

Devils Pulpit Pacific Highway Upgrade

Compliance Report

Transport for NSW | March 2024 to February 2025



1 Introduction

1.1 The Project

The Devils Pulpit Upgrade is part of the Pacific Highway Upgrade Program, a joint commitment by the Australian and NSW governments to improve the standard of the Pacific Highway between Hexham and the Queensland border. The Upgrade is 7.36 kilometres in length, located between 65.64 and 73 kilometres north of Grafton.

1.2 Project approval

The Project was approved under Part 9 of the *Environment Protection and Biodiversity Conservation Act 1999* on 14 February 2011.

1.3 Purpose of this report

This is the 13th report reporting on compliance with the Department of Climate Change, Energy, the Environment and Water conditions of approval for the project (EPBC 2010/5586). As required by condition 10, this report will report on compliance against each condition in the conditions of approval, including implementation of any management plans that have been approved by the Minister.

Condition 10. Within three months of every 12 month anniversary after the substantial commencement of the action, the person taking the action must submit to the department an annual report addressing compliance with each of the conditions of this approval, including implementation of any management plans that have been approved by the Minister. Annual reports must be provided until the Minister is satisfied that the person taking the action has complied with all conditions of this approval.

Bush regeneration of the connectivity corridor is the final activity associated with the project and this compliance report. Bush regeneration was undertaken between 15 September 2022 and 28 June 2024. The final report was received in October 2024 and is included in Appendix A. This will be the final Compliance Report for the project.

1.4 Activities and progress during the reporting period

Vegetation rehabilitation

The landscape maintenance contract was completed at the end of June 2016. TfNSW Regional Maintenance Delivery now maintains the vegetation under the routine maintenance contract for TfNSW roads.

Vegetation across the study area was significantly burnt in the late 2019 bush fires. Some areas (eg. Impact Site 4 and the swamp forest west of the Tabbimoble bridges) experienced particularly high intensity canopy fires. The vegetation connectivity corridor was also burnt, however recruitment and growth of native species has been recorded across the corridor. The bushfire impacted (reduced) native species diversity and cover in some areas, and increased weed cover mainly in the ground stratum. Exotic groundcovers (including weeds) are present and reducing native species recruitment in the southern half of the corridor.

As recommended in the Year 6 Ecological Monitoring Program (EMP), TfNSW commenced bush regeneration and tree plantings works in October 2022, to assist the regeneration process where the density of understorey/ canopy tree recruits is low. Plants are now well established with very good survival and growth rates. Bush regeneration was completed in June 2024 and the final report (Appendix A) was received in October 2024.

Ecological Monitoring Program

In June 2017, monitoring under the EMP commenced. The EMP requires monitoring in Year 3 (2017/2018), Year 4 (2018/2019) and Year 6 (2020/2021) following completion of construction. The final Year 6 report was attached to the 2021-2022 Compliance Report.

Road kill monitoring and fauna fence maintenance is undertaken regularly as part of TfNSW regular asset maintenance activities.

Fauna Connectivity

Transport for NSW have continued to investigate fauna connectivity structure repairs to improve dry passage following significant flood events in 2017. These works have been added to the TfNSW Road Maintenance works schedule.

1.5 Non-compliance

There were no non-compliances during the reporting period.

Compliance with approvals

Condition	Status	Comment
Condition 1. <i>The person taking the action must carry out the action in accordance with the conditions of this approval and as described in the referral documentation received 23 July 2010 and the variation information submitted 8 November 2010. Where the referral or variation information and these conditions are inconsistent, these conditions shall prevail to the extent of the inconsistency.</i>	Compliant	Noted.
Condition 2 <i>The person proposing to take the action must not clear more than 58 hectares of vegetation within the footprint of the action.</i>	Compliant	All clearing and grubbing for the project was completed. A total of 46.47 hectares was cleared.
Condition 3 <i>To minimise impacts on listed threatened species and migratory species, if the person taking the action intends to undertake preparatory works as part of the Pacific Highway Upgrade, a plan must be submitted to the Minister for approval outlining all preparatory works to be undertaken. This plan must be approved by the Minister prior to any preparatory works being undertaken. The plan must include, but not be limited to:</i> <i>a) the location of all preparatory works to be undertaken;</i> <i>b) the area (in hectares) to be impacted;</i> <i>c) an assessment of the quality vegetation to be impacted by the preparatory works; and</i> <i>d) an assessment of the likely impacts of the preparatory works on habitat for threatened species and migratory species.</i>	Compliant	The Preparatory Works Plan was approved on 13 December 2011.

<p>FLORA AND FAUNA MANAGEMENT PLAN</p> <p>Condition 4 <i>To mitigate impacts on listed threatened species and migratory species, the person taking the action must submit a detailed Flora and Fauna Management Plan to the Minister for approval prior to substantial commencement of the action. This plan must be approved by the Minister prior to substantial commencement of the action. The approved plan must be implemented. The Flora and Fauna Management Plan must include, but not be limited to, the following requirements:</i></p> <ul style="list-style-type: none"> a) <i>Measures to be implemented to avoid, suppress and control the spread of weeds, plant pathogens and invasive species and to measure other indirect impacts that may result from the proposal during construction;</i> b) <i>Measures to manage aquatic habitat on-site to at least maintain habitat values for the Oxleyan Pygmy Perch;</i> c) <i>An Ecological Restoration Plan detailing the rehabilitation of vegetation to occur within the footprint of the action;</i> d) <i>Engagement of a suitably qualified expert to undertake pre-clearing fauna searches within the footprint of the action, including searches of nests, hollow bearing trees, logs, existing culverts and existing bridges to ensure that the area is free of Spotted-tail Quoll, Grey-headed Flying-fox, Regent Honeyeater, Swift Parrot and any other EPBC Act listed species.</i> e) <i>Measures to relocate an/or ensure the appropriate care of individuals of EPBC Act listed fauna species that are located during searches referred to in Condition 4(d), in</i> 	Compliant	<p>The Flora and Fauna Management Plan was approved 9 February 2012.</p> <p>As recommended in the Year 6 Ecological Monitoring Program (EMP), TfNSW commenced bush regeneration and tree plantings works in October 2022, to assist the regeneration process where the density of understorey/ canopy tree recruits is low. Plants are now well established with very good survival and growth rates. Bush regeneration was completed in June 2024 and the final report (Appendix A) was received in October 2024.</p>
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<p><i>accordance with the RTA's Fauna Rescue Framework;</i></p> <p>f) <i>The Flora and Fauna Management Plan must include clear key milestones, monitoring, performance indicators, corrective actions and timeframes for the completion of all actions outlined in the plan.</i></p>		
<p>SPOTTED-TAIL QUOLL MANAGEMENT PLAN</p> <p>Condition 5. <i>The person taking the action must submit a management plan for the Spotted-tail Quoll to the Minister for approval prior to the substantial commencement of the action. This plan must be approved by the Minister prior to substantial commencement of the action. The approved plan must be implemented. The management plan must include, but not be limited to, the following requirements:</i></p> <p>a. <i>The construction, ongoing monitoring, maintenance and repair of permanent fauna crossings, fauna exclusion fencing and associated infrastructure that will ensure safe and effective movement of the Spotted-tail Quoll across the Pacific Highway Upgrade;</i></p> <p>b. <i>An independent, suitably qualified expert is to verify that the design, location and number of fauna crossings are appropriate;</i></p> <p>c. <i>The construction, ongoing monitoring, maintenance and repair of permanent fauna exclusion fencing that will restrict Spotted-tail Quoll from crossing the Pacific Highway Upgrade and facilitate the use of fauna crossings;</i></p> <p>d. <i>Conduct research that:</i></p>	Compliant	<p>The Spotted-tail Quoll Management Plan was approved 9 February 2012.</p> <p>As per Section 1.4, the final Year of the Ecological Monitoring Program was completed during the 2021 – 2022 reporting period.</p>

<ul style="list-style-type: none"> i. <i>Determines the effectiveness of various designs of fauna crossing structures to facilitate the effective movement of the Spotted-tailed Quoll across various types of linear infrastructure and avoid injury or death due to crossing;</i> ii. <i>determines the effectiveness of the fauna crossings constructed for the Pacific Highway Upgrade to maintain the viability of the Spotted-tail Quoll population affected by the Pacific Highway Upgrade;</i> iii. <i>determines the effectiveness of the existing culverts, to be repaired and maintained consistent with Conditions 5(a) to 5(c), to maintain the viability of the Spotted-tail Quoll population affected by the highway;</i> iv. <i>. identifies potential and actual threats to the viability of Spotted-tail Quoll populations affected by the Pacific Highway Upgrade;</i> v. <i>Have the research reviewed by a suitably qualified expert. Documentation of the review must be submitted to the Minister with documentation of research outcomes;</i> vi. <i>Implement recommendations made as a result of the research.</i> e. <i>The plan must include clear key milestones, performance indicators, corrective actions and timeframes for the completion of all commitments and actions outlined in the plan.</i> f. <i>If it is determined the fauna crossings and culverts monitored, consistent with condition 5(a), are not effective to maintain the viability</i> 		
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<p><i>of the Spotted-tailed Quoll population affected by the Pacific Highway Upgrade, the person taking the action must submit an amended Management Plan for the Spotted-tailed Quoll to the Minister for approval. The amended strategy must include appropriate measures to ameliorate impacts on the affected Spotted-tailed Quoll population;</i></p> <p><i>g. All actions must be developed in consultation with a suitably qualified expert.</i></p> <p><i>h. The plan must integrate with and build on management plans for other nearby highway upgrade projects for the Spotted-tail Quoll.</i></p>		
<p>SOIL AND WATER MANAGEMENT PLAN</p> <p><i>Condition 6. To mitigate impacts on listed threatened species, the person taking the action must submit a detailed Soil and Water Management Plan, to be developed in consultation with I&I NSW (Fisheries), to the Minister for approval prior to substantial commencement of the action. This plan must be approved by the Minister prior to substantial commencement of the action. The approved plan must be implemented. The Soil and Water Management Plan must include, but not be limited to:</i></p> <p><i>a) Details of the water monitoring program to be implemented before, during and after construction to determine baseline water conditions, water quality objectives for the site as they relate to the Oxleyan Pygmy Perch, as well as the performance and effectiveness of mitigation measures to be used to mitigate water quality and hydrologic impacts. The program must include but not be limited to:</i></p>	Compliant	The Soil and Water Management Plan was approved 9 February 2012 and implemented.

<ul style="list-style-type: none"> i. <i>A minimum of two (2) baseline data sites in Tabbimoble Floodway No. 2 and a minimum of two(2) in Tabbimoble Floodway No. 3, determined in consultation with I&I NSW (Fisheries);</i> ii. <i>Baseline water conditions must include data describing water quality, pH levels and hydrological parameters such as stream flows and velocity;</i> iii. <i>Water conditions must be monitored at monthly intervals before, during and after construction for a length of time to be determined in consultation with I&I NSW (Fisheries);</i> iv. <i>The identification of thresholds that will trigger corrective actions and the actions that will be implemented within 24 hours if a threshold is reached or exceeded. If such an event occurs, this is to be reported to the department within 2 weeks of the event occurring;</i> v. <i>Monitoring of the effectiveness of mitigation measures, which should include samples during and post rainfall events. Contaminant concentrations and flow volumes entering and discharging from treatment systems on-site must be quantified and contaminant loads calculated;</i> vi. <i>Reporting arrangements to the department, including procedures and time frames for reporting any non compliance; and</i> vii. <i>Results of the Monitoring Program (including data and its interpretation) is to be made publicly available on the website of the person taking the action including</i> 		
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<p><i>data and its interpretation within three months of every 12 month anniversary of the substantial commencement of the action.</i></p> <p><i>b) Details and location of all permanent erosion and sediment control, as well as pollution control measures, to be implemented during construction and operation of the Pacific Highway Upgrade. All erosion and sediment control measures must be best practice based on industry guidelines and must be certified, in consultation with I&I NSW (Fisheries) and approved by the department. These measures must include, but not be limited to:</i></p> <p><i>i. All waterway crossings within the footprint of the Pacific Highway Upgrade to be in accordance with the fish classification for each waterway based on state guidelines, unless otherwise agreed to by I&I NSW (Fisheries) and the department.</i></p> <p><i>ii. Any in-stream works in Class 1 waterway (as defined in the state guidelines) to be conducted outside the spawning season of the Oxleyan Pygmy Perch (October to December inclusive);</i></p> <p><i>iii. In-stream works in Class 1 waterways (as defined in the state guidelines) must not be undertaken on a day when a rainfall event is forecast. If a rainfall event occurs, in-stream work must only recommence once dry weather is forecast and Tabbimoble No. 2 and No. 3 have returned to a non-flowing state;</i></p>		
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<ul style="list-style-type: none"> iv. <i>No stockpiles to occur in the floodplain zone between Tabbimoble Floodway No. 2 and Tabbimoble Floodway No. 3;</i> v. <i>Chemicals and fuels to be stored and bunded so that the floor of the bund is above the 1 in 20 year flood event and the top of the bund above the 1 in 100 year flood event. No chemicals and fuels to be stored in the floodplain zone between Tabbimoble Floodway No. 2 and Tabbimoble Floodway No. 3;</i> vi. <i>The area within 50 meters of Tabbimoble No. 2 and Tabbimoble Floodway No. 3 to be fully stabilised before the commencement of the next spawning season of the Oxleyan Pygmy Perch;</i> vii. <i>Measures to ensure that any waters treated on site will be suitable for the Oxleyan Pygmy Perch (based on best available knowledge on the Oxleyan Pygmy Perch and results of monitoring outlined in Condition 6(a)) prior to release from water treatment areas implemented as part of the Pacific Highway Upgrade;</i> viii. <i>Measures to be implemented for events such as rainfall events and fuel and chemical spills;</i> ix. <i>Measures to be implemented to monitor, review and update the effectiveness of the sediment and erosion control measures implemented.</i> 		
<p>OFFSET PLAN</p> <p><i>Condition 7. The person taking the action must submit an Offset Plan for approval by the Minister within 12 months of the date of this approval to provide for the conservation and</i></p>	Compliant	<p>The revised Offset Plan was submitted to the Department of Environment and Energy for approval on 15 December 2017. Transport for NSW (TfNSW) received comments on the plan from the Department on 5 October 2018 and re-submitted in November 2019.</p>

<p><i>management in perpetuity of a minimum of 152 hectares of habitat for the Grey-headed Flying-fox, the Spotted-tail Quoll, the Regent Honeyeater and the Swift Parrot. The approved plan must be implemented. The Offset Plan must include, but not be limited to:</i></p> <ul style="list-style-type: none"> <i>a. The acquisition and conservation of land containing a minimum of 152 hectares of habitat for the Grey-headed Flying-fox, the Spotted-tail Quoll, the Regent Honeyeater and the Swift Parrot that is of equal or greater quality to that to be removed for the Pacific Highway Upgrade;</i> <i>b. The land referred to at condition 7(a) must be located within 50km of the Pacific Highway upgrade at Devil's Pulpit, unless otherwise agreed to by the department.</i> <i>c. The land referred to at condition 7(a) must be protected by a legal instrument under relevant nature conservation legislation on the title of the area within 18 months of the date of this approval.</i> <i>d. The instrument referred to in Condition 7(c) must provide for:</i> <ul style="list-style-type: none"> <i>i. The protection of the land in perpetuity</i> <i>ii. Prevent any future development activities</i> <i>iii. Ensure the active management of the land;</i> <i>e. The land referred to at Condition 7(a) must provide linkages to existing habitat for the species of concern.</i> 		<p>Further comments were received in February 2020. The Plan was re-submitted for approval on 27 May 2020 and approved on 14 August 2020. The approved Offset Plan has been implemented with the offset property now in the ownership of NSW National Parks and Wildlife Service.</p>
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<p>f. <i>The Offset Plan must include a clear commitment to ongoing management of the land at Condition 7(a). Management works must be consistent with advice from a suitably qualified expert. These measures must commence within 3 months of the legal protection of the land.</i></p> <p>g. <i>The Plan must include key milestones, performance indicators, corrective actions and timeframes for the completion of all actions outlined in the Plan.</i></p> <p>h. <i>The Plan must include clear outline of funding for the management in perpetuity of the land at Condition 7(a).</i></p> <p>i. <i>The Plan must be developed in consultation with the department.</i></p>		
<p>STANDARD ADMINISTRATIVE CONDITIONS</p> <p>Condition 8. <i>Within 10 business days of the substantial commencement of the action, the person taking the action must advise the department in writing of the actual date of substantial commencement.</i></p>	Compliant	The action was substantially commenced on 13 February 2012. The Department was advised of substantial commencement of the action on 21 September 2017.
<p>Condition 9. <i>If, after 3 years from the date of this approval, the person taking the action has not substantially commenced the action to the satisfaction of the Minister, the person taking the action must obtain the written agreement of the Minister to commence or continue taking the action.</i></p>	Compliant	The action was substantially commenced on 13 February 2012.
<p>Condition 10. <i>Within three months of every 12 month anniversary after the substantial commencement of the action, the person taking</i></p>	Compliant	The first annual compliance report for the period February 2012 to February 2013 was submitted on 10 July 2013.

<p><i>the action must submit to the department an annual report addressing compliance with each of the conditions of this approval, including implementation of any management plans that have been approved by the Minister. Annual reports must be provided until the Minister is satisfied that the person taking the action has complied with all conditions of this approval.</i></p>		<p>The second annual compliance report for the period March 2013 to February 2014 was submitted on 30 May 2014 (with a revised version being sent on 11 August 2014).</p> <p>A third annual compliance report for the period March 2014 – February 2015 was not submitted within three months of the third 12 month anniversary and was therefore a non-compliance.</p> <p>A fourth annual compliance report for the period March 2015 – February 2016 was not submitted within three months of the fourth 12 month anniversary and was therefore a non-compliance.</p> <p>These reports were submitted in March 2017 addressing those non-compliances. All reports following 2017 have been submitted within three of every 12 month anniversary.</p>
<p><i>Condition 11. Upon the direction of the Minister, the person taking the action must ensure that an independent audit of compliance with the conditions of approval is conducted and a report submitted to the Minister. The independent auditor must be approved by the Minister prior to the commencement of the audit. Audit criteria must be agreed to by the Minister and the audit report must address the criteria to the satisfaction.</i></p>	Compliant	<p>No direction from the Minister has been received to undertake an independent audit of compliance with the conditions of approval during the reporting period.</p> <p>Independent audits of the project have been undertaken and results of these are available on request.</p>
<p><i>Condition 12. If the person taking the action wishes to carry out any activity otherwise than in accordance with the plans, reports or strategies referred to in this approval, the person taking the action must submit for the Minister's approval a revised version of any such plan, report or strategy. The varied activity shall not commence until the Minister has approved the varied plan, report or strategy in writing. If the Minister approves such a revised plan, report or strategy, that plan, report or strategy must be implemented in place of the plan, report or strategy originally approved.</i></p>	Compliant	<p>No activities have been carried out otherwise than in accordance with the Conditions of Approval during the reporting period.</p>

Condition 13. <i>If the Minister believes that it is necessary or desirable for the better protection of listed migratory species and listed threatened species and ecological communities to do so, the Minister may request that the person taking the action make specified revisions to the plans, report or strategies approved pursuant to the conditions of this approval and submit the revised plan, report or strategy for the Minister's approval. The person taking the action must comply with any such request. The revised approved plan, report or strategy must be implemented. Unless the Minister has approved the revised plan, report or strategy, then the person taking the action must continue to implement the plan, report or strategy originally approved under this approval.</i>	Compliant	No requests for revisions to approved plans have been received from the Minister to date.
Condition 14. <i>The person taking the action must maintain accurate records substantiating all activities associated with or relevant to the conditions of this approval, including measures taken to implement the management plans required by this approval, and make them available upon request to the department. Such records may be subject to audit by the Department or an independent auditor in accordance with section 458 of the EPBC Act, or used to verify compliance with the conditions of approval. Summaries of audits may also be publicised through the general media.</i>	Compliant	Noted. All records are available upon request by the Department.

Appendix A - Connectivity Corridor Restoration Final Report – Devils Pulpit – W2B Pacific Highway Upgrade

28 October 2024
Ref No.: 2885-1076

Transport for NSW
76 Victoria Street
GRAFTON NSW 2460
Via email: simon.wilson@transport.nsw.gov.au

Attention: Mr Simon Wilson

Dear Simon

Connectivity Corridor Restoration Final Report – Devils Pulpit – W2B Pacific Highway Upgrade


1. Introduction

1.1 Background

This report documents the actions and outcomes of vegetation restoration undertaken at a connectivity corridor as part of the Woolgoolga to Ballina Pacific Highway Upgrade project. The corridor is located east of the Devils Pulpit Upgrade section of the Pacific Highway at the Tabbimoble Floodways, approximately 25 km south of Woodburn (refer to **Appendix A**).

The restoration works were originally undertaken between 2013 and 2016 and aimed to:

- Establish a wildlife corridor across cleared land that connects areas of native vegetation.
- Undertake revegetation works that replicate local native vegetation by using site specific species and establishes an open forest structure.
- Undertake regeneration works and environmental weed control within existing patches of native vegetation within the corridor.
- Provide habitat features, resources and connectivity for native wildlife through placement of structures to encourage native fauna movement and usage.
- Protect the restoration works from adverse impacts of wildfire, grazing by livestock and native herbivores, and pest and disease during establishment.
- Maintain all restoration works to achieve full connectivity and a highly functional wildlife corridor in the long term.



Vegetation monitoring was undertaken in Years 3, 4 and 6 post-construction (2017/2018, 2018/2019, and 2020/2021, respectively) as part of the Devils Pulpit Ecological Monitoring Program. In the final monitoring report (Year 6 post-construction; GeoLINK 2021) it was noted that in relation to the connectivity corridor:

'Recruitment and growth of native species has been recorded across the corridor, however exotic groundcovers (including weeds) are present and reducing native species recruitment in the southern half of the corridor. The 2019 bushfire impacted (reduced) native species diversity and cover in some areas, and increased weed cover mainly in the ground stratum. Compared to the former managed pastoral land, the corridor is regenerating and has vegetation characteristic of Subtropical Coastal Floodplain Forest, although exotic grass cover is hindering regeneration in the central to southern portion of the corridor.'

One recommendation was made relating to the connectivity corridor:

'Undertake bush regeneration and tree plantings works in localised areas with dense exotic groundcovers to assist the regeneration process where the density of understorey/ canopy tree recruits is low.'

This recommendation was adopted by Transport for NSW and subsequent vegetation management was undertaken between 15 September 2022 and 28 June 2024. This report specifically addresses the actions and outcomes of the subsequent vegetation management.

1.2 Vegetation Management

A summary of the actions completed as part of the vegetation management is provided in **Table 1.1**. Vegetation management zones are shown in **Appendix A**, photos taken during the final site visit are provided in **Appendix B** and a management and activity log is provided in **Appendix C**.

Table 1.1 Summary of Vegetation Management Actions Completed

Task	Zone	Initial Works	Follow up Maintenance	Status/ Comments
1	-	Slashing: <ul style="list-style-type: none"> ■ Slash along eastern side of fauna fence to provide access to Zone 1 and 2. ■ Slash Seteria in infill planting areas (Zone 1 and Zone 2) with bush regenerator on the ground to define area and spot saplings to avoid. ■ Slash along eastern side of fauna fence (western fence) elsewhere to protect fences from tree encroachment and damage. 	<ul style="list-style-type: none"> ■ Year 1: Initial slashing ■ Year 2: Spray along fence line to maintain access in year 2. 	<ul style="list-style-type: none"> ■ Completed: 23/09/2023.
2	Zone 1	<ul style="list-style-type: none"> ■ Spray planting area. ■ Infill plant in accordance with Management Zone B of RMS (2012) <i>Establishment of Fauna Connectivity Corridor</i> tender. Plant replacement numbers: Trees - 253; Mid-storey – 253; Shrub – 233. Total plants 739. 	<ul style="list-style-type: none"> ■ Year 1: 6 maintenance visits ■ Year 2: 6 maintenance visits. 	<ul style="list-style-type: none"> ■ Initial planting completed in December 2022. ■ Plant replacement was required due to plant loss (estimated at ~29%) and was completed 9/03/2023. ■ Survival of the second round of planting was high (~90%).
3	Zone 2	<ul style="list-style-type: none"> ■ Spray Seteria around existing native saplings. ■ Spray out planting points. ■ Infill plant in accordance with Management Zone B of RMS (2012) <i>Establishment of Fauna Connectivity Corridor</i> tender, incorporating existing saplings in plantings; estimated to require 25% of original plant numbers for this area. Plant replacement numbers: Trees - 261; Mid-storey – 261; Shrub – 241. Total plants 763. 	<ul style="list-style-type: none"> ■ Year 1: 6 maintenance visits ■ Year 2: 6 maintenance visits. 	<ul style="list-style-type: none"> ■ The final two maintenance visits were postponed to give smaller plantings better chance of survival. ■ The final maintenance visit was completed 28/06/2024.
4	Zone 3	<ul style="list-style-type: none"> ■ Spray around existing native saplings to suppress Seteria. ■ Groundsel Bush spot spray. 	<ul style="list-style-type: none"> ■ Year 1: 6 maintenance visits ■ Year 2: 2 maintenance visits. 	<ul style="list-style-type: none"> ■ Completed 3/04/2024.
5	Zone 4	<ul style="list-style-type: none"> ■ Groundsel Bush spot spray (one event). 	-	<ul style="list-style-type: none"> ■ Completed 14/10/2022.

2. Final Inspection

A final inspection of the restoration area was conducted by Gemma Quick (Senior Ecologist) on 29 August 2024. The aim was to conduct a general inspection of the vegetation management area to assess whether the regenerating vegetation within the corridor can be considered self-sustaining. No formal plot-based monitoring was undertaken. Key results are as follows:

Zone 1 and 2:

- Recent plantings range from 0.5 m to 3 m tall, with some taller plantings to 5 m.
- There is very low evidence of plant loss.
- Planting density is relatively uniform throughout.
- Combined cover of the midstorey and canopy is around 2 to 5 %.
- Pigeon Grass had been suppressed during a recent maintenance visit; however, cover is still high.
- Native ground layer species are present, however cover is low (<5%).
- Pigeon Grass growing outside of maintenance area is 1 to 1.5 m high, which is taller than the height of some of the recent plantings.

Zone 3:

- Plantings are well established. Combined cover of the midstorey and canopy is around 20%.
- Pigeon Grass cover is high.


Zone 4:

- Very dense native shrub and sapling growth ranging from 6 to 12 m tall with greater than 70% cover.
- Very high recruitment of Eucalyptus and Acacia spp. (<5 cm DBH).
- Pigeon Grass is being shaded out, with high cover at edges but low cover in the middle of the corridor.
- Native ground cover including Bladey Grass and Bracken Fern is high (> 50%).
- There is good connectivity from south to north.

Photos are provided in **Appendix B** and photo point locations in relation to management zones are shown in **Appendix A**.

Table 2.1 Assessment of Results Against Performance Measures

Performance Measure ¹	Findings 2021 ²	Findings 2024
Increase in height of native plants over time.	This performance measure has been realised. During the Project construction phase, the corridor primarily comprised former managed pastoral land, with saplings around 2-3 m tall (David Andrighetto, pers. obs. 2012). All quadrats recorded recruitment and growth of native species to varying extents with the mean tree heights observed at 7-10 m during Year 6. Native plant height in the shrub layer has either been stable or reduced due to the 2019 bushfire; while the height of the ground stratum has been consistent.	No direct comparison to previous findings can be made as formal plot-based monitoring was not undertaken. Heights of plantings are 6 to 12 m in Zone 4. Plantings within Zones 1 & 2 range from 0.5 to 5 m tall. This represents an increase since 2022.
Increase of per cent cover in native plant species and a reduction of per cent cover of exotic species over time.	There is no comprehensive pre-construction/ baseline data for comparison and the post construction monitoring has found native cover scores have remained stable or varied to a minor extent. Cover of exotic groundcover increased in some locations during post construction monitoring. Dense Pigeon Grass in the central to southern sections (quadrats 5 to 8) is likely to reduce recruitment rates of native species in this area. Notwithstanding, the transformation of the corridor from managed pastoral land to a corridor with regrowth vegetation including native species in three stratum suggests that this performance measure is being realised.	No formal plot-based cover estimates were undertaken during the final inspection. Native cover is relatively low in Zones 1 & 2, moderate in Zone 3 and high within Zone 4. Native cover has increased within all zones since 2022.
Weed cover (including noxious and invasive weed species) not to exceed 20 per cent. In the event that weed cover exceeds 20 per cent, a regular weeding program will be implemented.	Exotic species (including weeds and invasive grasses) exceed 20 % cover in the southern quadrats (particularly around quadrats 5 and 6), triggering the provision for 'a regular weeding program'. This is primarily triggered by dense occurrences of Pigeon Grass. In the long-term, recruitment and growth of native trees and shrubs is likely to 'shade out' and reduce exotic species cover in most relevant areas. Bush regeneration and tree plantings works in localised areas with dense exotic groundcovers would however assist the regeneration process where the density of understorey/ canopy tree recruits is low.	Pigeon Grass continues to exceed 20% cover in Zones 1, 2 and 3.
Prompt management of noxious weeds identified within the corridor. Any noxious weeds identified during monitoring of the corridor should be managed in accordance	<i>Noxious Weed Act 1993</i> (repealed) listed species for the Clarence Valley Council LGA species at the site including: Annual Ragweed (<i>Ambrosia artemisiifolia</i>), Groundsel Bush (<i>Baccharis halimifolia</i>), Camphor Laurel (<i>Cinnamomum camphora</i>) and Fireweed (<i>Senecio madagascariensis</i>). Cover of these species is <5 %. Groundsel Bush and Fireweed are listed under the <i>Biosecurity Act 2015</i> which replaces the <i>Noxious Weed Act 1993</i> .	<i>Biosecurity Act 2015</i> weeds were < 5% at the final inspection.



Performance Measure ¹	Findings 2021 ²	Findings 2024
with Noxious and Environmental Weed Control Handbook (DPI 2007).		
A minimum seedling density of 0.5 tree, 1 shrub and 2 groundcover seedlings per square metre within each quadrat.	This performance measure relates to planting densities. The TfNSW brief for the establishment of fauna connectivity corridor stipulates planting density of 1.75 x 1.75 m spacing, except at in specific locations around Tabbimoble Floodway 2 and 3 bridges which required 0.75 m centres. The current corridor comprises a mix of plantings and natural recruitment.	No estimates of planting densities were made during the final inspection.
Seedling survival of 60 %. If seedling survival falls below this percentage, a qualified and experienced expert in bush regeneration will assess the requirement for additional seedling planting.	It is not possible to determine if this performance measure has been met due to the time between the plantings and the monitoring.	Plant survival after initial planting in December 2022 was estimated at 71%. Additional planting was completed in March 2023 increasing the survival of plantings to 91% in May 2023. Some loss of trees (~40) was observed due to tree guard loss/ grazing in June 2023 – plastic guards were progressively replaced with corflute guards to offer better protection. Survival as at the final inspection is > 60%.
A qualified and experienced expert in bush regeneration to assess whether the regenerating vegetation within the corridor is self-sustaining by spring of Year 6.	The vegetation within the corridor is self-sustaining and showing recovery post the 2019 bushfire. Dense Pigeon Grass in the central to southern sections (quadrats 4 to 8) is likely to reduce recruitment rates of native species in this area. This is primarily triggered by dense occurrences of Pigeon Grass. In the long-term, recruitment and growth of native trees and shrubs is likely to ‘shade out’ and reduce exotic species cover in most relevant areas. Bush regeneration and tree plantings works in localised areas with dense exotic groundcovers would however assist the regeneration process where the density of understorey/ canopy tree recruits is low.	The main aim of the final inspection was to address this performance measure. Pigeon Grass continues to occur with high cover in areas (predominantly in zones 1, 2 and 3). Some replacement plantings that are smaller (0.5 m) may be out competed by Pigeon Grass. However, most plantings are at a height of > 1 m and are likely to ‘shade out’ Pigeon Grass and reduce exotic species cover in most areas in the longer term.

¹ From EMP Mitigation 7.6 Restoration of Vegetated Connectivity Corridor

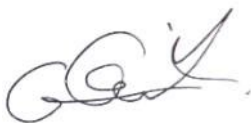
² Devils Pulpit Third (Final) Annual Report for Post-Construction Ecological Monitoring; (GeoLINK 2021)

Conclusion

Vegetation management activities during the works were generally undertaken in accordance with the prescriptions and maintenance schedule. In some cases, maintenance visits were postponed to increase the likelihood of survival of plantings. Some replacement of plantings was required due to early plant loss and grazing, however overall survival remained high at the final inspection.

Due to some of the smaller plantings being 0.5 m high and Pigeon Grass adjacent to the maintenance area growing to 2 m high, it is possible that there will be some additional plant loss without ongoing maintenance. Despite this, tree establishment is adequate to confidently predict that the majority of trees will survive grass competition if no additional maintenance is undertaken. Remaining tree guards should be removed as the plantings grow to over 2 m.

Yours sincerely
GeoLINK



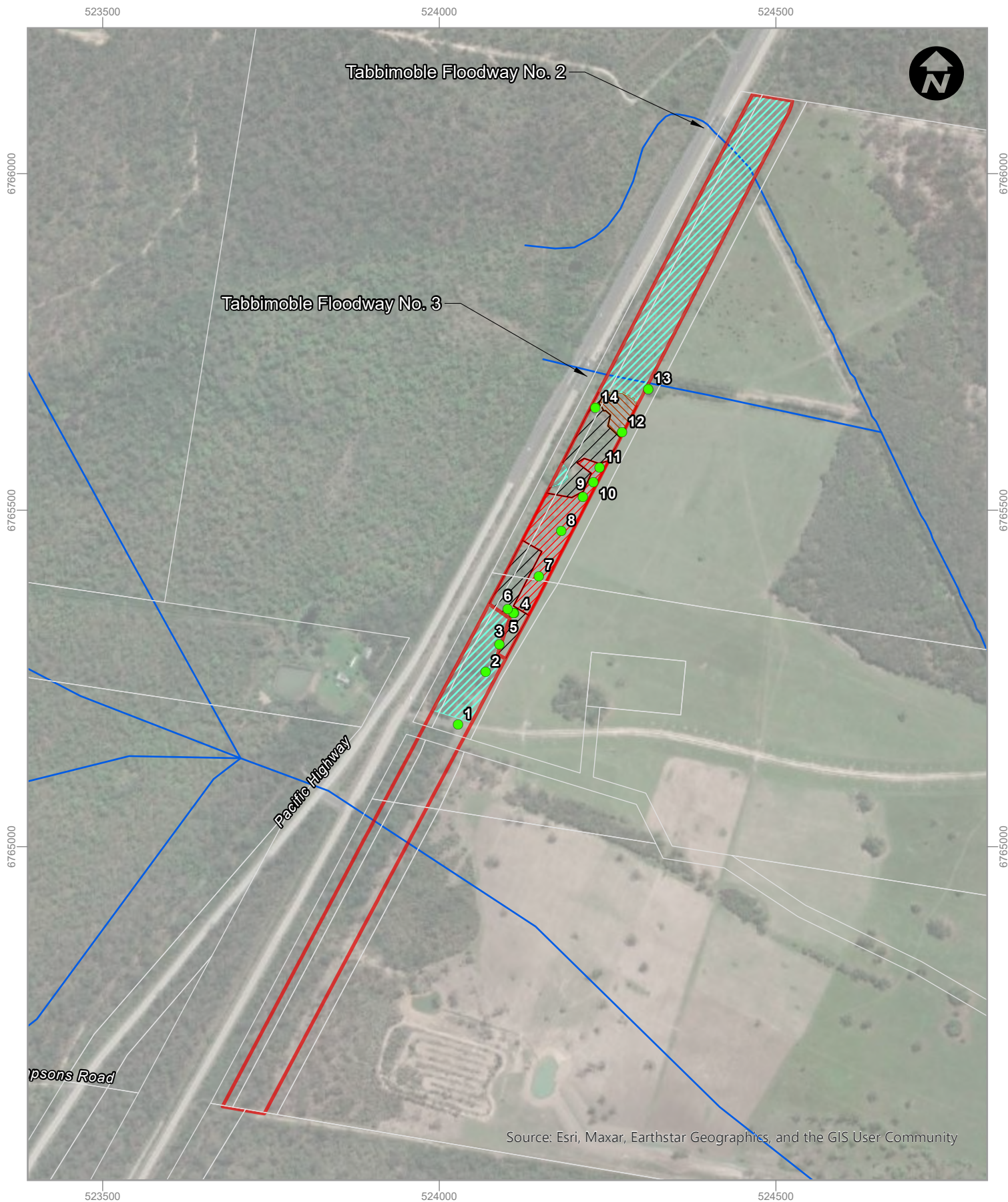
Gemma Quick
Senior Ecologist

UPR	Description	Issued By	Date Issued
2885-1076	Version 1	Gemma Quick	28/10/2024



Appendix A

Vegetation Management Zones and Photo Point Locations



Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

LEGEND

- Vegetated connectivity corridor
- Cadastre

Vegetation Management Zone

- Zone 1
- Zone 2
- Zone 3
- Zone 4

- ~ Watercourse
- Photo location

0 150 Metres

Photo Locations - Appendix A



Appendix B

Photos



Photo point 1 – tree height 6-12 m



Photo point 2 – high recruitment



Photo point 3 - > 90% Pigeon Grass, trees 3-8 m, approx. 20% cover



Photo point 4 – e.g. of smaller plant that may be outcompeted without further maintenance



Photo point 5 - density approx. 50 plantings per 10 x 10 m



Photo point 6 – Comparison between planting height and Pigeon Grass height



Photo point 7 – Good planting density and survival rate



Photo point 8 - Good planting density and survival rate



Photo point 9 – Good planting density and survival rate



Photo point 10 – Good planting density and survival rate



Photo point 11 – Transition between Zone 2 (foreground) and Zone 3 (background)



Photo point 12 – Example of native groundcover species (*Centella asiatica*, *Ranunculus inundatus*)



Photo point 13 – example Zone 4 north of floodway



Photo point 13 – example evidence of tree loss



Appendix C

Activity and Management Log

Log of Onground and Management Activities

Project number: 2885
Project: Devils Pulpit Ecological Monitoring
Sub-project: Variation 5 Connectivity Corridor Weed Management
Updated: 30/08/2024

Tasks completed:

Year	Date	Zone	Task/ Activity Description	Comments	Photo Reference
1	27/07/2022	1,2,3,4	Inception meeting with TfNSW, GMC and GeoLINK	-	Nil
1	15/09/2022-14/10/2022	-	Task 1: Slashing	GMC undertook the following: - Slash along eastern side of fauna fence to provide access to Zone 1 and 2. - Slash Seteria in infill planting areas (Zone 1 and Zone 2) - Slash along eastern side of fauna fence (western fence) elsewhere to protect fences from tree encroachment and damage.	Nil
1	15/09/2022-14/10/2022	1	Task 2: Spray planting area (1/6 maintenance visits)	GMC undertook the following: - Spraying planting area – Can Am sprayer	Nil
1	15/09/2022-14/10/2022	2	Task 3: Spray Seteria around existing native saplings; Spray out planting points (1/6 maintenance visits)	GMC undertook the following: - Spraying planting area – Can Am sprayer	Nil
1	15/09/2022-14/10/2022	3	Task 4: Spray around existing native saplings to suppress Seteria	GMC undertook the following: - Spray around existing native saplings to suppress Seteria.	Nil
1	15/09/2022-14/10/2022	4	Task 5: Groundsel Bush spot spray (1/1 maintenance visits)	GMC undertook the following: - Spraying groundsel	Nil
1	29/11/2022-13/12/2022	1	Task 2: Infill plant in accordance with Management Zone B of RMS (2012) Establishment of Fauna Connectivity Corridor tender.	GMC undertook the following: - Year 1 - Plant replacement at 100% original: - Trees – 253 - Mid-storey – 253 - Shrub – 233 Total – 739	Refer to 'Photos Tree Planting Dec2022 tab'
1	29/11/2022-13/12/2022	2	Task 3: Infill plant in accordance with Management Zone B of RMS (2012) Establishment of Fauna Connectivity Corridor tender, incorporating existing saplings in plantings; estimated to require 25% of original plant numbers for this area.	GMC undertook the following: - Year 1 - Plant replacement at 25% original: - Trees – 261 - Mid-storey – 261 - Shrub – 241 Total – 763	Refer to 'Photos Tree Planting Dec2022 tab'
1	2/03/2023	-	Site visit TfNSW and GeoLINK	TfNSW and GeoLINK inspection of plantings undertaken, notes as follows: - Overall generally pretty good. - A quick random inspection of 146 plants found 104 alive (71%) and 42 dead (29%). - Focus replacement plantings with <i>Melaleuca quinquenervia</i> and <i>Lophostemon suaveolens</i> . They seem to be more robust and will have a larger mass to compete against the Seteria as they grow. - The corflute tree guards seemed more wallaby resistant than the plastic.	Refer to 'Photos Tree Planting Dec2022 tab'
1	6-9/03/2023	1	Task 2: Maintenance (2/6 maintenance visits)	GMC undertook the following: - Clearing and spraying around planted trees and general maintenance.	Refer to 'Photos replanting Mar2023 tab'
1	6-9/03/2023	2	Task 3: Maintenance (2/6 maintenance visits)	GMC undertook the following: - Clearing and spraying around planted trees and general maintenance.	Refer to 'Photos replanting Mar2023 tab'
1	6-9/03/2023	1,2	N/A: Additional Task - Tree Replacement	GMC undertook the following: - replacement of approximately 300 trees in zones 1 and 2	Refer to 'Photos replanting Mar2023 tab'
1	1/05/2023	1,2	N/A: Additional Task - Tree Replacement Inspection	GMC undertook inspection, notes as follows: - No reports of losses of the newly planted trees. - Some macropod grazing observed. - Maintenance works are scheduled next week (subject to ground conditions after recent rain). GeoLINK/ TfNSW previously estimated 29% loss of 1,499 planted trees (approximately 435 dead trees). With the additional 300 planted trees, this puts the current alive number of plantings at approximate 1364 trees (91% of plantings). - GMC will continue to monitor the plants. - A follow up GMC/Transport/GeoLINK inspection is warranted in spring during the next growing season to consider and start planning any more longer term management requirements.	Nil
1	28/06/2023	1,2	N/A: Additional Task - Tree Replacement Inspection	GMC undertook inspection, notes as follows: - Some macropod grazing, approximately 40 tree/ guard losses. - Plastic tree guards are being progressively replaced with corflute guards which provide better protection.	Refer to 'Photos maintenance June-Sep2023 tab'
2	21/7 & 23/09/2023	-	Task 1: Fence line herbicide spray	GMC undertook the following: - Spray along fence line to maintain access to zones 1 and 2 in year 2. - Fence line spraying – Can Am sprayer	Refer to 'Photos maintenance June-Sep2023 tab'
2	21/7 & 23/09/2023	1	Task 2: Maintenance visit (3/6 maintenance visits)	GMC undertook the following: - clearing and spraying around planted trees and general maintenance.	Refer to 'Photos maintenance June-Sep2023 tab'
2	21/7 & 23/09/2023	2	Task 3: Maintenance visit (3/6 maintenance visits)	GMC undertook the following: - clearing and spraying around planted trees and general maintenance.	Refer to 'Photos maintenance June-Sep2023 tab'
2	24/07/2023	3	Task 4: Groundsel Bush spot spray (1/2 maintenance visits)	GMC undertook the following: - Spot spraying of Groundsel Bush	Refer to 'Photos maintenance June-Sep2023 tab'

Year	Date	Zone	Task/ Activity Description	Comments	Photo Reference
2	18/10/2023	1, 2, 3	N/A: Additional Task - Joint site inspection with TfNSW, GMC and GeoLINK	<p>TfNSW, GMC and GeoLINK inspection to consider and start planning any more longer term management requirements, notes as follows:</p> <p>- The health of the original and replacement plantings: The gaps in the original plantings have mostly been filled with additional plantings. The majority of the replacement plantings look healthy. However, just about any plantings without tree guards have been browsed.</p> <p>- Estimated survival rate Newer plantings have high survival rate, with only about 10 looking like they didn't survive planting.</p> <p>- Timing of remaining tasks Two of the remaining three maintenance trips will be scheduled as normal, task will involve Setaria control, and continuing to place guards on all trees <0.9m in height. Several trees with removed guards that are floppy, will be loosely staked to promote upright growth and strong roots.</p> <p>- Whether additional maintenance is required and possible options Simon Wilson from Transport NSW advised that there was very low probability of funds being available to add an additional term of maintenance to the program. However, there is the possibility of extending out the time frame before the third and final maintenance trip, so the last interval is longer, but it is recommended only by < six months. Only if all tree guarding has been completed before then.</p> <p>- Watering and weather Lack of rainfall has made the site easier to access, however, lack of rainfall may impact survival of newer plantings, so there are plans to monitor rainfall and include watering trips if required.</p> <p>- Groundcovers Searching for native groundcovers to see if there was any seed source for colonisation with native groundcovers once Setaria is controlled and maintenance ceases. Not many native grasses, even under more established trees, but a small amount of native sedges and herbs such as Philydrum lanuginosum and Centella asiatica in lower lying areas. Discussion about avoiding native ground covers when spraying, not just planted trees with the aim of replacing Setaria. Better weather conditions required. Neighbouring property had installed new fencing and had done a narrow strip of maintenance burn along the fence line.</p>	-
2	1/11/2023	1,2	N/A: Additional Task	<p>GMC undertook the following:</p> <p>- new guards fitted to plantings and exsisting guards adjusted.</p>	-
2	13-16/02/2024, 19/02/2024	1	Task 2: Maintenance visit (4/6 maintenance visits)	<p>GMC undertook the following:</p> <p>- Brush-cut/ mow, spray around trees, area maintenance.</p>	Refer to 'Photos maintenance Feb2024 tab'
2	13-16/02/2024, 19/02/2024	2	Task 3: Maintenance visit (4/6 maintenance visits)	<p>GMC undertook the following:</p> <p>- Brush-cut/ mow, spray around trees, area maintenance.</p>	Refer to 'Photos maintenance Feb2024 tab'
2	5/03/2024	All	N/A: GeoLINK action list update	<p>Actions update emailed by GeoLINK to TfNSW5/03/2024:</p> <p>- <i>Based on survival rate no additional planting is required.</i> <i>No change to this action proposed.</i></p> <p>- <i>Continue to place guards on all trees <0.9m in height.</i> <i>Undertaken in November 2023.</i></p> <p>- <i>Several trees with removed guards that are floppy will be loosely staked to promote upright growth and strong roots.</i> <i>Undertaken in November 2023.</i></p> <p>- <i>Monitor rainfall and include watering trips if required.</i> <i>Rainfall was near or above average during all months since the previous inspection, except December 2023. GMC report good growth during February 2024 maintenance trip. No additional watering proposed at this time, however should continue to be monitored as dry, warm autumn is predicted (https://media.bom.gov.au/releases/1156/a-dry-autumn-forecast-for-most-of-australia/).</i></p> <p>- <i>TfNSW, GMC and GeoLINK to discuss whether sixth and final maintenance visit should be postponed after fifth maintenance visit is completed:</i> <i>The fifth maintenance visit is proposed for March, we suggest the final inspection is undertaken either in conjunction with the fifth maintenance visit or in early April to inform whether the sixth visit should be postponed. Please let me know if this timing suits you and whether you would like it to include all three parties (GeoLINK TfNSW and GMC).</i></p>	

Year	Date	Zone	Task/ Activity Description	Comments	Photo Reference
2	9/04/2024	1,2	N/A: Additional Task - Joint site inspection with TfNSW, GMC and GeoLINK	<p>Actions update emailed by GeoLINK to TfNSW 13/05/2024:</p> <ul style="list-style-type: none"> - Based on survival rate no additional planting is required. - No change to this action proposed. - Continue to place guards on all trees <0.9m in height. - Guards have been straightened and reinstalled where needed, guards to be removed from trees taller than 2m. - Several trees with removed guards that are floppy will be loosely staked to promote upright growth and strong roots. - Staking had been completed as needed - Monitor rainfall and include watering trips if required. <p>Rainfall was above average during all months since the previous inspection. Please see below. GMC report good growth during February 2024 maintenance trip, and this was observed at April site inspection. No additional watering proposed at this time, tree establishment and ground water adequate. La Nina watch was recently announced by BOM, so further high rainfall has a 60% likelihood over the next six months.</p> <p>- TfNSW, GMC and GeoLINK to discuss whether sixth and final maintenance visit should be postponed after fifth maintenance visit is completed:</p> <p>The fifth maintenance visit was completed in March, the final inspection was undertaken in early April to inform whether the sixth visit should be postponed. Completing the final site treatment will reduce weed competition over Winter, and heading into Spring and would benefit the smallest replants, which are the most vulnerable. Ideally further funding would be available for completing one more warm season maintenance series, at start and end of Summer.</p> <p>However, tree establishment is adequate to confidently predict that the majority of trees will survive grass competition next Summer if no additional maintenance is able to be funded. Additional maintenance would improve the likelihood of Setaria being replaced with native groundcovers and grasses in the understory.</p> <p>It was decided at the meeting that the monitoring would occur after the final maintenance visit.</p>	
2	25-27/3/24	1	Task 2: Maintenance visit (5/6 maintenance visits)	<p>GMC undertook the following:</p> <ul style="list-style-type: none"> - Brush-cut/ mow, spray around trees, area maintenance. 	Refer to 'Photos maintenance Mar2024 tab'
2	25-27/3/24	2	Task 3: Maintenance visit (5/6 maintenance visits)	<p>GMC undertook the following:</p> <ul style="list-style-type: none"> - Brush-cut/ mow, spray around trees, area maintenance. 	Refer to 'Photos maintenance Mar2024 tab'
2	3/04/2024	3	Task 4: Groundsel Bush spot spray (2/2 maintenance visits)	<p>GMC undertook the following:</p> <ul style="list-style-type: none"> - Spot spraying of Groundsel Bush 	Refer to 'Photos maintenance Apr2024 tab'
2	27-28/6/2024	1	Task 2: Maintenance visit (6/6 maintenance visits)	<p>GMC undertook the following:</p> <ul style="list-style-type: none"> - Brush-cut/ mow, spray around trees, area maintenance. 	Refer to 'Photos maintenance Jun2024 tab'
2	27-28/6/2024	2	Task 3: Maintenance visit (6/6 maintenance visits)	<p>GMC undertook the following:</p> <ul style="list-style-type: none"> - Brush-cut/ mow, spray around trees, area maintenance. 	Refer to 'Photos maintenance Jun2024 tab'
2	30/08/2024	all	Final inspection	Final inspection undertaken by GeoLINK	Refer to final report
Tasks Remaining:					
Year	Date	Zone	Task/ Works Description		