place to mitigate them.
1 Regional management plans and practices	(b) Compliance delivery	Vegetation Management BAC Deep Dive.pptx Long term Vegetation Clearance Programme updated Feb 2022.xlsx (14) NW Route Vegetation Management Strategy (002).docx (22) TR44112 (Veg Profile).pdf (23) TR44113 (Survey).pdf	See Vegetation Management BAC Deep Dive and Vegetation Management Strategy for details of approach to clearance. Prioritisation under continual review based on risks using CCT. Vegetation Management is delivered under the Route Vegetation Clearance Programme (also known as Woodland Management) through Works Delivery. Works are tendered and delivered annually. Woodland Management works to bring ELR's to compliance are carried out under specific methodology and detailed into the VMS (Vegetation Management Specification) This enables the ecologists & arborists to include all points as above and effectively produce a bespoke work instruction of each section of ELR including method statements for habitat management. Annual work banks are planned for delivery and contracted through the NR tendering process. The VMS acts as the scope for Contractors to bid against and shapes their methodology to provide consideration to all aspects of the environmental requirements. WD will evaluate/score against set criteria including environmental concerns to ensure required governance & assurance is achieved and a compliant contractor has been awarded these works. WDs have ecologists and arbs and PMs, they do use some of the supply chain to bolster workforce from specific sites. Priority for long term clearance plan based on condition, consequence CCT (risk-based modelling), performance (adhesion sites) and overall risk. DUs do not undertake proactive maintenance. Reactive works are undertaken by DUs or contracted out. Follow up vegetation plans created by Works Delivery - follow up costs quoted to be 4% of clearance costs.. Maintenance of cleared sites undertaken by DUs - noted that areas handed back may quickly become non-compliant again, sometimes in as little as four years, which is less than the maintenance cycle. DUs noted that resources to maintain cleared areas are constrained. DUs noted that coordination of clearance works not always well coordinated between them and WD, for example they aren't always aware when works are taking place, and in coordination work in areas where clearance is scheduled but where but more urgent reactive works are required. Challenges noted relating to the amount of time available to undertake work due to time to set up possessions and isolations. DUs is consulted in the VMS process also with site walkouts but sharing of information could be improved.	2	Approach to developing work banks described and evidenced but could benefit from further clarity. Current workbanks and forward workbanks understood and prioritised with a risk prioritisation approach. Key risks identified but limited evidence provided as to how these risks are being managed/mitigated.
1 Regional management plans and practices	(c) Key performance indicators	Vegetation Management BAC Deep Dive.pptx State of Nature report NW&C 2021 FINAL.pdf (10) State of Nature report NW&C 2021 FINAL.pdf (14) NW Route Vegetation Management Strategy (002).docx (21) Tech AN OLE defect planning (3).docx	Compliance position reported to be monitored in TA Tracker (example not seen). As stated in #1(a) precise compliance position is uncertain, with areas where there is no up to date inspection information. Incidents such as delays are considered in planning as discussed in #1(d) Noted that progress against KPIs reviewed periodically by routes. Habitat baseline discussed under #3. Further discussion on asset information in #2.4. Habitat and biodiversity are tracked through aerial Light Detection and Ranging (LiDAR) measurement and Biodiversity Habitat Baselines are now established within Sustainability layer in Geo-RINM Viewer (GRV). VMS development to include biodiversity scoring prior to and post works. No net biodiversity loss is monitored through satellite imagery and tracker maintained by Capital Delivery based on surveys before and after projects (no example available). No information provided on trends in incidents caused by vegetation. Undertaking work to ensure that these requirements are integrated into asset strategies – a piece of work being developed under the DEAM 10 Point Plan. Our Regional Habitat Management Plan (HMP) sets out the approach to habitat management. In Capital Delivery, net gain is tracked on the Capital Delivery performance dashboard and some very large programmes such as East West Rail and TRU are delivering 10% biodiversity net gain already.	2	Common approach to defining profile compliance used across all routes which complies with the standard. Use of compliance tracker described but not seen. Maintenance works planning described which takes into account incidents, but no documents provided. Progress being made in biodiversity measurement, including ground truthing. Approach developed to monitor and record biodiversity net gain. Use of habitat data and biodiversity baseline published in State of Nature Report.
1 Regional management plans and practices	(d) Risk management	Vegetation Management BAC Deep Dive.pptx NW&C Hazardous Tree Register 22-02-22.xlsx Periodic VAMS Project Report Period 11 Year 3.xlsx (14) NW Route Vegetation Management Strategy (002).docx (17) Periodic VAMS Project Report Period 12 Year 3.xlsx (18) 2022-05-09 (Week 05) Ash Dieback.xlsx (19) 2022-05-09 (Week 05) Leaf fall Assessment.xlsx (20) 2022-05-09 (Week 05) Tree Survey.xlsx (21) Tech AN OLE defect planning (3).docx (26) WD Tree Survey Programme - 2022-04-11.xlsx (31)ST~1.RTF (33)FW~1.MSG (34) FDCS_GENERIC_ANSONLY_20220510_093416 (002).pdf (35) Waif for 68577125 FDCS_GENERIC_ANSONLY_20220510_102434.pdf	Asset information is collected through MyWork App, Field Data Manager (FDM) and PoleStar (Hazardous Tree, including Ash Dieback, and Leaf Fall Survey) and uploaded and held in Ellipse to manage vegetation maintenance works. Automated Intelligent Video Review (AIVR) system is used in planning and assessment for reactive works such as encroachment and incident response. Region maintain an Enterprise Risk Record utilising bow-tie approach to consider vegetation risks. Approach and risk mitigation described in VM BAC Deep Dive presentation (22/07/21). Vegetation Management Strategy describes risk management approach. Evidence provided relating to the management of hazardous trees, ash dieback, seasonal leaf fall and incidents. Reference to TARRs in #1(d). Seasonal preparedness plan and Working Arrangements Forum referred to but not evidenced. Extreme weather measures described but not seen. External supply chain risk outside NR control, but internal resource can be controlled to a degree. Climate change increases storm severity. Improved risk position anticipated moving from CP6 to CP7 through delivery of Vegetation Management Strategy.	3	Sound risk management processes evidenced. Examples of processes used to manage seasonal vegetation issues and extreme weather provided. Clear Risk based Prioritisation approach.
1 Regional management plans and practices	(e) Maintenance planning and reporting	20220215 P11 Engineering Assurance Pack .pdf Periodic VAMS Project Report Period 11 Year 3.xlsx (14) NW Route Vegetation Management Strategy (002).docx (15)VE~1.DOC (16) 20220215 P11 Engineering Assurance Pack - TARR.pdf (29) Stafford MDU Off Track Long Term Vegetation Plan.xlsx (30) Stafford KEY STD & TRACK STD JOBS_P13. xlsx.xlsx c. ABP Cost and Volume Summary.xlsx d. 2022-07-12 MNT171 Veg - Clearance vs Maintenance vs Reactive.xlsx	See Vegetation Management Strategy for details of approach to maintenance. The Vegetation Strategy is specified in the NW&C Region P-Way Asset Management Plan which is formulated around asset management principles (ISO5001 accreditation). Annual volumes for DU set by route asset team an reviewed quarterly. Maintenance targets and vegetation volumes set from TARR measures and ABP (see Engineering Assurance pack). Examples of DU work plans and reports from Ellipse of work done / planned. Example provided of inspection survey summary. Monitoring compliance covered in 1(a) and 1(c) (Reporter team have details of planned and actual inspections and maintenance for region from NR central team)	2	Examples of sound processes for maintenance management. Planning linked to TARRs but no specific examples at work item level. Large variance of planned vs actual maintenance delivery. Unable to distinguish between compliance delivery and maintenance delivery. Evidence was provided by region of setting maintenance targets and local reporting. However, the reporter team is unable to confirm clear alignment to Vegetation Management Plans and regional KPIs to understand progress against current compliance position. Evidence presented by regions is that understanding the current network 'state', to determine true level of maintenance work required ,requires more robust and accurate data. Data inaccuracies and issues of reporting regional works planned and completed within Ellipse requires improvements.

North West and Central Region

Review reference					
Theme	Topic	Documents reviewed	Notes from questionnaires and meetings	Confidence rating	Final Basis for confidence rating
1 Regional management plans and practices	(f) Cross asset working	(06) NWC 10PP Programme Handbook.v0.2.ppsx (14) NW Route Vegetation Management Strategy (002).docx (21) Tech AN OLE defect planning (3).docx	Noted that regional response focussed on seasonal preparedness, which is covered under 1(e). DUs described liaison with: - E&P regarding management of vegetation adjacent to OLE - Liaison with Level Crossing Managers - Infrastructure Maintenance Engineers - Route Asset Engineers and Maintenance Teams DU noted the SM(OT) has a 4 weekly vegetation meeting with Overhead Line (OHL) and Signalling & Telecommunications (S&T) to discuss their requirements for clearing around OHL and signal sighting issues. This is then planned in the available access and staff may be sent to assist the OHL and utilise their existing isolations to complete the work. Within the Routes a bi-annual Seasonal Working Arrangement forum is held by the Operational Seasonal Delivery Specialist attended by MDU and Route Off-Track representatives to ensure plans are in place and robust. Different approaches regarding extreme weather between Stafford (handled by Pway) and Carnforth. NW&Cs 10 Point Plan demonstrates programme approach to engineering and asset management across disciplines. However, there are no "profiles" with specific projects relating to vegetation or biodiversity.	2	Sound approach with examples of cross asset working provided. Improvement opportunities are identified.
2 Delivery against Varley recommendations	2 Appropriate governance must be put in place at organisation, route and project level.	(07) Tor Biodiversity Steering Group NWC .pptx (09) NW&C D&OT Org Chart .xlsx (10) State of Nature report NW&C 2021 FINAL.pdf (14) NW Route Vegetation Management Strategy (002).docx	**General governance approach** Regional org chart provided. Role of regional and DU teams described. NW Route Vegetation Management Strategy provided (similar available for outer routes?) TORs for NWC Biodiversity Steering Group provided. Priorities and future plans summarise in State of Nature Report. Not seen full regional vegetation or biodiversity strategy? - Have summary slides only. **Standards** Briefings delivered on the new Biodiversity Standard (NR/L2/ENV/015). Regional Biodiversity Working Group has been formed to help bring the vegetation strategy closer to the biodiversity strategies, although delivering the Vegetation Standard in Route Drainage & Off-Track (D&OT) takes priority. Senior managers briefed on biodiversity standards, NR Sustainability Strategy, and regional Environmental Delivery Plan (not seen). Vegetation Standard (OTK/5201) briefed to lineside teams. DUs noted latest version of OTK/5201 not yest cascaded to them. Issues with complying with standard when no in-house arborists. Benefits of OTK/5201 lost if not properly maintained. Biodiversity Standards, National Sustainability Strategy and Regional Environmental Delivery plan briefings have been undertaken with all senior management teams in NW&C for onward briefing to teams. DU noted The TME and SM(OT) have not been formally briefed on the biodiversity standard. DUs not aware of implementation of ENV/122 (rely on ecologists for advice)	3	Developing management processes for vegetation as an asset. Evidence of clarity in organisation arrangements Briefing on ENV/122 still under way at DU level.
2 Delivery against Varley recommendations	3 Network Rail should publish an ambitious vision for the lineside estate.	2022-02-03 - BAC Vegetation II.pdf NW&C Region Habitat Management Plan Strategy_finalv2.pdf State of Nature report NW&C 2021 FINAL.pdf (01) 2022-02-11 - QRR Veg Strategy Condensed.pptx (06) NWC 10PP Programme Handbook.v0.2.ppsx (10) State of Nature report NW&C 2021 FINAL.pdf (14) NW Route Vegetation Management Strategy (002).docx (24) NAJ2 0-5M VMS V3 - FINAL.pdf (25) VMS LEC4 143.0660 - 148.0000 V6.pdf	**Strategy** Region's Vegetation Strategy has been briefed via Regional Engineers meeting and at Business Assurance Committee for NW&C (BAC) for senior endorsement. Stated to be on track, but no timescales developed yet. Not seen full regional vegetation or biodiversity strategy? - Have summary slides only. Understood to be awaiting senior endorsement. See NW Route Vegetation Management Strategy. See NW&C Habitat Management Plan NW&C Sustainability Delivery Plan (not seen) based on NR Sustainability Strategy, rather than directly on Varley recommendations. Environmental and Social Appraisals (ESA) undertaken for capital projects, including clearance works (e.g. Commonwealth Games) - not seen. Application of OTK/5201 and ENV/122 considered to go a long way to meeting Varley recommendations while meeting safety and operational requirements. Acknowledged tension between maintaining a safe and efficient railway and achieving biodiversity benefits. **Timetable** Region committed to meeting DfT no net loss by 2024 and net gain by 2035. To be incorporated into asset strategies. No detailed implementation plan yet - challenges to delivery include resource limitations, supply chain overheating, unit rates, incomplete asset database, reduced budget and railway modernisation programme. Habitat related measures to be built into CP7 planning. **Biodiversity targets** Region committed to national targets for NNL / NG. Net gain on individual projects being recorded on tracker (no examples seen). Habitat data being recorded on GeoRINM. Habitat / biodiversity measures being incorporated into Vegetation Management Specifications (VMS) for clearance activities (examples provided). Minimum 10% biodiversity net gain required on projects with three named projects to trial approach. Good practice being implemented during maintenance. VMS for long-term maintenance being developed for no net loss.	2	Commitment to biodiversity principles demonstrated. Strategy and timetables not seen so progress cannot be evaluated Implementation of habitat management measures in VMSs. Progress described in recording BNG on projects. Region State of Nature Report issued.
2 Delivery against Varley recommendations	4 Network Rail must value and manage its lineside estate as an asset.	NW&C Region Habitat Management Plan Strategy_finalv2.pdf Vegetation Management BAC Deep Dive.pptx State of Nature report NW&C 2021 FINAL.pdf (06) NWC 10PP Programme Handbook.v0.2.ppsx (07) ToR Biodiversity Steering Group NWC .pptx (10) State of Nature report NW&C 2021 FINAL.pdf (11) NWC Pway Regional Asset Management Strategy Ver1.0.docx (13) NW&C Region Habitat Management Plan Strategy.pdf (14) NW Route Vegetation Management Strategy (002).docx (24) NAJ2 0-5M VMS V3 - FINAL.pdf (25) VMS LEC4 143.0660 - 148.0000 V6.pdf	**General** Note that characteristics of the approach in NR's Asset Management Plan have been reviewed through multiple responses to the questionnaires. Noted that the Vegetation Strategy is incorporated into NW&Cs P-Way Asset Management Plan (not seen). ENV/122 acknowledged to be bedding in still and Functional Audit Programme will measure assurance against it. **Resource and skills** Resource acknowledged to be an issue with overheated supply chain and limited resources. Concern that DUs are not sized to deliver maintenance volumes (in comparison to resources available to Works Delivery?), especially once clearance works have been undertaken. National competency framework to be launched in September 2022. Framework contracts for ecologist resource. Apprenticeship scheme to upskill NR employees. DUs reliant on ecology support from Works Delivery, subject to availability. **Asset data** <Responses from Q13 included under 1(c)> Inspection and work prioritisation approach defined in standards described in DU responses. Also describes use of WAIFs to prioritise work. Asset information collected using a variety of systems and held in Ellipse: DU staff represented on DLI during development and testing. Some limitations in system noted - sometimes to conservative in risk identification. Automated Intelligent Video Review also used. PowerBI used to assist in collating and interpreting data - noted that Ellipse constrained to 1/8ths, which is not always most logical way of defining asset. Considered that safety related data is managed well in Ellipse with link from reporting to maintenance action. **Demonstration projects** Examples provided and also described in SoN report. The Region has developed pilot sites to be able to demonstrate improvements to both biodiversity and the operational railway. We have the following sites that we will develop and track: Tring Cutting; Freshfields Sand Lizards; Stourbridge; Dutton Himalayan Balsam; Harbury Cutting, plus more in development. Pilot projects feeding back into practice through case study sheets, review and incorporation into future specs and standards. **Continuous improvement** No specific examples of continuous improvement process at regional or DU level. DUs noted sharing of feedback at safety briefs.	3	Sound approach to delivering components of managing vegetation as an asset. Not clear if this is fully joined up at all levels. Strategic documents for vegetation management not seen Example draft HMP provided (only example seen in review) Concern expressed regarding resource to deliver habitat benefits Demonstration and pilot projects delivered

North West and Central Region

Review reference		Documents reviewed	Notes from questionnaires and meetings	Confidence rating	Final Basis for confidence rating
Theme	**Topic**				
2 Delivery against Varley recommendations	5 Network Rail must improve its communication with communities and key stakeholders.	h. LEC4 q&a with pics.docx I. Exec report P11 Wk48.pdf j. IMG_6205.jpg k. IMG_6206.jpg l. IMG_6207.jpg m. Whitmore event and woodland management works final SG.docx	Good examples of consultees at national level (ad hoc engagement). At all levels the Region engages and works with: -Tree Council. Provides critical support in producing guidance documents (ADB), legislation and community activities, Forestry Commission, Arboricultural Association, Woodland Trust,Forestry England,ORR reporting, Community public events through WD (Varley good practice), Natural England for specific licence applications, Rivers Trust to joint deliver projects. Local engagement mainly through Works Delivery. The Maintenance Protection Coordinators deal with service requests and local authorities. The MDU has received positive feedback where work has taken place. Airdrop (mail distribution) system being used to inform locals of planned work. Standard approach used for contacting local stakeholders of maintenance work. Includes engagement with local councils, public events and site meetings. Role of Maintenance protection Coordinator (MPC) noted. Importance noted of good communications when dealing with third party trees. Third party risks are increasing with DU. WD liaison improving with stakeholders. Post-Covid picking up again including engagement with local councils, holding public event meetings and site meetings.	3	Sound approach to stakeholder management described Examples provided of engagement materials
2 Delivery against Varley recommendations	6 Network Rail should lead a cultural change for valuing nature and the environment across the organisation.	NW&C Region Habitat Management Plan Strategy_finalv2.pdf (01) 2022-02-11 - QRR Veg Strategy Condensed.pptx	Senior management commitment through sign off for Regional Sustainability Delivery Plan by regional executive. Efforts by Works Delivery Ecology team to develop cultural change to "cut and maintain". Considered to be "bolt on" rather than "core part". Recognition of importance of biodiversity in DUs and introduction of habitat friendly measures, although nesting birds have been a consideration for a number of years. However, no noticeable culture changes. The Works Delivery Ecology team has helped move the culture along significantly but more still needs to be done to moving to a 'cut and maintain' culture. The work that the Sustainable Land Use Programme (SLUP) has done in developing guides and training will aid us but improving biodiversity takes time and is a multi-control period change programme. Also ref SoN report.	2	Cultural change spreading "top down". Not clear if DUs are fully engaged.
3 Habitat management and biodiversity	-	NW&C Region Habitat Management Plan Strategy_finalv2.pdf State of Nature report NW&C 2021 FINAL.pdf (07) ToR Biodiversity Steering Group NWC .pptx (13) NW&C Region Habitat Management Plan Strategy.pdf (14) NW Route Vegetation Management Strategy (002).docx (24) NAJ2 0-5M VMS V3 - FINAL.pdf (25) VMS LEC4 143.0660 - 148.0000 V6.pdf (28) Stoke (Stafford MDU) SSSI sites.jpg	The Vegetation Strategy and Requirements reinforces NR's target for no net biodiversity loss by 2024. A minimum 10% net gain requirement for habitat management is specified on project delivery. Currently have Vegetation Management Specifications (VMS) written by Works Delivery (WD) for sites to be cleared as part of the Vegetation Management (Woodland Management) Programme. NW&C HMP provided. SoN report has habitat baseline data. Use of LIDAR data and Geo-RINM viewer noted. Woodland Management Programme and VMS defines best practice (VMS examples provided). Individual HMPs being introduced for projects. The Commonwealth Games vegetation works includes biodiversity requirements to deliver habitat improvements in the VMS. Some biodiversity offsetting being trialled. Ecologists employed by Works Delivery, with routes using framework ecologists. There are no ecologists in the DUs. DU noted they have no ecologist and rely on the availability of WD Ecologist who are already in high demand and therefore not available at short notice. Tree works scheduled outside nesting season. DUs undertake routine checks for nesting birds, badgers and bats and call on ecology specialists if needed and if work is not urgent (affecting safety and performance). 10% of region should be covered by a Habitat Management Plan by the end of CP6. Railway friendly species are retained e.g., blackthorn, and felled materials are retained on site to create insect habitats. Flailing has been significantly reduced as a maintenance tool to avoid unnecessary damage to the environment. Only hazardous vegetation is removed. Felled materials are retained on site to create insect habitats or chipped to bank. Reduced the number of contractors we use through the summer season to avoid vegetation clearance in the bird nesting season.	3	Sound progress in beginning to implement HMPs at region and route level. Some evidence of monitoring achievement of biodiversity targets and offsetting.
4 CP7 planning	-	No documents	<Further information on CP7 planning requested on 01/06/22 - response awaited> Overall approach to CP7 planning and development of costs and volumes not provided, apart form short summary in condensed Vegetation Strategy. The Region CP7 vegetation plans align with the Long-Term Vegetation Clearance Plan outlined for CP6 to compliance in 2039. Priority based on condition, consequence CCT (risk-based modelling), performance (adhesion sites) and risk remain largely unchanged. Clearance volumes will be based on long term Vegetation Clearance Plan (see 1(a)). DUs noted that maintenance volumes assumed to be at CP6 levels. Ash Die Back to be considered separately - volumes to be based on survey data and top down modelling. Achievability of CP7 targets stated to be dependent on improved streamlining of possession and isolation times.	2	Current funding lines provided with evidence of funding envelopes presented. No information provided on assumptions for developing funding envelopes. No link to how funding will impact on long term goals and objectives.

Scotland's Railway

Review reference				Confidence rating	
Theme	Topic	Documents reviewed	Notes from questionnaires and meetings	Confidence rating	Final Basis for confidence rating
1 Regional management plans and practices	(a) Compliance roadmap	Scotland Route Vegetation Management StrategyV1.pdf Edin - TR44257.pdf Glasgow - TR54148.pdf Motherwell - TR45599.pdf Perth - TR39185.pdf ORR VM review - Follow up request for information - Scotland.docx Scotland Vegetation Compliance Tracker v5.xlsx ORR VM review - Follow up request for information - Scotland.docx Scotland Vegetation Workbank v4.xlsxx	Follow up information on compliance received 09/06/22. Temporary variations issued against NR/L2/OTK/5201/02 at different times for each MDU with 2029 the stated date for compliance. Noted that compliance was an issue prior to introduction of new standard. Motherwell had a pre-existing variation identified in 2017, the others date to 2019 Compliance tracker information provided. Long term compliance plan in vegetation management strategy (2015) - shows estimated date for compliance as 2036. Current forecast to achieve compliance is 2042 compared with 2029 in TV (across all regions) - information on basis for 2042 date not seen. Workbank provided for CP5/CP6. CP7 workbank in preparation. Most recent compliance estimate is 45% across all regions, reflecting improvement during CP6. - based on current know compliance and assumed regression with a lack of cyclical maintenance - analysis of LIDAR data currently being procured.	**1**	Evidence provided shows sectional break down of work completed to date and compliance levels based on historic survey data. No clear evidence to understand a forward plan of the compliance trajectory. Evidence provides an incomplete picture of how the regions are addressing the causes of non compliance and the plans in place to mitigate them. Overall region compliance has slipped several years from initial TV estimates.
1 Regional management plans and practices	(b) Compliance delivery	Scotland Route Vegetation Management StrategyV1.pdf Scotland Vegetation Clearance Specification Issue 5 2018 19_01_18 RL.pdf Edin - TR44257.pdf Glasgow - TR54148.pdf Motherwell - TR45599.pdf Perth - TR39185.pdf ORR VM review - Follow up request for information - Scotland.docx Scotland Vegetation Compliance Tracker v5.xlsx ORR VM review - Follow up request for information - Scotland.docx	Approach to clearance described in detail in specification (2018). Contractors follow spec from tender stage and supervised by WD for compliance with end product checks carried out. Difficulty in assessing degree of compliance due to intervals between surveys and rate of re-growth. LIDAR not considered reliable tool to assess compliance %. Focus is very much on clearance but the route themselves state that clearance does not equal compliance. Consistent comments around enormous amount of work to comply with standards and require significant financial and personnel investment to be able to comply. Challenges noted include Increased unit rates, biodiversity considerations, ash die back and tree health issues, lack of cyclical maintenance and lack of financial and physical resource to deliver the maintenance and renewal works. Reducing track access and OLE isolation times to undertake works also cited as barriers to progress. Currently the level of cyclical maintenance is considered insufficient to keep cleared areas compliant.	**2**	Sound approach to planning and delivering compliant sites described. Sound approach to undertaking reactive works, including sites awaiting clearance back to a compliant profile. Concerns exist relating to ability to undertake work to maintain sites to keep to schedule.
1 Regional management plans and practices	(c) Key performance indicators	NR-Environmental-Strategy-FINAL-web.pdf Q7 Scotland Vegetation compliance screen shot.PNG Sustainability Assurance Plan.xlsx Scotland Vegetation Compliance Tracker v5.xlsx WHL 0-2 Miles Vegetation Management Sectional Plan CP6.3 (1).pdf State of Nature Report	Biodiversity KPIs monitored in Sustainability Dashboard (work in progress) - currently: - % Route surveyed, - % Scotrail biodiversity budget spent - % of INNS treatments sprayed vs planned in ellipse - % of SLU Budget spent. See #3 for more discussion on biodiversity metric. Habitat baseline has not been established - currently no viable tool or the resources (finance and competency) to produce one. Habitat/biodiversity improvement / loss surveys via remote sensing but not enough clarity for detail desired. As an interim measure trialling a Scotland based metric that focuses on the area impacted outside of the immediate action zone and restock a % of that area to mitigate vegetation removal and to facilitate a change in vegetation structure that adds more of the woody species we want and hopefully don't have to remove often. Offsetting pilot delivering 345 Ha of Atlantic Woodland described. The aspiration is to use the annual state of nature reports to publicise progress and communicate best practice. It will evolve to reflect regional position as it matures.	**2**	Common approach to defining profile compliance used across the region which complies with the standard. Compliance tracker provided. Maintenance works planning described which takes into account incidents, but no documents provided. Biodiversity baseline using Defra metric published in State of Nature Report. Investigating alternatives to Defra measure for use in Scotland. Approach developed to monitor and record biodiversity offsetting.
1 Regional management plans and practices	(d) Risk management	Cyclical Maintenance Guidance Scotland Region v1.2.pdf Scotland Route Vegetation Management StrategyV1.pdf Appendix - Extreme Weather Response Process Flow Chart.pdf Appendix - National Weather Alert Thresholds.pdf Autumn Working Arrangements Appendix A.docx.doc Autumn Working Arrangements Appendix B.doc Autumn Working Arrangements Final.pdf Completed Circuits 2021.pdf ROLA - Autumn Working Arrangements Appendix D.docx Edin - TR44257.pdf Glasgow - TR54148.pdf Motherwell - TR45599.pdf Perth - TR39185.pdf	Use of TARRs in planning noted (see also #1(e)). Examples provided of seasonal preparedness and extreme weather measures. Effects of recent severe storms noted (Arwen and Malik). Concern that 50% were outside boundary, and only 5/150 had been noted on LTS - many were healthy. Risk mitigation relating to non-compliance describe in TVs. Top 5 risks detailed in questionnaire response: 1.Dead dying diseased trees / tree failures during weather (derailment) - identified through LTS 2.OLE Structures / Equipment / OHL (Reds/Super Reds) - identified by OLE team 3.Signal and LC Sighting - identified through repeat faults - managed on reactive basis 4.Leaf Fall WSF (Autumn Clearance) - identified through LTS and seasonal delivery teams 5.Vegetation encroachment – identified through physical reports from walk throughs, cab brides, FFV footage or reports of vegetation striking trains. No general escalation process included but detail for autumn weather and flowchart for extreme weather included. Escalation process described as simple due to being 1 route region. Additional concerns around •Walking Routes •Complaints from TOC/FOCs (damage to trains) •Scenic View Clearance (HLOS) commitment Risks also identified in conversations with MDU - MDU mention data issues with mitigation (removal/inspection etc); Invasive species detailed and treatment described in "Network rail Scotland region tree establishment spec" and "Scotland vegetation clearance spec" Ref The risk profile has increased during CP6 prior to the start of the control period the lineside tree survey had not been carried out since ~2009/11 so the resumption of this survey has highlighted large numbers of trees that pose a risk to the operational network. Ash dieback is an emergent risk during the control period. More has been learned about it from other regions where it is at a greater stage of decline. The risk profile for CP7 will be dependent on funding.	**3**	Sound approach to risk management and good examples of seasonal and extreme weather management. Clear risk based prioritisation approach.
1 Regional management plans and practices	(e) Maintenance planning and reporting	Cyclical Maintenance Guidance Scotland Region v1.2.pdf Scotland Route Vegetation Management StrategyV1.pdf GDOT V6 CP5 and CP6 volumes.xlsx Scotland Vegetation Workbank v4.xlsx Q7 Scotland Vegetation compliance screen shot.PNG Storm Arwen tree failure sites.xlsx Storm Malik and Corrie Tree Failures.xlsx Sustainability Assurance Plan.xlsx Scotland Vegetation Compliance Tracker v5.xlsx	DU Maintenance works are primarily reactive - approach to planning based on data from various sources described. Targets managed through Ellipse. Currently the focus is on mitigating negative impacts of vegetation by removing high risk leaf fall species and removing/pruning where "vegetation can impact assets". Workbanks prepared using lineside tree surveys regarding ash die back and DDD trees (spreadsheets and autumn performance currently used). Clearance targets for period set by RAM and resource levels generated using ABP. Work delivery do planned clearance and the vegetation clearance for the capital delivery enhancement pipeline (they do both because they are one team). Reactive clearance and planned maintenance is with the DU. Prior to CP6 start, vegetation clearance targets were set by RAM Geotechnical Drainage and off-track which defined resourcing levels through the ABP tool. MDU maintenance targets are managed via Ellipse but relies on manual measurement and transfer into the system - difficult to interpret but improvements recently being seen with Power BI integration Bioengineering is not considered workable and ultimately, but will promote dialogue between biodiversity working group and Geotech RAM regarding steep cuttings that require the most vegetation removal and where an agreeable restocking strategy is needed to keep the railway safe. Ref *Sustainability dashboard screenshot* - shows how delivery plans are monitored at high level with the number of milestones achieved vs planned Seasonal preparedness documents included for Autumn Working Arrangements and extreme weather flow chart. Cyclical maintenance document also included	**2**	Examples of sound processes for maintenance management. Planning linked to TARRs but no specific examples at work item level. Large variance of planned vs actual maintenance delivery. Unable to distinguish between compliance delivery and maintenance delivery. Evidence was provided by region of setting maintenance targets and local reporting. However, the reporter team is unable to confirm clear alignment to Vegetation Management Plans and regional KPIs to understand progress against current compliance position. Evidence presented by regions is that understanding the current network 'state', to determine true level of maintenance work required ,requires more robust and accurate data. Data inaccuracies and issues of reporting regional works planned and completed within Ellipse requires improvements.

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Review reference					
Theme	**Topic**	**Documents reviewed**	**Notes from questionnaires and meetings**	**Confidence rating**	**Final Basis for confidence rating**
1 Regional management plans and practices	(f) Cross asset working	Scotland Route Vegetation Management StrategyV1.pdf Scotland's Railway Sustainability Strategy & Delivery Plan.pdf Scotland Vegetation Clearance Specification Issue 5 2018 19_01_18 RL.pdf Autumn Working Arrangements Final.pdf	RAM direct works delivery with clearance planned in dialogue with the DUs, who provide their priority sites in relation to repeat faults and safety of the line issues. Seasonal issues are requested and compared to the work bank, as are OLE or signal problem locations. Where synergy can be found, it is realised. Capital Delivery Enhancement / Renewal locations are generally avoided as they provide additional clearance over the core programme. Where there are concerns about an asset such as earthworks slope stability the geotechnical team is consulted or another relevant RAM team depending on the concern raised. MDUs reach out to RAM and route delivery if things cant be achieved themselves. Works are largely seen as reactive with effort placed on tackling some sites prior to the leaf fall season. Documents imply that cross asset working happens but not seen any formality around this as to how it is defined.	2	Sound approach with examples of cross asset working provided. Improvement opportunities are identified.
2 Delivery against Varley recommendations	2 Appropriate governance must be put in place at organisation, route and project level.	CP6 Sustainability Delivery Plan - Biodiversity.xlsx ENV122 Biodiversity RACI.xlsx DRAFT Biodiversity Working Group TOR.pptx SRSPB TOR (1).pptx	**General governance approach** Head of Sustainability and Social Value has overall accountability. Other responsibilities documented in a RACI agreed by biodiversity group and issued for consultation. Sustainability programme board chaired by Alex Hynes managing director and includes his direct reports and transport Scotland, and ScotRail – to oversee issues, risks, sign off, endorsement etc. Currently no Biodiversity action plan or Habitat management plan in place and no associated management processes. There are plans for production but don't have resources to deliver them until CP7. (ref ENV122 Biodiversity RACI) Documents such as Sustainability Delivery Plan, regional org chart, workbank and KPI dashboard give an indication of how this is managed. Revising Vegetation Strategy and Specification to highlight need to protect the environment around the network A biodiversity working group includes members from the sustainability team, Regional Asset Manager Lineside & Drainage, WD ecologists, Geotech RAM and DU off-track. This creates a platform to discuss ENV122 compliance. **Standards** Standards available on portal. Specifications revised with reference to working towards compliance with ENV122 & OTK5201. Noted that post implementation review of ENV/122 is due in May 2022. Awareness briefings of new/changes to standards undertaken over Teams and briefing packs produced centrally and stored on the standards website. These standards are available and referenced to the suppliers via a Portal with standards referenced into the regional specification in the core text. Upskilling and making headway in bringing the Delivery Units onboard and signposting them to training and explaining the new specification. Progress is slow due to resource, but had positive initial feedback. 2018 Clearance specification details what is required and how it will be delivered incorporating lessons learned (check if more recent version)	3	Governance processes developing and organisation and RACI charts provided. Cross asset working to implement biodiversity measures Implementation of ENV/122 slowed down due to resource issues.
2 Delivery against Varley recommendations	3 Network Rail should publish an ambitious vision for the lineside estate.	Scotland's Railway Sustainability Strategy & Delivery Plan.pdf CP6 Sustainability Delivery Plan - Biodiversity.xlsx Scotland's Railway Sustainability Strategy & Delivery Plan (2).pdf SRSPB TOR (1).pptx Sustainability governance illustration.pptx	**Strategy** Scotland are currently lacking the vegetation management plan and habitat management plan (regularly citing lack of financial and personnel resources) and as such there is limited documented detail as to how these aims will be achieved with the timescales on expected compliance being bushed from 2029 to 2042. Scotland's Railway & Sustainability Strategy and delivery plans detail at a very high level how they plan to meet regulatory targets. Scotland are currently lacking the vegetation management plan and habitat management plan (regularly citing lack of financial and personnel resources) and as such there is limited documented detail as to how these aims will be achieved with the timescales on expected compliance being pushed from 2029 to 2042. Biodiversity delivery plan has a working group reporting into the wider sustainability steering group on a bi monthly basis. Communications via NRs Environmental Sustainability Strategy and via Sustainable Land Use Programme meetings. Cascades have happened through internal comms to asset teams, delivery partners & working groups. Funding identified as the primary constraint to achieving stated requirements. Large scale trials were planned but fiscal challenges outside of their control has hampered this - instead small scale trials of sustainable land management have happened slower that desired. **Timetable** Enhancing biodiversity targets re-stated in Sustainability Strategy and Delivery Plan (no underlying details) Varley compliance via OTK5201 and ENV122 not achieved, funding for specialist resource a big challenge - exploring opportunities with specialist suppliers. **Biodiversity Targets** See discussions on biodiversity measures.	2	Vegetation and habitat management strategies / plans not yet introduced. Region State of Nature Report issued.
2 Delivery against Varley recommendations	4 Network Rail must value and manage its lineside estate as an asset.	Org chart.pptx Scotland's Railway Sustainability Strategy & Delivery Plan.pdf Q18 Screenshot of Sustainability Dashboard.docx CP6 Sustainability Delivery Plan - Biodiversity.xlsx DRAFT Biodiversity Working Group TOR.pptx	**General** Biodiversity is one of ten strategic priorities and has a delivery plan, technical lead and working group. PPF RAM team currently building up, but not fully resourced, with vacant roles. Noted that need link between offtrack and sustainability teams to deliver habitat plans. The region believes there is work to do across the business to recognise the lineside as an asset to be protected or enhanced. They are revising their vegetation strategy and specification to highlight that environmental protection should be happening. **Resource and Skills** Region considered to be under-resourced relative to its size. Differing work practices and needs across region. Engineering, ecology and arborist posts unfilled. Shortage of skilled specialists noted. e.g. ecologists and arborists. Putting Passengers First programme restructured, grew and moved the team under engineering and asset management. Team has had losses but is equipped to delivery the sustainability strategy. Technical competency framework which Scotland's railway will align to (future aspiration). Resource gaps being filled via national ecological services framework. Internal training offered but struggling for the right calibre of candidates, considering changing roles to assistant ecologists. There is an acceptance that they are under resourced in ecology - a definite risk and significant concern of the team. Biodiversity net gain training for RAM lineside, sustainability teams and works delivery ecologists Focus is very much on clearance but the route state that current levels of cyclical maintenance are insufficient. Consistent comments around enormous amount of work to comply with standards and require significant financial and personnel investment to be able to comply. . **Asset Data** Maintenance works are largely reactive, data collected via annual cab ride / video /3yearly walk and managed via ellipse/spreadsheet/ different locations. Issues cited with data being in differing locations. Change to more automated/ technological survey is very welcomed. Work is prioritised by section managers using a risk approach based on rail type. Prioritisation score is issued against work giving data as to where risks will be tackled. Some concerns cited with data and information being held in different places with regards to DDD surveys making it difficult for MDU to fully identify work scope Noted that Digitised Lineside Inspection (Maps, LiDAR, Aerial Imagery, FFV) and all of the allied data sources planned for tranche 2 (Tree risk model, hyperspectral etc) are key to future asset information needs. **Demonstration Projects** Examples of demonstration projects provided (see questionnaire and SoN report. Winchburgh - enhancement of woodland with Trees retained with bat potential and bot boxes installed Safeguarding of nesting hen harriers Regions first beaver tunnel under railway Gone West partnership to plant community forests Offsetting pilot delivering 345 Ha of Atlantic Woodland described. **Continuous Improvement** Continuous improvement driven by the sustainability strategy. Responses highlight memberships of numerous professional bodies, attending cross body meetings, groups (sustainable land use, Scottish Ash die back resilience) etc for shared learnings.	3	Good examples of work to develop approach to managing habitat and introducing relevant biodiversity measures. Linkage between offtrack and sustainability teams to deliver habitat plans. Progress hampered by lack of resource. Examples of demonstration and pilot projects provided.

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Review reference				Confidence rating	
Theme	**Topic**	**Documents reviewed**	**Notes from questionnaires and meetings**		**Final Basis for confidence rating**
2 Delivery against Varley recommendations	5 Network Rail must improve its communication with communities and key stakeholders.	Scotland's Railway Sustainability Strategy & Delivery Plan.pdf	Steering groups (Sustainability, Sustainability programme board, NR sustainable land use group). Meetings with Nature Scot, ORR and SEPA regularly, also supply chain. Dedicated communications manager undertakes significant communication with communities; further regular FAQ documents sent to lineside neighbours, social media, local press, dedicated web page. Role of communications manager described. Information on tree and vegetation management on dedicated webpage for lineside neighbours. Also good specific examples of communication given on specific projects	3	Examples of good practice provided.
2 Delivery against Varley recommendations	6 Network Rail should lead a cultural change for valuing nature and the environment across the organisation.	ENV 122 technical briefing PERTH.pdf 4. Scotland's Railway sustainability communications winter review FINAL (3).pdf Q6 Regional. Screen grab of Training links.docx Q7 Scotland Vegetation compliance screen shot.PNG	Improvements been seen but it is recognised it doesn't happen overnight, Sustainability communication strategy approved by sustainability programme board. Also good news stories highlighting works they are doing, further initiatives like biodiversity training, green code, sustainability intranet, lunch and learns and best practice biodiversity standard. No formal change process, but, sustainability communications strategy sponsored by Sustainability Programme Board. The feeling is cultural change has started but huge amount still to do and engagement outside of lineside and sustainability has been slow. Further highlighting of slow progress due to limited recourse and detailed plans as to how to achieve this. (ref ORR VM review - Region questionnaire SCOTLAND). Initiatives to upskilling Delivery Units (see 2.2).	2	Sound approach noted, but again progress limited by resource.
3 Habitat management and biodiversity	-	Cyclical Maintenance Guidance Scotland Region v1.2.pdf Scotland's Railway Sustainability Strategy & Delivery Plan.pdf Network Rail Scotland Region Tree Establishment Specification v1.2.pdf Scotland Vegetation Clearance Specification Issue 5 2018 19_01_18 RL.pdf Autumn Working Arrangements Final.pdf ENV 122 technical briefing PERTH.pdf 4. Scotland's Railway sustainability communications winter review FINAL (3).pdf CP6 Sustainability Delivery Plan - Biodiversity.xlsx ENV122 Biodiversity RACI.xlsx Q18 Screenshot of Sustainability Dashboard.docx Q6 Regional. Screen grab of Training links.docx Q7 Scotland Vegetation compliance screen shot.PNG	Sustainability Strategy sets out approach to meet regulatory targets. Noted that Scottish Government do not have a biodiversity target comparable to that in England, including net gain. The strategic target of this priority area and the working group is to achieve no net loss/net gain. Progress in this area is restrained in CP6 by a lack of resource (both human and financial). It is also hampered by the absence of a suitable methodology and tool for calculating biodiversity on linear infrastructure in Scotland. Ringfencing funding to deliver offsetting work. Intend to try some enhancement inside the boundary before CP7. Need to blend approaches to provide a metric that works for the regulators in Scotland and the TA. Habitat Management Plans are a requirement of NR/L2/ENV/122/02, Scotland region isn't compliant yet but are collaborating with lineside to produce and align the HMPs within vegetation management plans. Hoping for feasibility study in CP6 but no budget until CP7. Citing lack of budget in CP6, most work to comply with ENV122 has been limited and largely on a trial basis. Biodiversity working group set up with discussion around ENV122 compliance Currently not mature enough to monitor progress towards biodiversity targets other than accepting the Tech Authority net gain score - they can monitor spend on sustainability as a target. Noted that no budget to meet ENV/122 requirements during CP6. This could have significant future cost impact across a number of asset classes. Anticipate being non-compliant to ENV/122 into CP7. Cost neutral benefits for biodiversity have been integrated into trial and draft vegetation specifications. Noted that irreplaceable habitats within the boundary are "incredibly rare". Mitigating the negative impacts of vegetation by removing high risk leaf fall species and removing/pruning vegetation that can impact assets. Designated sites are worked with NatureScot and ecologists. Workstreams under way to develop approach to monitor biodiversity.	2	Sound progress in considering habitat and biodiversity noted across a number of areas, as noted in response to Varley recommendations in #2. Progress in implementing ENV/122 and HMPs stated to be behind schedule due to resource limitations. Issues noted with adoption of biodiversity metric in Scotland.
4 CP7 planning	-	Scotland Route Vegetation Management StrategyV1.pdf CP7 round 5 dates.PNG CP7 Round 4.5 realistic minimum.pptx	Follow up information on compliance received 09/06/22. CP7 Round 5 planning currently under way. Noted observation that this ORR review may not be in time to influence planning for CP7. Workbank is being developed, undertaking specialist analysis of LIDAR data to understand current compliance, informing workbank for CP7. Key assumptions focussed around getting the funding they request and having the required resources to deliver. No single document for planning / prioritisation process, instead relying on data and info from key stakeholders. (ref ORR VM follow up for request for information) Risk profile dependent on level of funding achieved for CP7. Lineside tree survey had not been carried out since 2009/11, resumption of this has highlighted large number of trees posing operational risk. CP7 viewed as an opportunity to get back on track regarding compliance. Management Approach/Key Short Term Assumptions: • We won't be aiming to transform habitat types – Kent have shown is unlikely to work and unaffordable. • We won't be carrying out biodiversity net gain calculations for delivering a compliant lineside. It should be used for development work or where habitat is removed altogether. • We will enhance any lineside we work in to ensure a functional wildlife corridor/natural capital benefit exists posts work • We will do a blend of restocking inside the boundary and partnership offsetting on third party land to deliver significant benefits for biodiversity in line with Scottish Government planning strategy. • Ash dieback: Needs significant investment on top of our regular vegetation management pot. This will be requested in CP7 plans. • Lineside tree surveys mapping route issues with Hyperspectral adding another layer of risk management	2	Current funding lines provided with some evidence of funding envelopes presented. No information provided on assumptions used to develop proposed funding envelop. No link to how funding will impact on long term goals and objectives.

Southern Region

Review reference		Documents reviewed	Notes from questionnaires and meetings	Confidence rating	Final Basis for confidence rating
Theme	Topic				
1 Regional management plans and practices	(a) Compliance roadmap	02. Kent Vegetation Strategy Maintenance RAM Track V1 2021.pdf 02. Sussex Vegetation Strategy Maintenance RAM Track V1 2021.pdf 02. 06. 08. Wessex Route Vegetation Management to Compliance - 15Yr - V6.4.xlsx 02. Wessex Route Vegetation Management to Compliance 15Yr - V6.4.xlsx 07. Compliance Tracker Veg Kent and Sussex 2.xlsx 07. TV Veg KENT 47269.pdf 07. TV Veg SUSSEX 47272.pdf 07. Wessex - Certificate - TR44431 - Veg Compliance.pdf Vegetation Management in CP6 - 2018.pptx Wessex Route Vegetation Plan May 2019.pptx	Temporary variations issued against NR/L2/OTK/5201/02 in August 2019 for Kent and Sussex and May (?) 2019 for Wessex. Full compliance expected in April 2027 for Kent and Sussex and 2034 for Wessex. Wessex submission mentions earlier TV. Plans to compliance for all routes. Kent and Sussex shown as two years behind planned dates in TV. - Noted that interpretation of compliance varies in different DUs. For Kent and Sussex, it is removing all the vegetation out of the action zone, immediate action zone and managing the vegetation in the immediate action zone and not doing anything to the vegetation outside of that which is why compliance date is short compared to other routes regions. Part of the activities of the region is to unify the interpretation of the terminology and when digital lineside is eventually rolled out, the definition will be unified across NR	2	Roadmaps provided for all routes shows understanding of delivery program and current delivery progress. Evidence provides an incomplete picture of how the regions are address the causes of non compliance and the plans in place to mitigate them. Kent and Sussex forecast date for compliance slipped by two years. Not clear what latest forecast date is for Wessex.
1 Regional management plans and practices	(b) Compliance delivery	02. Kent Vegetation Strategy Maintenance RAM Track V1 2021.pdf 02. Sussex Vegetation Strategy Maintenance RAM Track V1 2021.pdf 02. 06. 08. Wessex Route Vegetation Management to Compliance - 15Yr - V6.4.xlsx 02. Wessex Route Vegetation Management to Compliance 15Yr - V6.4.xlsx 06. CP6 K&S Veg Work Plan 2022 unconstrained ORR.xlsx 08. Maintenance Programme - Copy to OT.xlsx 07. Compliance Tracker Veg Kent and Sussex 2.xlsx Vegetation Management in CP6 - 2018.pptx Wessex Route Vegetation Mgt Strategy Issue 1.2 040122.pdf Wessex Route Vegetation Plan May 2019.pptx ~$T 1 Site Spec RDG2 Wokingham to Reading.docx LOT 1 Site Spec RDG1 Feltham to Staines Bridge.docx LOT 1 Site Spec RDG1 Feltham to Staines Bridge.pdf LOT 2 Site Spec RDG1 Staines Bridge to Virginia Water.docx LOT 2 Site Spec RDG1 Staines Bridge to Virginia Water.pdf LOT 3 Individual Tree Scope of Work - RDG1 28m 80yd - 28m 460yd.pdf LOT 3 Individual Tree Scope of Work - RDG1 28m 80yd - 28m 460yd.xlsx	To create a compliant profile, including clearing the vegetation in the action and immediate action areas is remitted by a Senior Asset Engineer (Track) for Kent and Sussex to be delivered by framework contractors project managed by Works Delivery. In Wessex this is carried out by a SAE (lineside) and the work is delivered via framework contractors under the stewardship of Area Services - Compliance tracker available for Kent and Sussex - Wessex route has vegetation management to compliance plan - Funding sought for CP7 to make up any shortfall in spend during CP6 - Challenge in measuring compliance consistently noted - Southern region is going through an organisational and transformational change that includes the review and implementation of AM policy. Kent has a draft vegetation management plan and a vegetation maintenance strategy, Sussex has a vegetational maintenance strategy and Wessex has none provided. During interview, it was mentioned that all vegetation management for the DUs are similar with slight changes to details specific to the DU - There are documents that show work banks and managing access for inspections, and maintenance works. This was explained in the questionnaire (Q5). Response in Q5 mentions a Habitat Management Plan which was not provided. - Questionnaire also provides information on responsibilities for the different types of vegetation management work for biodiversity assets. - Examples of the framework employed to build work banks to be provided by the region. This will show the information provided from central and how it is processed to build the work banks and the assumptions made.	3	Sound approach to developing work banks described and evidenced. Current workbanks and forward workbanks understood and prioritised by a sound risk prioritisation approach. Risks to delivery understood and are well documented.
1 Regional management plans and practices	(c) Key performance indicators	02. 06. 08. Wessex Route Vegetation Management to Compliance - 15Yr - V6.4.xlsx 06. CP6 K&S Veg Work Plan 2022 unconstrained ORR.xlsx 08. Maintenance Programme - Copy to OT.xlsx 03. SEAM Off Track Incidents report - 100322.pdf 03. SEAM Off Track Vegetation (002).png 03. Vegetation update Period 10 Kent.pdf 03. Vegetation update Period 10 Sussex.pdf 03. Vegetation update Period 11 Kent.pdf 03. Vegetation update Period 11 Sussex.pdf 07. Compliance Tracker Veg Kent and Sussex 2.xlsx 11. Network Rail State of Nature report - Executive summary 2021 and regional appendices v1.pdf	- Repeatable KPIs mentioned in the questionnaire - Region has worked on enhanced SoN report and uses data generated by improvement workstreams to populate the report - SoN updates are expected to form a core part of the management review cycle for biodiversity as an asset - Vegetation updates documents show KPIs as described in the questionnaire - Project to collect habitat data described	3	Different approaches to defining profile compliance used in Wessex, but all broadly comply with the standard. Compliance tracker provided. Maintenance works planning described which takes into account incidents, but no documents provided. Good progress on biodiversity measurement. Use of habitat data and biodiversity baseline published in State of Nature Report.
1 Regional management plans and practices	(d) Risk management	02. Kent Veg Man Plan Draft.pdf 02. Kent Vegetation Strategy Maintenance RAM Track V1 2021.pdf 02. Sussex Vegetation Strategy Maintenance RAM Track V1 2021.pdf 05. K&S ADAS Tree Summary Combined Sheet ORR.xlsx 05. Wessex -All Survey Trees - Main.xlsx 05. Wessex Tree Survey Progress by ELR - Yr4.xlsx 09. 2021 Autumn Working Arrangements Kent.pdf 09. 2021 Autumn Working Arrangements Sussex.pdf 09. Autumn Stage Gate Assurance 2021.xlsx 09. Joint Autumn 2021 Plan - GTR - v3 (1).pdf 09. Joint Autumn 2021 Plan - GTR - v3.pdf 09. Kent & SER Autumn Assurance 2021.pptx 09. Sussex Autumn Assurance 2021.pptx 09. Wessex -SCSG Joint Autumn 2021 Plan SWR V2.docm 07. TV Veg KENT 47269.pdf 07. TV Veg SUSSEX 47272.pdf 07. Wessex - Certificate - TR44431 - Veg Compliance.pdf 2022 Summer Working Arrangements Sussex v3.0.pdf	The delivery units are responsible for the vegetation on-foot inspection under NR/L2/OTK/5201/F3079, cab ride of lineside vegetation NR/L2/OTK/5201/F3270. The delivery unit also deliver the response to risk identified in Table 2 of NR/L2/OTK/5201/01 - No documents provided to support how risks are identified and managed. - TV documents explain how risks are controlled during the period of deviation. - Top 5 risks were explained in the questionnaire with details on how they are identified. - Regions understand the risks to be managed. Even though the questionnaire mentions 3rd party trees as the greatest risk, during the interview, the greatest risk mentioned was climate change. - With the right level of resources and structure, the delivery of volume of work and the management of 3rd party trees will be easier to achieve A 3 yearly maintenance inspection regime (with resulting work going into Ellipse) takes place however this wasn't considered to give a live feel of what needs doing on the ground or really assist in prioritising the work bank To aid decision making utilise cab rides/AIVR/Hubble to assess need for work prior to the growing season and through the year – depending on what protection is required this work is planned either using our day teams GZ, using LB's or possession. This is prioritised depending on risk. ADAS inspections every 30 months – timescale driven DDD trees planned either on days or in possessions. Level crossing inspectors reports regarding sighting. S&T signal sighting cab rides producing a plan for crossings that may be obscured through the growing season. MSTs identified for key signal and crossing assets where growth is an issue each year. No specific seasonal preparedness work takes place aside from the longer term leaf fall work (clearing Cat 4 and Cat 5 leaf fall sites) and any other sites where adhesion/track circuit issues occur due to vegetation.	3	Sound approach demonstrated. Assumed risk management approach as per standards. Clear Risk based prioritisation approach.
1 Regional management plans and practices	(e) Maintenance planning and reporting	02. Kent Veg Man Plan Draft.pdf 02. Kent Vegetation Strategy Maintenance RAM Track V1 2021.pdf 02. Sussex Vegetation Strategy Maintenance RAM Track V1 2021.pdf 08. Wessex Future_Work_Annual_Plan_Template_(On_Demand)_In Progress.xlsx 03. SEAM Off Track MNT report - 100322.pdf 03. SEAM TARR report - 100322.pdf 06. Brighton DU MST download 2022 23.xls TARR Volume Development 30 Mar 2022_v3.pptx	- Maintenance volumes are set under TARR proposals and tracked on the scorecard. No scorecard document was submitted to support how maintenance targets are tracked and managed - Volumes are reported on via SharePoint and renewed each period with routes as part of the Asset Stewardship and Reliability reviews. SEAM TARR report submitted to support this Most work is planned using a legacy sheet due to the unwieldiness of Ellipse, but ultimately all work is planned and scheduled through Ellipse in line with standard practice DU noted the number of ADB trees have been growing steadily through CP6. The DU has managed to keep on top of the CAT 3's with assistance from WDM clearing CAT 4+. Hopefully this steady increase forms part of the volume discussion.	2	Examples of sound processes for maintenance management. Planning linked to TARRs but no specific examples at work item level. Large variance of planned vs actual maintenance delivery. Unable to distinguish between compliance delivery and maintenance delivery. Evidence was provided by region of setting maintenance targets and local reporting. However, the reporter team is unable to confirm clear alignment to Vegetation Management Plans and regional KPIs to understand progress against current compliance position. Evidence presented by regions is that understanding the current network 'state', to determine true level of maintenance work required ,requires more robust and accurate data. Data inaccuracies and issues of reporting regional works planned and completed within Ellipse requires improvements.
1 Regional management plans and practices	(f) Cross asset working	02. Kent Veg Man Plan Draft.pdf 02. Kent Vegetation Strategy Maintenance RAM Track V1 2021.pdf 02. Sussex Vegetation Strategy Maintenance RAM Track V1 2021.pdf DOT Management Strategy & Implementation Plan Draft 20220504 v0.1.docx	-Working with other assets depends on the nature of the work being done on vegetation and the other asset. Planned work can be affected due to other assets not being able to complete or execute their own works in the same blockage. This has currently affected the compliance program and some planned works have been moved to Y4 - Through various forums coordination on SMD trees, tree stumps, and risk due to vegetation management is being consulted with Geotech, such as Vegetation Programme Update in Wessex. However, greater interaction with other assets will be reviewed as part of the DOT Improvement Plan for greater coordination of delivery with the hope of driving efficiencies across the business. -Senior Asset Engineers are responsible for coordinating with the seasonal delivery specialists as part of the seasonal arrangement workshops	2	Sound approach with examples of cross asset working provided. Improvement opportunities are identified.

Southern Region

Review reference		Documents reviewed	Notes from questionnaires and meetings	Confidence rating	Final Basis for confidence rating
Theme	**Topic**				
2 Delivery against Varley recommendations	2 Appropriate governance must be put in place at organisation, route and project level.	DOT Management Strategy & Implementation Plan Draft 20220504 v0.1.docx Q3 Organisational Chart.pptx	**General governance approach** - Organisational chart provided. No description of the responsibilities of the roles within the organisational chart - Questionnaire states that final RACI is still a work in progress - There is a sustainability board with high level executives responsibly for biodiversity - There is a biodiversity implementation lead aligned to the delivery of Varley programme and there is a regular liaison meeting with other regions and TA. - For Wessex, the new standard introduced at the end of CP5 is managed by Area services (maintenance team). Clearance works and maintenance are similar but adopts different mechanism of delivery. **Standards** - The Ecology Management team have identified 585 roles within the Regional support and Route organisations that have responsibilities, or a significant stake in the success of, Biodiversity Standard ENV/122. We have held more than 20 sessions of technical briefings, this Control Period to date, organised functionally - to Asset Management, Maintenance, Operations, Safety & Environment, Area Services, Support Services (including colleagues in Commercial, Finance & Property). - Around 150 Capital Delivery colleagues have received briefings via their dedicated Environment Managers during this Control Period. - Principal and Framework Contractors have also been offered the opportunity to attend these briefings. DU noted that they had been briefed on habitat standard.	4	Robust and sustainable approach demonstrated.. DOT Management Strategy and other initiatives provide examples of best practice. Good examples of briefing on standards.
2 Delivery against Varley recommendations	3 Network Rail should publish an ambitious vision for the lineside estate.	02. Kent Veg Man Plan Draft.pdf 02. Kent Vegetation Strategy Maintenance RAM Track V1 2021.pdf 02. Sussex Vegetation Strategy Maintenance RAM Track V1 2021.pdf 11. Sustainability Board - March 22 - End of Year Summary v1.pptx DOT Management Strategy & Implementation Plan Draft 20220504 v0.1.docx	**Vision** The current vision in place for Kent and Sussex is 'We treat vegetation as an asset where we manage the risk to the operational railway, reduce its impact on performance and on our lineside neighbours and improve the lineside habitat for all.' **Strategy** - There is no precedence for biodiversity action plan within the region. - Southern region has a DOT Management Strategy developed from scratch based on the that more focus needs to be placed on off-track assets. New roles (e.g. regional asset manager) were created to manage and deliver the strategy document. A programme manager has also been engaged to help with the development and delivery of the strategy. - Currently, for Kent and Sussex, activities to create a compliant profile, including vegetation clearance is managed by a Senior Asset Engineer (track), delivered by framework contractors and project managed by works delivery while in Wessex, this is carried out by Senior Asset Engineer (lineside) and the work is delivered by frame work contractors but managed by area services - DUs are responsible for inspections (on foot and cab ride) in accordance with vegetation standards (NR/L2/OTK/5201/F3079 and NR/L2/OTK/5201/F3270). - Questionnaire mentions a southern sustainability plan which shows responsibilities and programme of activities - During the interview, it was mentioned that the strategy does not necessarily link to other NR strategies. The alignment of the strategy to other NR documents has not been formulated in full detail. - There is an overarching framework tied up to the recommendations of Varley's report managed by the environmental and sustainability function **Timetable** - Ad hoc communication activities have been delivered by our Environmental and Lineside Engineering community. For example, a focus of communication and engagement on World Environment Days in 2018 and 2019 was on the topic of biodiversity and the management of habitats and species diversity that we own and manage on the Routes. Engagement with messaging was supported by colleagues in our Regional Communications Directorate and included delivery of online and in-person seminars, cascade briefings, field activities, posters, safety hour presentations, screening of documentaries. - Delivery of this vision has been incorporated into a national programme called the 'Sustainable Land Use' (SLU) programme. Southern Region has subsequently set up a SLU programme board for the Region with senior representatives from various delivery and support functions in attendance. The vision and timetable for SLU programme has been cascaded to the Region through this group. The sustainable land use programme when it was first developed, mapped out the requirements from the 2019 DfT document and Varley report to come up with the aims and objectives to meet up with the requirements **Biodiversity targets** Southern Region recognises two core measurable objectives with respect to biodiversity change: with reference to a baseline position taken in Spring 2021 (I) no net loss in baseline habitat value by 2024 and (ii) net gain in baseline habitat value by 2035. Our Regional biodiversity programme is principally oriented towards achieving these objectives, building on the initial corporate Sustainable Land Use Programme workstreams. Southern Region also recognises Species Diversity as a core biodiversity asset - setting targets and objectives for management of this asset is however complex and our Plan involves first testing and establishing what works best for the Region. For example, a key workstream is being conducted in partnership with the Zoological Society of London, where we are seeking to adapt the latest technologies, including connected Internet of Things	4	Robust and sustainable approach demonstrated. Sustainable Land Use Board established. DOT Management Strategy and other initiatives provide examples of best practice. Implementation timetable provided for sustainability plan Ecology management team set up Good progress on developing approach to achieving biodiversity standards. Region State of Nature Report issued.
2 Delivery against Varley recommendations	4 Network Rail must value and manage its lineside estate as an asset.	02. Kent Veg Man Plan Draft.pdf 02. Kent Vegetation Strategy Maintenance RAM Track V1 2021.pdf 02. Sussex Vegetation Strategy Maintenance RAM Track V1 2021.pdf 11. Network Rail State of Nature report - Executive summary 2021 and regional appendices v1.pdf DOT Management Strategy & Implementation Plan Draft 20220504 v0.1.docx	**General** -Southern Region is going through an organisational and transformation which will include the review and implementation of a Regional Asset Management Policy. However, the organisational change to appoint a Regional Asset Manager and Principal Engineer with the responsibility for vegetation management is a clear commitment to manage vegetation as an asset. - A regional policy will be developed and revised over the coming months - Biodiversity Competency Management Southern Region has established an Ecology Management Unit (EMU) to support policy development and application and to provide expert advice and assistance to the Route workforce and contractors across the lifecycle of biodiversity management, including planning, delivery and regulatory compliance for operational activities, to achieve required biodiversity outcomes and meet the expectations of a wide stakeholder community. - Biodiversity Data Management A great deal of information on various aspects of the Region's biodiversity asset has been collected and interpreted in recent years. However, the existing knowledge base is fragmented and difficult to access. - Asset Works Schedules A common lifecycle phase, for all railway assets, is operation and maintenance. Woodland habitat is an example of a type of asset class. The condition of this habitat class can be described and measured, and the asset also delivers functions, the performance of which can be inspected and the level assessed. If the function performance is poor, we can take corrective maintenance action to restore to an acceptable level. - Questionnaire mentions Habitat Management Plan (HMP) and Species Recovery Plan (SRP) which were not provided **Resource and skills** Regional Ecology Management team has the professional competence to undertake more detailed reviews of the nature conservation legal and policy landscape, with the most recent analysis completed in early 2022. Southern Region recognises the need for access to professional competence in ecology to effectively manage biodiversity as an asset and also to manage the impacts of engineering and operational activity on this asset. Ideally, this would best be achieved by having dedicated in-house resource serving the Region and a future aspiration for CP7 is to establish permanent templated roles within our organisation. To support the drive to compliance with ENV/122, established a Route-facing Ecology Management team populated with temporary employees (contracted to terminate in April 2024), and engaged dedicated ecology roles within our Works Delivery Off-Track function. This is supplemented by procuring in ecology services, as required, utilising the national Ecological Services Framework. Going forward, for CP7, we are proposing to formalise the Ecology Management team within our headcount and to develop our own Regional Ecological Services Framework to drive improved access, quality and efficiency of service. For Capital Delivery managed schemes, ecology is managed through the supply chain and this is expected to continue through CP7. However, greater levels of assurance and quality checking will be realised through service provided by the Regional Ecology Management team. **Asset data** <Responses from Q13 included under 1(c)> - Biodiversity Data Management A great deal of information on various aspects of the Region's biodiversity asset has been collected and interpreted in recent years. However, the existing knowledge base is fragmented and difficult to access - The Vegetation on-foot inspection and the cab ride of lineside is undertaken by the Delivery Units. With the tree inspection and the remote survey are instructed by asset management and leaf-fall inspection. There is an acknowledgement that at present large amount of the data is not successfully updated into an Ellipse and this is due to be addressed as part of the Southern DOT Transformation plan. -The Vegetation on-foot inspection and the cab ride of lineside is undertaken by the Delivery Units. With the tree inspection and the remote survey are instructed by asset management and leaf-fall inspection. There is an acknowledgement that at present large amount of the data is not successfully updated into an Ellipse and this is due to be addressed as part of the Southern DOT Transformation plan. **Demonstration projects** Regional tree planting scheme with the tree council. Bug hotel via reused timber from welfare sites Blackheath station wildflower planting - native bulbs and flowers Creation of Great Crested Newt Hibernacula with materials attained from site	3	Robust and sustainable approach demonstrated. DOT Management Strategy and other initiatives provide examples of best practice. Resource issues being addressed Need for specialist resource understood but challenges in filling posts. Limitations of asset data understood with measures being developed to improve this (national and regional). Examples of demonstration and pilot projects provided.

Southern Region

Review reference		Documents reviewed	Notes from questionnaires and meetings	Confidence rating	Final Basis for confidence rating
Theme	Topic				
			Continuous improvement Region has demonstrated its approach to continuous improvement by undergoing an organisational change to increase its focus on vegetation management, new roles have been created to provide ownership for critical activities like creating and maintaining a compliant profile. -New strategies and policies being developed recognises legal duties and regulatory requirements for the environment and biodiversity. DUs - Ashford - The elimination of RZ access and the utilisation of more LB work has definitely increased safety across the vegetation management sector. However the inherently treacherous type of working alongside an open railway will continue to present risks that are difficult to fully mitigate. -Battery powered plant, whilst good for smaller pieces of work, doesn't at present lend itself to teams undertaking vegetation on a larger scale. -Teams are also far better versed in understanding risks associated with HAV's, monitoring trigger time and splitting tasks to ensure time on tolls is reduced to an acceptable level. HAV medicals amongst the Off Track team are common which checks on any related health condition caused by tool use. -The teams have improved significantly through CP6 in the awareness and implementation of control measures relating to habitat, more particularly relating to bird nesting		
2 Delivery against Varley recommendations	5 Network Rail must improve its communication with communities and key stakeholders.	02. Kent Veg Man Plan Draft.pdf 02. Kent Vegetation Strategy Maintenance RAM Track V1 2021.pdf 02. Sussex Vegetation Strategy Maintenance RAM Track V1 2021.pdf 18D1972B.tmp NN 5147 - Winchester - February 2021 - disto list.msg Notes from Winchester Drop in .msg Pre-notification - Winchester - Feb 2021 Week 45.docx Winchester drop in session draft amended by CD 21 Jan 21.pptx ~$e-notification - Winchester - Feb 2021 Week 45.docx Ash Die Back Photos.docx Ash dieback leaflet - Forestry Commission.pdf Contacts from Drop-in Session Wokingham to Reading Vegetation Management.msg Examples of tree fall on RDG1 and RDG2 from Ascot.docx Fallen tree photos.msg Fareham Story.pptx FW Fallen trees RDG2.msg FW Wokingham drop-in session Sept 2019 photos.msg Lineside Performance.msg RE Morning Work Report Off Track Monday 120819..msg Shane contacts from drop-in centre.msg Tree.msg Woking to Reading Photos.pdf Wokingham drop-in session photos.msg	**Statutory** Region holds a regular meeting with the Technical Authority, who then feeds discussion on our behalf to corporate level Liaison meetings with Natural England, Environment Agency and Forestry Commission. At a Regional level, we reach out to engage with local Offices and Officers of Regulatory Bodies on a range of topics, driven by our internal risk assessment processes, such as to the EA on minimizing the impact to environmentally sensitive sites from oil leaks and on supporting work to monitor the reintroduction of Beavers; to NE on establishing efficient Wildlife Licensing and Appropriate Assessment processes; to the Forestry Commission on supporting work to control invasive pest species such as the Oak Processionary Moth. On feedback from the local Regulator teams, we do not have regularly scheduled liaison meetings but engage with each other as and when joint working would be most appropriate. **Non-Statutory** We have established and are continually developing relationships with a wide range of stakeholders in the Region with respect to biodiversity management. We have a mix of approaches to establishing these relationships that range from opportunistic response to service requests, to building on rapport developed from notifying lineside neighbours to work interventions, to planned engagement on biodiversity schemes that we seek to deliver on our estate or on collaborative schemes at landscape level. **Improved communications** Southern region recognises that environmental and ecological matters are more important to our neighbours than ever before and we find ourselves receiving more and more contacts from them about our approach to work and how it impacts the local environment.	4	Good progress on stakeholder management with many examples provided.
2 Delivery against Varley recommendations	6 Network Rail should lead a cultural change for valuing nature and the environment across the organisation.	No documents	- Southern region is not aware of any specific implementation framework with respect to change culture. It would be helpful if there is a more central initiative to measure this either by the wider rail community e.g. by RSSB - Region's approach has been informed by maturity models. Examples are compliance, communication, competency. individual behaviours, working environment etc. - In the short term region expects to measure cultural shifts by changes in types of conversations. E.g. Executive and senior leadership requesting feedback, engagements of environmental professionals through sustainability and biodiversity forums - Environmental Sustainability team influenced establishment of the new Ecology Management team function. This will be a key function in delivering much of the biodiversity culture change work, especially within the Route organisations. - Change has already started in the approach of a number of influential teams, in particular in the Director Engineering and Asset Management DEAM organisation. - Biodiversity knowledge training courses and briefings are being delivered across the Regional functions covering staff at most levels. DU - Ashford - There has been a big shift in how seriously the route takes these issues with support now available from the route team if required. -Engagement from the team is frequent and information flow is far better with regards to any issues occurring across the route. -Locally in the MDU, there is much more awareness from the local NR and contractor maintenance teams regarding the correct approach to take when encountering potential protected species. They would now very much adopt the 'Take 5' attitude to new situations, stopping work to seek Ecological advice regarding the correct next steps	3	Good progress on cultural change. Formal change management approach taken.
3 Habitat management and biodiversity	-	02. Kent Veg Man Plan Draft.pdf 02. Kent Vegetation Strategy Maintenance RAM Track V1 2021.pdf 02. Sussex Vegetation Strategy Maintenance RAM Track V1 2021.pdf 11. Biodiversity this year.pptx 11. Network Rail State of Nature report - Executive summary 2021 and regional appendices v1.pdf LOT 1 PEA RDG2 Wokingham to Reading.pdf LOT 1 Site Spec RDG2 Wokingham to Reading.docx LOT 1 Site Spec RDG2 Wokingham to Reading.pdf Tech Workscope CP6 Year 2 Veg Management RDG1 19 May 2020.pdf (+ further examples from clearance works)	Southern Region has recently undergone an organisational change to increase the focus on vegetation management. This includes the creation of a Regional Asset Manager (Off-track and Drainage) and a Principal Engineer (Off-track and Drainage). - Two aspects are broadly considered when delivering vegetation clearance interventions (for safety compliance or to enable delivery of works to other asset types): ecological risk and works affecting the biodiversity asset. ECOLOGICAL RISK - A competent ecologist determines and documents the level of risk assessment required -Ecological features are prioritised according to sensitivity/level of legal protection - For High priority features (such as European Protected Species of animal), works do not commence until further relevant survey/assessment is undertaken and subsequent mitigation actions have been delivered - For lower priority features, works are able to commence so long as the delivery manager follows mitigation measures as identified by the competent ecologist BIODIVERSITY ASSET - Enabling vegetation clearance work (for example, removal of vegetation on a slope or around a structure to prepare for a stabilisation intervention) impacts the functioning and value of the biodiversity asset located at the site - Such impacts are managed for 'traditional' railway infrastructure by the NR/L2/MTC/089 Standard, implementation of an asset management plan (AMP) -This protocol is not yet available for biodiversity assets but it is envisaged that Habitat Management Plans will form the basis of a more robust control mechanism – these detail the current type, condition and extent of the biodiversity asset and the expected future state of the biodiversity asset on completion of the enabling vegetation works. - Southern have taken base line position of no net loss from April 2021, another review will take place at the end of the current control period and by 2035, they should have demonstrated net gain against the April 2021 baseline position.	3	Sound approach described in questionnaires Vegetation management plans and strategies provided for all routes. Substantial number of ecology and planning documents provided for a number of projects. Uncertainties around how net loss / gain are measured and tracked are acknowledged and practical approaches being developed.
4 CP7 planning	-	06. CP6 K&S Veg Work Plan 2022 unconstrained ORR.xlsx 01. Southern Region CP7.docx 01. Southern Round 4.5 - Phase 2 28 January 2022 FINAL.pdf 08. CP7 - Off track Veg Southern Region CP7 iss2.xlsx	- The creation of a compliant vegetation profile will be delivered by the Region via framework contractors, along with the hazardous tree inspections and removal of CAT4-7. A 15% value of the creation spend has been budgeted by the project for bio-diversity improvements ~£6.2m across the control period. Where additional funding is required to enhance the habitat and biodiversity this will be funded by the Head of Sustainability and Biodiversity.	2	Current funding lines provided with evidence of funding envelopes presented though inconsistencies between routes. No information provided on assumptions used to develop proposed funding envelop. No link to how funding will impact on long term goals and objectives.

Wales and Western Region

Review reference					
Theme	Topic	Documents reviewed	Notes from questionnaires and meetings	Confidence rating	Final Basis for confidence rating
1 Regional management plans and practices	(a) Compliance roadmap	CP6 Wales & Western Sustainability Delivery Plan.pdf Regional Vegetation Review Oct21.pptx Veg TV Western.pdf Wales Cardiff Leaf Fall TV Dec20.pdf Wales Cardiff veg condition TV Dec20.pdf Wales Shrewsbury leaf fall TV Sept20.pdf Wales Shrewsbury Tree inspection TV Jun20.pdf Wales Shrewsbury veg condition Sept19.pdf Wales veg condition TV Sept19.pdf Regional Vegetation Review Oct21.pptx WW Veg Management Strategy slidesNov21.pptx	The region has several Temporary Variation (TVs) in place to mange compliance against NR/L2/OTK/5201/02 in May 2019 for Western and April 2019 for Wales. The region outline in the TVs that full compliance is expected in May 2029 for Western and April 2039 for Wales. Prior to the existing TVs being put in place the Region have outlined that that previous TVs were in place against the older standards for vegetation management which showcase historical challenges with delivering compliance against vegetation management. Wales route and DU are working on an updated temporary variation given the changes in risk and interpretation of risk based on the standard, this work is not complete and has not been reviewed. Wales and Western routes operate against different requirements under the TVs they have in place. Within Western they routinely clear out to 8m to keep clear of the OLE, also buying a few extra years before maintenance is required. Wales clearing to 6m in line with the standard and have a much greater focus on trees given their risk profile. Anecdotal evidence from the region during stakeholder workshop is that they believe they have a more compliant profile but don't have the data available at this time to confirm that assumption and this would require twice yearly surveys. The Wales and Western Vegetation Management Strategy outlines a goal of achieving a compliant position by the end of CP7 which contrasts with the Wales route TV (TR44071) of 2039 with a move from Cut and Maintain Strategy to Cut and Manage Approach in line with Varley Recommendations. Noted that follow up maintenance on cleared sections is creating resource issues. Long time to achieve clearance (decades in some circumstances). Even If large funding became available rate of clearance increasing is limited due to access, safety supervision issues, skills in the market to meet challenge. Uncertainty expressed over proportion compliant without live data.	1	Evidence provided lacks the detail to understand why compliance date have or have not moved since first established. Only a high level position of compliance is available no underlying data. Evidence provides an incomplete picture of how the regions would address the causes of non compliance and the plans in place to mitigate them.
1 Regional management plans and practices	(b) Compliance delivery	WW Veg Management Strategy slidesNov21.pptx Regional Vegetation Review Oct21.pptx P11 2021-22 TARR 3.xlsx Veg TV Western.pdf Wales Cardiff veg condition TV Dec20.pdf Wales Shrewsbury Tree inspection TV Jun20.pdf Wales Shrewsbury veg condition Sept19.pdf Wales veg condition TV Sept19.pdf Regional Vegetation Review Oct21.pptx Wales_Route_Section_6_Summary_Report_P2 (3).pdf P11 2021-22 TARR 3.xlsx Veg TV Western.pdf Wales Cardiff veg condition TV Dec20.pdf Wales Shrewsbury Tree inspection TV Jun20.pdf Wales Shrewsbury veg condition Sept19.pdf Wales veg condition TV Sept19.pdf	In Wales: - Work to deliver compliant sites is undertaken by the DU to integrate clearance and maintenance into one function this move was instigated since the start of CP6. In Western Route: - Work to deliver compliant sites is undertaken by the Works Delivery team under a fixed OPEX budget. Would inspect on next scheduled inspection - Significant clearance undertaken in connection with introduction of Inter City Express fleets NR WD Minimum Requirement for Ecology document outlines the requirements for planning and delivering clearance to compliance profile and managing risk. Access plans consider if mechanical intervention can be used. (Increased use of blockade works to coordinate maintenance works) The region does not have the data to provide how they have improved the compliance position the scope of work that has delivered compliance of the year. Biggest challenge is access. Blockades are rare. Only get 2/3 hours access at a time.	1	Planning and prioritisation process not fully described. No evidence provided on the current work to date workbank not provided. Key risks identified but limited evidence provide as to how these risks are being managed/mitigated.
1 Regional management plans and practices	(c) Key performance indicators	W&W Bio imp. trial Sites summary Sept21.xlsx W&W Bio POP P10 Jan 2022.pptx Wales_Route_Section_6_Summary_Report_P2 (3).pdf W&W Veg Condition FDM data Y3 P11.docx Wales maintenance works.docx	The region have WSFs as part of the of period reporting. Assurance activity including level 1 investigations into incidents and level 2 management checks. The region report the number of signals obscured by vegetation which then become part of the work bank. CCIL train delay incident reporting including veg/animal incursion – split by incident – review periodically The region has a target to deliver against hazardous tree management programme for 2021/22 on Western Route (215 Cat 3 and above, NR trees) Region records tree survey condition data in FDM - the data is however incomplete and the majority of areas have not been surveyed this is a centrally manged report. Maintenance team manage track faults and close calls, service requests (public complaints). Habitat baseline established for W&W and published in State of Nature Report. Noted that metric not recognised in Wales. The NR requirement for NNL / BNG is not recognised by the Welsh Government and Natural Resource Wales. Currently no agreement has been reached as to what the metric for Wales should be. Government and NRW view no net loss equating to enhance and maintain approach they advocate else where. The Region will start to record against the DEFRA metric until such time that an agreement is reached. Currently no ecology database as described in Biodiversity Action Plan to capture information in HMPS and VMPs. Only exists as layers inn GeoRINM.	2	Different approach to defining profile compliance in Wales and Wessex, although both broadly comply with the standard. Compliance tracker not provided. Maintenance works planning described which takes into account incidents, but no documents provided. Biodiversity baseline using Defra metric published in State of Nature Report. Investigating alternatives to Defra measure for use in Wales..
1 Regional management plans and practices	(d) Risk management	Western Route Ash Trees.xlsx P11 2021-22 TARR 3.xlsx Wales Shrewsbury Tree inspection TV Jun20.pdf Wales Shrewsbury veg condition Sept19.pdf Wales veg condition TV Sept19.pdf Rapid Response 20200714 (2).pdf P11 2021-22 TARR 3.xlsx Wales DDD survey pop Feb22.pptx Western Route Ash Trees.xlsx Veg TV Western.pdf Wales Cardiff Leaf Fall TV Dec20.pdf Wales Cardiff veg condition TV Dec20.pdf Wales Shrewsbury leaf fall TV Sept20.pdf Wales Shrewsbury Tree inspection TV Jun20.pdf Wales Shrewsbury veg condition Sept19.pdf Wales veg condition TV Sept19.pdf	Risks identified via surveys, inspections, forward facing video,- all in line with standards. Increased use of technology for remote sensing, including hyperspectral surveys. TOCs/FOCs also advise of issues – for instance GWR have a reporting app which has been approved and reviewed at JSMG. Hazardous trees are most significant risk and this is being exacerbated by the Ash Die back. – managed via collaborative working between RAM Team and DUs - data on SharePoint is updated on a regular basis – includes countdown to non compliance, assigned owner for. Network Rail have had a toolkit to manage ash dieback produced by the Tree Council, Region are deploying this to mange risk. Region hold weekly meetings to go over tree survey results and develop an action plan for what needs to be done at this tactical level. Western Route provided a tracker for the number of Ash Trees (13435) across each ELR with associated management cost for climbing. Adhesion sites reviewed by RAM team and SDS – and risk assessment collected via tree survey. Leaf fall is managed through a specialist contractor. Leaf fall are being tagged onto the Hazards tree inspections. Have been historically done in Wales done with ops, transport for Wales. Extreme weather – issues regarding. More storms outside of storms season, more flash flooding. After large storm with trees coming down there is an inspection to check vulnerable trees. If any vulnerable tress in area, checks are done to revaluate threat level Mitigation via Adverse Weather Plan – signed off and piloted in Wales – to be applied to Western.	2	Sound risk management processes evidenced. Examples of processes used to manage seasonal vegetation issues and extreme weather not seen. Unclear risk based prioritisation approach.
1 Regional management plans and practices	(e) Maintenance planning and reporting	WW Veg Management Strategy slidesNov21.pptx Wales Japanese Knotweed spray .xlsx Western Route Ash Trees.xlsx Regional Vegetation Review Oct21.pptx Wales DDD survey pop Feb22.pptx Wales DDD Tracker Feb22.xlsx Western DDD post inspection tree management Y2 wk44.xlsx P11 2021-22 TARR 3.xlsx Regional Vegetation Review Oct21.pptx ABP Actual vs Annual Plan CP6 Y4 P01.xlsx Western veg WD progress Pop Year 3 P10 1.2.pdf Rapid Response 20200714 (2).pdf Wales Japanese Knotweed spray .xlsx Western Route Ash Trees.xlsx	Maintenance volumes are set using the ABP planning based on financial reforecasting (RF) stages – RF8 sets it for the year and Dus are tracked against what they deliver against these total volumes. Volumes are measured and tracked via Plan v actuals (m2) - reviewed within maintenance, HEAM PBR, & national ATR. Some volumes are recorded against the national TARR measures. Tree management on earthworks comes under a capital budget, e.g. stripping slopes and what we put back in as bio work to improve biodiversity. Process for dealing with Japanese Knotweed provide alongside volume of work required to manage the issue. Rapid response process for high risk sites outline how works would be planned and implemented and the vegetation issues that require rapid response due to risk. inspections relating to tree management can be two years out of date. All work is generated by inspections, cab rides, on foot. Given priority and entered into a work bank. Veg inspections – on foot every 3 years. Cab inspections yearly, tree inspections every 2.5 years. Workbank is a bottom up view that is continues across control periods and get cut to fit the five year cycle. Better data does highlight the unknown quantity of work. Problems can be highlighted further up the chain. Benefits of cutting back to standard helps with the amount of close calls and reactive maintenance. Autumn adhesion program every year. Generated from leaf fall inspections every year. Amount of MST and volume return rate every 15 years for a specific location, not feasible. Limited mechanisation. Immature in ecology surveys. Funding set aside under OPEX through CP5 & CP6 to deliver as capital style works delivering linear mileage vegetation management – cess miles unit rates for varying scope (8m clearance (Wales), maintenance) - tendered lots released to market.	2	Examples of sound processes for maintenance management. Planning linked to TARRs but no specific examples at work item level. Large variance of planned vs actual maintenance delivery. Unable to distinguish between compliance delivery and maintenance delivery. Evidence was provided by region of setting maintenance targets and local reporting. However, the reporter team is unable to confirm clear alignment to Vegetation Management Plans and regional KPIs to understand progress against current compliance position. Evidence presented by regions is that understanding the current network 'state', to determine true level of maintenance work required ,requires more robust and accurate data. Data inaccuracies and issues of reporting regional works planned and completed within Ellipse requires improvements.

Wales and Western Region

Review reference		Documents reviewed	Notes from questionnaires and meetings	Confidence rating	Final Basis for confidence rating
Theme	Topic				
1 Regional management plans and practices	(f) Cross asset working	No documents	HEAM holds Geotech/Lineside/Drainage period business review – includes Wrong Side Failures – trends/discussion/actions. Plans driven by delivery team – coordinate with other projects, ONELAN review, use of hopper to distribute work Veg management contract lots of work reviewed by Geotech (rock slides), Work closely with OLE team. Do immediate work, cut it back to buy time to address it properly. Seasonal working Storms in particular area, they're led by specialist teams. Vulnerable trees are assessed under the requirements for Module four of OTK 5201.	2	Sound approach with examples of cross asset working provided. Improvement opportunities are identified.
2 Delivery against Varley recommendations	2 Appropriate governance must be put in place at organisation, route and project level.	DEAM GDL structure.jpg DRAFT Ecologist ORG chart Wales Western 20211028.pptx CP6 Wales & Western Sustainability Delivery Plan.pdf DEAM GDL structure.jpg	**General governance approach** Organogram for Region shows a difference in the operating principles of the two routes within the region. Wales appears to have more Ecological support in place to deliver schemes. The region are still in the process of determining how the will operate and the scope of ecology expertise they will have moving into CP7. Region have struggled to recruit in the space. Different approaches to managing major projects in Wales (in-house) and in Western (through Works Delivery). No Champion at board level. No board level biodiversity metric. Ecologists integrated into the RAM GDL Team. Regular slots at the Team Brief on Biodiversity and Ecology matters. Trying to set up Off track as separate professional rather than a subsection within the Track team. Professional head relationship/technical head as part of the ATR and Asset technical forum, are the main comms links. Workforce within the DU is a generally a generalist view to enable them to responded to both reactive and planned works. There's is limited ecological experience at the DU level. Expertise is brought in for clearance **Standards** Team briefings on standards. Embedment of ecologists in RAM team. All of the DEAM team were asked to complete the video Briefing on the ENV122 standards, and the link to the new eLearning on 'Introduction to Sustainable Land Use'.	2	Developing management processes for vegetation as an asset. Board level responsibility / KPIs not clear.
2 Delivery against Varley recommendations	3 Network Rail should publish an ambitious vision for the lineside estate.	WW Veg Management Strategy slidesNov21.pptx CP6 Wales & Western Sustainability Delivery Plan.pdf Wales_Route_Section_6_Summary_Report_P2 (3).pdf	**Strategy** Noted that NR Biodiversity Action Plan and Environmental Sustainability Strategies largely left to regions to fund and implement. Regional strategy being developed through series of workshops. Spring 22 Vegetation Action Plan – is the strategy The Region is working on Vegetation Action plan with 13 themes being reviewed to form a strategy involving asset management, maintenance & delivery. Ecology team integrated into the DEAM team which has illustrated to colleagues across the business how the Region is taking this goal seriously and the complexities. The Technical Authority has liaised at initial stages on the NESS and BAP, however these were largely drafted by the TA through an external contractor. The targets were communicated through the publication of those documents. Delivery of the strategy and BAP has been devolved to the Regions and Routes to develop and fund. The TA have proposed an outline Delivery plan when finalising the strategies, which has some challenge in setting milestones / targets for the Routes and Regions to achieve. We need to review funding within the Region and we need to allocate Regional internal resource to deliver the vision, strategy and milestones **Timetable** Timetable for implementing national strategies felt to be challenging. **Biodiversity targets** See also 1(c) Biodiversity target in Western follows the NESS milestone of 'By 2024 we achieve no net loss of biodiversity across the network'. Noted different requirements t of Natural Resources Wales and Natural England. More focus in Wales at the moment, but will have more pressure due to English Environmental Act aligning with the Welsh policy in October. No net loss – by 2024 is the target but it is the interpretation of the no net loss that needs to be established for the region given that differences between England and Wales. Wales view of the maintain and enhance approach considers all of the infrastructures. England's project approach does not look at all the asset just projects being done. We need internal resource to capture corporate memory and build relationships with external stakeholders. Not being able to establish baseline conditions is an issue to deliver no net loss– need a benchmark. In the progress of drafting route level biodiversity action plan which will feed into Habitat management plans developed for each section (1/8) which is very specific and would then inform the vegetation management plan, with the need to develop a ecology data base to manage each of these.	2	Commitment to biodiversity principles demonstrated. Strategy and timetables not seen. Issues with biodiversity metrics as discussed above. Region State of Nature Report issued.
2 Delivery against Varley recommendations	4 Network Rail must value and manage its lineside estate as an asset.	DRAFT Ecologist ORG chart Wales Western 20211028.pptx Copy of Lesson Learnt Pilot Sites Nov 2021.xlsx Ecology Upskilling.pdf W&W Bio imp. trial Sites summary Sept21.xlsx WWL22-24 - Shared Learning - Good Practice management of urgent fault repair works next to badger sett.pdf State of Nature Report	**General** Note that characteristics of the approach in NR's Asset Management Plan have been reviewed through multiple responses to the questionnaires. Region intend to manage the lineside estate as an asset as recommended in Varley Review (through RAM Ecology Team. The Region is working on Vegetation Action plan with 13 themes being reviewed to form a strategy involving asset management, maintenance & delivery. Ecology team integrated into the DEAM team which has illustrated to colleagues across the business how the Region is taking this goal seriously. Funding set aside under OPEX through CP5 & CP6 to deliver as capital style works delivering linear mileage vegetation management – cess miles unit rates for varying scope (8m clearance, maintenance) - tendered lots released to market. Specific references made during CP7 scenario planning Regional strategy being developed through series of workshops. Spring 22 **Resource and skills** Since May 2019 the Region has created 11 new Ecology roles (10 x Ecologists, 1 x Biodiversity & Ecology Manager). Industry cost constraint has affected recruitment to all of these posts which has affected delivery e.g. HMPs and VMPs. New Ecology Framework is in progress with the existing framework was extended until March 2023 Difficulties noted in hiring ecologists into NR - role / job description not attractive. Resource for vegetation management are available but maybe not always the correct people, arb surveys are not up to the best practice. Bio/ecological skills are lacking and there are supply chain issues as focus has been protected species rather than habitat and we need skills and don't have time to train at the moment. **Asset data** <Responses from Q13 included under 1(c)> Noted that no ecology database as described in Biodiversity Action Plan. **Demonstration projects** Projects listed in State of Nature Report. Examples also given in questionnaire responses. Lessons learnt feedback provided to TA. **Continuous improvement** Section managers get to meet their counterparts more regularly. Regular section manager and engineer catch ups. Assurances, safety etc. No catch ups for engineer or section mangers nationally. Region have undertaken Pilot projects and lessons learned from these have been captured within a log to drive improvement.	2	Sound approach to delivering components of managing vegetation as an asset in the future. Not clear if this is fully joined up at all levels. Vegetation Action Plan being prepared. Resource being increased to meet demand for ecologists Examples of demonstration and pilot projects provided
2 Delivery against Varley recommendations	5 Network Rail must improve its communication with communities and key stakeholders.	No documents	With regard to Biodiversity - regular communication between the Biodiversity & Ecology Manager with key stakeholders in WG, NRW and TfW. Also communication on project-by-project basis with the Welsh Beaver Project, RSPB, Wildlife Trusts, botanical groups, Natural England. RAM Ecology team are seeking to engage with Local Nature Partnerships in Wales, and opportunities in Western with the new Local Nature Recovery Strategies and Landscape Recovery Projects. EA liaison (Chris Stratton) in-house Liaison Officer jointly funded by EA and NR. Standard letter has been produced for contacting landowners to ensure consistency. Service Level Agreement with Aderyn, which covers the Biological Records Centres across Wales. In England we contact each records centre directly on an individual basis. Community Rail team work with Communities on e.g. planting at stations, or bee keeping on land adjacent to the railway Stakeholders: Relationships with neighbours, reputational etc. issues with third party trees. Standard processes for consultation with other bodies. Land Clearance is 3rd party work and their communication has been improved to key stakeholder and also to report close calls and safety issues. Daily interactions with public and lineside neighbours. Especially during blockades. DUs have regular engagement with the public and lineside neighbours.	3	Sound approach to stakeholder management, but lacking documented examples.

Wales and Western Region

Review reference		Documents reviewed	Notes from questionnaires and meetings	Confidence rating	Final Basis for confidence rating
Theme	**Topic**				
2 Delivery against Varley recommendations	6 Network Rail should lead a cultural change for valuing nature and the environment across the organisation.	Ecus Network Rail WW Ecology Session 1 03.06.21.pdf Ecus Network Rail WW Ecology Session 2 10.06.21 v2.pptx	Cultural change promoted through integrating internal Ecologists within teams. Since May 2019, the Region has created an additional 10 x Ecologist roles and 1 x Biodiversity & Ecology Manager role. Pilot Sites projects, initially funded by the TA, have involved key stakeholders from across the functions, from the initial project planning stage through to delivery there has been active consultation and engagement. Presentations to key teams by the Ecology Manager to raise the profile of valuing nature and Biodiversity; Pilot Site updates; Shared Learning; Wales Route Ecologist has presented at Safety Hour in St Patrick's House. Biodiversity & Ecology Manager presented to the RAM Graduates to ensure early career knowledge. Capital/Works Delivery procured upskilling CPD videos and documents. We can improve on these using in-house Ecologists through undertaking additional touch points such as Sustainability Live Briefings, initial meeting in November 2021. Wales Route Ecologist arranged workshops with Works Delivery in Wales to create a document for planning work. This workshop encouraged brainstorming, engagement and collaboration. When drafting the reports for Section 6 Env Wales Act and State of Nature, this has involved collaboration and acknowledgement of the progress made by colleagues across the business. Raising the profile in the Maintenance Organisation – including consideration of offsetting. There is a good understanding and growing capability particularly within Wales to ensure biodiversity and habitat management are being undertaken. Region pointed out the on the regional score card there is nothing on environment – there is limited exec view on this. Volume is a target but not on the biodiversity front where there is currently not a KPI. No specific change to program. (hearts and minds). No overarching program. Though offtrack used to be a poor relation within network rail as work not seen as important there is a definite shift in support, funding and doors opened as Vegetation management status has definitely increased. All of the DEAM team were asked to complete the video Briefing on the ENV122 standards, and the link to the new eLearning on 'Introduction to Sustainable Land	2	Cultural change spreading "top down". No formal change programme, but some initiatives being delivered.
3 Habitat management and biodiversity	-	CP6 Wales & Western Sustainability Delivery Plan.pdf W&W Bio POP P10 Jan 2022.pptx WAYS OF WORKINGv0.3 FINAL rev 1 20190920 (2).pdf Breeding Bird Briefing 2020 for distribution.pdf W&W Bio POP P10 Jan 2022.pptx Wales_Route_Section_6_Summary_Report_P2 (3).pdf	Wales Route has a "Biodiversity and Ecosystems Resilience Duty" under the Environment (Wales) Act 2016. This has created a challenge to establish a baseline condition for biodiversity and require a benchmark to compare against. Western Route is targeting no net loss target by 2024. Safety of the railway takes precedence, operating mitigations taken where needed including special arrangements during adverse or extreme weather. Construction Services plan their work utilising the minimum requirements document. Maintenance plan their work using the 'Ways of Working document. Capital Delivery follow their own processes which include planning for ecology & biodiversity. Breeding Bird check following TA guidance. Main challenge affecting delivery of biodiversity and habitat management work is level of internal Ecology resource and funding. The region are in the process of reviewing the funding available within the Region and how they will need to allocate internal resource to deliver the vision, strategy and milestones that the centre have set. ELR Ecology surveys will inform both the HMP and VMP. Habitat management will take into consideration the requirements of the working railway and safety. As In 2019 the Wales & Borders Route completed their 'Section 6 summary report' which has received excellent feedback from key stakeholders from Welsh Government and Natural Resource Wales. Since the beginning of 2019, on the Wales & Borders Route, the Maintenance and Asset Mgmt. team have led on procurement of ELR surveys to provide a baseline of ecological constraints, to inform Phase 2 surveys (e.g. protected species surveys) and also requirements of permissions ahead of vegetation management works. Wherever possible these are planned in advance of works using the workbank. Under the environment Wales act (section 6) we have to undertake a section 6 every three years.(part of the environmental Wales act) CP6 plans outline the need for habitat and biodiversity management plans but little evidence to show how the development progress of these. Region program highlights 4 biodiverse site have been delivered and a work bank of 12 to be complete in FY3 of CP6 and another 4 in FY4. Most relate to protected species rather than vegetation. Bird Briefing document provides key requirements and recommendations to staff on how to ensure vegetation clearance does not cause harm to wild birds. Programme has been hampered by key staff leaving. Ways of working focuses on species need not vegetation management. Bird Briefing document provides key requirements and recommendations to staff on how to ensure vegetation clearance does not cause harm to wild birds. DU Not briefed on habitat management plans, Knowledge and experience of applying habitat man standard. Bigger projects are doing that type of management. Monthly briefing with section managers. Disseminate info Quarterly briefing ran by IME. Email specific info out to staff. Where cleared back to meet 5201 standards. Pilot sites are examples of habitat management for biodiversity enhancement. Inclusion of habitat opportunities within earthwork renewal schemes Opportunities to change or enhance existing habitats within the NR estate combined with more efficient maintenance or project activity	2	Examples provided of initiatives to promote best proactive. No examples of HMPs at route or project level. Limited examples of specifications of habitat / ecology related work.
4 CP7 planning	-	Regional Vegetation Review Oct21.pptx WW Veg Management Strategy slidesNov21.pptx Copy of Lesson Learnt Pilot Sites Nov 2021.xlsx DRAFT Ecologist ORG chart Wales Western 20211028.pptx	Vegetation Management Strategy outlines funding for: – Vegetation Management – Ash Die Back Management – Biodiversity Promotion – CP Tree Survey Different options for creating compliant vegetation profile while promoting lineside biodiversity and habitats. Actual costs of recent habitat management work (including the pilot sites projects in the Region) will be used to forecast proposed incremental improvements in CP7. Vegetation Management Action Plan and strategy being developed through series of workshops, Spring 22. This will inform a more proactive approach in CP7, subject to DfT funding. For CAPEX in CP7 for vegetation wont be included apart from under land management for Geotechnics as a volume, everything else is OPEX . DUs to undertake the ABP analysis but have not done this yet but will be part of the 5th round of planning. Wales Route DDD plan stretches out to CP7 and gives indication of volume but this will be updated as new survey information is undertaken, the Western DDD Post CP7 input in assumptions and planning Looked at technical availability CP7 volume input has been limited, waiting on the outcome vegetation workshop. Have had RF 3 reviews about what CP7 will look like. Submitted preliminary volumes for CP7. Region have outlines the scope of the services that they would need to undertake biodiversity and habitat managed planning for ecological support within the draft org chart, this include potential CP7 spend.	1	Evidence that some planning has been undertaken but funding estimates are from October 2021. No information provided on assumptions used to develop proposed funding envelop.