

# MOOREBANK INTERMODAL PRECINCT – OPERATIONAL FACILITY

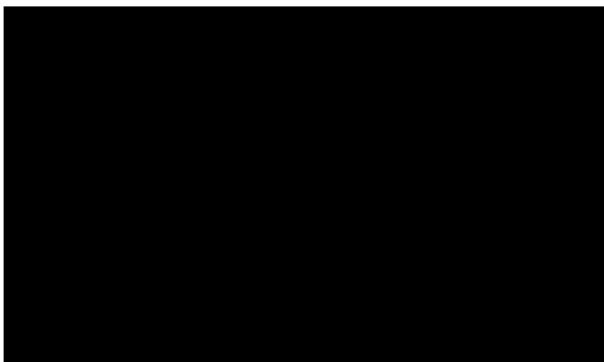
## Annual Flora and Fauna Monitoring Report

16 MAY 2025





## CONTACT



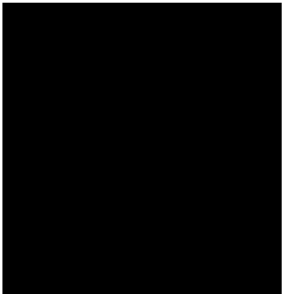
Arcadis

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# MOOREBANK INTERMODAL PRECINCT— OPERATIONAL FACILITY

## Annual Monitoring Report

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Report No 1.0  
Date 16/05/2025  
Revision Text B

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## REVISIONS

| Revision | Date       | Description | Prepared by | Approved by |
|----------|------------|-------------|-------------|-------------|
| A        | 05/05/2025 | First draft | AJ, ET      | EE          |
| B        | 16/05/2025 | Final       | ET, KM      | EE          |



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# 1 INTRODUCTION

Arcadis was commissioned to undertake monitoring inspections and deliver the annual flora and fauna monitoring report for the operation of the Moorebank Precinct East (MPE) facility and Moorebank Precinct West (MPW) (Figure 1-1). The requirement to monitor biodiversity values within the MPE and MPW operational facilities and biodiversity values related to the approval of the project is specified in the following Conditions of Consent (CoC) and Conditions of Approval (CoA):

- Moorebank Precinct East EPBC Concept Approval (EPBC 2011/6229)
- Ministers' Conditions of Consent (MPE) (CoC) (SSD 6766; SSD 7628)
- Moorebank Precinct West (MPW) EPBC Act approval (EPBC 2011/6086)
- Ministers' Conditions of Consent (MPW) (CoC) (SSD 7709)

Additional requirements to monitor biodiversity values are included in the following project documents:

- Moorebank Precinct East – Stage 1 (SSD 6766) and Moorebank Precinct East – Stage 2 (SSD 7628) Environmental Impact Statements (EIS)
- Riparian Vegetation Management Plan for SIMTA Intermodal Terminal Facility – Stage 1 (Hyder 2015)
- SIMTA Intermodal Terminal Facility – Stage 1. Riparian Vegetation Management Plan – 2017 Updated (AMBS 2017)
- Operational Flora and Fauna Management Plan for Moorebank Logistics Park – East Precinct (Arcadis 2020a)
- Threatened Flora Offset Management Plan (Arcadis 2020b)
- Nest Box Management Strategy. Moorebank Precinct East Stage 1 – Rail Link (CPB 2017)
- Moorebank Precinct West Stage 2. Koala Management Plan (Cumberland Ecology 2020)
- Moorebank Precinct West – Concept and Stage 1 Approval (SSD 5066) and Moorebank Precinct West – Stage 2 Approval (SSD 7709) Environmental Impact Statements (EIS)
- Moorebank Precinct West Stage 2 - Koala Management Plan (Cumberland Ecology, 2020)

## 1.1 Moorebank Intermodal Precinct

The Moorebank Intermodal Precinct (MIP) is an integral component of the Freight, Ports and Transport strategies of both the NSW and Commonwealth governments to help manage the challenges of an expected tripling of freight volumes at Port Botany by 2031.

The MIP aims to streamline the freight logistics supply chain from port to store, deliver savings to businesses and consumers, and help service the rapidly growing demand for imported goods in south-west Sydney. It is located approximately 27 kilometres south-west of the Sydney Central Business District and approximately 26 kilometres west of Port Botany within the Liverpool Local Government Area. The MIP is divided into an East Precinct and a West Precinct, located east and west of Moorebank Avenue, respectively.

### 1.1.1 Moorebank Precinct East

The main features of MPE include the following:

- An Import Export (IMEX) Terminal. The IMEX Terminal comprises:
- Truck processing, holding and loading areas with an entrance and exit from Moorebank Avenue
- Rail loading and container storage areas serviced by container handling equipment
- An Administration facility and associated car parking with light vehicle access from Moorebank Avenue

- An Operational Rail Link connecting the IMEX terminal and the Southern Sydney Freight Line (SSFL) traversing Moorebank Avenue, Anzac Creek, Georges River and Glenfield Waste Facility
- Associated ancillary infrastructure, including signage, lighting, landscaping, water management
- Warehouse and distribution facilities, including warehousing up to 21 metres in height, typically ranging in size from 20,000 meters squared to 62,000 meters squared
  - Office and administration facilities
  - Amenities
  - Car parking
  - Truck loading/unloading docks
  - Internal parking for pick-up and delivery vehicles (PUD)
  - Specialised sortation and conveyor equipment
  - Hardstand areas that provide trailer parking spaces, external PUD parking spaces, vehicle manoeuvring areas and access to the main internal site road
  - Signage for business identification purposes, including backlit illuminated signage on each warehouse
  - Internal fitout, comprising racking and storage
- A freight village including a mix of retail, commercial and light industrial spaces typically up to 15 metres in height and varying in size and design
- An internal road network to enable efficient movement of vehicles, dispatch of freight from the warehouses and transport of containers between the IMEX Terminal and warehouse and distribution facilities

In addition to the constructed assets of the MPE development, several other areas have been included within the MPE operational facility for flora and fauna monitoring. These include:

- Five designated offset sites for EPBC listed threatened flora species within Wattle Grove offset area
- Lands adjoining (within 10 meters of) the Rail Link
- Riparian vegetation management sites at Anzac Creek and Georges River
- Nest box locations within Moorebank and Wattle Grove offset areas

### **1.1.2 Moorebank Precinct West**

- The MPW Stage 2 Development involves:
  - Construction and 24/7 operation of an intermodal terminal (IMT) facility to support a container freight throughout volume of 500,000 twenty-foot equivalent units (TEUs) per annum, including:
    - a rail terminal with nine rail sidings
    - a rail link connection from the sidings to the rail link constructed under MPE Stage 1 (SSD 6766) to the Southern Sydney Freight Line (SSFL)
    - rail and truck container loading and unloading and container storage areas
    - truck waiting area and emergency truck storage areas
    - container wash-down facilities and degassing area
    - mobile locomotive refuelling station
    - engineer's workshop, administration facility and associated car parking.
- Operation of the IMT facility includes operation of the rail link to the SSFL and container freight movement by truck to and from the MPE Site.

- Construction and 24/7 operation of a warehousing estate on the northern part of the site servicing the IMT facility and including:
  - six warehouses with a total gross floor area (GFA) of 215,000 m<sup>2</sup> and, for each warehouse, associated offices, staff amenities, hardstands and truck and light vehicle parking
  - 800 m<sup>2</sup> freight village (operating from 7am to 6pm, 7 days/ week) including staff/visitor amenities
  - internal roads, noise wall, landscaping, lighting and signage.
- Intersection upgrades on Moorebank Avenue at:
  - Anzac Road providing site access
  - Bapaume Road for left turn only out of the site.
- Construction and operation of on-site detention basin, bioretention/ biofiltration systems and trunk stormwater drainage for the entire site.
- Construction works and temporary ancillary facilities, including:
  - vegetation clearing, topsoil stripping and stockpiling and site earthworks and temporary on-site detention
  - importation of up to 1,600,000 m<sup>3</sup> of uncompacted fill, temporary stockpiling and placement over the entire site to raise existing ground levels by up to 3 metres
  - materials screening, crushing and washing facilities
  - importation and placement of engineering fill and rail line ballast
  - installation and use of a concrete batching plant
  - utilities installation/connection.

## 1.2 Monitoring objectives

Management of flora and fauna values within the MIP operational facility and associated lands is reviewed annually following a series of detailed monitoring surveys. The core objectives of flora and fauna monitoring are to:

- Monitor protected threatened flora species
- Monitor protected vegetated areas adjacent to the operational facility (including EPBC offset areas), including:
  - Monitoring the spread of weeds and pathogens
  - Monitoring unauthorised entry and damage.
- Monitoring to minimise harm to fauna and maintain habitat offsets (nest boxes)
- Monitor works to protect and improve riparian and aquatic environments
- Monitor for weed occurrence and recruitment within the operational site
- Monitor koala habitat and population

The results of flora and fauna monitoring across the MIP operational facility is the subject of this report. A series of recommendations are included to rectify any management issues identified during monitoring and enhance the biodiversity values within the MIP operational facility.

The methodologies and results of the nest box and EPBC offset site surveys have not been included in the body of this report. Both of these monitoring components have been described in separate documents, which have been included as appendices to this report:

- Appendix C. EPBC offset sites - Annual monitoring report (2024-2025)
- Appendix I. Nest box monitoring report (Spring 2024)



Figure 1-1. MIP operational facility and adjacent biobank sites

### **1.3 Requirements for monitoring**

The requirements to monitor biodiversity values during the operation of the MPE facility are summarised below in Table 1-1, while the requirements for the MPW facility are summarised in Table 1-2.

Table 1-1-1. MPE operational facility flora and fauna monitoring requirements

| Subject                                | Approval condition        | Requirement                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Where addressed                                                                  |
|----------------------------------------|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|
| Weed and feral animal monitoring       | CoC B110 (SSD 7628, 7709) | B110. Prior to operation, the Applicant must prepare an Operational Flora and Fauna Management Plan (OFFMP) in consultation with OEH. The OFFMP must form part of the OEMP required by condition C3 and must include measures to ensure biodiversity values not intended to be impacted are protected, including but not limited to the following: <ul style="list-style-type: none"> <li>i. Weed control</li> <li>ii. Feral animal control</li> <li>iii. Pathogen management procedures</li> <li>iv. Monitoring</li> <li>v. Rehabilitation actions.</li> </ul>                         | Sections: 2.3, 3.3, 4.3 (weeds)<br>Sections: 2.4.2, 3.4.3, 4.4.3 (feral animals) |
|                                        | CoC B127 (SSD 7628, 7709) | The Applicant must: <ul style="list-style-type: none"> <li>a. Take all reasonable steps to manage pests and vermin on the site;</li> <li>b. Manage declared noxious weeds on the site in accordance with the requirements of the noxious weeds act 1993;</li> <li>c. Inspect the site on a regular basis, no less than every three months, to ensure that these measures are working effectively, and that pests, vermin or noxious weeds are not present on site in sufficient numbers to pose an environmental hazard or cause the loss of amenity in the surrounding area</li> </ul> |                                                                                  |
|                                        | CoA 5(h) (EPBC 2011.6229) | For the better protection of EPBC-listed flora & the environment on Commonwealth land, the person taking the action must engage a suitably qualified expert to prepare a Flora and Fauna Management Plan (FFMP) for the approval of the Minister. The FFMP must include (but need not be limited to): <ul style="list-style-type: none"> <li>h) measures to safeguard flora and fauna from the threat of weeds, fire, pathogens and unauthorised access, including (but not limited to) the commitments outlined in section 7.4.1 of the EIS (and summarised in Annexure A)</li> </ul>  |                                                                                  |
| Riparian rehabilitation and management | CoC C21, E9 (SSD 6766)    | C21. The Georges River Bridge shall be designed to ensure fauna movement within the riparian corridor is maintained. The bridge shall be designed in consultation with DPI Water and DPI Fisheries and approved by the Certifying Authority. A copy of the final design shall be submitted to the Secretary for information and made available on the Project Website.                                                                                                                                                                                                                  | Sections: 2.1.2, 3.1.2, 4.1.2                                                    |

| Subject                                                                                              | Approval condition          | Requirement                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Where addressed                                    |
|------------------------------------------------------------------------------------------------------|-----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------|
|                                                                                                      |                             | E9. All activities taking place in, on or under waterfront land, as defined in the Water Management Act 2000, should be conducted generally in accordance with the NSW Office of Water's Guidelines for Controlled Activities.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                    |
|                                                                                                      | CoC B110 (i) (v) (SSD 7628) | B110 (i),(v). See above.<br>Riparian vegetation monitoring will be conducted within the riparian management areas identified within the original MPE Stage 1 Riparian Vegetation Management Plan (Hyder 2015) and updated version (AMBS 2017). The monitoring requirements are also set out in these documents.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                    |
| EPBC-threatened flora offsets                                                                        | EPBC CoA 6(e)               | 6(e). measures for regular monitoring of the status of individuals of Nodding Geebung and Small-flower Grevillea and their habitat as measured against the baseline population and distribution, including: <ul style="list-style-type: none"> <li>i. Fluctuations in population size and distribution; and</li> <li>ii. Response to disturbances and/or management actions.</li> </ul> Monitoring of threatened flora species (Nodding Geebung and Small-flowered Grevillea) within the EPBC offset areas will be completed in accordance with the Threatened Flora Offset Management Plan (Arcadis 2020).                                                                                                                                                                                                       | Appendix B                                         |
| Monitoring condition of threatened flora and vegetation adjacent to the Rail Link within BA341 lands | EPBC CoA 5(i)               | Ongoing monitoring to inform the adaptive management of native vegetation adjoining the rail easement<br>Monitoring of threatened flora and vegetation conditions adjoining the Rail Link will be conducted in accordance with the OFFMP (Arcadis 2020a) and the BA341 Biobanking Agreement (OEH 2019) requirements.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Sections: 2.1.1, 2.2.1, 3.1.1, 3.2.1, 4.1.1, 4.2.1 |
| Koala management                                                                                     | CoC B152 (SSD 7709)         | B152. Prior to clearing of native vegetation, a Koala Management Plan (KMP) must be prepared by a suitably qualified person in consultation with OEH and be submitted to the Planning Secretary for approval. KMP must: <ul style="list-style-type: none"> <li>a. Identify habitat corridors of adequate dimension to provide Koala habitat corridors as supported by Koala specialists, to provide connectivity both within the Intermodal Precinct area and with other core koala habitat areas (i.e. To the south and the west along Georges River);</li> <li>b. Include details of structures to eliminate barriers to movement (presented by fences, roads, drainage culverts or pits, rail lines and the like) for koalas and other native fauna likely to use the site of the habitat corridor;</li> </ul> | Sections: 2.4.2, 2.4.4 , 3.4.1, 3.4.2, 4.4.2       |

| Subject            | Approval condition                                   | Requirement                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Where addressed |
|--------------------|------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
|                    |                                                      | <p>c. Include other measures to minimise the risk of harm to koalas.</p> <p>Koala fencing is to be installed along the interface of the occupied habitat (Wattle Grove offset area) and the MPE operational site. Annual monitoring of the fencing will be conducted to ensure it is functional and in agreement within the Koala Management Plan (Cumberland Ecology 2020).</p> <p>Monitor Bootland and Moorebank Offset Areas for Koala presence and Koala habitat monitoring</p>                                                                                  |                 |
| Artificial hollows | EPBC CoA Annexure A – Summary of mitigation measures | Consider the installation of nest boxes in woodland vegetation in the rail corridor that may offer alternative nesting habitat to hollow-dependent species recorded in the study area.                                                                                                                                                                                                                                                                                                                                                                               | Appendix I      |
|                    | CoC E34(d)(ii)(b) (SSD 6766)                         | <p>The identification of areas to be cleared and details of management measures to avoid residual habitat damage or loss and to minimise or eliminate time lags between the removal and subsequent replacement of habitat, such as:</p> <ul style="list-style-type: none"> <li>- clearing procedures (including nest box plan)</li> </ul> <p>Requirements for nest box monitoring have been documented with the approved Nest Box Management Strategy for Moorebank East Precinct Stage 1 – Rail Link (CPB 2017)</p>                                                 |                 |
|                    | CoC B108 (a) and (b) (SSD 7628)                      | <p>B108. Prior to clearing of native vegetation, the Applicant must prepare a Construction Flora and Fauna Management Plan (CFFMP) in consultation with OEH. The CFFMP must form part of the CEMP required by condition C1 and must include the following:</p> <ul style="list-style-type: none"> <li>a. Measures to minimise the loss of key fauna habitat, including tree hollows;</li> <li>b. Measures to minimise the impacts on fauna on site, including conducting fauna pre-clearance surveys prior to vegetation clearing and building demolition</li> </ul> |                 |

Table 1-2 MPW operational facility flora and fauna monitoring requirements

| Subject                            | Approval condition     | Requirement                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Where addressed                                                                    |
|------------------------------------|------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------|
| Weed and feral animal monitoring   | SSD (7709)             | Inspect the project site to determine weeds, vermin and pest species are not present in sufficient numbers to pose an environmental hazard or cause loss of amenity in the surrounding area.                                                                                                                                                                                                                                                                             | Sections: 2.3.2, 3.3, 4.3 (weeds)<br>Sections: 2.4.2, 3.4.3, 4.4.3 (feral animals) |
| Flora and fauna monitoring program | SSD (7709)<br>FCMM 4R  | The OEMP would include a biodiversity monitoring program designed to detect operational impacts of the Georges River riparian corridor (within the offset site).                                                                                                                                                                                                                                                                                                         | Sections: 2.1.2, 3.1.2, 3.2.1, 4.1.2                                               |
| Koala management                   | SSD (7709)             | Annual monitoring of the fencing will be conducted to ensure it is functional. Monitoring would comprise a visual inspection of the entire length of fencing, looking for signs of deterioration such as holes, collapsed sections or excessive corrosion. Any additional koala monitoring that is included within the Koala Management Plan would also be included.<br><br>Annual monitoring of Moorebank Offset areas for koala presence and koala habitat monitoring. | Sections: 2.4.4, 3.4.2, 4.4.2, Appendix J                                          |
| Nest Boxes                         | SSD (5066)<br>REMM 6AA | Annual monitoring is to take place in spring and is required to be conducted in line with the MIP Artificial Hollow Strategy (Arcadis, 2025)                                                                                                                                                                                                                                                                                                                             | Appendix I                                                                         |

## 2 METHODOLOGY

This annual monitoring report summarises the findings of field surveys conducted across the MIP operational facility and provides an assessment of the management actions being implemented. This report contains the results of surveys and site inspections undertaken during the monitoring period (May 2024 – May 2025), including details of:

- Date, time and location
- Nature of the inspection
- Name of the person conducting the inspection
- Weather observations.

Table 2-1 itemises the survey dates, including the monitoring actions completed and the prevailing weather conditions from the nearest weather station at Holsworthy Aerodrome AWS {station 066161} (BOM 2024-2025).

Table 2-1. Timings and weather conditions on survey dates

| Date              | Survey type                                                          | Temperature (°C) |      | Rain (mm) | Attending ecologists                         |
|-------------------|----------------------------------------------------------------------|------------------|------|-----------|----------------------------------------------|
|                   |                                                                      | Min              | Max  |           |                                              |
| 15 May 2024       | Bi-monthly weed inspection of the operational facility and Rail Link | 11.9             | 22.0 | 0         | Kate Mauger                                  |
| 4 June 2024       | Nest-box Corrective Actions                                          | 5.9              | 16.5 | 0         | William Terry                                |
| 5 June 2024       | Nest-box Corrective Actions                                          | 8.8              | 14.3 | 0         | William Terry                                |
| 14 August 2024    | Bi-monthly weed inspection of the operational facility and Rail Link | 15.0             | 17.5 | 1.6       | Nathan Banks                                 |
| 12 September 2024 | Camera Trap Deployment                                               | 15.2             | 20.1 | 0         | Taylor Bliss-Henaghan, Acacia Jennings       |
| 17 September 2024 | BAM Plots                                                            | 5.8              | 22.2 | 0         | Kate Mauger, Acacia Jennings                 |
| 18 September 2024 | BAM Plots                                                            | 4.2              | 26.1 | 0         | Kate Mauger, Briony Mowbray                  |
| 24 September 2024 | East Nest Box Monitoring                                             | 11.6             | 26.7 | 0         | Acacia Jennings, Emma Teusner                |
| 25 September 2024 | West Nest Box Monitoring                                             | 13.9             | 26.8 | 0         | Taylor Bliss-Henaghan, Acacia Jennings       |
| 27 September 2024 | West Nest Box Monitoring and Threatened Flora Transects              | 10.2             | 17.2 | 12.2      | Acacia Jennings, Emma Teusner                |
| 9 October 2024    | Threatened Flora Transects                                           | 11.9             | 16.8 | 0         | Kate Mauger, Acacia Jennings, Briony Mowbray |
| 22 October 2024   | Bi-monthly weed inspection of the operational facility and Rail Link | 8.4              | 26.0 | 0         | Kate Mauger                                  |
| 25 October 2024   | Threatened Flora Transects                                           | 9.5              | 21.5 | 8.4       | Acacia Jennings, Briony Mowbray              |

| Date             | Survey type                                                          | Temperature (°C) |      | Rain (mm) | Attending ecologists                   |
|------------------|----------------------------------------------------------------------|------------------|------|-----------|----------------------------------------|
|                  |                                                                      | Min              | Max  |           |                                        |
| 30 October 2024  | Bi-monthly weed inspection of Moorebank West                         | 16.4             | 28.2 | 0         | Kate Mauger                            |
| 22 November 2024 | Camera Trap Collection                                               | 12.3             | 28.1 | -         | Kate Mauger, Acacia Jennings           |
| 12 December 2024 | Bi-monthly weed inspection of the operational facility and Rail Link | 14.0             | 30.7 | 0         | Kate Mauger                            |
| 17 December 2024 | Koala SAT Surveys and Spotlighting                                   | 18.8             | 39.0 | 0         | William Terry, Briony Mowbray          |
| 18 December 2024 | Koala SAT Surveys                                                    | 16.5             | 23.1 | 2.2       | William Terry, Emma Teusner            |
| 19 December 2024 | Koala SAT Surveys and Spotlighting                                   | 14.8             | 24.8 | 0.6       | William Terry, Acacia Jennings         |
| 22 January       | Camera Trap Collection<br>Camera Trap Deployment                     | 16.8             | 36.4 | 0.4       | Brendan Fraser, Emma Teusner           |
| 21 February 2025 | Koala SAT Surveys                                                    | 16.0             | 25.2 | 0         | William Terry, Acacia Jennings         |
| 19 March 2025    | Camera Trap Deployment                                               | 15.6             | 28.6 | 0         | Nathan Banks, Acacia Jennings          |
| 26 March 2025    | Bi-monthly weed inspection of the operational facility and Rail Link | 18.4             | 27.5 | 1.0       | Kate Mauger                            |
| 17 April 2025    | Camera Trap Collection, Riparian Vegetation surveys                  | 14.7             | 24.4 | 0         | Kate Mauger, Taylor Bliss-Henaghan     |
| 30 April 2025    | Koala habitat monitoring                                             | 13.2             | 24.2 | 12.4      | Taylor Bliss-Henaghan, Acacia Jennings |
| 1 May 2025       | Koala habitat monitoring                                             | 11.0             | 19.3 | 6         | Taylor Bliss-Henaghan, Acacia Jennings |
| 7 May 2025       | Bi-monthly weed inspection of the operational facility and Rail Link | 11.6             | 26.7 | 0.2       | Kate Mauger                            |

## 2.1 Native vegetation monitoring

The methodologies applied to monitoring native vegetation at riparian vegetation management sites and in the lands adjoining the Rail Link are discussed below, and the location of the surveys are presented in Figure 2-2.

### 2.1.1 Lands adjoining Rail Link

Native vegetation adjoining the Rail Link in the Wattle Grove offset area was assessed to determine whether operations within the Rail Link are resulting in edge effects that are impacting the condition of adjoining vegetation. Surveying was restricted to native vegetation adjoining (within 10 metres) the Rail Link. Monitoring of this vegetation is a requirement of the EPBC Condition of Approval (CoA) 5(i) (Table 1-1).

Vegetation condition was monitored by conducting 10 x 40-metre vegetation quadrats. Vegetation quadrats followed the Biodiversity Assessment Method (BAM) (DPIE EES 2020) however focused on composition and structure data; no function data was collected. Vegetation quadrats were conducted in the same location as the previous survey events to allow an accurate comparison of changes to composition across monitoring years. The location of vegetation quadrats was demarcated with a metal star picket and is given below in Table 2-2.

The following composition attributes were quantitatively assessed within vegetation quadrats:

- Percent foliage cover of canopy species
- Percent foliage cover of shrub species
- Percent foliage cover of ground cover species
- Percent foliage cover of exotic species

Table 2-2. Location details of vegetation plots in lands adjoining the Rail Link

| Plot number               | Zone | Easting | Northing |
|---------------------------|------|---------|----------|
| Eastern side of Rail Link | 56   | 308028  | 6240109  |
| Western side of Rail Link | 56   | 307993  | 6240098  |

### 2.1.2 Riparian vegetation management

Riparian vegetation monitoring is required to measure the success of bush regeneration works and track the regeneration and condition of native vegetation at Georges River and Anzac Creek management areas. Results are compared annually against the performance criteria identified in the Riparian Vegetation Management Plan ([Table 4, Riparian vegetation management monitoring report] Hyder 2015) to determine whether works are on track to achieving the RVMP objectives, which are to:

- Restore, conserve, and enhance the riparian vegetation in the Georges River and Anzac Creek sites that fall within the SIMTA Rail Corridor
- Achieve long-term eradication of weed species from the management sites
- Maintain an adequate width of riparian vegetation adjoining Georges River and Anzac Creek
- Protect and enhance fauna habitat connectivity along the Georges River and Anzac Creek riparian zone.

In April 2018, the Anzac Creek riparian management area was burned in a bushfire. Following the bushfire, asbestos was identified within the area, and since then, no bush regeneration works have been conducted within the Anzac Creek management zone. Subsequently, monitoring was not conducted by Arcadis to review bush regeneration activities within this management area. Anzac Creek riparian management area will not be reviewed further in this report.

Eight 5 x 5-metre monitoring plots were established across the Georges River management zones during the baseline survey in June 2018 (AMBS 2017). Two additional plots were established before works began on the western bank of the Georges River in September 2019 (AMBS 2017). These permanent monitoring plots were established to monitor changes in vegetation composition as well as monitor the success of plantings. The locations of each plot are detailed in Table 2-3.

At each monitoring plot, the following actions were conducted:

- Plots were divided into four segments, numbered 1 to 4, from the south east corner of the plot in a clockwise direction to the north-east corner of the plot.
- Vegetation attributes were assessed and recorded for each segment:
  - Percentage cover of weed species – percent cover in each segment was estimated for each weed species present, and a mean value for each species was calculated
  - Percentage cover of native species – percent cover in each segment was estimated for each structural layer (ground, mid and canopy), and a mean value for each structural later was calculated
  - Naturally occurring (non-planted) native species – a list of all naturally occurring native species within the plot was recorded.
- Photographs of each plot were taken from the permanent stake

Previously, the number of planted natives and naturally occurring natives were recorded separately. However, due to difficulty in distinguishing between now established planted and naturally occurring native vegetation, the methodology has been updated to exclude this delineation.

*Table 2-3 Riparian vegetation monitoring plot details*

| Management zone | Plot Number | Zone | Easting | Northing |
|-----------------|-------------|------|---------|----------|
| GZ1             | MR09        | 56   | 307302  | 6239796  |
| GZ1             | MR10        | 56   | 307310  | 6239809  |
| GZ1             | MR11        | 56   | 307296  | 6239829  |
| GZ2             | MR12        | 56   | 307261  | 6239813  |
| GZ2             | MR13        | 56   | 307249  | 6239834  |
| GZ2             | MR15        | 56   | 307245  | 6239769  |
| GZ4             | MR14        | 56   | 307229  | 6239815  |
| GZ4             | MR16        | 56   | 307222  | 6239778  |
| GZ2             | MR18        | 56   | 307152  | 6239797  |
| GZ5             | MR19        | 56   | 307158  | 6239818  |



Figure 2-1. Monitoring plot locations established by AMBS during early years of monitoring

## 2.2 Threatened flora monitoring

Threatened flora species were monitored on lands adjoining the Rail Link. The methodologies used to monitor threatened flora are discussed below.

### 2.2.1 Lands adjoining Rail Link

Monitoring of threatened flora in the areas adjoining (within 10 metres) the Rail Link was conducted to determine if operations within the Rail Link are resulting in edge effects that are impacting threatened species occurrence or individual condition.

Monitoring for threatened flora species occurrence was conducted by walking parallel field transects at three-metre spacings, marking the location of any threatened species on an Arc-GIS-enabled iPad. Notes were collected on the health of plants, including whether individuals were seeding, budding or flowering.

## 2.3 Weed management

Weed monitoring has been conducted by an ecologist on a bi-monthly basis over the 2024/2025 monitoring period: August, October, and December in 2024, and March and May in 2025.

The methodology employed to monitor weeds across the operational facility and in the Rail Link corridor is described in the bi-monthly reports, which have been included in Appendix A.

A summary of the changes to weed cover across the MIP operational facility and Rail Link for the monitoring year has been summarised in Section 3.3, and ongoing recommendations to manage weed are included in Section 4.3.

2.3.1 Weed control works

Arcadis has been engaged to oversee weed remediation works conducted by Toolijooa Environmental Restoration to reduce weed cover and prevent the spread of weeds outside of the Rail Link. Sections of the Rail Link adjoin ecologically sensitive areas, which are susceptible to invasion. Thirteen days of weed remediation works were conducted between August 2024 and May 2025. The methodology employed to monitor weed remediation works in the Rail Link corridor is described in the weed remediation summary report, included in Appendix A.

A summary of the changes to weed cover across the Rail Link as result of the targeted weed control works has been summarised in Section 3.3. A detailed memorandum has also been included in Appendix B.

2.3.2 MPW weed monitoring

Weed monitoring works were conducted in Moorebank Precinct West (MPW) on two occasions.

The initial monitoring event was conducted on 30 October 2024 supervising Toolijooa bush regenerators in the northern section of MPW, adjacent to the security building, removing weeds and trimming native species. The works at this location were to assist with APZ management.

Monitoring of the landscaped vegetation along Bushmasters Avenue was conducted on 17 April 2025 and involved observing any weed occurrences or infestations within the native vegetation.

2.4 Fauna monitoring

Surveys were undertaken to assess fauna habitat connectivity, determine feral animal presence and review the effectiveness of fauna habitat features relevant to the operation of the MIP facility. The surveys conducted have been discussed below.

2.4.1 Habitat connectivity monitoring

Anzac Creek culvert, the expanse beneath the Rail Link bridge (on the eastern side of Georges River) and three drainage outlets to Georges River were monitored using remote cameras to determine whether native fauna are using the fauna connectivity structures to move between habitat patches. A total of fourteen remote infrared cameras were deployed for between approximately four to ten weeks to photograph animals moving between habitat patches (Figure 2-2). The locations of the cameras are described in Table 2-4.

Table 2-4 Location of remote cameras monitoring habitat connectivity

| Description of location                        | Number of cameras | Total trap nights in location |
|------------------------------------------------|-------------------|-------------------------------|
| MPE                                            |                   |                               |
| Northern bank of Anzac Creek facing downstream | 1                 | 10 weeks                      |
| Northern bank of Anzac Creek facing upstream   | 1                 | 10 weeks                      |
| Southern bank of Anzac Creek facing downstream | 1                 | 10 weeks                      |
| Southern bank of Anzac Creek facing upstream   | 1                 | 10 weeks                      |
| MPW                                            |                   |                               |
| Northern side of bridge facing south           | 2                 | 10 weeks                      |
| Southern side of bridge facing north           | 2                 | 10 weeks                      |
| Southern-most outlet facing north              | 1                 | 4 weeks                       |
| Middle outlet facing north                     | 1                 | 4 weeks                       |
| Middle outlet facing south                     | 1                 | 4 weeks                       |
| Northern-most outlet facing toward the outlet  | 3                 | 4 weeks                       |

The captured view of deployed cameras at each survey location is presented in Plate 2-1 and Plate 2-2.



*Plate 2-1 Examples of remote camera deployment at Anzac Creek management site to monitor habitat connectivity. Left: Remote camera: downstream south. Right: Remote camera: upstream north.*



*Plate 2-2 Example of remote camera deployment to assess the connectivity value of the Georges River management site. Left: Remote camera facing northwest at rail underpass. Right: View of remote camera facing north at outlet basin*

Following the collection of remote cameras, captured photographs were reviewed for animal presence. A species list was generated for each camera, with dates and times recorded for threatened species observations.

## 2.4.2 Feral animal monitoring

Feral animal presence was investigated where offset sites interface with the MIP operational facility through the deployment of remote cameras. Cameras were left at a single location for approximately 4 to 10 weeks to detect feral animal activity, following which the captured images were reviewed and processed. A species list for each camera was documented.

Cameras were along access trails, internal roads and connecting passages that are likely to be used by feral animals when moving across the landscape. Locations of cameras are shown in Figure 2-2, and examples of the captured views of deployed cameras are presented in Plate 2-4.

### Moorebank Precinct East

Five remote infra-red cameras were set up along the access roads that follow the boundary fence of MPE, where it interfaces with the Wattle Grove offset area.



*Plate 2-3 Examples of feral animal remote camera deployment. The left camera faces the southern boundary of Moorebank Precinct, and the right-hand image faces the central access track in Wattle Grove offset area.*

### **Moorebank Precinct West**

Three cameras were deployed targeting pest species at the Moorebank (Georges River) offset site. One was deployed adjacent to the Rail Link bridge connectivity cameras, monitoring a hole in the fence, predicted to be used by deer, this camera was used to assess both connectivity and pest species. The other two cameras were set up in the southern section of the Georges River management site, with one facing the access track and the other near the fence bordering the MPW operational facility.



*Plate 2-4 Examples of remote cameras deployed at MPW targeting feral vertebrates. The left camera faces the internal access track in the southern section of the Georges River offset site, and the right image shows the view of a camera on an access track leading to the MPW operational area,*



Figure 2-2. Monitoring surveys conducted across MPE operational facility

### 2.4.3 Koala management monitoring

Arcadis ecologists visually inspected fencing and Koala fencing within the Wattle Grove offset area where it interfaces with the MPE Operational facility. Koala fencing, bridges and culverts were assessed for installation and condition in accordance with *Figure 9. Location of Koala Grids and Bridges*, of the Moorebank Precinct West Stage 2 Koala Management Plan (KMP) (Cumberland Ecology, 2020).

Visual inspections included an assessment of the following:

- The level of intactness of fences, identifying damage, holes, points of entry, and areas of collapse or corrosion
- Presence and condition of koala bridges across cyclone fencing
- Presence and condition of koala gates and grids at management access points Wattle Grove offset area (Plate 2-3)

Where issues were identified, photographs were captured, and locations recorded using an Arc-GIS-enabled iPad.

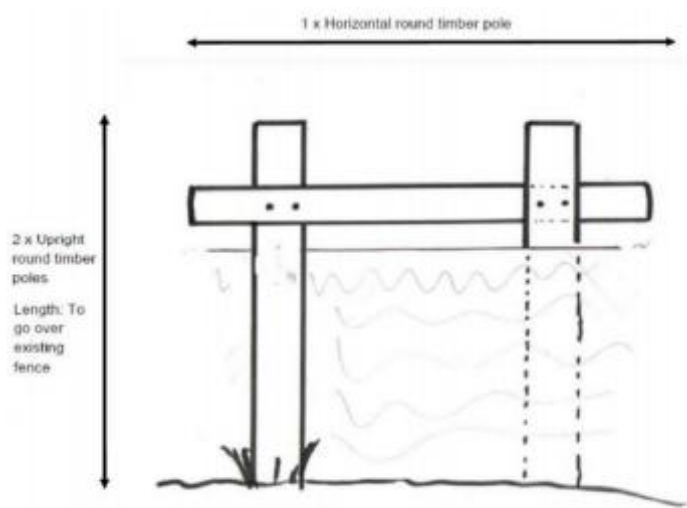


Plate 2-5 Koala structures to be constructed along the perimeter fencing. Left: Koala grids. Right: Koala bridges.

### 2.4.4 Baseline koala surveys and habitat monitoring

Arcadis ecologists performed baseline koala surveys across the MIP offset areas between December 2024 and March 2025 to establish permanent survey locations for annual koala habitat and population monitoring across the offset sites.

Survey locations were determined by overlaying a 250 x 250 metre grid on an aerial of each of the Moorebank offset sites, with permanent monitoring locations established where the centre of each grid square intersected suitable habitat. Suitable habitat was identified through the presence of preferred koala feed trees with a diameter at breast height (DBH) over 10-centimetres. The centre of each monitoring location was marked with a star-picket stake.

Rapid Spot Assessment Techniques (SATs) (Phillips et al. 2021) were conducted at these survey locations and involved the searching of the nearest 5-7 preferred koala feed trees that have a minimum DBH of 30 centimetres for koala presence through the identification of faecal pellets at the base of trees.

Additionally, nocturnal spotlighting surveys were conducted to detect the presence of koalas. These nocturnal spotlighting surveys were primarily completed on foot in areas of containing koala habitat, though vehicle-based transects were conducted along Georges River Corridor in areas of low tree density. To conduct spotlighting surveys, ecologists used high-powered handheld torches to slowly scan vegetation for eyeshine, walking at an average pace of 10 minutes per 100 metres or <5 kilometres per hour when travelling in a vehicle.

Koala habitat monitoring was conducted for the first time this monitoring period and would allow for any problems associated with the development of the biobanking sites to be detected at an early stage and appropriate ameliorative measures implemented. Habitat monitoring was conducted in permanent monitoring locations within a 50-metre diameter of each of the SAT survey stakes. Vegetation characteristics to be surveyed include:

- Tree canopy species present and estimated cover of preferred koala feed trees
- Midstorey species present and estimated total cover
- Estimated cover of midstorey weeds
- Dominant groundcover and total cover
- Any other changes or issues on site
- Photo point monitoring, capturing a view of each monitoring stake facing 0° (north) and 180° (south)

### 3 RESULTS

The results of the monitoring surveys undertaken to assess the condition of the biodiversity values within the MIP operational facility are discussed below.

#### 3.1 Native vegetation

The result of monitoring native vegetation at riparian vegetation management sites and in the lands adjoining the Rail Link are discussed below.

##### 3.1.1 Lands adjoining Rail Link

Native vegetation on either side of the Rail Link is Plant Community Type (PCT) 883 Castlereagh Scribbly Gum woodland. Assemblages on either side of the Rail Link are in good condition with low levels of weed occurrence restricted to the fence line, and a diversity of native plant species. Both patches of native woodland are fully structured, including trees, shrubs, and groundcover vegetation. No signs of natural dieback were observed during monitoring surveys, nor were any signs observed to suggest that operations within the Rail Link are having a negative impact on native vegetation. Vegetation was observed to be gaining biomass in comparison to last year.

Two vegetation quadrats were conducted within the lands adjoining the Rail Link, one on the eastern side and one on the western side. A summary of the results of quadrat monitoring is presented in Table 3-1.

Table 3-1. Results of vegetation quadrat monitoring

| Vegetation attribute | Monitoring quadrat on western side of Rail Link (Q1) |          | Monitoring quadrat on eastern side of Rail Link (Q2) |          |
|----------------------|------------------------------------------------------|----------|------------------------------------------------------|----------|
|                      | Cover (%)                                            | Richness | Cover (%)                                            | Richness |
| Native canopy        | 16.5                                                 | 3        | 23                                                   | 3        |
| Native shrub         | 22.2                                                 | 17       | 17.9                                                 | 19       |
| Native groundcover   | 19.6                                                 | 18       | 14.3                                                 | 16       |
| Total native         | 58.3                                                 | 38       | 56.5                                                 | 41       |
| Total exotic         | 0.4                                                  | 4        | 0.3                                                  | 3        |
| High threat exotic   | 0.1                                                  | 1        | 0.1                                                  | 1        |

Five species of exotic plants were recorded during quadrat monitoring, these were: *Senecio madagascariensis* (Fireweed) which is also listed as a High Threat Weed; *Salvia sp.* (Sage), *Medicago polymorpha* (Burr Clover), *Verbena bonariensis* (Purple Top) and *Plantago lanceolata* (Ribwort). Exotic species accounted for a low cover across both quadrats, equating to 0.4 and 0.3 percent, respectively in each quadrat. Exotic species were mainly restricted to disturbed areas immediately adjacent to the Rail Link. Weeds are mostly present in areas that were disturbed during the construction of the Rail Link rather than in areas of intact native vegetation that did not experience disturbance.

##### 3.1.2 Riparian vegetation management

The 2024/2025 survey marked the twelfth time monitoring has occurred for revegetated areas on the eastern side and seventh time on the western side of the Georges River management site. A total of 39 exotic species and 50 native species were recorded across the management site. A summary of exotic and native vegetation cover is presented in Appendix F.

The results demonstrate an increase in exotic cover at three of the monitoring quadrats (MR10, MR12, and MR13), with the largest increase in exotic cover observed at MR13, which increased from 16.3% to 25% between January 2024 and April 2025, represented as light-blue in Figure 3-1. Despite native species still being present weeds have quickly colonised all bare areas and have suppressed native

species from colonising and having high increases in cover. Other locations where increases in weed cover have been recorded are located on the edges of the management zone and are experiencing weed encroachment from less managed adjoining areas.

Seven monitoring quadrats recorded a decrease in exotic cover (MR09, MR11, MR14, MR15, MR16, MR18 and MR19). The lowest exotic cover was recorded at MR14, which decreased from 11.8% in January 2024 to 2.75% during the current surveys. Exotic vegetation cover has remained low in MR10 only, in comparison to the other eight monitoring quadrats. This location received a high density of native plantings during the revegetation project and follow-up maintenance by a trained bush regeneration contractor. Native plantings in these locations quickly established and begun colonising bare areas, however majority of this area still has areas of bare ground which are avoiding colonisation of weed species. This may be due to this locations elevation being higher than surrounding plots, which limit weed incursion from flooding events.

The average weed cover for the entire management site was 10.55%, which was less than what was recorded during the 2023/2024 monitoring event (17.6%).

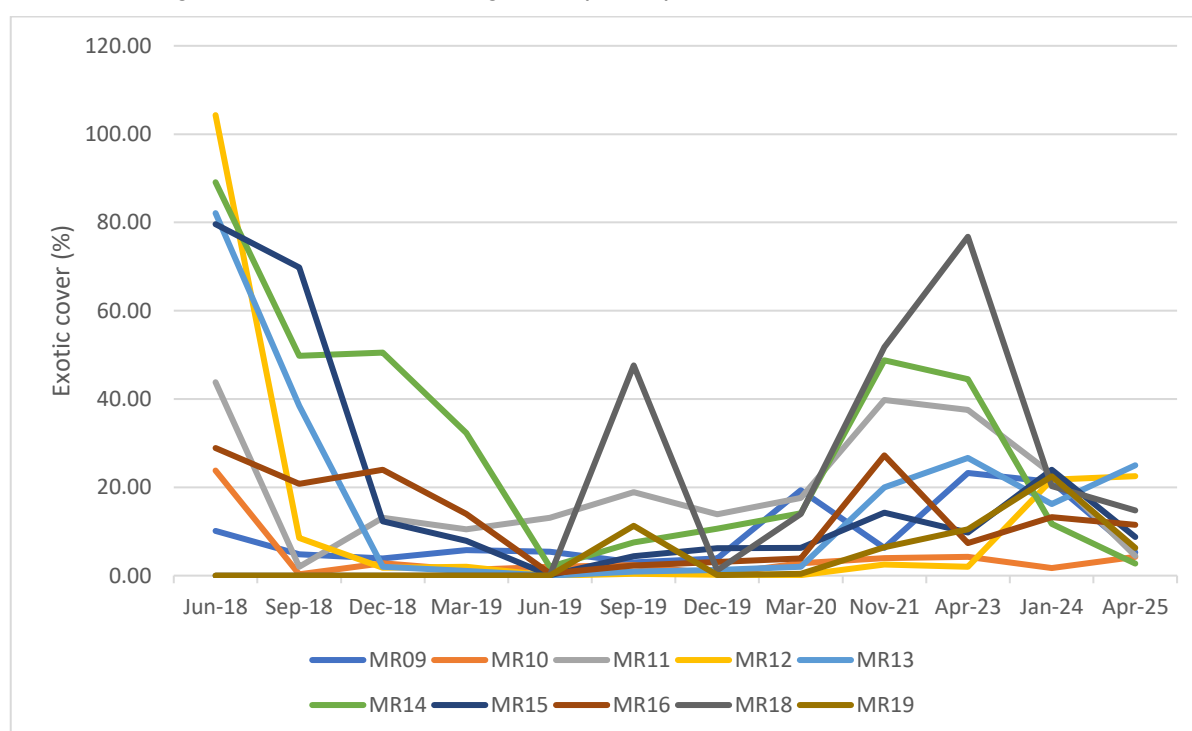


Figure 3-1 Line plot outlining the trajectory of the exotic cover percent over the past twelve times of monitoring at all ten monitoring sites

An increase in native species cover was observed at five of the monitoring quadrats (MR12, MR13, MR14, MR15 and MR18), while the other five quadrats recorded a decrease in native cover. The largest increase in native species cover was recorded at MR15, which increased from 2.3% to 30.8% between January 2024 and April 2025. Vegetation at this quadrat consisted of *Casuarina glauca* (Swamp Oak), *Melaleuca decora*, *Commelina cyanea* and *Dodonaea truncatiales* (Angular Hop-bush). MR16 saw the greatest decrease in native cover between January 2024 and April 2025, with a decrease from 45% to 12.6%. Encroachment from weeds from areas outside of the management site resulted in decrease in native cover at this location. Native vegetation cover in all monitoring quadrats decreased by an average of 12% (Figure 3-2).

The average native cover for the entire management site was 13.7%, which was less than what was recorded during the 2023/2024 monitoring event (16.9%).

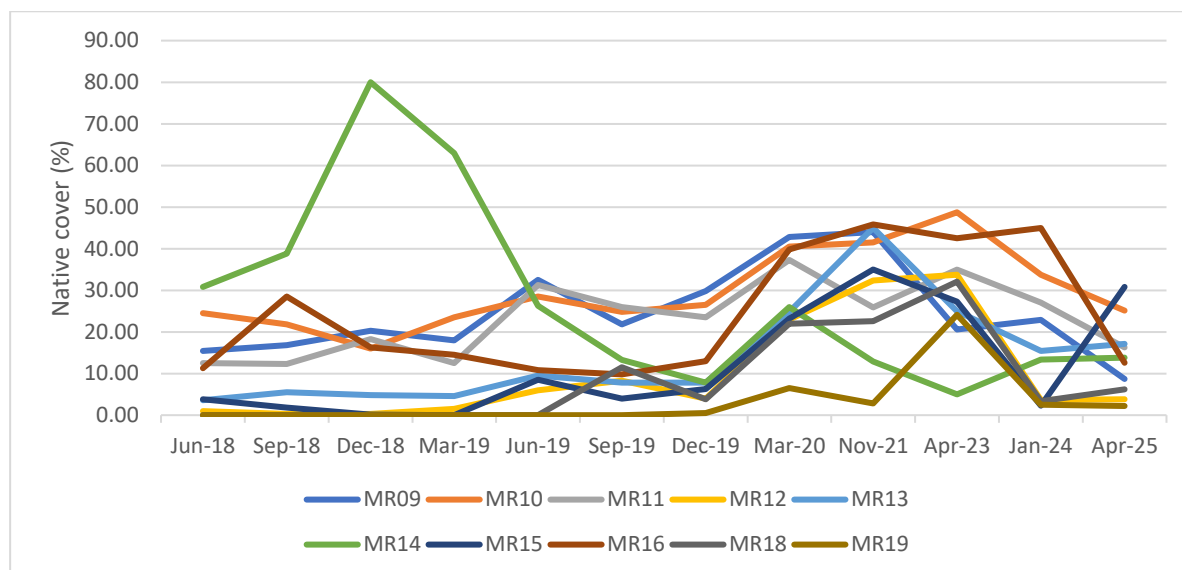


Figure 3-2 Line plot outlining the trajectory of the native cover percent over the past twelve times of monitoring at all ten monitoring sites

Plantings for the Georges River management site were selected based on species included in the River-Flat Eucalypt Forest on Coastal Floodplains of the NSW North Coast, Sydney Basin and South East Corner Bioregions (RFEFCF) Endangered Ecological Community (EEC). Ongoing monitoring of the revegetation areas focused on reviewing the survival and persistence of planted species commensurate with the EEC. A suite of shrub and groundcovers species were recorded which are characteristic of RFEFCF, including *A. parramattensis* (Parramatta Wattle), *Austrostipa ramosissima* (Stout Bamboo Grass), *Echinopogon ovatus* (Forest Hedgehog Grass) and *Melaleuca styphelioides* (Prickly-leaved Tea Tree). A comparison of the species recorded during plot monitoring with species characteristic of the RFEFCF EEC is included in Appendix E.

Plantings have displayed significant growth over the past seven years. Individual plantings are mostly indistinguishable from each other however there are still patches of bare ground (particularly at M19) which could encourage weed incursion. Native and exotic cover within plot locations varied over the past seven years of monitoring.

For example, five plots (MR12-15 and MR18) showed an increase in native cover between January 2024 and April 2025. The remaining plots all experienced decreases. This contradicts previous recordings over the years, where some plots have experienced opposing circumstances to what was recorded during this monitoring period. Various in rainfall, flooding events, and warm weather can all contribute to increased weed species, and therefore suppression of native species.

An inventory of native flora species recorded within the fixed monitoring quadrats has been included in Appendix E, and photo points are included in Appendix G.

## 3.2 Threatened flora

The results of monitoring threatened flora are discussed below.

### 3.2.1 Lands adjoining Rail Link

Parallel field transect identified two threatened plant species within 10 metres of the Rail Link corridor fencing. Both species had been recorded during previous monitoring surveys:

- *Persoonia nutans* (Nodding Geebung)
- *Hibbertia puberula* subsp. *puberula*

*Grevillea parviflora* subsp. *parviflora* (Small-flower Grevillea) was identified in the south-west corner of the western side of the Rail Link in 2023, however was not identified in 2024. *Acacia bynoeana* (Bynoe's Wattle) was recorded in the 2021 monitoring survey but has not been recorded since. One individual of

*Persoonia nutans* (Nodding Geebung) was identified at the north-eastern extent of the survey area, which marks the fourth occurrence of this species within 10 metres of the Rail Link in the past three years of monitoring. *Persoonia nutans* was first observed during the 2021 monitoring survey.

*Hibbertia puberula* subsp. *puberula* was observed in high numbers, particularly at the southern extent of the survey area on the eastern side of the Rail Link. Individuals appeared to be in a healthy condition, with some bearing flowers and seeds. The locations of threatened plants have been presented in Figure 3-3.

Table 3-2 provides the listing status for the threatened plant species located and a count for the number of individuals found.

Table 3-2. Threatened plant species identified within lands adjoining the operational Rail Link

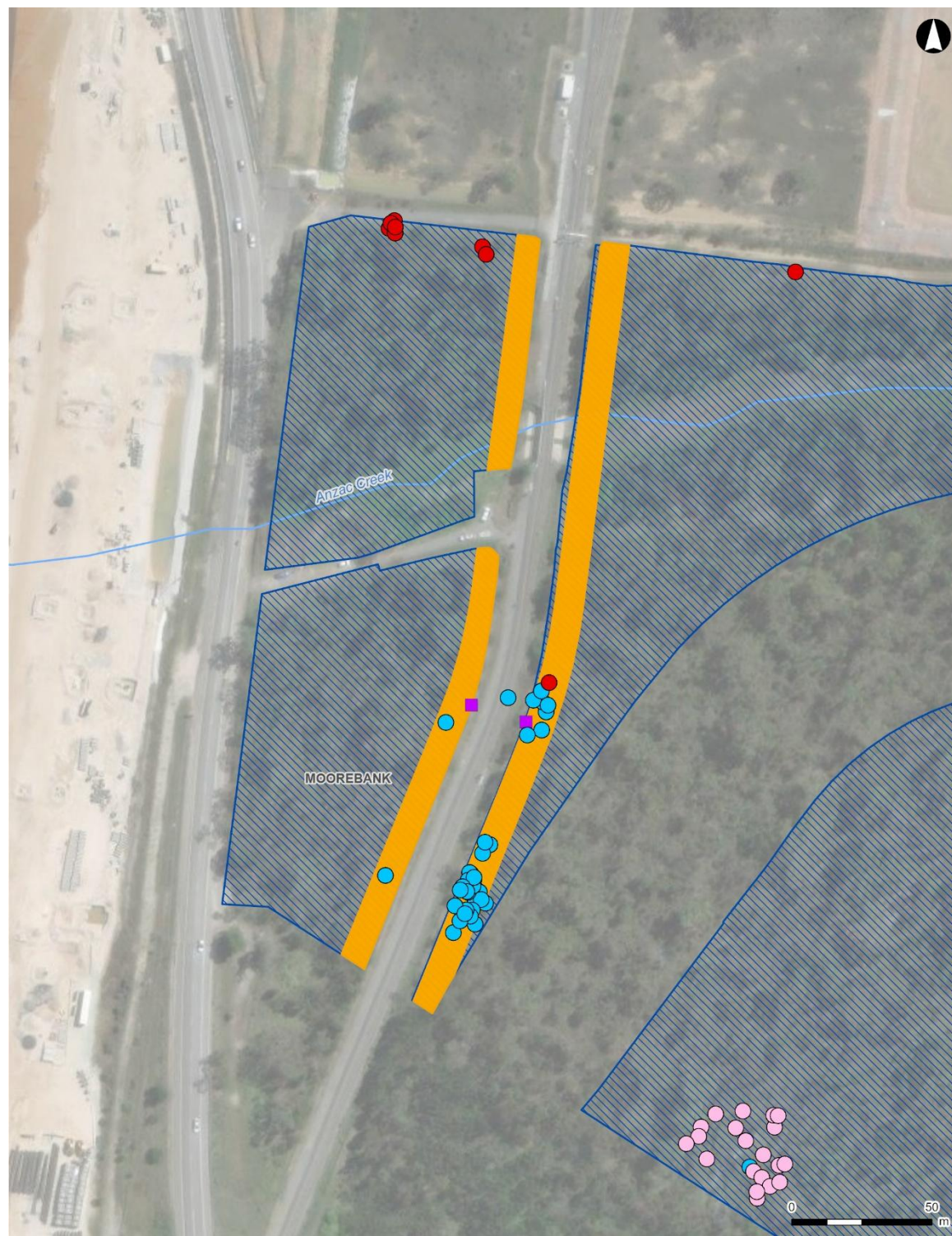
| Species                                          | Listing status                             | Number of individuals identified |
|--------------------------------------------------|--------------------------------------------|----------------------------------|
| <i>Hibbertia puberula</i> subsp. <i>puberula</i> | BC Act: Endangered<br>EPBC Act: Not listed | 65                               |
| <i>Persoonia nutans</i><br>(Nodding Geebung)     | BC Act: Endangered<br>EPBC Act: Endangered | 1                                |

Changes to the number of individuals of the observed threatened plant species are shown below in Table 3-3.

Table 3-3 Changes to numbers of individuals of the four threatened plant species identified on lands adjoining the Rail Link

| Species                                                                       | Number individuals detected 2023/2024 | Number individuals detected 2024/2025 | Change |
|-------------------------------------------------------------------------------|---------------------------------------|---------------------------------------|--------|
| <i>Acacia bynoeana</i> (Bynoe's Wattle)                                       | 0                                     | 0                                     | 0      |
| <i>Grevillea parviflora</i> subsp. <i>parviflora</i> (Small-flower Grevillea) | 3                                     | 0                                     | -3     |
| <i>Hibbertia puberula</i> subsp. <i>puberula</i>                              | 77                                    | 65                                    | -12    |
| <i>Persoonia nutans</i> (Nodding Geebung)                                     | 1                                     | 1                                     | 0      |

No impacts were observed to native vegetation or threatened species outside of the rail corridor because of operation or ongoing management activities within the Rail Link.

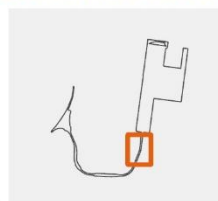


Legend

- Wattle Grove offset area
- Land adjoining (with 10 metres of) the Rail Link
- Watercourse
- Vegetation quadrat

Threatened Flora

- Grevillea parviflora* subsp. *parviflora*
- Hibbertia puberula* subsp. *puberula*
- Persoonia nutans*



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Date issued: May 4, 2025  
Imagery: Esri



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Figure 3-3. Results of monitoring lands adjoining the operational Rail Link

### 3.3 Weed management

#### Moorebank Precinct East

During operational monitoring, *Eragrostis curvula* (African Lovegrass) was identified at three EPBC Offset Areas (P1, P2 and P3). *Eragrostis curvula* is dominating the edges of these areas hugging the roadside and outcompeting native understorey species.

Location of these occurrences are compiled in Table 3-4 below.

Table 3-4 Incidental observations of weed outbreaks in Wattle Grove offset area

| Species present                               | Offset site | Latitude    | Longitude (WSG 1984) |
|-----------------------------------------------|-------------|-------------|----------------------|
| <i>Eragrostis curvula</i> (African Lovegrass) | P1          | -33.960626° | 150.922054°          |
|                                               | P2          | -33.960626° | 150.922962°          |
|                                               | P3          | -33.960421° | 150.926238°          |

Three additional priority weed species, as listed for the Greater Sydney Local Land Services Region, were identified on the MPE operational facility and Rail Link during the monitoring year, including *Lantana camara* (Lantana), *Ludwigia peruviana* (Ludwigia), and *Senecio madagascariensis* (Fireweed). Priority weeds were sparsely scattered, mainly located within the Rail Link corridor. Despite the presence of some exotic species, as of April 2025, all **priority weeds** along the rail corridor were removed except for Fireweed which requires ongoing control to eradicate. Each bi-monthly weed monitoring survey site are included in Appendix A.

Weed cover across the MPE operational facility was generally low throughout the monitoring year. Minor changes in weed cover and exotic species diversity were observed in landscaped areas around warehousing units, within trunk drainage infrastructure running along the western boundary, and in drainage swales at the north-eastern extent of the site. This was maintained by regular mowing, which reduces occurrences of *Chloris virgata* (Rhodes Grass). Ongoing, periodic weed control works carried out in these areas were observed to be sufficient in maintaining a low weed cover and promoting an increase in cover of native species like *Daviesia ulicifolia* (Gorse Bitter Pea), *Acacia falcata* (Sickle Wattle), *Persicaria decipiens* (Slender Knotweed), *Typha orientalis* (Bulrush), *Chloris truncata* (Windmill Grass) and *Ficinia nodosa* (Knobby Club Rush).



Plate 3-1 Photographs captured during the February 2025 inspection showing low weed cover in the Rail Link. Native grasses have begun heavily colonising the on soft batters on either side of the rail line.

The Rail Link experienced a steady decrease in weed coverage over the monitoring year. A large-scale remediation project commenced in early spring 2020 in the Rail Link to remove weeds from soft landscaped areas and revegetate with native plant species. Bi-monthly surveys over the past monitoring year have monitored the progress of this remediation project and provided an ongoing assessment of the cover of weeds and the striking of native seeds. Generally, the cover of exotic plant species was consistent over the past year, with a cover of 0.4 and 0.3 percent across Q1 and Q2 respectively, consistent with the previous year's survey findings. Five species of exotic plants were recorded these were: *Senecio madagascariensis* (Fireweed) which is also listed as a High Threat Weed; *Salvia sp.* (Sage), *Medicago polymorpha* (Burr Clover), *Verbena bonariensis* (Purple Top) and *Plantago lanceolata* (Ribwort). High Threat weeds were reduced to just Fireweed which requires ongoing management.

A targeted large-scale effort to reduce the biomass of exotic species and eradicate aggressive grasses impacting native seedlings commenced in December 2022. As of May 2025, 28 days of weed control works had been completed. The weed control works conducted by Toolijooa Environmental Restoration and overseen by Arcadis successfully reduced weed biomass whilst maintaining native species. These works were specific to the Rail Link. Efforts to control/suppress weeds were focused on weed species that were having a detrimental impact on native seedlings, mainly competitive exotic grass species. Targeted weed control works included herbicide spraying and slashing.

Over the period that weed control works were undertaken native plants were observed to be increasing in size and colonising new areas. Native species observed included *Melaleuca nodosa* (Prickly-leaved Paperbark), *Leptospermum parvifolium* (Small-flowered Tea Tree), *Leptospermum trinervium* (Woolly Tea Tree), *Empodisma minus* (Wire Rush) and *Hakea sericea* (Silk Hakea).



Plate 3-2. Soft batters in the Rail Link corridor following weed removal works by Toolijooa.

### Moorebank Precinct West (MPW)

Results of the initial weed removal supervision works in October 2024 involved the successful removal of minor weed species, and trimming of several *Acacia* sp. in the APZ area between the BioBank site and the MPW operational areas.

Weed monitoring conducted in April 2025 concluded that the landscaped areas along Bushmasters Avenue are in good condition, with minor weed incursions of *Sonchus oleraceus* (Common Sowthistle), *Chloris virgata* (Rhodes Grass), *Bidens pilosa*, *Conyza bonariensis* (Fleabane), *Cyclospermum leptophyllum* (Slender Celery), and *Tagetes minuta* (Stinking Roger). Whilst the current levels of these weeds are low, if continued maintenance of these landscaped areas is not frequent enough their coverage could increase. This is pertinent for areas where landscaped species have died back, and bare ground is more abundant (Plate 3-3).



Plate 3-3 Areas of bare ground along Bushmasters Avenue which could be colonised by weed species

The following reports have been completed throughout the year to document weed control works being undertaken within the Rail Link and broader operational area. These reports have been included as Appendices to this report:

- Bi-monthly weed monitoring reports (May 2024 – May 2025) (Appendix A)

## 3.4 Fauna

The results of monitoring fauna habitat connectivity, feral animals and the effectiveness of fauna habitat features across the MIP operational area are discussed below.

### 3.4.1 Habitat connectivity

A total of fourteen connectivity cameras deployed. Four surrounding Anzac Creek within the Wattle Grove Offset Area and ten within the Georges River management site, four beneath the Rail Link bridge and the other six around the three outlet basins to the Georges River.

#### Moorebank Precinct East

Remote infra-red cameras captured a suite of native and introduced fauna utilising the Anzac Creek culvert to move between patches of bushland within Wattle Grove offset area. Native terrestrial fauna recorded included Koala (*Phascolarctos cinereus*), listed as Endangered under the BC Act and EPBC Act, as well as common native species such as Swamp Wallaby (*Wallabia bicolor*) (Plate 3-3), Eastern Grey Kangaroo (*Macropus giganteus*), Common Brushtail Possum (*Trichosurus vulpecula*), Australian Magpie (*Gymnorhina tibicen*), Australian Raven (*Corvus coronoides*) and Australasian Swamphen (*Porphyrio melanotus*). Introduced fauna recorded included Red Fox (*Vulpes vulpes*) and Black Rat (*Rattus rattus*).

#### Moorebank Precinct West

Eight terrestrial fauna species were recorded on remote cameras, moving beneath the Rail Link bridge (on the eastern side of Georges River) and around the outlet basins. Species identified included three native species, Swamp Wallaby, Laughing Kookaburra and Eastern Grey Kangaroo and five pest species: Rusa Deer (*Rusa timorensis*), Red Fox, Common Myna, Brown Hare and Domestic Cat (Plate 3-5). No cameras captured fauna using the woody debris to cross the ballast.

Two cameras that had been deployed, one under the Rail Link Bridge and one facing the northern-most basin, were missing at the time of collection. As a result, no records from these cameras are available.



*Plate 3-4 Fauna captured on remote cameras using fauna furniture to move between patches of bushland crossing Anzac Creek. Top Left: Koala. Top Right: Swamp Wallaby. Bottom Left: Red Fox (exotic).*



*Plate 3-5 Fauna species identified beneath the Rail Link bridge (on the eastern side of Georges River).*

A complete list of fauna recorded on remote cameras at Anzac Creek culvert and in the Georges River management site has been included in Appendix B.

### 3.4.2 Koala management

To date, no Koala bridges or grids have been constructed as per the MIP Koala Management Plan (KMP) (Cumberland Ecology 2020). Fauna ramps were located at Anzac Creek culvert, which are providing connectivity between patches of bushland for Koala. Fauna ramps were observed to be in good

condition. The condition of perimeter fencing separating the Wattle Grove offset area from the MPE operational facility was found to be in good condition with no maintenance issues.

### Baseline koala surveys and habitat monitoring

During targeted Koala surveys at least two Koalas were detected. Koala Spot Assessment Technique Surveys were conducted over three days 17<sup>th</sup>, 18<sup>th</sup> and 19<sup>th</sup> of December 2024 and on the 21<sup>st</sup> of February 2025. Nocturnal spotlighting surveys were conducted on the 17<sup>th</sup> and 19<sup>th</sup> of December. From these surveys, Koala scats were found across Wattle Grove and Moorebank Offset Site. Identified Koala trees (as listed under *the State Environmental Planning Policy (Koala Habitat Protection) 2021* and by NSW Environment and Heritage) were searched at each SAT site. Scats were identified under *Eucalyptus microcorys* (Tallowwood), *Eucalyptus tereticornis* (Forest Red Gum), *Eucalyptus haemastoma* (Scribbly Gum) and *Eucalyptus crebra* (Narrow-leaved Ironbark). Furthermore, one Koala was observed during spotlighting on the 17<sup>th</sup> of December at the western edge of the east precinct. On the 19<sup>th</sup> of December during spotlighting one Koala was observed along the northern edge of the east precinct. Over an hour after this initial observation, approximately 0.5kms away, Koala growling calls were heard. This was presumed to be a second Koala considering the calls volume, which suggested that the Koala was close. Furthermore, two Koalas were detected on cameras on the same night (17/11/2024) on the Central Track and at Anzac Creek these records are ~2hrs and 1km apart, inferring these are likely two separate koalas. Another Koala was recorded of a pest animal camera trap (March 2025) at MPW beside the Georges River.

The dates, time and location of Koala detection by remote cameras include:

- 21/10/2024 at 12:29am along the south-end of the Central track
- 16/11/2024 at 11:13pm and 17/11/2024 at 12:04am along the Central track
- 17/11/2024 2:25 am along the South-east corner of Anzac Creek
- 3/2/2025 18.57pm along the track beside the Georges River

Koala habitat monitoring conducted found that the majority of sites were classified as juvenile and maturing forests as most eucalypts had narrow DBH (<50cm), likely due to signs of historical timber removal. The preliminary habitat assessments identified that the Wattle Grove and Georges River Corridor offset sites had very different habitat types and species composition in the canopy layer, though both could support Koalas. While the shrub density between both offset sites were similar and had the potential to impede koala movement, Wattle Grove frequently contained dense stands of native shrubs, while the Georges River offset was dominated by invasive shrubs. The Georges River offset site has been subject to clearing of Lantana, improving suitability for Koalas.

## 3.4.3 Feral animals

### Moorebank Precinct East

Remote camera monitoring identified five feral animal species within Wattle Grove offset area, immediately adjacent to the MPE operational facility. Feral animals recorded included, Domestic Cat (*Felis catus*), Red Fox (*Vulpes vulpes*), Brown Hare (*Lepus europaeus*), and Black Rat (*Rattus rattus*) (Plate 3-6). It is anticipated that these feral animals are using the MPE operational facility when moving around the local landscape.

Remote cameras targeting feral animals were deployed at six locations along the north and western boundaries of the Wattle Grove offset area, nearest to the operational facility. Red Fox was captured on all cameras except three, including the four remote cameras deployed at Anzac Creek assessing connectivity. Black Rat was detected on three cameras at Anzac Creek. At least two distinct cats were recorded on remote cameras. Several Red Fox individuals were detected on remote cameras in MPE, including two juvenile foxes, demonstrating breeding is likely to be occurring onsite. Foxes were also recorded preying on native wildlife numerous times throughout the monitoring period, indicative of the direct impact of pest species on native wildlife within adjacent bushland areas.

In addition to detections on remote cameras, Red Fox was incidentally observed in the southeastern corner of the Wattle Grove offset site during surveys in May 2025.

### Moorebank Precinct West

A total of three remote cameras were deployed within the Georges River management site for feral animal monitoring. Feral animals recorded included Domestic Cat (*Felis catus*), Red Fox (*Vulpes vulpes*), Brown Hare (*Lepus europaeus*), and Rusa Deer (*Cervus timorensis*), with Common Myna (*Acridotheres tristis*) additionally recorded on habitat connectivity cameras. Red Fox and Rusa Deer made up the majority of captured images with consistent records across the camera deployment period.

In addition to the detections of these species on remote cameras, Red Fox and Brown Hare were observed several times incidentally in the Georges River offset area during the monitoring period, along the internal access tracks and near the outlet basins.

A complete list of fauna recorded on remote cameras has been included in Appendix B.



Plate 3-6 Feral animal species within the MIP operational facility. Top left: Feral cat. Top right: Two juvenile red foxes. Bottom left: Brown Hare.

## 4 DISCUSSION AND RECOMMENDATIONS

An assessment of the various monitoring requirements for the MIP operation facility has been discussed below. Where necessary, recommendations have been included to improve or enhance the management of biodiversity values.

### 4.1 Native vegetation

A discussion of the monitoring results for assemblages of native vegetation required to be managed as a component of operations of the MIP operational facility is included below with recommendations to further improve the condition.

#### 4.1.1 Lands adjoining Rail Link

Castlereagh Scribbly Gum woodland (PCT 883) adjacent to the Rail Link is in good condition and has low levels of weeds. There was a high diversity of native plant species within the patches, with the native woodland assemblage being fully structured, including trees, shrubs and native groundcover vegetation.

No signs of change (i.e., dieback) were observed by ecologists in vegetation either side of the Rail Link. A comparison of quadrat data with previous years monitoring data does indicate that the patches have changed slightly with a reduction in native cover and richness. Some discrepancies can be explained due the timing of surveys between monitoring years and potentially climatic variables (i.e., significant rainfall in 2022/23). A decrease in exotic species diversity was recorded across Q1 with a slight increase in Q2, the total cover was largely the same as what was observed in 2023/2024.

Table 4-1. Comparison of vegetation quadrat data between 2022-2024 and 2024/2025 monitoring events

| Plot            | Eastern (Q2) |           |           | Western (Q1) |           |           |
|-----------------|--------------|-----------|-----------|--------------|-----------|-----------|
| Survey period   | 2022/2023    | 2023/2024 | 2024/2025 | 2022/2023    | 2023/2024 | 2024/2025 |
| Native cover    | 52.6         | 79        | 56.5      | 80.7         | 72        | 58.3      |
| Native richness | 52           | 48        | 41        | 46           | 48        | 38        |
| Exotic cover    | 0.5          | 0.3       | 0.4       | 0.6          | 0.4       | 0.3       |
| Exotic richness | 10           | 3         | 4         | 5            | 4         | 3         |

Data collected over the last three years indicates that the operation of the Rail Link is having a negligible impact on adjoining patches of native vegetation. Exotic species are still being recorded in the offset area; however, they are mostly restricted to already disturbed edges within the former construction footprint of the Rail Link. Over the period that these patches of native vegetation have been monitored encroachment of weeds into non-disturbed, natural areas has been minor. Of the weeds species recorded only *Senecio madagascariensis* (Fireweed) has been observed successfully colonising the natural areas. The lower nutrient soils of natural areas which have a high composition of sand is likely to be unsuitable to the exotic species growing in the Rail Link and is inhibiting encroachment.

Ongoing operation of the Rail Link should include management of soft landscaped areas within the corridor to minimise the movement of weeds into adjacent areas of native vegetation. Contractors undertaking weed control works should employ techniques that do not risk impacts to native vegetation like hand weeding, targeted slashing, and spot spraying with herbicide. Indiscriminate hi-volume spraying should be avoided. The management contractor for the Wattle Grove offset site should be made aware of minor weed encroachment from the Rail Link and undertake semi-regular targeted weed control works to remove any colonising weeds and maintain the good condition of native vegetation within the 10-metre corridor. Recommended management actions to maintain/enhance the condition of native vegetation adjacent to the Rail Link have been summarised in Table 4-2.

Table 4-2. Recommended management actions to maintain/enhance the condition of native vegetation adjacent to the Rail Link

| Identified Issue                                                                                                                                                                                          | Recommended action                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Increased cover and abundance of weeds on soft landscapes areas within the rail link corridor which are encroaching on adjacent patches of native vegetation.                                             | Hi-volume spraying of herbicide within the Rail Link in areas adjacent to native vegetation (specifically the BA341 biobank site) should not be conducted.<br>Weed control works within these areas should include manual removal or spot spraying with herbicide. Spot spraying with herbicide should only be undertaken during optimal conditions to avoid spray drift.                                                                                |
| Occurrence of weeds immediately outside the rail corridor fencing on areas disturbed during construction of the Rail Link.<br><br>Potential for these weeds to infiltrate the adjacent native vegetation. | These areas should be subject to on-going monitoring to determine whether weeds from the Rail Link are infiltrating and degrading the condition of native vegetation.<br><br>The management contractor for the Moorebank biobank site should be made aware of potential weed encroachment from the Rail Link and undertake semi-regular targeted weed control works to remove any colonising weeds and maintain the good condition of native vegetation. |

4.1.2 Riparian vegetation management

With the Georges River management site, on the eastern side of the Georges River, being incorporated into the BA341 biobank site, native vegetation and biodiversity values are subject to improvement through a combination of management activities including weed removal, bush regeneration, soil stabilisation and habitat enhancement. In 2022 EcoLogical was engaged by National Internodal (owner of the BA341 biobank site) to commence active management of the biobank site (which includes this management site). EcoLogical has been undertaking targeted weed control works throughout this area including brush cutting, careful spot spraying with herbicide and hand weeding targeting the following aggressive weed species: *Asparagus asparagoides* (Bridal Creeper), *Senecio madagascariensis* (Fireweed), *Conyza* sp. (Fleabane), *Lantana camara* (Lantana), *Ligustrum* sp. (Privet) and *Acetosa sagitta* (Turkey Rhubarb). This report should be provided the bush regeneration contractor for their reference and consideration when planning and scheduling works over the coming year.

The Georges River management site on the western side of the Georges River is not incorporated into the BA341 biobank site and is not subject to the management activities being undertaken by EcoLogical. No evidence of bush regeneration works has been observed in this location since the last monitoring survey in 2024. It is recommended that a bush regeneration contractor should be procured to remove weeds and support native plantings. Weeds should be removed, and native species cover increased. The removal of weeds may create enough space for native species to naturally colonise surrounding areas, however if this is not observed additional tube stock plantings should be installed.

No particular trends in vegetation condition have been observed across the management site since the previous monitoring year.

A review of the monitoring data and vegetation condition across the management site has been assessed against the Key Performance Indicators (KPIs) of the Riparian Vegetation Management Plan (RVMP) (Hyder 2015) in Appendix D. A summary of performance against the relevant KPIs has been included below in Table 4-3.

Table 4-3. Summary of performance against project KPIs

| Key Performance Indicator                                                                                                                                         | Status                                                                                                                             |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------|
| Gradual improvement of native plant establishment with the aim of achieving 80 percent cover of native vegetation after five years following the initial planting | KPI completion date: Western side (June 2024); Eastern side (December 2024)<br><br>Plans have failed to successful fulfil this KPI |

| Key Performance Indicator                                                                                                                   | Status                                                                            |
|---------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|
| Gradual reduction in weed density to 5 percent of the total area of each management site (eastern bank of Georges River)                    | KPI completion date: June 2023<br>Plans have failed to successful fulfil this KPI |
| Reduction in weed density to 5 percent of the total area of management site 5 years after construction (western bank of Georges River only) | KPI completion date: June 2023<br>Plans have failed to successful fulfil this KPI |
| Gradual extension of native plant cover in each management site through natural regeneration                                                | In progress – works required                                                      |
| Stability of riparian banks, including maintenance or reduction of erosion within management sites                                          | Achieving                                                                         |
| Re-establish and maintain connectivity for fauna habitat, particularly in the Georges River management site.                                | In progress – works required and review of adequacy site.                         |

Additional works are required across the management site to achieve the KPIs and restore native riparian vegetation across the Georges River management site. Recommendations for revegetation, weed control and connectivity enhancement are included in Table 4-4.

*Table 4-4. Recommended actions to increase the ecological value of the Georges River management site*

| Identified Issue                                                                 | Recommended action                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Increased weed coverage within revegetation areas                                | The bush regeneration contractor for the BA341 biobank site should be notified of the RVPM and the objectives for the Georges River management site.<br>A bush regeneration contractor should be on-boarded to undertake weed control and revegetation in the Casula offset area.<br>The condition of revegetated areas should be improved through weed removal. Scattered weeds and isolated infestations should be removed from the management site. Natural regeneration of native species should be assisted, however if this is not observed tube stock plantings should; be installed in areas where weeds have been removed. |
| Encroachment of weed species from adjacent areas of infested bushland            | The installation of a sediment fence to limit the amount of weed seed being transported into the revegetated site should be considered if the encroachment is continuing despite routine weeding exercises.                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Bare patches between plantings on the eastern side of Georges River              | Encourage natural recruitment of native species by maintaining low levels of weeds in bare areas between plantings.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Bare and weedy areas surrounding plantings on the western side of Georges River. | Infill planting with native tube stock should be considered if natural recruitment is not observed in bare areas beneath the Rail Link bridge. Plantings should be commensurate with species present in the RFEFCF vegetation community.                                                                                                                                                                                                                                                                                                                                                                                            |

4.2 Threatened flora

4.2.1 EPBC Offset Sites

As per the 2020 Moorebank Intermodal Facility - Threatened Flora Offset Management Plan (TFOMP), Section 6.3 provides potential scenarios to manage threatened species population declines with remedial actions (Arcadis 2020b). *Persoonia nutans* totalled 112 individuals in 2019 across three offset sites, with P4 being added in 2020 after the fire, increasing the number of individuals to 133. Across the 2024/2025 monitoring period 80 individuals were detected. As there is a measured population decline greater than 25% of stem count for *Persoonia nutans* over the past 5-year monitoring period, the below remedial actions are required (Table 4-5).

As per the TFOMP, if remedial actions listed are implemented, Cth. DAWE (now Cth. DCCEEW), will need to be notified. Should additional actions be required, DCCEEW would need to be consulted and, if necessary, the TFOMP would be updated. Any updates would require written approval from the Minister under Condition 14 of EPBC 2011/6229 Conditions of Approval.

Table 4-5 Potential remedial actions to manage population fluctuations within the offset sites from the 2020 Moorebank Intermodal Facility Threatened Flora Offset Management Plan

| Scenario                                                                    | Remedial Action                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|-----------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Population decline of greater than 25% of stem count within a 5-year period | <p>Identify and document visible causes of population decline such as habitat degradation, unauthorised access or fire.</p> <p>Consider and document any climatic events that could have resulted in population fluctuations such as unseasonably hot or dry conditions.</p> <p>Review the use of herbicide for weed control within the offset site and in adjacent areas. Implement manual (rather than chemical) weed control methods within a buffer zone to the EPBC offset site if appropriate.</p> <p>Consider the impact of long-term bush restoration and native species establishment on the populations of threatened species within the offset site. For example, promotion of native shrub recruitment could result in shading of threatened species seedlings. In such instances thinning of the native shrub layer (excluding the threatened species) may be required.</p> <p>Seed collection and/or propagation of cuttings from a selection of individuals to preserve the genetic material of the population, should the population decline continue.</p> |

4.2.2 Lands adjoining the Rail Link

Threatened species transect identified three threatened plant species within 10 metres of the Rail Link corridor fencing, including *Persoonia nutans* and *Hibbertia puberula* subsp. *puberula*. Individuals of these threatened species were mostly observed to be in good condition. *Grevillea parviflora* subsp. *parviflora* was identified in the Rail Link in 2023, however was not identified in 2024. The number of individuals of *Persoonia nutans* remained the same (one individual) and *Hibbertia puberula* subsp. *puberula* decreased by twelve. The threatened plant species *Acacia bynoeana* (Bynoe’s Wattle) was not recorded during the survey and is likely to have perished in this location.

Large amounts of rainfall experienced during winter 2022 was observed to negatively impact populations of Bynoe’s Wattle in adjoining areas of habitat. It is possible that the large amounts of water have also resulted in the demise of individuals within 10 metres of the Rail Link corridor, which have still not recovered in 2024. No evidence was observed to indicate that the operation or ongoing management of Rail Link contributed to the loss of individuals. It should be noted that the Rail Link does not increase surface run off into areas outside of the Rail Link corridor. Despite the loss of three individuals, it is likely that propagules of this species are present in the soil profile and will germinate during optimal conditions in the future.

Similarly, the reduction of the *Hibbertia puberula* subsp. *puberula* is not thought to be a result of the operation or ongoing management of Rail Link. This reduction could be considered a natural fluctuation considering there are 65 individuals in relatively high density, specifically on the east side of the rail link. It is possible that in the warmer periods (spring and summer) following the period of high rainfall, prolific growth of native groundcovers and shrubs in the understorey occurred. As a result of understorey growth some individuals of *Hibbertia puberula* subsp. *puberula* may have demised due to increased competition, however it is also possible that they were not re-found during surveys due to being obscured and are in fact still present.

Cover and abundance of weeds in areas occupied by these threatened flora species was observed to be low. Intrusion of weeds into areas of habitat is mainly restricted to sparse scatterings of *Senecio madagascariensis* (Fireweed). No dense infestations of exotic perennial grass species or other aggressive weed species was observed. At current the occurrence of weeds in the Rail Link is not deemed to be impacting upon the presence or persistence of *Acacia bynoeana*, *Persoonia nutans*, *Grevillea parviflora* subsp. *parviflora* and *Hibbertia puberula* subsp. *puberula*.

Recommended management actions to protect and promote the persistence of threatened flora species in lands adjoining the Rail Link are identified in Table 4-5.

Table 4-6. Recommended management actions to protect threatened flora species in lands adjoining the Rail Link

| Identified Issue                                                                                                                                                                                              | Recommended action                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Increased cover and abundance of weeds on soft landscapes areas within the rail link corridor which are encroaching on habitat of threatened flora species.                                                   | Hi-volume spraying of herbicide within the Rail Link in areas adjacent to native vegetation (specifically the BA341 biobank site) should not be conducted.<br>Weed control works within these areas should include removal or spot spraying with herbicide. Spot spraying with herbicide should only be undertaken during optimal conditions to avoid spray drift.                                                                                                                           |
| Occurrence of weeds immediately outside the rail corridor fencing on areas disturbed during construction of the Rail Link.<br>Potential for these weeds to encroaching on habitat of threatened flora species | These areas should be subject to on-going monitoring to determine whether weeds from the Rail Link are infiltrating and degrading the condition of threatened flora species habitat.<br>The management contractor for the Moorebank biobank site should be made aware of potential weed encroachment from the Rail Link. It is recommended that semi-regular targeted weed control works to remove any colonising weeds and maintain the good condition of threatened flora species habitat. |

### 4.3 Weed management

Based on this past monitoring year, it is anticipated that providing ongoing weed control works will increase the cover of native species in soft landscaped areas. Existing plantings, with support from bush regenerators, will continue to colonise surrounding areas and outcompete annual common herbaceous weeds.

To maintain low weed covers and promote the regeneration of native plant species across the MIP operational facility, the recommended management actions identified in Table 4-6 and Table 4-3 should be implemented.

Table 4-7. Recommended actions to achieve/maintain low weed cover across MIP operational area, Rail Link and Offset Areas.

| Identified issue                                                         | Recommended action                                                                                                                                                                                                                                        |
|--------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Weed growth on soft landscaped areas within the MPE operational facility | Weeds on soft batters within the trunk drainage system and retention basin/swale at the north-eastern extent of the facility should continue to be suppressed through a combination of herbicide application, slashing and hand weeding.                  |
| Weed growth on soft landscaped areas within the Rail Link                | Weed control works targeting exotic species listed as 'priority' for the Greater Sydney Local Land Services region and the exotic grass species: <i>Melinus repens</i> (Red Natal Grass), <i>Chloris gayana</i> (Rhodes Grass), <i>Eragrostis curvula</i> |

| Identified issue                                                         | Recommended action                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|--------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                          | <p>(African Love Grass), <i>Hyparrhenia hirta</i> (Coolatai Grass) and <i>Themeda quadrivalvis</i> (Grader Grass).</p> <p>Large patches of African Lovegrass and Rhodes Grass between the Rail Link and the East Hills train line should be slashed on a regular basis to prevent seeding events.</p> <p>Two outbreaks of Blackberry and Hawthorn and in the northern and eastern extent of Wattle Grove should be managed through manual removal.</p>                                                                                                                                                                                                                                                                                                          |
| Low cover of native species on revegetated soft batters in the Rail Link | <p>To support the continued regeneration and colonisation of native species:</p> <ul style="list-style-type: none"> <li>• A trained bush regeneration contractor should continue to conduct regular ongoing weed control work targeting weed species that have a detrimental impact on native seedlings, mainly competitive exotic grasses</li> <li>• Retention of mature native species particularly seeding native grasses during weed control works promote colonisation of surrounding areas.</li> <li>• Monitoring of rehabilitated areas of the Rail Link to identify areas that may require additional support to increase native plant cover (i.e. seeding) or any novel exotic species which may be detrimental to the survival of natives.</li> </ul> |
| Weed growth along margins of P1-P3 Offset Areas                          | Weed growth, particularly that of African Love Grass, has increased along the margins of P1, P2 and P3 Offset Areas. This increased competition is impacting on the recruitment ability of Nodding Geebung. It is recommended that hand weeding occur in these areas, targeting African Love Grass.                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Priority weed outbreaks in the Wattle Grove Offset Area                  | Areas of <i>Rubus fruticosus</i> sp. agg. (Blackberry) outbreaks observed in the northeast of the site on the edge of the P4 <i>Persoonia nutans</i> EPBC offset area and along the eastern fence line should be managed by hand weeding.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Weed incursion in landscaped areas along Bushmasters Avenue (MPW)        | All areas of native landscaping should be incorporated into the current bush regeneration schedule, to control weeds and monitor the condition of landscaped areas.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |

## 4.4 Fauna

### 4.4.1 Fauna habitat connectivity

#### Moorebank Precinct East

Fauna habitat connectivity monitoring identified that several species, both native and invasive, are regularly utilising the Anzac Creek corridor to move between patches of native vegetation within the Wattle Grove offset area. Consistent with last year's findings, Red Fox was the most frequently observed species using the Anzac Creek crossing, followed by Swamp Wallaby. A Koala was also detected using the fauna ramps, with the ramps installed at the culvert being readily used by native fauna and providing access and egress between patches of bushland on either side of the operation Rail Link.

During periods of high rainfall, Anzac Creek culverts have been inundated with water resulting in the fauna ramps moving slightly. Regular monitoring inspections should be made of the culvert to ensure fauna ramps remain in situ and vegetation growth within crossing passages does not begin to obstruct movement or cause an issue to the culvert infrastructure or operation of the Rail Link.

Surrounding the Wattle Grove Offset Area is 6-foot high barbed-wire fencing. This is a barrier to wildlife movement and a hazard to native animals. Wildlife including the carcass of a Grey-headed Flying Fox (*Pteropus poliocephalus*) which is listed as Vulnerable under the NSW state *Biodiversity Conservation Act, 2016* and the federal *Environment Protection and Biodiversity Conservation Act, 1999*, was discovered in the barbed wire along the northern edge of the Offset area. This exemplifies how this fencing is inappropriate for managing wildlife.

Large logs and coarse woody debris placed on rock ballast remain as the habitat connectivity measure linking riparian vegetation within the MPW precinct with bushland to the south. This alternative habitat connectivity measure was adopted following the placement of ballast in the 20-metre-wide gap cleared

for the bridge on the eastern side of the Georges River during construction. No fauna were observed utilising the woody debris during the current monitoring period, with no use observed during the previous spring monitoring in 2022. Installation of additional woody debris or flat wooden ramps similar to those at the Anzac Creek culverts should be considered to encourage movement between areas of habitat.



Plate 4-1. Large logs and piles, of course, woody debris placed to facilitate movement of fauna across ballast at Georges River beneath the rail link bridge

### Moorebank Precinct West

Mobile native species recorded within the Georges River offset site which are likely to move along riparian vegetation corridors include *Petaurus breviceps* (Sugar Glider), *Pseudocheirus peregrinus* (Common Ringtail Possum), *Trichosurus vulpecula* (Common Brushtail Possum), *Wallabia bicolor* (Swamp Wallaby) and *Macropus robustus* (Common Wallaroo). Remote camera monitoring for the Rail Link area identified three species as using the corridor, including Red Fox, Rusa Deer and Swamp Wallaby. Evidently, only a small subset of the native species known to occur within MPW have been recorded using the corridor. Arboreal mammals often will not cross areas with low tree cover (Soanes & van der Ree, 2009), and no evidence of use by these species has been recorded by remote cameras. It is likely that the current habitat connectivity measures in place are not facilitating dispersal for some species along the vegetated Georges River corridor. The installation of a connectivity structure, such as a rope bridge between patches of vegetation either side of the ballast should be considered to facilitate movement of arboreal fauna.

Additionally, a six-foot-high cyclone fence with top-lined barbed wire installed to the south of the Georges River management site is likely a barrier to the movement of some fauna species between the MPW site and bushland to the south. Ground-dwelling fauna like macropods are unlikely to be able to pass this cyclone fence, and due to the barbed wire lined top, arboreal fauna is also likely prevented from climbing the fence and dispersing across the landscape. Koalas have been recorded in riparian bushland along the Georges River as well as bushland to the south outside of the MPW precinct. Koalas would readily move along this corridor for various reasons (foraging, dispersal, breeding), and cyclone fencing may be inhibiting these movements. A large hole has been discovered in this fence, with a remote camera installed to monitor fauna movement through this hole. Rusa deer, foxes and swamp wallaby were the only species recorded to be moving through this access point.



Plate 4-2. Cyclone fence at the southern extent of the management site

**Recommended actions**

Removal of the cyclone fencing should be considered to facilitate movement of a greater diversity of fauna species along the Georges River riparian corridor. Recommended actions to increase the connectivity value of the Georges River management site are identified in Table 4-7. These actions integrate components of the methodology outlined in the RVMP to maintain and enhance fauna habitat beneath the Rail Link bridge.

Table 4-8. Recommended actions to improve habitat connectivity at Anzac Creek culvert and beneath the Rail Link bridge on the eastern banks of the Georges River

| Identified Issue                                                                                                                                                        | Recommended action                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Vegetation growth within crossing passages on the northern and southern sides of the Anzac Creek culvert.                                                               | Intermittent monitoring inspections should be made of the culvert to ensure fauna ramps remain in situ and vegetation growth within crossing passages does not begin to obstruct movement or cause an issue to the culvert infrastructure or operation of the Rail Link                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Inadequate habitat connectivity beneath the Rail Link bridge                                                                                                            | <p>Improvement of connectivity structures is required. Placement of additional woody debris or flat wooden ramps across the ballast should be considered. The installation of a rope canopy bridge or similar arboreal crossing between trees either side of the bridge is recommended to facilitate movement of arboreal fauna.</p> <p>Should these additional connectivity measures not improve movement of fauna in the next monitoring period, a review of rock ballast as the necessary means for erosion and sediment control beneath the Rail Link bridge. If rock ballast is not deemed necessary for the entire 20-metre-wide gap, as much as feasible should be removed and replaced with alternative soil stabilisation materials (i.e. coir logs, jute and coir mesh). Planting of native species should be undertaken in conjunction with the installation of soft stabilisation materials as per the original habitat connectivity enhancement plan from the RVMP (Hyder 2015).</p> |
| Installation of a six-foot-high cyclone fence at the southern extent of the management site restricting the movement of fauna along the Georges River riparian corridor | <p>A review of the fencing location and design should be conducted to determine whether it is necessary and/or whether it can be modified to allow the movement of fauna from the MIP site to bushland south of the site. Fencing design should not include barbed wire, and existing fencing should be modified to improve connectivity.</p> <p>Considerations should be made for the installation of crossing mechanisms for fauna (i.e. Koala bridges) or replacement of the current Cyclone fence with a</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |

| Identified Issue | Recommended action                                                                                                 |
|------------------|--------------------------------------------------------------------------------------------------------------------|
|                  | rural style fence with wooden bollard and five straight wires, as is to be installed around MIP drainage channels. |

## 4.4.2 Koala management

### Koala management monitoring

Cyclone mesh fencing is present along the interface between Wattle Grove offset area and the MPE operational facility restricting the movement of Koalas into unsuitable areas. Inspection of areas where gaps under the fence have previously been identified were not subject to increases gap size and subsequently no management actions are currently recommended. Monitoring of these areas should continue throughout the year to ensure gaps do not increase in size due to erosion or use by smaller animals such as hares.

Currently, no structures (bridges, culverts, refuge posts) have been installed which facilitate the movement of Koalas from the Wattle Grove offset area to adjoining areas of suitable habitat. Koala bridges are yet to be installed along the southern boundary of the offset area as per the KPM (Cumberland Ecology 2020) to facilitate Koala movement into bushland areas within the Holsworthy defence area. It is noted in the KPM that prior to installing Koala bridges, "Transport for NSW and Department of Defence will need to be consulted...to gain necessary access/permits." Additionally, a series of other actions are required to increase suitability for Koala movement across the rail line, as discussed in Section 8.3.5.2 of the KMP (Cumberland Ecology 2020).

As development continues across the MIP site, Koala fences, bridges, gates and grids will be installed in accordance with the plans outlined in the KMP (Cumberland Ecology, 2020).

Table 4-9. Recommended management actions to maintain Koala fencing adjacent to the MPE operational facility

| Identified Issue                                                                         | Recommended action                                                                                                                                                                                                                                                                                                                                                             |
|------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| No connectivity between Wattle Grove offset area and bushland in Holsworthy defence area | Discussions should commence with TfNSW and the Department of Defence to determine the feasibility of implementing connectivity measures outlined in the KMP (Cumberland Ecology 2020) to allow Koalas and other fauna to move between the Wattle Grove offset area and bushland in the Holsworthy defence area. Barbed wire should not be used in fence design in these areas. |

### Baseline koala surveys and habitat monitoring

The successful detection of Koalas on both the MPW and MPE sides of the biobank highlights the importance of conservation of these areas. Ecological enhancements to the biobank areas will provide the Koalas with additional habitat to grow. Critical to this is their safe movement out of the fences so that they can access adjoining habitat. This can be enabled through carefully designed Koalas bridges and 'doggy doors' through consultation with experienced ecologists.

The habitat at the Moorebank Intermodal Precinct biobank sites were found to contain rich resources for Koalas. All species of canopy trees recorded at Moorebank are listed as preferred Koala feed trees in the Central Coast Koala Management Area. Both the Georges River and Wattle Grove offset sites contain access to permanent water which will support Koalas survival during extreme heat in summer.

It is anticipated that enhancements to the biobanks through revegetation, weed control, fencing and pest animal control, that the Koala population should continue to grow. Annual monitoring will aim to evaluate changes and provide opportunities for intervention if there are threats which could impact on the population. This will be of particular importance while the realignment of Moorebank Avenue is underway and disturbance to the population likely.

## 4.4.3 Feral animals

The assessment of feral animal presence through remote camera monitoring has remained consistent with previous monitoring periods, with Red Fox, Black Rat and Feral Cats detected on cameras with the addition of Brown Hare, Common Myna and Rusa Deer this monitoring period. Abundance and impacts

of these species are difficult to determine through camera results, though given the number of images captured during this monitoring period of feral species, it is likely that the abundance and impacts have increased from the previous years.

Brown Hare has previously been recorded throughout the offset sites, with several observations in the Georges River offset site in recent months. Brown Hare can cause significant damage when gnawing the bark of young trees and shrubs and can cause severe damage to revegetation sites (Agriculture Victoria 2021). Ongoing revegetation may be at risk from this species. Continued monitoring for this species is recommended.

The occurrence of Black Rat is not considered to be a significant issue. This species is common across the landscape however was only detected on one camera, at Anzac Creek, during the monitoring period. One nest box in Georges River Corridor was occupied by a Black Rat during the current monitoring period, a decrease from the four detected in the 2022/2023 monitoring period. Black Rats may predate on native bird eggs and/or compete for nesting space with hollow-dependant fauna (Zarzoso-Lacoste et al. 2011), and in large numbers, this species has the potential to impact native fauna through predation and competition for resources. No significant infestations of this species or signs of infestation have been observed across the facility or within the adjacent Wattle Grove and Georges River Corridor offset areas.

There is evidence to suggest that Red Fox populations are problematic within the offset sites. The species was detected on 16 of 20 remote cameras deployed and collected during the spring monitoring period. Juveniles have been recorded in the Wattle Grove offset site for the past two monitoring periods, indicating a breeding population is present. Furthermore, there were at least 10 distinct captures of Red Fox with prey items during the three-month monitoring period. This number likely represents a small portion of the predation of native fauna by Red Fox and indicates that management of the Red Fox population should be undertaken to reduce impacts to local biodiversity.

As with previous years, cats were also recorded on remote cameras walking along the access tracks on the boundary of the MPE and MPW operational facility. At least two individual cats, potentially domestic, were captured on remote cameras at both sites.

Rusa deer have been recorded in the MPW management site. Actions are required to monitor the population of Rusa deer and eliminate their impact on the local ecosystem. Rusa deer can have significant impacts on native vegetation due to overgrazing, trampling, and browsing, which may lead to habitat degradation and biodiversity loss. If their population is not managed, they could create long-term ecological challenges for the area.

The landholder should support the implementation of a feral animal control program predominately focusing on the control of Red Fox in the bushland immediately adjacent to the operation facility. The MIP property manager should communicate with Liverpool City Council and surrounding landholders (Glenfield Waste Facility, National Intermodal and Holsworthy Army Barracks) to discuss the feasibility and willingness to undertake a coordinated feral animal control program. Live trapping of feral/domestic cats is also recommended in both offset areas to remove these individuals and determine if they are owned or feral individuals. As per Liverpool City Council's Urban Cat Management Plan and the *Companion Animals Act 1998 (revised 2019)*, cats should not be free roaming in wildlife protection areas. The council has animal management services available to support the collection of cats from the Wattle Grove and Georges River management areas.

Table 4-10. Recommended actions for feral animals within the MIP operational facility

| Identified Issue                                                        | Recommended Corrective Action                                                                                                                                                                                                                                                                                            |
|-------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Vertebrate pests within the MIP operational facility and surrounds      | Ongoing opportunistic monitoring should be conducted through MPE operational facility and surrounds to determine whether populations of Brown Hare, Red Fox, Black Rat, Rusa Deer and feral Cats are having a negative impact on native biota. Any signs of novel pests within the biobank site should also be recorded. |
| Increased observation of Red Fox including predation on native wildlife | A control program should be undertaken to manage the Red Fox population within the Georges River Corridor and Wattle Grove offset sites. Communicate with Liverpool City Council and surrounding landholders (Glenfield Waste                                                                                            |

|                                     |                                                                                                                                                                                                                                                                                                                                                                          |
|-------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                     | Facility and Holsworthy Army Barracks) to discuss feasibility and willingness to undertake a coordinated Red Fox control program.                                                                                                                                                                                                                                        |
| Domestic/Feral Cats in offset site. | Communicate with Liverpool City Council to discuss collection of cats in the offset areas. Live trapping should be undertaken to along the central access track at night to collect individuals in the offset site. Liaise with Liverpool City Council to see if they can communicate with nearby residents to raise awareness of the impacts of cats on local wildlife. |

## 4.5 Summary of recommendations

Table 4-10 compiles management issues identified during the 2024/2025 monitoring period within the MIP operational facility and recommend appropriate corrective actions.

*Table 4-11. Compiled list of management issues identified within the MIP operational facility and recommended corrective actions*

| Identified issue and reference number                    |                                                                                                                                                                                                       | Recommended action                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|----------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Native vegetation: Lands adjoining the Rail Link</b>  |                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| 1                                                        | Increased cover and abundance of weeds on soft landscapes areas within the rail link corridor which are encroaching on adjacent patches of native vegetation.                                         | Hi-volume spraying of herbicide within the Rail Link in areas adjacent to native vegetation (specifically the BA341 biobank site) should not be conducted.<br>Weed control works within these areas should include manual removal or spot spraying with herbicide. Spot spraying with herbicide should only be undertaken during optimal conditions to avoid spray drift.                                                                                                                                                                                                                                                                           |
| 2                                                        | Occurrence of weeds immediately outside the rail corridor fencing on areas disturbed during construction of the Rail Link.<br>Potential for these weeds to infiltrate the adjacent native vegetation. | These areas should be subject to on-going monitoring to determine whether weeds from the Rail Link are infiltrating and degrading the condition of native vegetation.<br>The management contractor for the Moorebank biobank site should be made aware of potential weed encroachment from the Rail Link and undertake semi-regular targeted weed control works to remove any colonising weeds and maintain the good condition of native vegetation.                                                                                                                                                                                                |
| <b>Native vegetation: Riparian vegetation management</b> |                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| 3                                                        | Increased weed coverage within revegetation areas                                                                                                                                                     | The bush regeneration contractor for the BA341 biobank site should be notified of the RVPM and the objectives for the Georges River management site.<br>A bush regeneration contractor should be on-boarded to undertake weed control and revegetation works on the western side of Georges River.<br>The condition of revegetated areas should be improved through weed removal. Scattered weeds and isolated infestations should be removed from the management site. Natural regeneration of native species should be assisted, however if this is not observed tube stock plantings should be installed in areas where weeds have been removed. |
| 4                                                        | Encroachment of weed species from adjacent areas of infested bushland                                                                                                                                 | The installation of a sediment fence to limit the amount of weed seed being transported into the revegetated site should be considered if the encroachment is continuing despite routine weeding exercises.                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 5                                                        | Bare patches between plantings on the eastern side of Georges River                                                                                                                                   | Encourage natural recruitment of native species by maintaining low levels of weeds in bare areas between plantings.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| 6                                                        | Bare and weedy areas surrounding plantings on the western side of Georges River.                                                                                                                      | Infill planting with native tube stock should be considered if natural recruitment is not observed in bare areas beneath the Rail Link bridge. Plantings should be commensurate with species present in the RFEFCF vegetation community.                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Threatened flora: EPBC Offset Sites</b>               |                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |

| Identified issue and reference number                                                                                                                                                                                             | Recommended action                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>7</p> <p>Population decline of greater than 25% of stem count within a 5-year period (<i>Persoonia nutans</i>).</p>                                                                                                            | <p>Identify and document visible causes of population decline such as habitat degradation, unauthorised access or fire.</p> <p>Consider and document any climatic events that could have resulted in population fluctuations such as unseasonably hot or dry conditions.</p> <p>Review the use of herbicide for weed control within the offset site and in adjacent areas. Implement manual (rather than chemical) weed control methods within a buffer zone to the EPBC offset site if appropriate.</p> <p>Consider the impact of long-term bush restoration and native species establishment on the populations of threatened species within the offset site. For example, promotion of native shrub recruitment could result in shading of threatened species seedlings. In such instances thinning of the native shrub layer (excluding the threatened species) may be required.</p> <p>Seed collection and/or propagation of cuttings from a selection of individuals to preserve the genetic material of the population, should the population decline continue.</p> |
| <b>Threatened flora: Lands adjoining the Rail Link</b>                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <p>8</p> <p>Increased cover and abundance of weeds on soft landscapes areas within the rail link corridor which are encroaching on habitat of threatened flora species.</p>                                                       | <p>Hi-volume spraying of herbicide within the Rail Link in areas adjacent to native vegetation (specifically the BA341 biobank site) should not be conducted.</p> <p>Weed control works within these areas should include manual removal or spot spraying with herbicide. Spot spraying with herbicide should only be undertaken during optimal conditions to avoid spray drift.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <p>9</p> <p>Occurrence of weeds immediately outside the rail corridor fencing on areas disturbed during construction of the Rail Link.</p> <p>Potential for these weeds to encroaching on habitat of threatened flora species</p> | <p>These areas should be subject to on-going monitoring to determine whether weeds from the Rail Link are infiltrating and degrading the condition of threatened flora species habitat.</p> <p>The management contractor for the Moorebank biobank site should be made aware of potential weed encroachment from the Rail Link and undertake semi-regular targeted weed control works to remove any colonising weeds and maintain the good condition of threatened flora species habitat.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Weed management</b>                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <p>10</p> <p>Weed growth on soft landscaped areas within the MIP operational facility</p>                                                                                                                                         | <p>Weeds on soft batters within the trunk drainage system and retention basin/swale at the north-eastern extent of the facility should continue to be suppressed through a combination of herbicide application, slashing and hand weeding.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <p>11</p> <p>Weed growth on soft landscaped areas within the Rail Link</p>                                                                                                                                                        | <p>Weed control works targeting exotic species listed as 'priority' for the Greater Sydney Local Land Services region and the exotic grass species: <i>Melinis repens</i> (Red Natal Grass), <i>Chloris gayana</i> (Rhodes Grass), <i>Eragrostis curvula</i> (African Love Grass), <i>Hyparrhenia hirta</i> (Coolatai Grass) and <i>Themeda quadrivalvis</i> (Grader Grass).</p> <p>Large patches of African Lovegrass and Rhodes Grass between the Rail Link and the East Hills train line</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |

| Identified issue and reference number                                                                        | Recommended action                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|--------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                                              | should be slashed on a regular basis to prevent seeding events.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| 12 Low cover of native species on revegetated soft batters in the Rail Link                                  | <p>To support the continued regeneration and colonisation of native species:</p> <ul style="list-style-type: none"> <li>• a trained bush regeneration contractor should be onboarded to conduct regular ongoing weed control work targeting weed species that have a detrimental impact on native seedlings, mainly competitive exotic grasses</li> <li>• retention of mature native species particularly seeding native grasses during weed control works promote colonisation of surrounding areas.</li> <li>• monitoring of rehabilitated areas of the Rail Link to identify areas that may require additional support to increase native plant cover (i.e. seeding) or any novel exotic species which may be detrimental to the survival of natives</li> </ul>                                                                                                                                                                                                                  |
| 13 Weed growth along margins of P1-P3 Offset Areas                                                           | Weed growth, particularly that of African Love Grass, has increased along the margins of P1, P2 and P3 Offset Areas. This increased competition is impacting on the recruitment ability of Nodding Geebung. It is recommended that hand weeding occur in these areas, targeting African Love Grass.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| 14 Priority weed outbreaks in the Wattle Grove Offset Area                                                   | Areas of <i>Rubus fruticosus</i> sp. agg. (Blackberry) outbreaks observed in the northeast of the site on the edge of the P4 <i>Persoonia nutans</i> EPBC offset area and along the eastern fence line should be managed by hand weeding.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>Fauna: Fauna habitat connectivity</b>                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| 15 Vegetation growth within crossing passages on the northern and southern sides of the Anzac Creek culvert. | Intermittent monitoring inspections should be made of the culvert to ensure fauna ramps remain in situ and vegetation growth within crossing passages does not begin to obstruct movement or cause an issue to the culvert infrastructure or operation of the Rail Link                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| 16 Inadequate habitat connectivity beneath the Rail Link bridge                                              | Improvement of connectivity structures is required. Placement of additional woody debris or flat wooden ramps across the ballast should be considered. The installation of a rope canopy bridge or similar arboreal crossing between trees either side of the bridge is recommended to facilitate movement of arboreal fauna. Should these additional connectivity measures not improve movement of fauna in the next monitoring period, a review of rock ballast as the necessary means for erosion and sediment control beneath the Rail Link bridge. If rock ballast is not deemed necessary for the entire 20-metre-wide gap, as much as feasible should be removed and replaced with alternative soil stabilisation materials (i.e. coir logs, jute and coir mesh). Planting of native species should be undertaken in conjunction with the installation of soft stabilisation materials as per the original habitat connectivity enhancement plan from the RVMP (Hyder 2015). |
| 17 Inappropriate six-foot high barbed wire fencing surrounding Wattle Grove offset area.                     | A review of fencing suitability should be conducted considering the death of a state and federally listed threatened species, a Grey-headed Flying Fox whose                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |

| Identified issue and reference number     |                                                                                                                                                                         | Recommended action                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|-------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                           |                                                                                                                                                                         | carcass was discovered in the barbed wire along the northern edge of the Offset area. This fencing is considered inappropriate for managing wildlife and recommended to be replaced with a wildlife friendly alternative, such as 'floppy top' fencing.                                                                                                                                                                                                                                                                                                                                                                             |
| 18                                        | Installation of a six-foot-high cyclone fence at the southern extent of the management site restricting the movement of fauna along the Georges River riparian corridor | <p>A review of the fencing location and design should be conducted to determine whether it is necessary and/or whether it can be modified to allow the movement of fauna from the MIP site to bushland south of the site. Fencing design should not include barbed wire, and existing fencing should be modified to improve connectivity.</p> <p>Considerations should be made for the installation of crossing mechanisms for fauna (i.e. Koala bridges) or replacement of the current Cyclone fence with a rural style fence with wooden bollard and five straight wires, as is to be installed around MIP drainage channels.</p> |
| <b>Fauna: Koala management monitoring</b> |                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| 19                                        | No connectivity between Wattle Grove offset area and bushland in Holsworthy defence area                                                                                | Discussions should commence with TfNSW and the Department of Defence to determine the feasibility of implementing connectivity measures outlined in the KMP (Cumberland Ecology 2020) to allow Koalas and other fauna to move between the Wattle Grove offset area and bushland in the Holsworthy defence area.                                                                                                                                                                                                                                                                                                                     |
| <b>Fauna: Feral animals</b>               |                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| 20                                        | Vertebrate pests within the MIP operational facility and surrounds                                                                                                      | Ongoing opportunistic monitoring should be conducted through MIP operational facility and surrounds to determine whether populations of Rusa Deer, Brown Hare, Red Fox, Black Rat and Feral Cat are having a negative impact on native biota. Any signs of novel pests within the biobank site should also be recorded.                                                                                                                                                                                                                                                                                                             |
| 21                                        | Increased observation of Red Fox including predation on native wildlife                                                                                                 | A control program should be undertaken to manage the Red Fox population within the Georges River Corridor and Wattle Grove offset sites. Communicate with Liverpool City Council and surrounding landholders (Glenfield Waste Facility and Holsworthy Army Barracks) to discuss feasibility and willingness to undertake a coordinated Red Fox control program.                                                                                                                                                                                                                                                                     |
| 22                                        | Domestic/Feral Cats in offset site.                                                                                                                                     | Communicate with Liverpool City Council to discuss collection of cats in the offset areas. Live trapping should be undertaken to along the central access track at night to collect individuals in the offset site. Liaise with Liverpool City Council to see if they can communicate with nearby residents to raise awareness of the impacts of cats on local wildlife.                                                                                                                                                                                                                                                            |

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## **6 APPENDICES**

**APPENDIX A . WEED MONITORING REPORTS (JUNE 2024 – MAY 2025)**

**APPENDIX B . REMOTE CAMERA: FAUNA SPECIES INVENTORY**

**APPENDIX C . EPBC OFFSET SITES - ANNUAL MONITORING REPORT**

**APPENDIX D . KEY PERFORMANCE INDICATORS (KPIS) FOR RVMP WORKS**

**APPENDIX E . RIPARIAN VEGETATION MANAGEMENT – NATIVE FLORA INVENTORIES**

**APPENDIX F . RIPARIAN VEGETATION COMPARISON OF EXOTIC AND NATIVE COVER PERCENTAGES  
FOR EACH VEGETATION QUADRAT ACROSS MONITORING EVENTS (JUNE 2018 – APRIL 2025)**

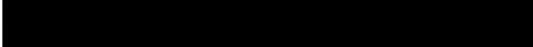
**APPENDIX G . RIPARIAN VEGETATION MANAGEMENT – PHOTO POINTS**

**APPENDIX H . BA341 LANDS ADJOINING RAIL LINK - QUADRAT MONITORING DATA**

**APPENDIX I . NEST BOX MONITORING REPORT (SPRING 2024)**

**APPENDIX J . ANNUAL KOALA MONITORING REPORT**

## **APPENDIX A. WEED MONITORING REPORTS (JUNE 2024 - MAY 2025)**

**Date** 22/08/2024  
**To**   
**From**   
**Copy to**   
**Subject** MPE operational facility – Weed monitoring report August 2024

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**Introduction**

Arcadis has been commissioned to conduct bi-monthly weed monitoring surveys within Moorebank Precinct East (MPE) operational facility at Moorebank Logistics Park. The MPE operational facility includes the following:

- Import and Export Terminal (IMEX)
- Rail Access Land Package (RALP)
- Warehouses, distribution facilities and freight village
- Stormwater trunk drainage infrastructure and landscaping areas

Regular monitoring of the MPE operational facility will inform the land manager of weed cover and the presence of any weeds listed as 'priority' for the Greater Sydney Local Land Services region under the *Biosecurity Act 2015*.

**Background**

Arcadis has been monitoring the MPE operational facility for weed occurrence since April 2020. High levels of weed cover within the Rail Link have been observed across most of the monitoring period, except for during weed monitoring events immediately following remediation works. Routine weed remediation works have commenced as of December 2022 along the rail link corridor, with future remediation works planned continuously planned when relevant.

The RALP, which includes the MPE operational Rail Link, has seen significant change and works over the time Arcadis has conducted weed monitoring. The soft batters on either side of the Rail Link have had varying levels of exotic cover. Additionally, works conducted in the Moorebank Precinct West (MPW) in 2023/24 have changed the layout and vegetation spread in the RALP. Several weed remediation events have occurred since the inception of weed monitoring, detailed below in Table 1.

*Table 1 Summary of weed events throughout monitoring history*

| Timing        | Summary of events                                                                                                                                                                                                                                                                  | Weed contractor       |
|---------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| Spring 2020   | <ul style="list-style-type: none"><li>• Weeds removed from batters and revegetated with native species, as per the Urban Design and Landscaping Plan (UDLP) for MPE</li><li>• Cumberland Plain Seeds were procured to provide technical oversight of revegetation effort</li></ul> | Spray Grass Solutions |
| December 2021 | <ul style="list-style-type: none"><li>• As per recommendations from Spray Grass Solutions and Cumberland Plain Seeds, the</li></ul>                                                                                                                                                |                       |

| Timing                     | Summary of events                                                                                                                                                                                                        | Weed contractor                     |
|----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|
|                            | <p>monitoring methodology was changed</p> <ul style="list-style-type: none"> <li>Changes included reporting on cover on 'priority' weeds species and key weeds specific to the project.</li> </ul>                       |                                     |
| December 2022 to June 2023 | <ul style="list-style-type: none"> <li>Weed remediation works commenced</li> <li>Priority weed species were targeted</li> <li>Native species were identified throughout the RALP to avoid accidental removal.</li> </ul> | P&E Services                        |
| December 2023 to present   | <ul style="list-style-type: none"> <li>Weed remediation works continued</li> <li>Regular maintenance of priority weed species via slashing, hand removal and herbicide spraying</li> </ul>                               | Toolijooa Environmental Restoration |

## Methodology

Arcadis ecologist Nathan Banks attended the MPE operational facility on 14 August 2024. Monitoring involved traversing the MPE operational facility on foot, surveying landscaped areas, stormwater infrastructure and soft batters adjoining the Rail Link. The areas surveyed are presented in Figure 1.

The weather on the 14 August was cloudy, with a maximum temperature of 17.5°C, and the weather recorded at Holsworthy Aerodrome (station 066161) (BOM 2024).

### IMEX, warehouses and drainage infrastructure

In soft landscaped areas surrounding the IMEX, warehouses, freight village and within drainage infrastructure, the following activities were conducted:

- Identifying and mapping the occurrence of weeds listed as priority
- Mapping and estimating the per cent foliage cover of exotic species
- Mapping and estimating the per cent foliage cover of priority weeds
- Recording and mapping the extent of weed remediation works

The cover of exotic species and priority weeds were estimated based on the area of cover within a patch and categorised as per Table 2.

*Table 2. Categories to describe percent cover of weeds*

| Categories | Percentage cover of weeds within a patch (%) |
|------------|----------------------------------------------|
| Low        | 5 – 25                                       |

| Categories | Percentage cover of weeds within a patch (%) |
|------------|----------------------------------------------|
| Moderate   | 25 – 75                                      |
| High       | 75 – 100                                     |

The location of weed infestations, priority weed species and observed weed remediation works were recorded on an Arc-GIS enabled iPad.

## Rail Link

Following the meeting held in December 2021 regarding revegetating the Rail Link, the monitoring methodology for weeds within the Rail Link has been refined to focus on key and priority weed species rather than all exotic species.

Priority weed species are any exotic species listed under the *Biosecurity Act 2015* for the Greater Sydney Local Land Services Area, and key weed species have been identified as site-specific exotic plants with the potential to have detrimental outcomes for the recruitment of native seedlings or impacts on adjacent ecologically sensitive areas. A list of priority and key weed species known from the Rail Link is included in Table 3.

Table 3 Priority and key weed species subject to control within the Rail Link

| Priority weed species                                        | Key weed species                              |
|--------------------------------------------------------------|-----------------------------------------------|
| <i>Alternanthera philoxeroides</i> (Alligator weed)          | <i>Chloris gayana</i> (Rhodes Grass)          |
| <i>Asparagus asparagoides</i> (Bridal Creeper)               | <i>Echium plantagineum</i> (Paterson's Curse) |
| <i>Lantana camara</i> (Lantana)                              | <i>Eragrostis curvula</i> (African Lovegrass) |
| <i>Ludwigia peruviana</i> (Ludwigia)                         | <i>Hyparrhenia hirta</i> (Coolatai Grass)     |
| <i>Olea europaea</i> subsp. <i>cuspidata</i> (African Olive) | <i>Themeda quadrivalvis</i> (Grader Grass)    |
| <i>Senecio madagascariensis</i> (Fireweed)                   |                                               |

## Study Limitations

The data presented within this report is restricted to what was observed and recorded by the attending Arcadis ecologists during the site assessment on 15 August 2024.

Monitoring of weeds was restricted to the operational facility; weeds were not assessed within the bounds of the active construction areas surrounding new warehouses.

Surveys were not undertaken in areas extending beyond the junction between the QUBE Rail Link and the Southern Sydney Freight Line (SSFL).

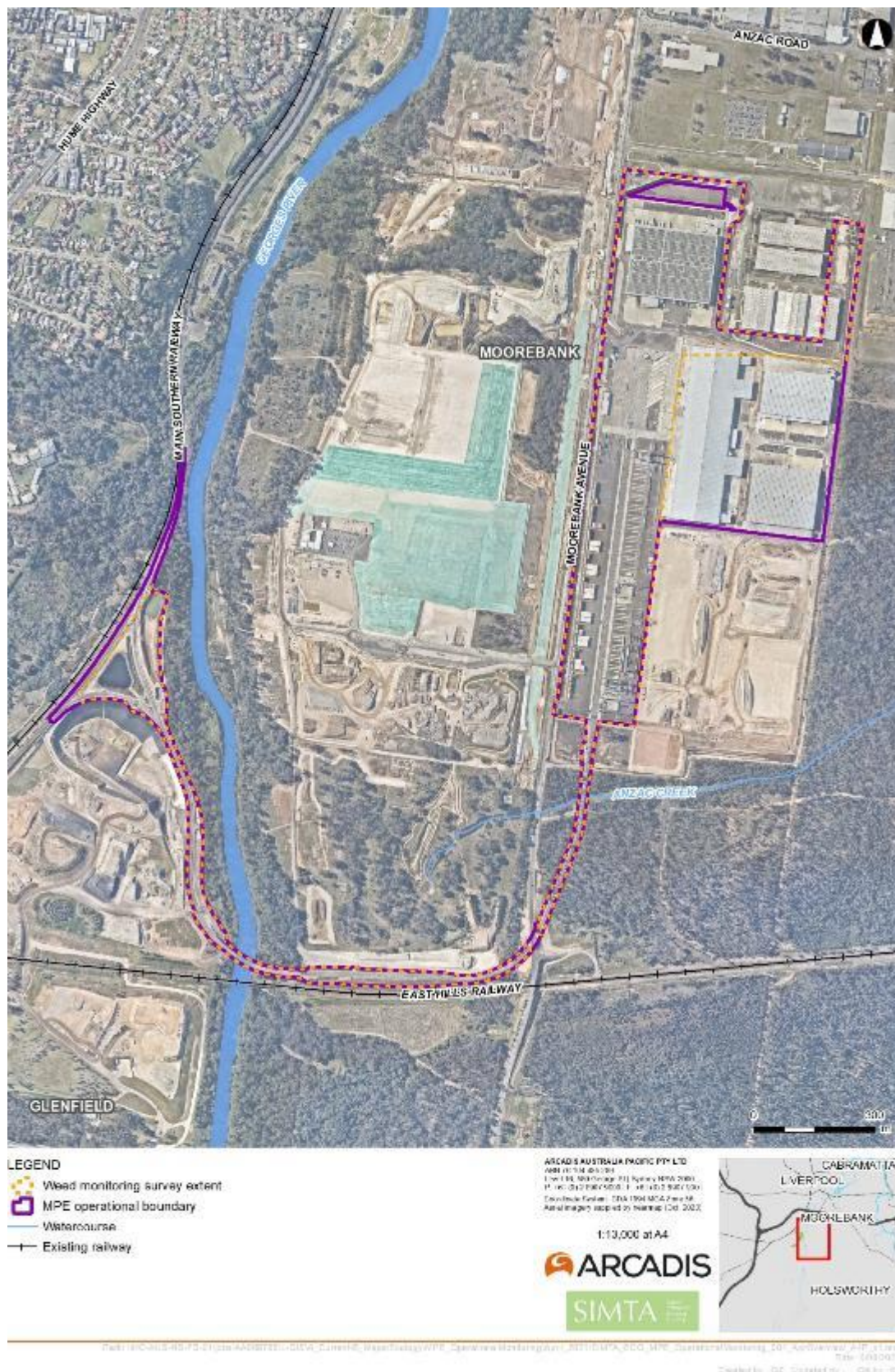


Figure 1. Survey extent within the MPE operational facility

## Results

Observations made by the attending ecologists during the August 2024 weed monitoring survey are summarised below.

### IMEX, warehouses and drainage infrastructure

Weed cover is generally low in soft landscaped areas surrounding the IMEX. A greater cover of weedy species are present along the batters of drainage infrastructure along the western boundary of the precinct and in the north-eastern corner around the basins. Further sapling and stands of *Acacia falcata* (Hickory Wattle) continue to grow unimpeded by weeds.

Although weeds are present around the warehouse areas, they are not causing infestations or inhibiting the growth of native species. Large areas of the native *Cynodon dactylon* (Couch Grass) is present across most of these areas and is generally outcompeting weed species..

Occurrences of weeds in the warehouse area and associated drainage infrastructure is restricted to scattered individuals of *Senecio madagascariensis* (Fireweed), *Plantago lanceolata* (Plantain), *Trifolium arvense* (Clover) and exotic grasses like *Sporobolus africanus* (Parramatta Grass), *Paspalum urvillei* (Giant Paspalum) and *Ehrharta erect* (Panic Veldtgrass).

The drainage lines and lower lying areas of the basins are showing strong resilience to weed infiltration. Native species dominate these areas and have a high cover and density. Some sections of the drainage channel and basins are dominated by *Bulboschoenus fluviatilis* (Marsh club-rush) whilst other are dominated by *Typha orientalis* (Bulrush). Where space is present between stands of theses native emergent species small clumps of *Persicaria decipiens* (Slender Knotweed), *Daviesia ulicifolia*, *Ficinia nodosa* (Knotted Club-rush), *Carex tereticaulis* and *Juncus usitatus* are present. Other native species such as *Imperata cylindrica* and *Lomandra longifolia* were observed in the drainage channels.

*Ludwigia peruviana* was observed in the north-eastern corner of the MPE facility, in the drainage channel, and requires removal to prior to spreading elsewhere in the facility.

Photos for each area discussed above and illustrated in Table 4

Table 4 Photos for each monitoring area of MPE

| Area of MPE                                               | Photo                                                                                                                                                                                                   |
|-----------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>IMEX building and adjacent drainage infrastructure</p> |  <p><i>Plate 1 IMEX building drainage infrastructure</i></p>                                                         |
| <p>Warehouse areas</p>                                    |  <p><i>Plate 2 Stabilized erosion areas with rainfall brining increased litter into drainage infrastructure</i></p> |

| Area of MPE                                     | Photo                                                                                                                                                                                       |
|-------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Eastern boundary drainage infrastructure</p> |  <p><i>Plate 3 Erosion from persistent rain events evident in areas with limited vegetation cover</i></p> |

## Rail Access Land Package (RALP)

During the August 2024 weed monitoring survey, bush regenerators from Toolijooa Environmental Restoration (Toolijooa) were conducting weed control works within the RALP.

Priority weed occurrence and cover within the RALP was observed to be low. Previous occurrences of *Senecio madagascariensis* (Fireweed) have decreased due to targeted weeding efforts by Toolijooa. Another priority weed, *Themeda quadrivalvis* (Grader Grass) has also decreased in abundance due to weeding efforts. Hand weeding and slashing of other weeds include *Vicia sativa*, *Sonchus oleraceus*, *Eragrostis curvula*, *Melinis repens*, *Andropogon virginicus*, *Bidens pilosa*. Two vine weeds, *Araujia sericifera* and *Asparagus asparagoides* were also removed.

Native species were observed to be growing well. Mature tussocks of native grass species, which have been avoided during slashing works, were observed with spent seed heads. With additional support from bush regenerators, it is anticipated that the fallen seed will germinate and establish and in turn the cover of native grasses will increase.

The status of weeds and weed remediation works observed during the August 2024 monitoring survey has been compared against a series of recommended actions developed during the baseline monitoring survey (Table 5). Overall, the status of weed management works by Toolijooa is performing well against these criteria.

Table 5 Weed remediation works tracking

| Priority | Action                                                                                       | Action description                                                                                                                                                                                                                                                                                                                                                                                                                             | October '23 performance assessment                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|----------|----------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1        | Eradicate 'priority' weeds                                                                   | Target 'priority' weed species through manual removal and herbicide treatment. Herbicide application should consider timing (i.e., applying herbicide when weeds are actively growing) and best practice methodologies. Areas outlined by coloured polygons in Figure 3 - Figure 10 should be prioritised.                                                                                                                                     | One priority weed species are present within the Rail Link: <i>Senecio madagascariensis</i> (Fireweed) (Figure 3 - Figure 10). These should be removed as a priority. Progress has been made through remediation works within the Rail link corridor. Continued management must be undertaken to work towards eradication.                                                                                                                                                                                                                                                                                                                                                                                      |
| 2        | Removal of key and aggressive weed species                                                   | <p>Key weed species, including African Lovegrass, Rhodes Grass, Paterson's Curse, Coolatai Grass and Grader Grass, should be removed from revegetated areas of soft batter.</p> <p>Aggressive weed species, including Moth Vine and Castor Oil Plant, should be removed from all operational areas using a combination of manual and herbicide control. Areas outlined by coloured polygons in Figure 3 - Figure 10 should be prioritised.</p> | <p>Key weed species, including Rhodes Grass, African Lovegrass, Coolatai Grass, Paterson's Curse, and Grader Grass, are colonising soft batters in the Rail Link. These weeds should be removed.</p> <p>Progress has been made through remediation works within the Rail Link Corridor. Continued management must be undertaken to work towards eradication.</p>                                                                                                                                                                                                                                                                                                                                                |
| 3        | Suppress further colonisation of environmental weeds and encroachment into areas of bushland | Control of exotic species adjacent to the biobank site and ecologically sensitive areas. Manual removal should be adopted in areas adjacent to threatened flora locations. Areas outlined by coloured polygons in Figure 3 - Figure 10 should be prioritised.                                                                                                                                                                                  | <p>Weed growth is increasing on soft batters adjacent to the biobank site and ecologically sensitive areas.</p> <p>Manual removal, including routine slashing, has not recently been adopted to prevent present weeds from reaching seeding maturity and further encroaching on adjacent high-value areas (biobank site and ecologically sensitive areas containing threatened plant species). All works should be restricted to the operational area and not extend into the biobank site or identified ecologically sensitive areas.</p> <p>Slashing should only be conducted when weed species are not in flower to prevent further spread. Appropriate slashing time is during winter for most species.</p> |

| Priority | Action                                                                                           | Action description                                                                                                                                                                                                       | October '23 performance assessment                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|----------|--------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 4        | Slashing of invasive grasses to prevent seeding.                                                 | Management of invasive grasses such as Rhodes Grass and African Love Grass through regular mowing or slashing. Areas outlined by coloured polygons in Figure 3 - Figure 10 should be prioritised.                        | <p>Slashing has been adopted to manage the regrowth of invasive grasses (African Lovegrass, Grader Grass) within the Rail Link in ballast and gravel areas. Some areas beyond the Georges River bridge are yet to be managed.</p> <p>Slashing should be used to manage large expanses of exotic grassland to prevent seeding events. However, as native grasses become established, extreme care must be taken, and indiscriminate slashing must be avoided. A contractor with knowledge of native species should be employed to carry out this task, in failing that, an ecologist should be on site to monitor weed remediation.</p> |
| 5        | Reduce cover of weeds within the Rail Link                                                       | Reduction of weed cover by applying control methods commensurate with the Operational Flora and Fauna Management Plan (Arcadis 2019). Areas outlined by coloured polygons in Figure 3 - Figure 10 should be prioritised. | <p>Works should involve targeted slashing of mature plants and removing flowering and seed heads to minimise seeding. Targeted slashing has been previously employed to control weed colonisation on soft batters. However, it must be continued to limit the re-colonisation of weeds within the Rail Link.</p> <p>Future weed control actions will focus on removing and reducing the cover of priority and key weed species and suppressing the further colonisation of common weeds, which is consistent with the rehabilitation methodology proposed by Spray Grass Solutions and Cumberland Plain Seeds.</p>                     |
| 6        | Remove herbaceous and woody weeds within the operational area and trunk drainage infrastructure. | Reduction in herbaceous and woody weeds by applying control methods commensurate with the Operational Flora and Fauna Management Plan (Arcadis 2019)                                                                     | Weed cover has generally remained low within trunk drainage infrastructure and at the north-eastern extent of the MIP East operational facility.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |

## Erosion

Geo-mesh fabric and boulders used to remediate erosion prone areas around the IMEX and drainage infrastructure were observed to be in good condition and serving their purpose of stabilisation during the August 2024 surveys.

Batter slumping is still present within drainage infrastructure in the warehouse area. Although some outlets have been stabilised with large boulders, the erosion is still present and will continue to erode during heavy rainfall events. (Plate 3**Error! Reference source not found.**).

Previous areas of batter slumping within the RALP have accumulated more vegetation and the risk of further deterioration has been reduced.

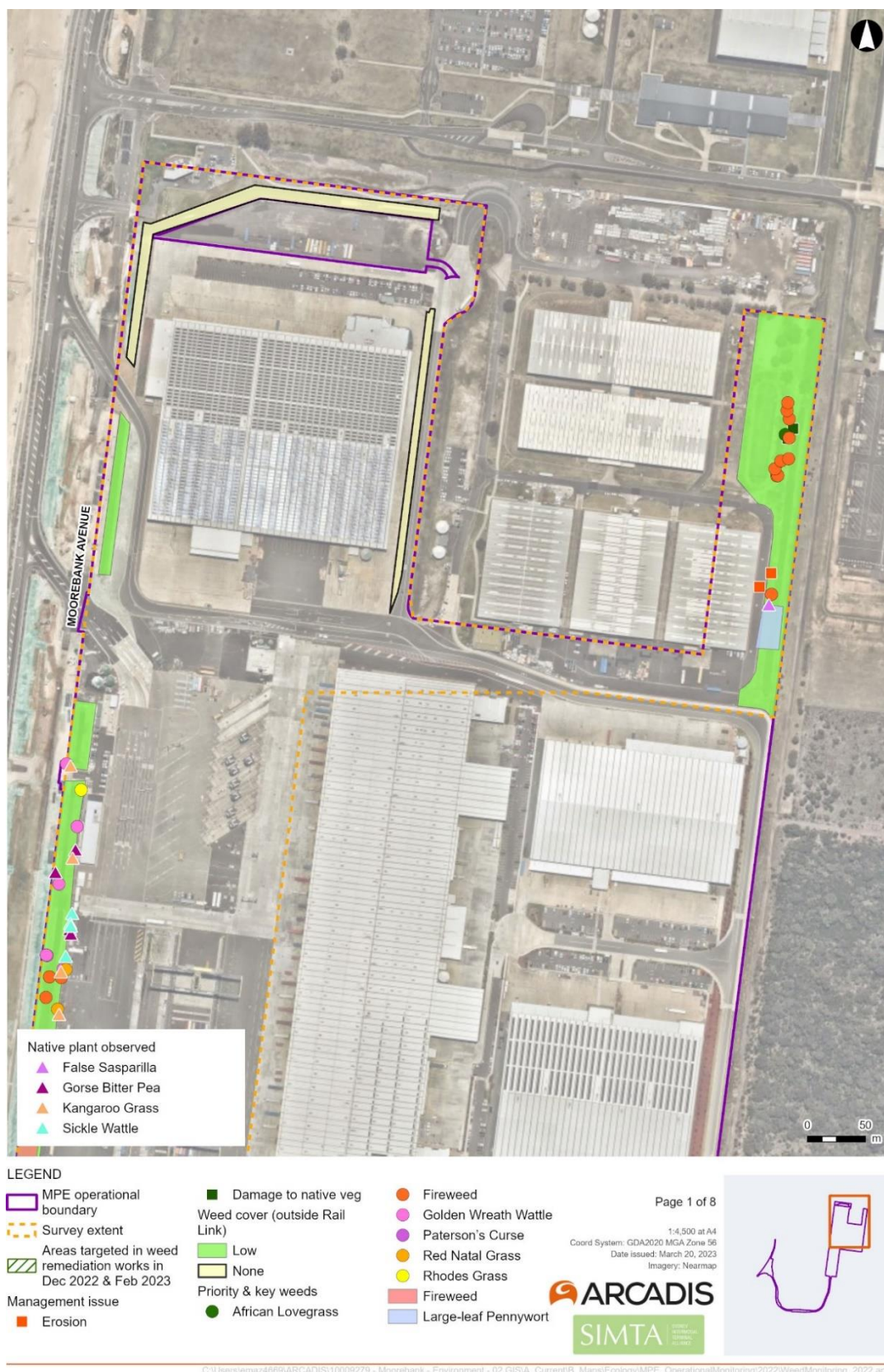


Figure 2 Native plant, weed covers and aggressive weeds identified across the MPE operational facility (Map 1 of 8).

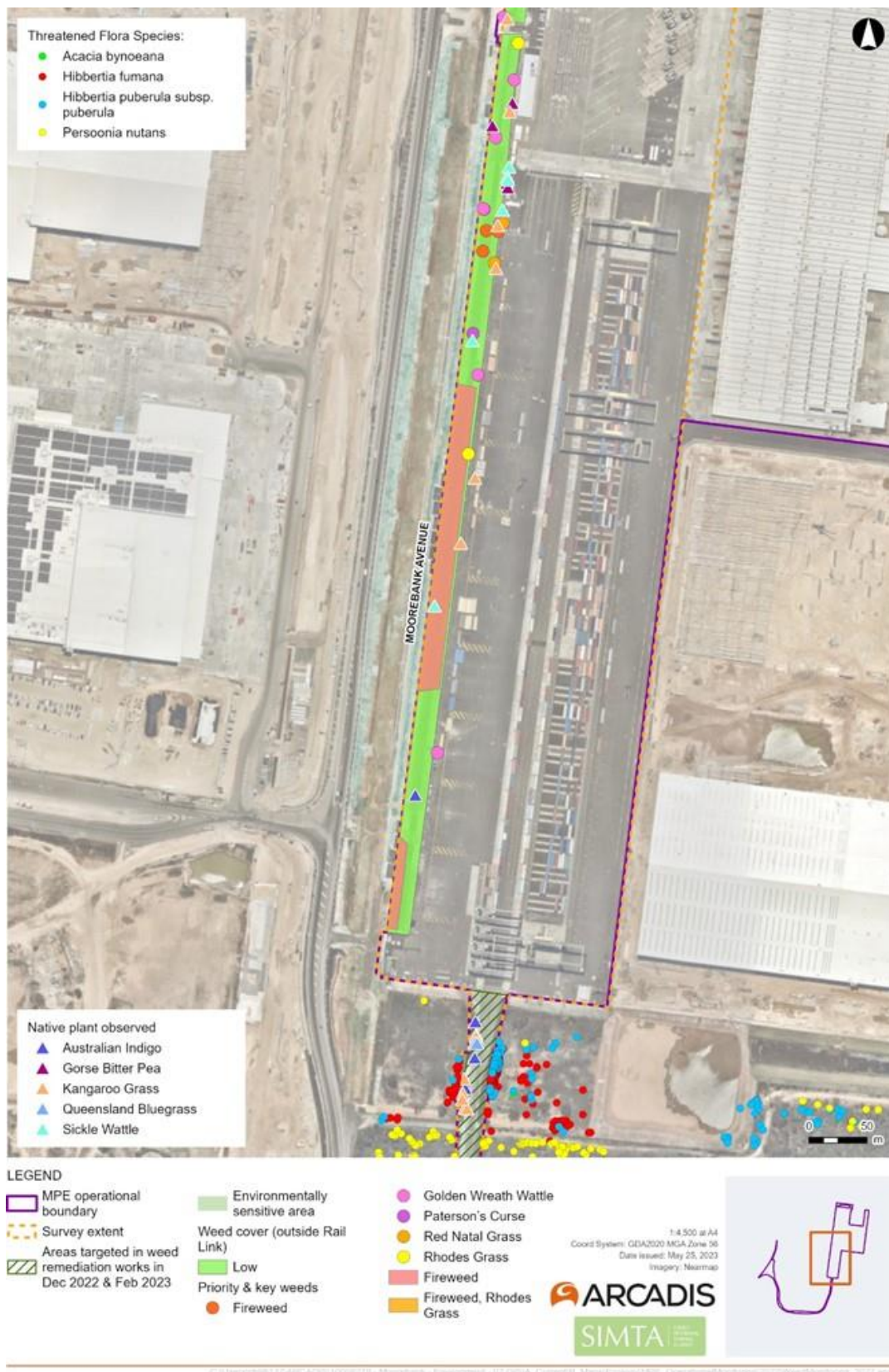


Figure 3 Native plants, weed covers and aggressive weeds identified across the MPE operational facility. The coloured areas under the "Priority & key weeds" legend area areas that have high-density weeds (Map 2 of 8)

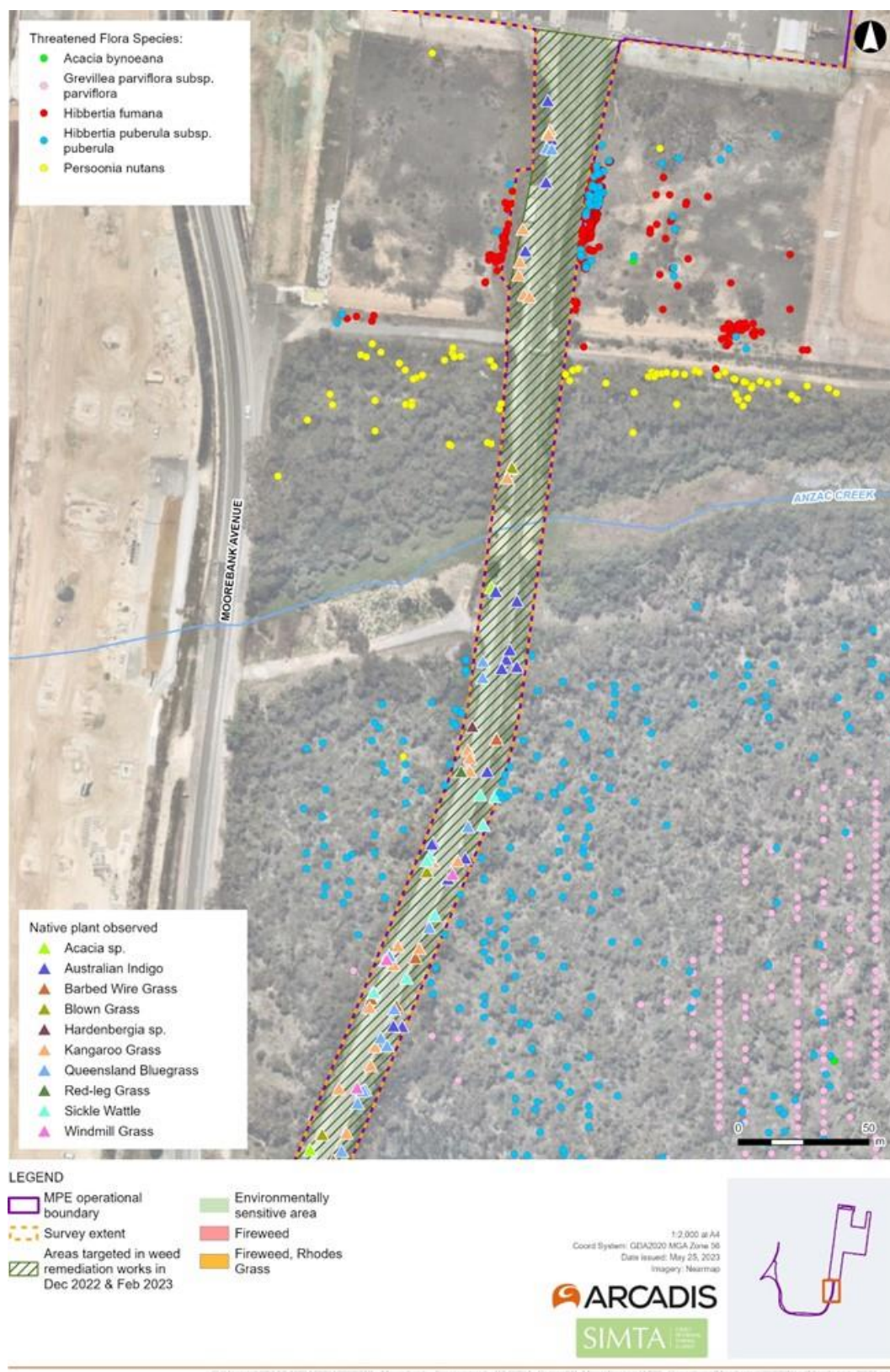


Figure 4 Native species, weed covers and aggressive weeds identified across the MPE operational facility. The coloured areas under the "Priority & key weeds" legend area areas that have high-density weeds (Map 3 of 8)

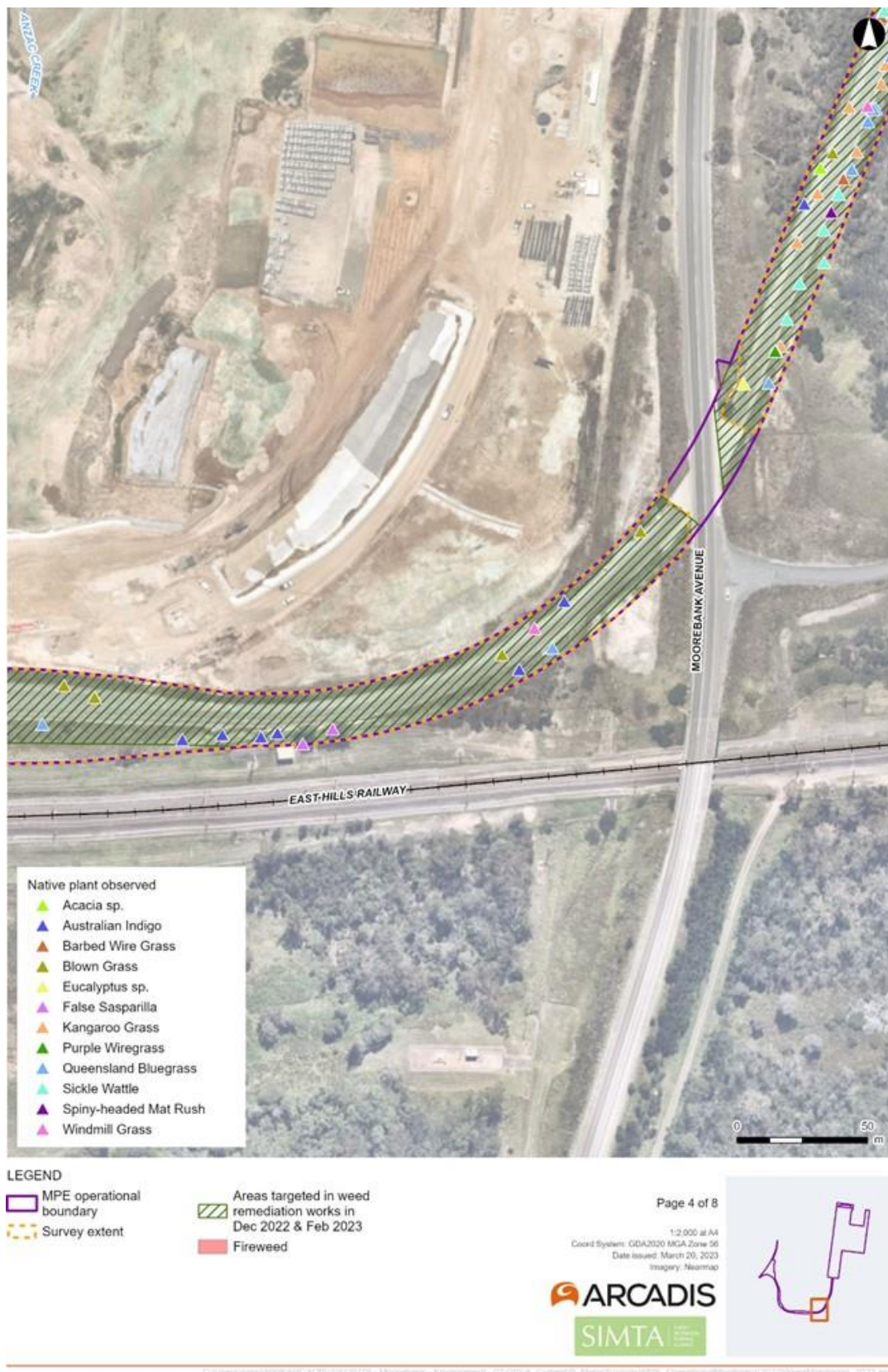




Figure 6. Native plant, weed covers and aggressive weeds identified across the MPE operational facility (Map 5 of 8)

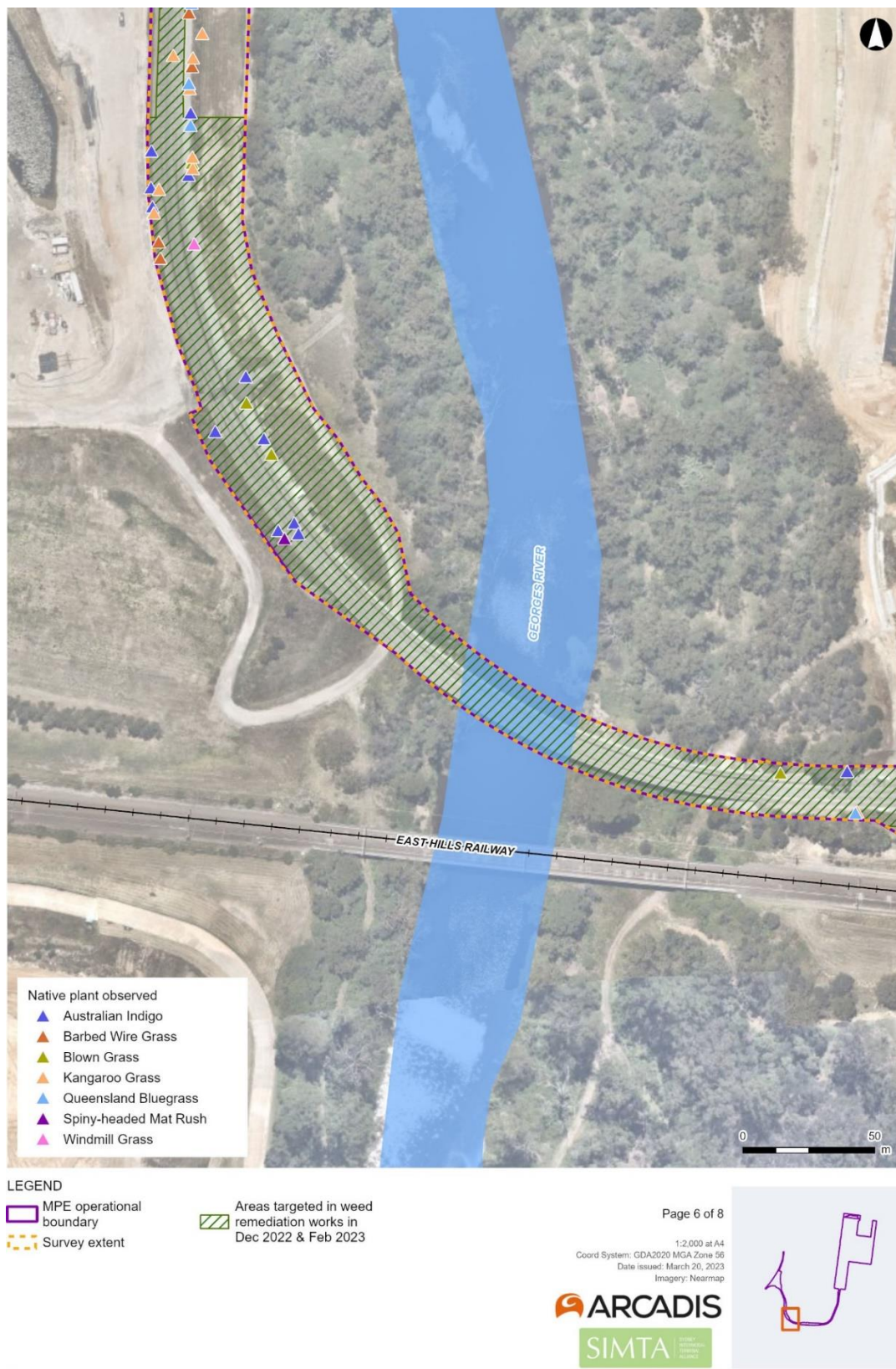


Figure 7. Native plants, weed covers and aggressive weeds identified across the MPE operational facility. The coloured areas under the "Priority & key weeds" legend area areas that have high-density weeds (Map 6 of 8)

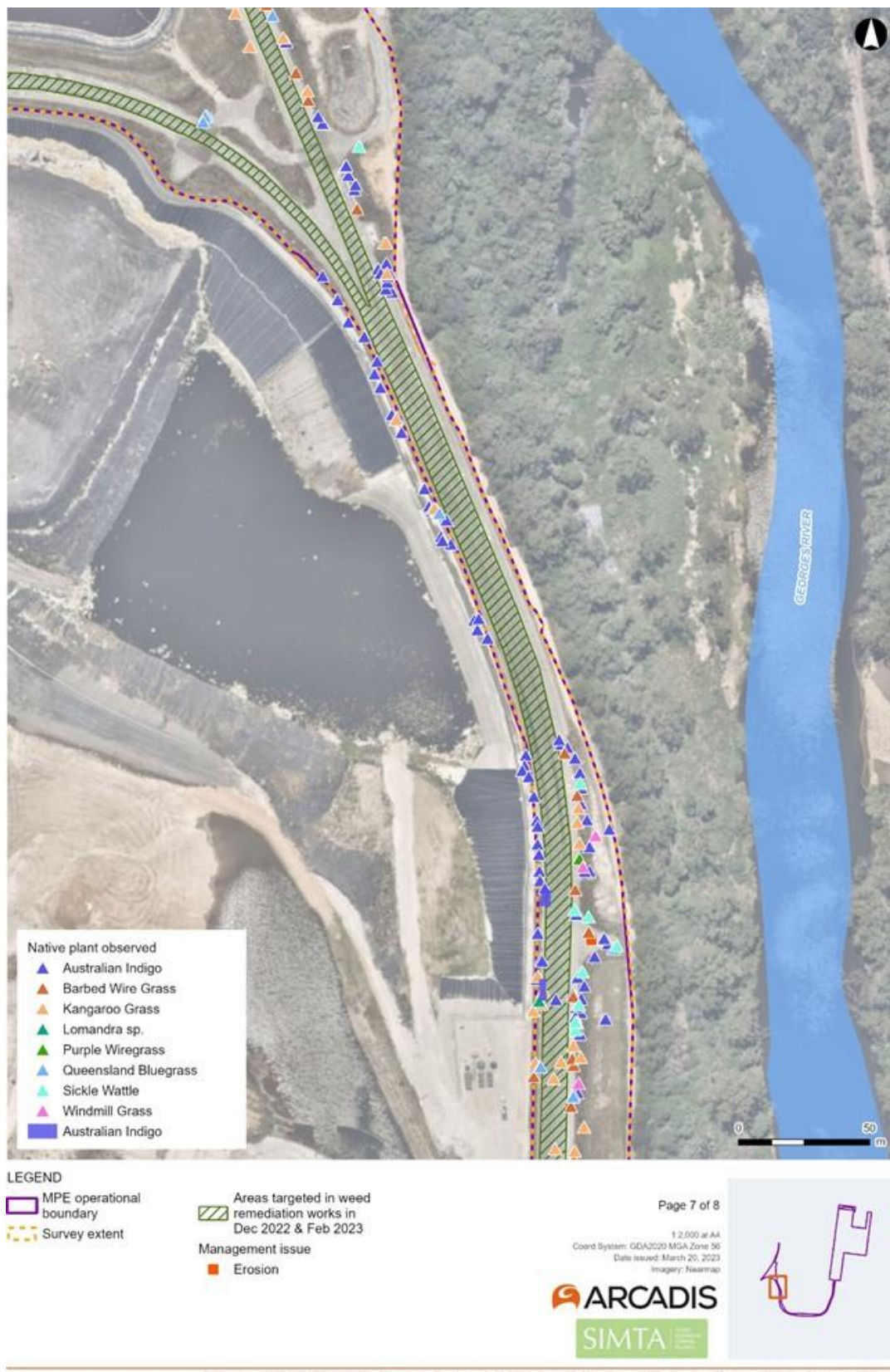


Figure 8. Native plants, weed covers and aggressive weeds identified across the MPE operational facility. The coloured areas under the "Priority & key weeds" legend area areas that have high-density weeds (Map 7 of 8)

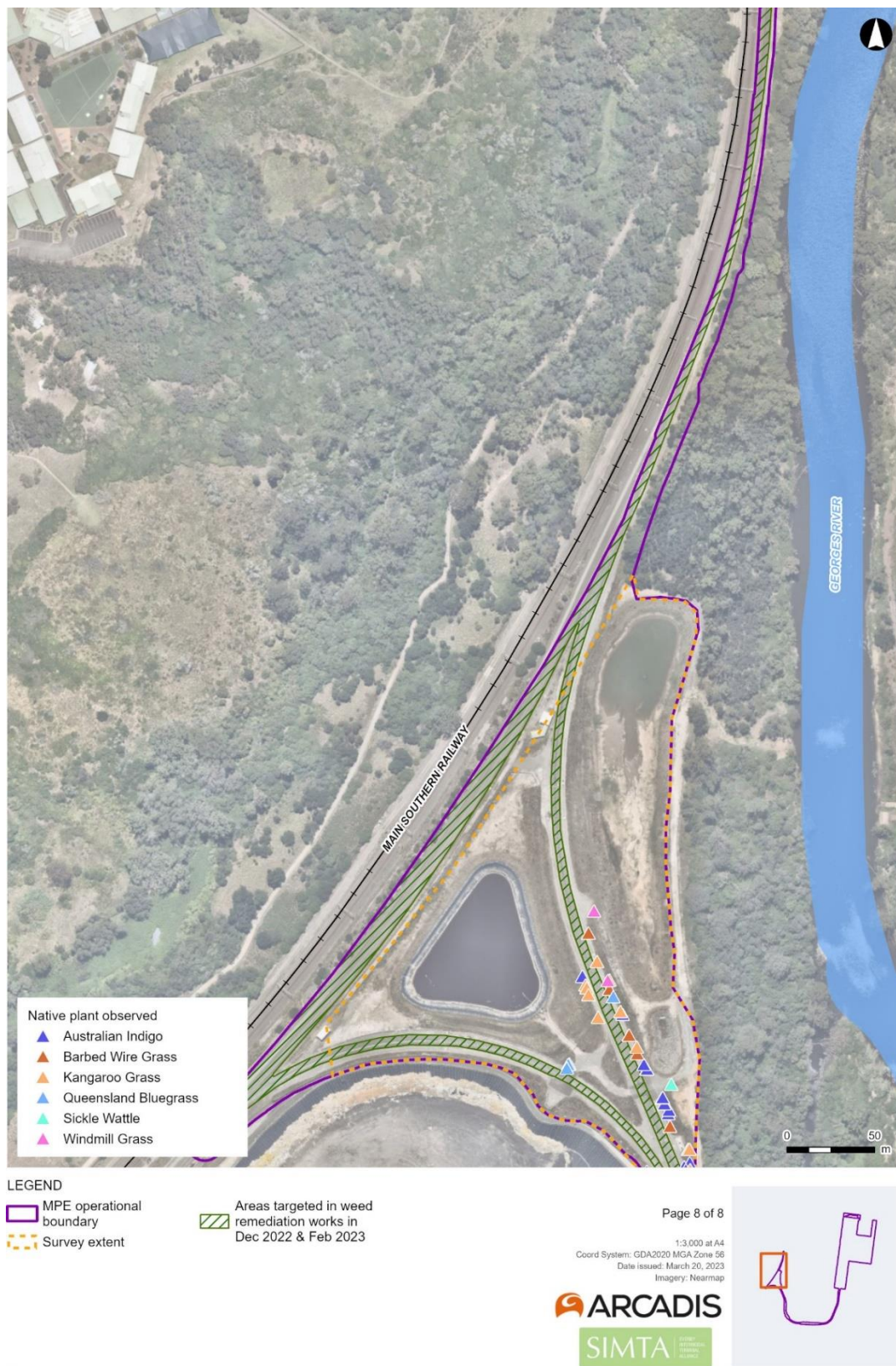


Figure 9. Native plants, weed covers and aggressive weeds identified across the MPE operational facility. The coloured areas under the "Priority & key weeds" legend area areas that have high-density weeds (Map 8 of 8)

## Recommendations

Recommended actions documented in previous weed monitoring reports are included in *Appendix A: Recommended Actions Catalogue*. The catalogue has been reviewed and updated to reflect works which have been completed and is considerate of the revegetation methodology proposed by Spray Grass Solutions and Cumberland Plain Seeds.

The majority of weed remediation and management action recommendations documented in the previous weed monitoring report are still applicable to the management of the site. These include:

- Targeted weed remediation to continue in August 2024 and is to be conducted using the same methods and at the same locations as previously conducted.
- Targeted weed remediation works to continue along revegetated soft batters. Weed remediation works will focus on controlling priority and key weed species. Hand weeding should be conducted for individuals, whereas slashing and herbicide spraying should be adopted to target larger patches of weeds. However, extreme care must be taken when conducting any weed management along the rail corridor, as many native grasses have become established. A suggested process to target weeds along revegetated soft batters is presented in the methodology section of this report and Figure 11. Hand weeding is only feasible on annual species such as *Themeda quadrivalvis* (Grader Grass) and *Senecio madagascariensis* (Fireweed) due to their relatively small root system.
- Priority and aggressive weed species outside revegetated Rail Link areas should be removed. Weeds that should be targeted include *Senecio madagascariensis* (Fireweed).
- Large patches of *Eragrostis curvula* (African Lovegrass), *Chloris gayana* (Rhodes Grass) and *Themeda quadrivalvis* (Grader Grass) between the Rail Link and the East Hills train line should be slashed regularly to prevent seeding events (Figure 4 and Figure 9). This will reduce the colonisation of these grasses into revegetation areas. However, slashing should only occur when plants are not seeding to prevent further spread. Furthermore, as more native species become established in these areas, slashing may impact their growth; therefore, non-targeted slashing should be avoided.
- Continue to collect litter from within the Rail Link and in adjacent areas.
- Soft batters within the trunk drainage system and retention basin/swale at the north-eastern extent of the facility should be inspected for weed growth. Weed levels should be controlled through herbicide application, slashing and hand weeding. Weed remediation works should be conducted in accordance with the approved Weed Management Plan.

Application of herbicide within the Rail Link and in areas adjacent to the Moorebank biobank site should be conducted to prevent overspray (off-target poisoning). If herbicide application occurs, recommended herbicides for tussock grass, such as *Chloris gayana* (Rhodes Grass) and *Eragrostis curvula* (African Lovegrass), include glyphosate or flupropanate, while plants are actively growing during summer and spring. Native vegetation outside the Rail Link fence must not be impacted by herbicide during weed remediation works.

No herbicide spraying should be conducted outside the Rail Link corridor, specifically adjacent to ecologically sensitive areas south of the MPE Operational facility (Figure 3). Manual weed remediation works in ecologically sensitive areas should not extend beyond the construction envelope of the RALP project. If further clarification is necessary, the project ecologist should be consulted.

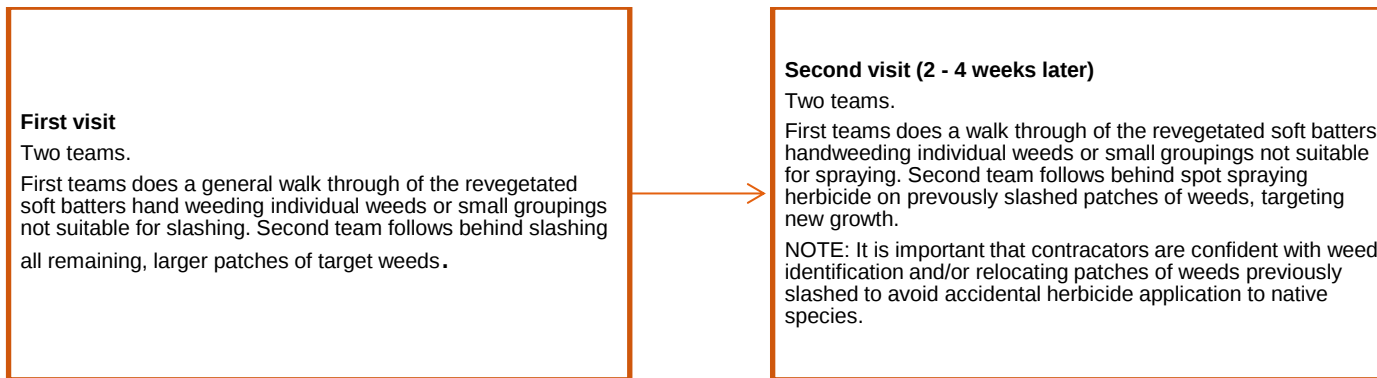


Figure 10. Suggested process to controlling target weeds on revegetated soft batters

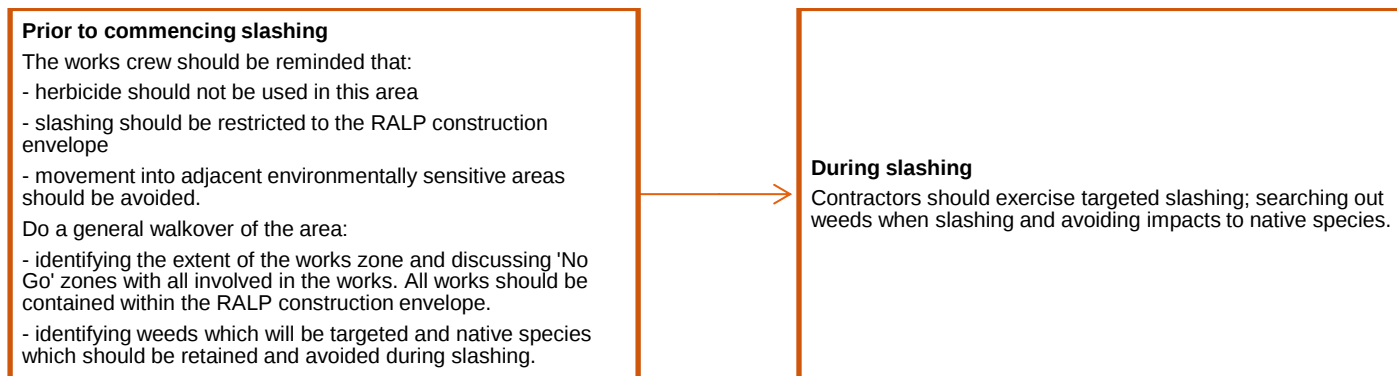


Figure 11. Slashing target weeds within the RALP construction envelope adjacent to ecologically sensitive areas

## References

Arcadis (2019a) Urban Design and Landscape Plan. Moorebank Precinct East Stage 1

Arcadis (2019b) Operational Flora and Fauna Management Plan. Moorebank Logistics Park – East Precinct

Arcadis (2019c) Landscape Vegetation Management Sub Plan. Moorebank Precinct East Stage 2

Arcadis (2020) MPE Operational – Weed Monitoring Report October 2020

Arcadis (2020) Urban Design and Landscape Plan. Moorebank Precinct East Stage 2

Bureau of Meteorology (BOM) (2021) Climate Data Online. Weather and Climate: Holsworthy Aerodrome NSW (station 066161) <http://www.bom.gov.au/climate/dwo/IDCJDW2161.latest.shtml>

NSW Department of Primary Industries (DPI) (accessed 2021) NSW WeedWise. priority weeds for the Greater Sydney. <https://weeds.dpi.nsw.gov.au/WeedBiosecurities?AreaId=3>

## APPENDIX A. RECOMMENDED ACTIONS CATALOGUE

| Month of logging | Recommended action                                                                                                                                                                                                                 | Status<br>(Not started, Commenced, Complete) | Comments                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| April 2020       | Eradicate priority weeds species, including Bridal Creeper, Alligator Weed, Lantana, Fireweed and African Olive                                                                                                                    | Commenced                                    | Lantana, African Olive, Fireweed and Bridal Creeper remain within the Rail Link. These weed species should be prioritised for removal.                                                                                                                                                                                                                                                                                                                                                            |
| April 2020       | Remove key and aggressive weed species within Rail Link, including Golden Wreath Wattle, Moth Vine, Castor Oil Plant, Small-leafed Privet, Grader Grass and Balloon Vine                                                           | Commenced                                    | <p>Grader Grass has been observed colonising remediated areas within the Rail Link. This species should be removed to prevent further colonisation and infestations.</p> <p>Golden Wreath Wattle, Moth Vine and Castor Oil Plant on the southern side of the Rail Link in the area between the operational boundary and the East Hills line rail corridor. Consideration should be given to the management of these areas to reduce encroachment into recently remediated areas.</p>              |
| June 2020        | Planning should commence to revegetate soft batters and un-developed areas within the MPE operational facility with native species in accordance with the approved Urban Design and Landscaping Plan (Arcadis 2019a, Arcadis 2020) | Commenced                                    | <p>Revegetation has commenced for remediated areas using a hydro-mulch containing a seed palette commensurate with the UDLP (Arcadis 2020).</p> <p>Additional striking of native seed was observed during the February 2022 monitoring inspection within the Rail Link. The following native species were observed growing Hickory Wattle, Indigofera, Windmill Grass, Queensland Bluegrass, Couch Grass, Kangaroo Grass, Kidney Weed, Barbed Wire Grass, Blown Grass, and Creeping Saltbush.</p> |

| Month of logging | Recommended action                                                                                                                                                                             | Status<br>(Not started, Commenced, Complete) | Comments                                                                                                                                                                                                                                                                                                                                                                                                                |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| August 2020      | Exotic species, specifically <i>Medicago polymorpha</i> (Burr medic), should be removed from grassland on either side of the Rail Link at its eastern extent, closest to the operational area. | Commenced                                    | Targeted manual removal, including slashing, has been conducted for exotic species outside the Rail Link corridor fencing. A qualified bush regeneration contractor should be used to avoid impacts on native species. Strictly no herbicide should be used in this area, and works should not extend beyond the RALP construction envelope. Where possible, contractors should not access/pass through adjacent areas. |
| August 2021      | Collect litter scattered through the Rail Link corridor and in adjacent areas                                                                                                                  | Commenced                                    | Litter remains in the Rail Link corridor and adjacent areas.                                                                                                                                                                                                                                                                                                                                                            |
| October 2021     | Control aggressive weed species Coolatai Grass and Paterson's Curse within the Rail Link                                                                                                       | Commenced                                    | New instances of aggressive weed species Coolatai Grass and Paterson's Curse within the Rail Link should be removed as soon as practicable to avoid the spread of these species into ecologically sensitive areas adjacent to the Rail Link.                                                                                                                                                                            |
| February 2022    | Continued targeted slashing of woody and herbaceous weeds within the Rail Link.                                                                                                                | Commenced                                    | Continue regular slashing of large woody weeds to remove the fertile seed head and discourage further germination of these weeds within the Rail Link.                                                                                                                                                                                                                                                                  |
| August 2022      | Prioritise weed remediation works for priority and key weed species which have experienced accelerated growth in recent months.                                                                | Commenced                                    | Areas of particularly high biomass of priority and key weed species should be prioritised for weed remediation works in coming months to avoid mass seeding events.                                                                                                                                                                                                                                                     |
|                  | Begin remediation of soft batters which have slipped following extreme rainfall events in recent weeks                                                                                         | Not started                                  | Areas within the operational facility, including a number of areas within the Rail Link, require urgent batter remediation in areas of batter slipping.                                                                                                                                                                                                                                                                 |

| Month of logging | Recommended action                                                                                                                                  | Status<br>(Not started, Commenced, Complete) | Comments                                                                                                                                                                                                           |
|------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| December 2022    | Begin weed remediation of gravel and ballast areas along Rail link                                                                                  | Commenced                                    | Removal of all vegetation in gravel and ballast areas due along Rail Link corridor using slashing and herbicide due to safety concerns of train operators and prevent spread of weeds.                             |
| December 2022    | Continue weed remediation works along the soft batters within the Rail Link corridor.                                                               | Commenced                                    | Future weed remediation works should include targeted slashing and spraying of priority and key weed species, whilst avoiding native species by hand weeding within a one metre buffer zone of native individuals. |
| February 2023    | Continue weed remediation works along the soft batters within the Rail Link corridor beyond Georges River bridge.                                   | Commenced                                    | Future weed remediation works should include targeted slashing and spraying of priority and key weed species, whilst avoiding native species by hand weeding within a one metre buffer zone of native individuals. |
| April 2023       | No weed remediation has occurred since February 2023. Expected to recommence in June 2023, in same areas that have previously been remediated.      | Commenced                                    | Future weed remediation works should include targeted slashing and spraying of priority and key weed species, whilst avoiding native species by hand weeding within a one metre buffer zone of native individuals. |
| June 2023        | Continue weed remediation works along the soft batters within the Rail Link corridor                                                                | Commenced                                    | Future weed remediation works should include targeted slashing and spraying of priority and key weed species, whilst avoiding native species by hand weeding within a one metre buffer zone of native individuals. |
| October 2023     | Toolijooa Environmental Restoration inducted as primary weed control contractors.<br>Weed remediation recommenced throughout the Rail Link corridor | Commenced                                    | Future weed remediation works should include targeted slashing and spraying of priority and key weed species, whilst avoiding native species by hand weeding within a one metre buffer zone of native individuals. |

## APPENDIX B. REMEDIATION PROGRESS PHOTOGRAPHS



April 2021



August 2023



August 2024



April 2021



August 2023



August 2024



April 2021



August 2023



August 2024



April 2021



August 2023



August 2024



April 2021



August 2023

N/A



April 2021



August 2023



August 2024



April 2021

Photo point not yet established



August 2023

Photo point not yet established



August 2024

N/A

## APPENDIX C. PROFILES: PRIORITY WEEDS



Lantana



Fireweed



Alligator Weed



African Olive



Bridal Creeper



Peruvian Primrose

## APPENDIX D. PROFILES: KEY WEEDS



Rhodes Grass



African Love Grass



Patterson's Curse



Coolatai Grass



Grader Grass



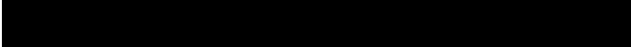
Red Natal Grass

## APPENDIX E. PLANT SPECIES INVENTORY

| Scientific name                    | Common name          | Exotic | Priority/key weed |
|------------------------------------|----------------------|--------|-------------------|
| <i>Acacia falcata</i>              | Hickory Wattle       |        |                   |
| <i>Acacia parramattensis</i>       | Parramatta Wattle    |        |                   |
| <i>Acacia saligna</i>              | Golden Wreath Wattle | *      |                   |
| <i>Alternanthera philoxeroides</i> | Alligator weed       | *      | Priority          |
| <i>Alternanthera pungens</i>       | Khaki Weed           | *      |                   |
| <i>Araujia sericifera</i>          | Moth Vine            | *      |                   |
| <i>Asparagus asparagoides</i>      | Bridal Creeper       | *      | Priority          |
| <i>Atriplex semibaccata</i>        | Creeping Saltbush    |        |                   |
| <i>Austrodanthonia spp.</i>        | -                    |        |                   |
| <i>Avena spp.</i>                  | Oats                 | *      |                   |
| <i>Bidens pilosa</i>               | Cobbler's Pegs       | *      |                   |
| <i>Brassica rapa</i>               | Field Mustard        | *      |                   |
| <i>Briza maxima</i>                | Quaking Grass        | *      |                   |
| <i>Briza minor</i>                 | Shivery Grass        | *      |                   |
| <i>Cenchrus clandestinus</i>       | Kikuyu Grass         | *      |                   |
| <i>Centaureum spp.</i>             | -                    | *      |                   |
| <i>Chloris gayana</i>              | Rhodes Grass         | *      | Key               |
| <i>Chloris truncata</i>            | Windmill Grass       |        |                   |
| <i>Cirsium vulgare</i>             | Spear Thistle        | *      |                   |
| <i>Convolvulus erubescens</i>      | Pink Bindweed        |        |                   |
| <i>Conyza bonariensis</i>          | Flaxleaf Fleabane    | *      |                   |
| <i>Cyclospermum leptophyllum</i>   | Slender Celery       | *      |                   |
| <i>Cynodon dactylon</i>            | Common Couch         |        |                   |
| <i>Cymbopogon refractus</i>        | Barbed Wire Grass    |        |                   |
| <i>Cyperus eragrostis</i>          | Umbrella Sedge       | *      |                   |
| <i>Daviesia ulicifolia</i>         | Gorse Bitter Pea     |        |                   |
| <i>Dichanthium sericeum</i>        | Queensland Bluegrass |        |                   |
| <i>Dichondra repens</i>            | Kidney Weed          |        |                   |
| <i>Echium plantagineum</i>         | Paterson's Curse     | *      | Key               |
| <i>Eragrostis brownii</i>          | Brown's Lovegrass    |        |                   |
| <i>Eragrostis curvula</i>          | African Lovegrass    | *      | Key               |
| <i>Euchiton spp.</i>               | -                    |        |                   |
| <i>Ficinia nodosa</i>              | Knobby Club-rush     |        |                   |
| <i>Foeniculum vulgare</i>          | Fennel               | *      |                   |
| <i>Glycine clandestina</i>         | -                    |        |                   |

| Scientific name                       | Common name             | Exotic | Priority/key weed |
|---------------------------------------|-------------------------|--------|-------------------|
| <i>Hardenbergia violacea</i>          | False Sarsaparilla      |        |                   |
| <i>Hypochoeris radicata</i>           | Catsear                 | *      |                   |
| <i>Indigofera australis</i>           | Australian Indigo       |        |                   |
| <i>Juncus usitatus</i>                | -                       |        |                   |
| <i>Lantana camara</i>                 | Lantana                 | *      | Priority          |
| <i>Lachnagrostis filiformis</i>       | Blown Grass             |        |                   |
| <i>Lactuca serriola</i>               | Prickly Lettuce         | *      |                   |
| <i>Linum trigynum</i>                 | French Flax             | *      |                   |
| <i>Lolium perenne</i>                 | Perennial Ryegrass      | *      |                   |
| <i>Lomandra longifolia</i>            | Spiny-headed Mat-rush   |        |                   |
| <i>Lysimachia arvensis</i>            | Scarlet Pimpernel       | *      |                   |
| <i>Ludwigia peruviana</i>             | Peruvian water primrose | *      | Priority          |
| <i>Medicago polymorpha</i>            | Burr Medic              | *      |                   |
| <i>Melilotus alba</i>                 | Bokhara                 | *      |                   |
| <i>Melinis repens</i>                 | Red Natal Grass         | *      | Key               |
| <i>Modiola caroliniana</i>            | Red-flowered Mallow     | *      |                   |
| <i>Olea europaea subsp. cuspidate</i> | African Olive           | *      | Priority          |
| <i>Paspalum dilatatum</i>             | Paspalum                | *      |                   |
| <i>Persicaria decipiens</i>           | Slender Knotweed        |        |                   |
| <i>Phytolacca octandra</i>            | Inkweed                 | *      |                   |
| <i>Plantago lanceolata</i>            | Lamb's Tongues          | *      |                   |
| <i>Portulaca oleracea</i>             | Common Purslane         |        |                   |
| <i>Rumex crispus</i>                  | Curled Dock             | *      |                   |
| <i>Senecio madagascariensis</i>       | Fireweed                | *      | Priority          |
| <i>Setaria parviflora</i>             | -                       | *      |                   |
| <i>Sida rhombifolia</i>               | Paddy's Lucerne         | *      | Key               |
| <i>Solanum nigrum</i>                 | Black-berry Nightshade  | *      |                   |
| <i>Solanum sisymbriifolium</i>        |                         | *      |                   |
| <i>Sonchus oleraceus</i>              | Common Sowthistle       | *      |                   |
| <i>Tagetes minuta</i>                 | Stinking Roger          | *      |                   |
| <i>Themeda quadrivalvis</i>           | Grader Grass            | *      | Key               |
| <i>Themeda triandra</i>               | -                       |        |                   |
| <i>Trifolium arvense</i>              | Haresfoot Clover        | *      |                   |
| <i>Trifolium repens</i>               | White Clover            | *      |                   |
| <i>Trifolium michelianum</i>          | Bolansa Clover          | *      |                   |
| <i>Verbena bonariensis</i>            | Purpletop               | *      |                   |

| Scientific name                          | Common name    | Exotic | Priority/key weed |
|------------------------------------------|----------------|--------|-------------------|
| <i>Verbena rigida</i> var. <i>Rigida</i> | Veined Verbena | *      |                   |

**Date** 6/11/2024  
**To**   
**From**   
**Copy to**   
**Subject** MPE operational facility – Weed monitoring report October 2024

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**Introduction**

Arcadis has been commissioned to conduct bi-monthly weed monitoring surveys within Moorebank Precinct East (MPE) operational facility at Moorebank Logistics Park. The MPE operational facility includes the following:

- Import and Export Terminal (IMEX)
- Rail Access Land Package (RALP)
- Warehouses, distribution facilities and freight village
- Stormwater trunk drainage infrastructure and landscaping areas

Regular monitoring of the MPE operational facility will inform the land manager of weed cover and the presence of any weeds listed as 'priority' for the Greater Sydney Local Land Services region under the *Biosecurity Act 2015*.

**Background**

Arcadis has been monitoring the MPE operational facility for weed occurrence since April 2020. High levels of weed cover within the Rail Link have been observed across most of the monitoring period, except for during weed monitoring events immediately following remediation works. Routine weed remediation works have commenced as of December 2022 along the rail link corridor, with future remediation works planned continuously planned when relevant.

The RALP, which includes the MPE operational Rail Link, has seen significant change and works over the time Arcadis has conducted weed monitoring. The soft batters on either side of the Rail Link have had varying levels of exotic cover. Additionally, works conducted in the Moorebank Precinct West (MPW) in 2023/24 have changed the layout and vegetation spread in the RALP. Several weed remediation events have occurred since the inception of weed monitoring, detailed below in Table 1.

*Table 1 Summary of weed events throughout monitoring history*

| Timing        | Summary of events                                                                                                                                                                                                                                                                  | Weed contractor       |
|---------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| Spring 2020   | <ul style="list-style-type: none"><li>• Weeds removed from batters and revegetated with native species, as per the Urban Design and Landscaping Plan (UDLP) for MPE</li><li>• Cumberland Plain Seeds were procured to provide technical oversight of revegetation effort</li></ul> | Spray Grass Solutions |
| December 2021 | <ul style="list-style-type: none"><li>• As per recommendations from Spray Grass Solutions and Cumberland Plain Seeds, the</li></ul>                                                                                                                                                |                       |

| Timing                     | Summary of events                                                                                                                                                                                                        | Weed contractor                     |
|----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|
|                            | <p>monitoring methodology was changed</p> <ul style="list-style-type: none"> <li>Changes included reporting on cover on 'priority' weeds species and key weeds specific to the project.</li> </ul>                       |                                     |
| December 2022 to June 2023 | <ul style="list-style-type: none"> <li>Weed remediation works commenced</li> <li>Priority weed species were targeted</li> <li>Native species were identified throughout the RALP to avoid accidental removal.</li> </ul> | P&E Services                        |
| December 2023 to present   | <ul style="list-style-type: none"> <li>Weed remediation works continued</li> <li>Regular maintenance of priority weed species via slashing, hand removal and herbicide spraying</li> </ul>                               | Toolijooa Environmental Restoration |

## Methodology

Arcadis ecologist Nathan Banks attended the MPE operational facility on 14 October 2024. Monitoring involved traversing the MPE operational facility on foot, surveying landscaped areas, stormwater infrastructure and soft batters adjoining the Rail Link. The areas surveyed are presented in Figure 1.

The weather on the 22 October was cloudy, with a maximum temperature of 26°C, and the weather recorded at Holsworthy Aerodrome (station 066161) (BOM 2024).

### IMEX, warehouses and drainage infrastructure

In soft landscaped areas surrounding the IMEX, warehouses, freight village and within drainage infrastructure, the following activities were conducted:

- Identifying and mapping the occurrence of weeds listed as priority
- Mapping and estimating the per cent foliage cover of exotic species
- Mapping and estimating the per cent foliage cover of priority weeds
- Recording and mapping the extent of weed remediation works

The cover of exotic species and priority weeds were estimated based on the area of cover within a patch and categorised as per Table 2.

*Table 2. Categories to describe percent cover of weeds*

| Categories | Percentage cover of weeds within a patch (%) |
|------------|----------------------------------------------|
| Low        | 5 – 25                                       |

| Categories | Percentage cover of weeds within a patch (%) |
|------------|----------------------------------------------|
| Moderate   | 25 – 75                                      |
| High       | 75 – 100                                     |

The location of weed infestations, priority weed species and observed weed remediation works were recorded on an Arc-GIS enabled iPad.

## Rail Link

Following the meeting held in December 2021 regarding revegetating the Rail Link, the monitoring methodology for weeds within the Rail Link has been refined to focus on key and priority weed species rather than all exotic species.

Priority weed species are any exotic species listed under the *Biosecurity Act 2015* for the Greater Sydney Local Land Services Area, and key weed species have been identified as site-specific exotic plants with the potential to have detrimental outcomes for the recruitment of native seedlings or impacts on adjacent ecologically sensitive areas. A list of priority and key weed species known from the Rail Link is included in Table 3.

Table 3 Priority and key weed species subject to control within the Rail Link

| Priority weed species                                        | Key weed species                              |
|--------------------------------------------------------------|-----------------------------------------------|
| <i>Alternanthera philoxeroides</i> (Alligator weed)          | <i>Chloris gayana</i> (Rhodes Grass)          |
| <i>Asparagus asparagoides</i> (Bridal Creeper)               | <i>Echium plantagineum</i> (Paterson's Curse) |
| <i>Lantana camara</i> (Lantana)                              | <i>Eragrostis curvula</i> (African Lovegrass) |
| <i>Ludwigia peruviana</i> (Ludwigia)                         | <i>Hyparrhenia hirta</i> (Coolatai Grass)     |
| <i>Olea europaea</i> subsp. <i>cuspidata</i> (African Olive) | <i>Themeda quadrivalvis</i> (Grader Grass)    |
| <i>Senecio madagascariensis</i> (Fireweed)                   |                                               |

## Study Limitations

The data presented within this report is restricted to what was observed and recorded by the attending Arcadis ecologists during the site assessment on 15 October 2024.

Monitoring of weeds was restricted to the operational facility; weeds were not assessed within the bounds of the active construction areas surrounding new warehouses.

Surveys were not undertaken in areas extending beyond the junction between the QUBE Rail Link and the Southern Sydney Freight Line (SSFL).



## Results

Observations made by the attending ecologists during the October 2024 weed monitoring survey are summarised below.

### IMEX, warehouses and drainage infrastructure

Weed cover is generally low in soft landscaped areas surrounding the IMEX. A greater cover of weedy species are present along the batters of drainage infrastructure along the western boundary of the precinct and in the north-eastern corner around the basins. Further sapling and stands of *Acacia falcata* (Hickory Wattle) continue to grow unimpeded by weeds.

Although weeds are present around the warehouse areas, they are not causing infestations or inhibiting the growth of native species. Large areas of the native *Cynodon dactylon* (Couch Grass) is present across most of these areas and is generally outcompeting weed species..

Occurrences of weeds in the warehouse area and associated drainage infrastructure is restricted to scattered individuals of *Senecio madagascariensis* (Fireweed), *Plantago lanceolata* (Plantain), *Trifolium arvense* (Clover) and exotic grasses like *Sporobolus africanus* (Parramatta Grass), *Paspalum urvillei* (Giant Paspalum) and *Ehrharta erect* (Panic Veldtgrass).

The drainage lines and lower lying areas of the basins are showing strong resilience to weed infiltration. Native species dominate these areas and have a high cover and density. Some sections of the drainage channel and basins are dominated by *Bulboschoenus fluviatilis* (Marsh club-rush) whilst other are dominated by *Typha orientalis* (Bulrush). Where space is present between stands of theses native emergent species small clumps of *Persicaria decipiens* (Slender Knotweed), *Daviesia ulicifolia*, *Ficinia nodosa* (Knotted Club-rush), *Carex tereticaulis* and *Juncus usitatus* are present. Other native species such as *Imperata cylindrica* and *Lomandra longifolia* were observed in the drainage channels.

*Ludwigia peruviana* was observed in the north-eastern corner of the MPE facility during the August 2024 surveys and requires removal to prior to spreading elsewhere in the facility.

Photos for each area discussed above and illustrated in Table 4

Table 4 Photos for each monitoring area of MPE

| Area of MPE                                               | Photo                                                                                                                                                                                                                                |
|-----------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>IMEX building and adjacent drainage infrastructure</p> |  <p><i>Plate 1 IMEX building drainage infrastructure</i></p>                                                                                      |
| <p>Warehouse areas</p>                                    |  <p><i>Plate 2 Stabilized erosion areas with rainfall brining increased litter into drainage infrastructure (no change from August 2024)</i></p> |

| Area of MPE                                     | Photo                                                                                                                                                                                       |
|-------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Eastern boundary drainage infrastructure</p> |  <p><i>Plate 3 Erosion from persistent rain events evident in areas with limited vegetation cover</i></p> |

## Rail Access Land Package (RALP)

During the October 2024 weed monitoring survey, bush regenerators from Toolijooa Environmental Restoration (Toolijooa) were conducting weed control works within the RALP.

Priority weed occurrence and cover within the RALP was observed to be low. Previous occurrences of *Senecio madagascariensis* (Fireweed) have decreased due to targeted weeding efforts by Toolijooa. Another priority weed, *Themeda quadrivalvis* (Grader Grass) has also decreased in abundance due to weeding efforts. Hand weeding and slashing of other weeds include *Vicia sativa*, *Sonchus oleraceus*, *Eragrostis curvula*, *Melinis repens*, *Andropogon virginicus*, *Bidens pilosa*.

Native species were observed to be growing well. Mature tussocks of native grass species, which have been avoided during slashing works, were observed with spent seed heads. With additional support from bush regenerators, it is anticipated that the fallen seed will germinate and establish and in turn the cover of native grasses will increase.

The status of weeds and weed remediation works observed during the October 2024 monitoring survey has been compared against a series of recommended actions developed during the baseline monitoring survey (Table 5). Overall, the status of weed management works by Toolijooa is performing well against these criteria.

Table 5 Weed remediation works tracking

| Priority | Action                                                                                       | Action description                                                                                                                                                                                                                                                                                                                                                                                                                             | October '23 performance assessment                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|----------|----------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1        | Eradicate 'priority' weeds                                                                   | Target 'priority' weed species through manual removal and herbicide treatment. Herbicide application should consider timing (i.e., applying herbicide when weeds are actively growing) and best practice methodologies. Areas outlined by coloured polygons in Figure 3 - Figure 10 should be prioritised.                                                                                                                                     | One priority weed species are present within the Rail Link: <i>Senecio madagascariensis</i> (Fireweed) (Figure 3 - Figure 10). These should be removed as a priority. Progress has been made through remediation works within the Rail link corridor. Continued management must be undertaken to work towards eradication.                                                                                                                                                                                                                                                                                                                                                                                      |
| 2        | Removal of key and aggressive weed species                                                   | <p>Key weed species, including African Lovegrass, Rhodes Grass, Paterson's Curse, Coolatai Grass and Grader Grass, should be removed from revegetated areas of soft batter.</p> <p>Aggressive weed species, including Moth Vine and Castor Oil Plant, should be removed from all operational areas using a combination of manual and herbicide control. Areas outlined by coloured polygons in Figure 3 - Figure 10 should be prioritised.</p> | <p>Key weed species, including Rhodes Grass, African Lovegrass, Coolatai Grass, Paterson's Curse, and Grader Grass, are colonising soft batters in the Rail Link. These weeds should be removed.</p> <p>Progress has been made through remediation works within the Rail Link Corridor. Continued management must be undertaken to work towards eradication.</p>                                                                                                                                                                                                                                                                                                                                                |
| 3        | Suppress further colonisation of environmental weeds and encroachment into areas of bushland | Control of exotic species adjacent to the biobank site and ecologically sensitive areas. Manual removal should be adopted in areas adjacent to threatened flora locations. Areas outlined by coloured polygons in Figure 3 - Figure 10 should be prioritised.                                                                                                                                                                                  | <p>Weed growth is increasing on soft batters adjacent to the biobank site and ecologically sensitive areas.</p> <p>Manual removal, including routine slashing, has not recently been adopted to prevent present weeds from reaching seeding maturity and further encroaching on adjacent high-value areas (biobank site and ecologically sensitive areas containing threatened plant species). All works should be restricted to the operational area and not extend into the biobank site or identified ecologically sensitive areas.</p> <p>Slashing should only be conducted when weed species are not in flower to prevent further spread. Appropriate slashing time is during winter for most species.</p> |

| Priority | Action                                                                                           | Action description                                                                                                                                                                                                       | October '23 performance assessment                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|----------|--------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 4        | Slashing of invasive grasses to prevent seeding.                                                 | Management of invasive grasses such as Rhodes Grass and African Love Grass through regular mowing or slashing. Areas outlined by coloured polygons in Figure 3 - Figure 10 should be prioritised.                        | <p>Slashing has been adopted to manage the regrowth of invasive grasses (African Lovegrass, Grader Grass) within the Rail Link in ballast and gravel areas. Some areas beyond the Georges River bridge are yet to be managed.</p> <p>Slashing should be used to manage large expanses of exotic grassland to prevent seeding events. However, as native grasses become established, extreme care must be taken, and indiscriminate slashing must be avoided. A contractor with knowledge of native species should be employed to carry out this task, in failing that, an ecologist should be on site to monitor weed remediation.</p> |
| 5        | Reduce cover of weeds within the Rail Link                                                       | Reduction of weed cover by applying control methods commensurate with the Operational Flora and Fauna Management Plan (Arcadis 2019). Areas outlined by coloured polygons in Figure 3 - Figure 10 should be prioritised. | <p>Works should involve targeted slashing of mature plants and removing flowering and seed heads to minimise seeding. Targeted slashing has been previously employed to control weed colonisation on soft batters. However, it must be continued to limit the re-colonisation of weeds within the Rail Link.</p> <p>Future weed control actions will focus on removing and reducing the cover of priority and key weed species and suppressing the further colonisation of common weeds, which is consistent with the rehabilitation methodology proposed by Spray Grass Solutions and Cumberland Plain Seeds.</p>                     |
| 6        | Remove herbaceous and woody weeds within the operational area and trunk drainage infrastructure. | Reduction in herbaceous and woody weeds by applying control methods commensurate with the Operational Flora and Fauna Management Plan (Arcadis 2019)                                                                     | Weed cover has generally remained low within trunk drainage infrastructure and at the north-eastern extent of the MIP East operational facility.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |

## Erosion

Geo-mesh fabric and boulders used to remediate erosion prone areas around the IMEX and drainage infrastructure were observed to be in good condition and serving their purpose of stabilisation during the October 2024 surveys.

Batter slumping is still present within drainage infrastructure in the warehouse area. Although some outlets have been stabilised with large boulders, the erosion is still present and will continue to erode during heavy rainfall events. (Plate 3).

Previous areas of batter slumping within the RALP have accumulated more vegetation and the risk of further deterioration has been reduced, however targeted stabilised of these areas is recommended once construction in the rail corridor is completed.

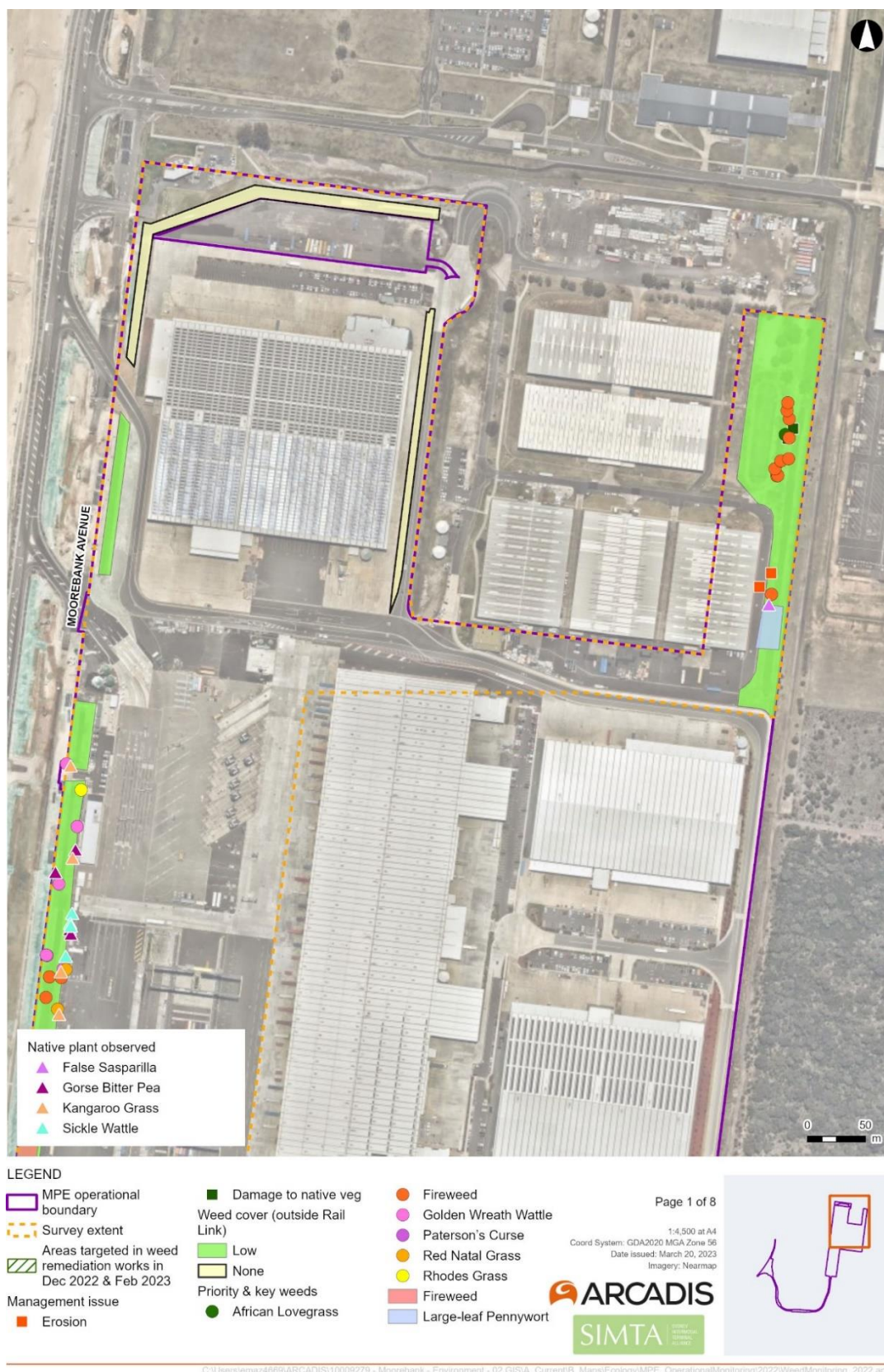


Figure 2 Native plant, weed covers and aggressive weeds identified across the MPE operational facility (Map 1 of 8).

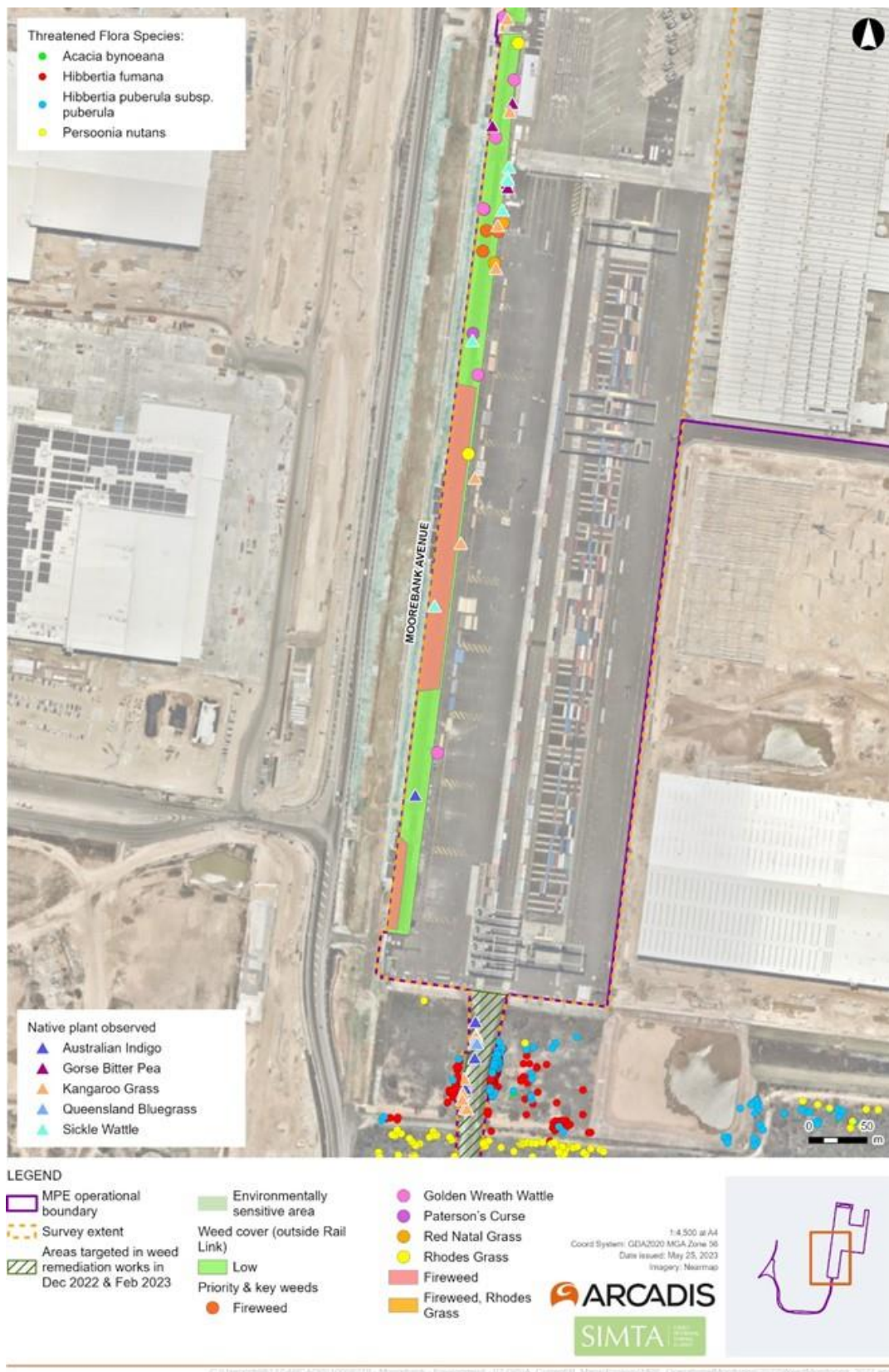


Figure 3 Native plants, weed covers and aggressive weeds identified across the MPE operational facility. The coloured areas under the "Priority & key weeds" legend area areas that have high-density weeds (Map 2 of 8)

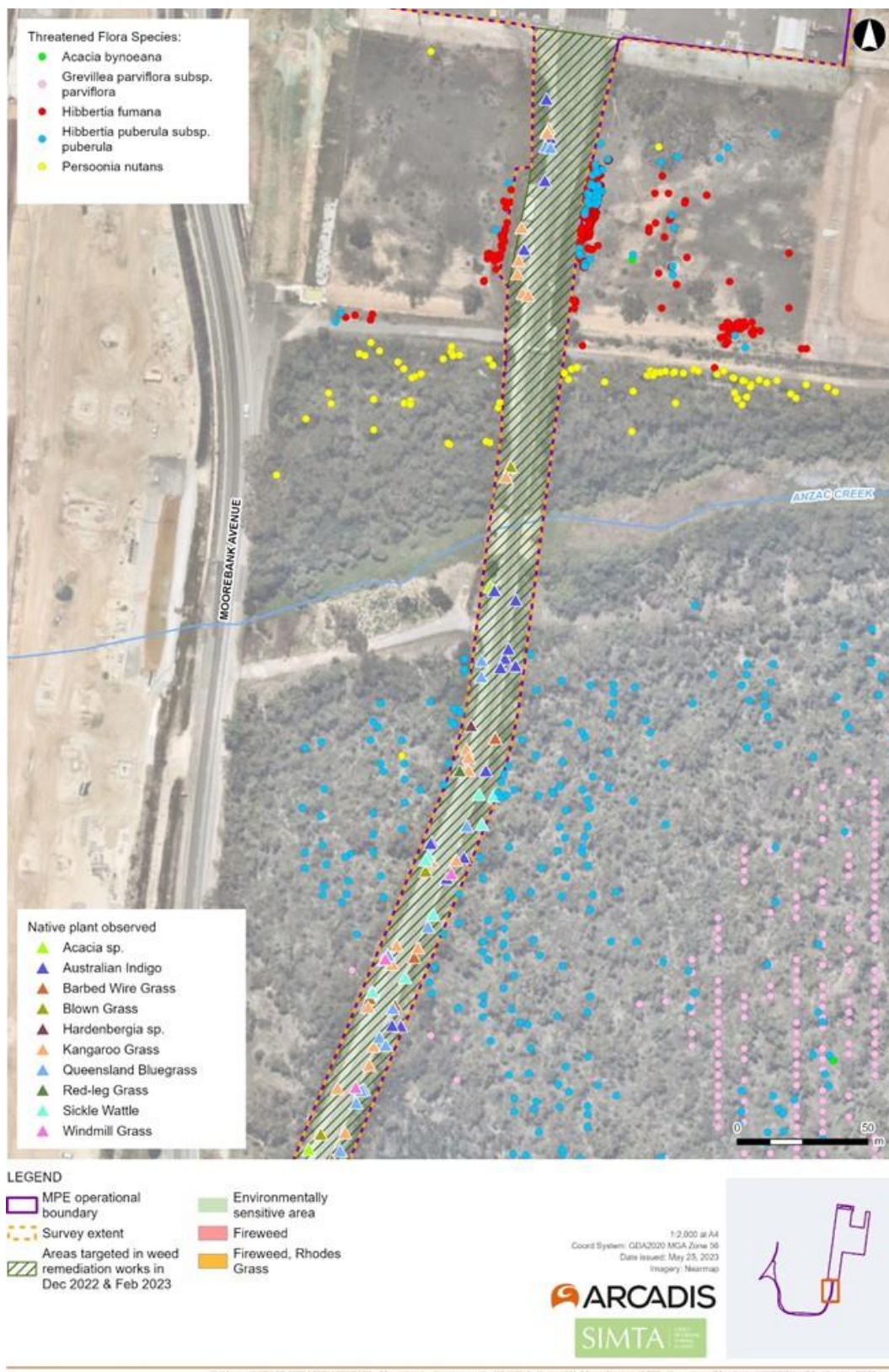


Figure 4 Native species, weed covers and aggressive weeds identified across the MPE operational facility. The coloured areas under the "Priority & key weeds" legend area areas that have high-density weeds (Map 3 of 8)

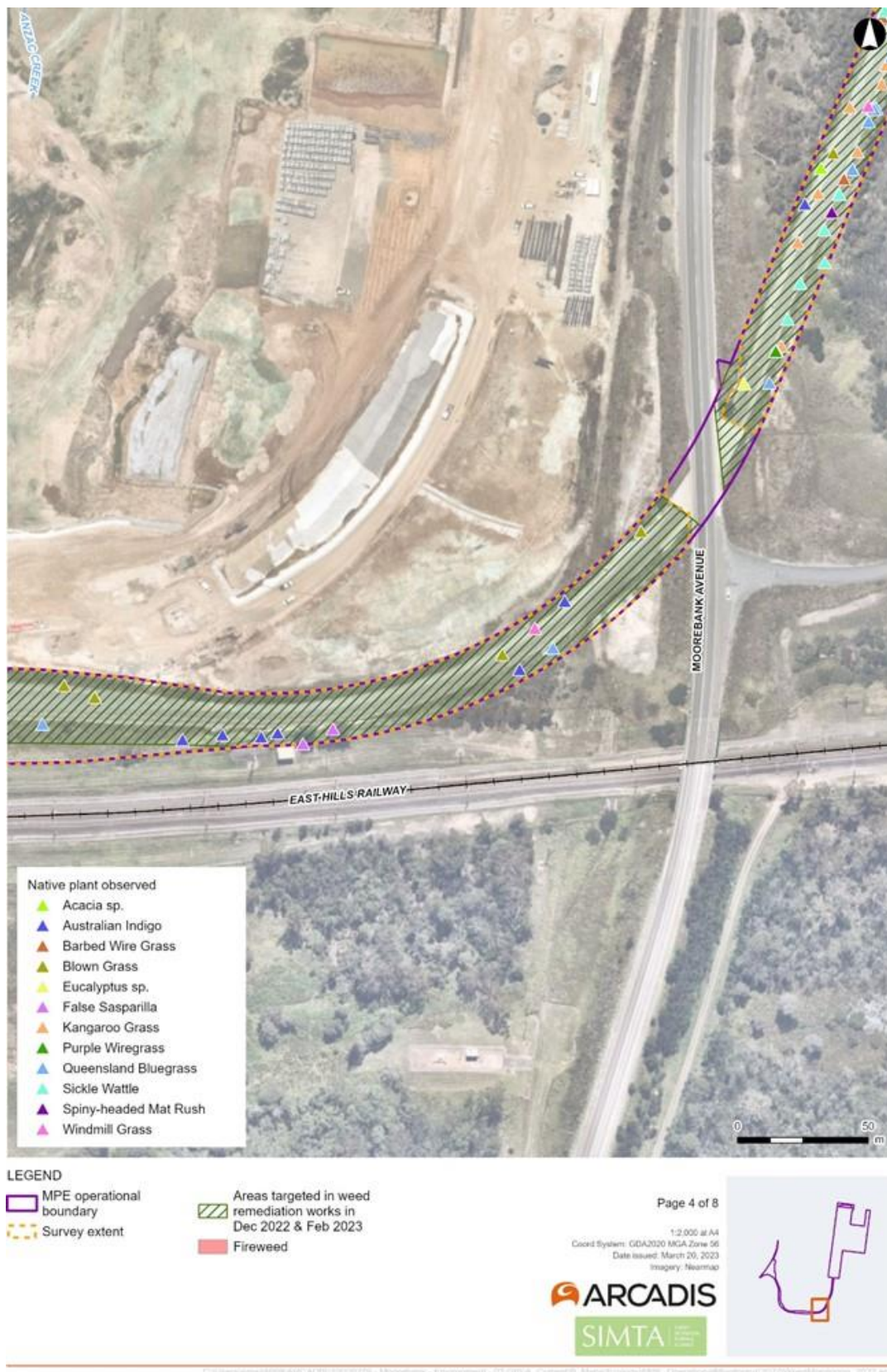


Figure 5. Native plant, weed covers and aggressive weeds identified across the MPE operational facility (Map 4 of 8)



Figure 6. Native plant, weed covers and aggressive weeds identified across the MPE operational facility (Map 5 of 8)

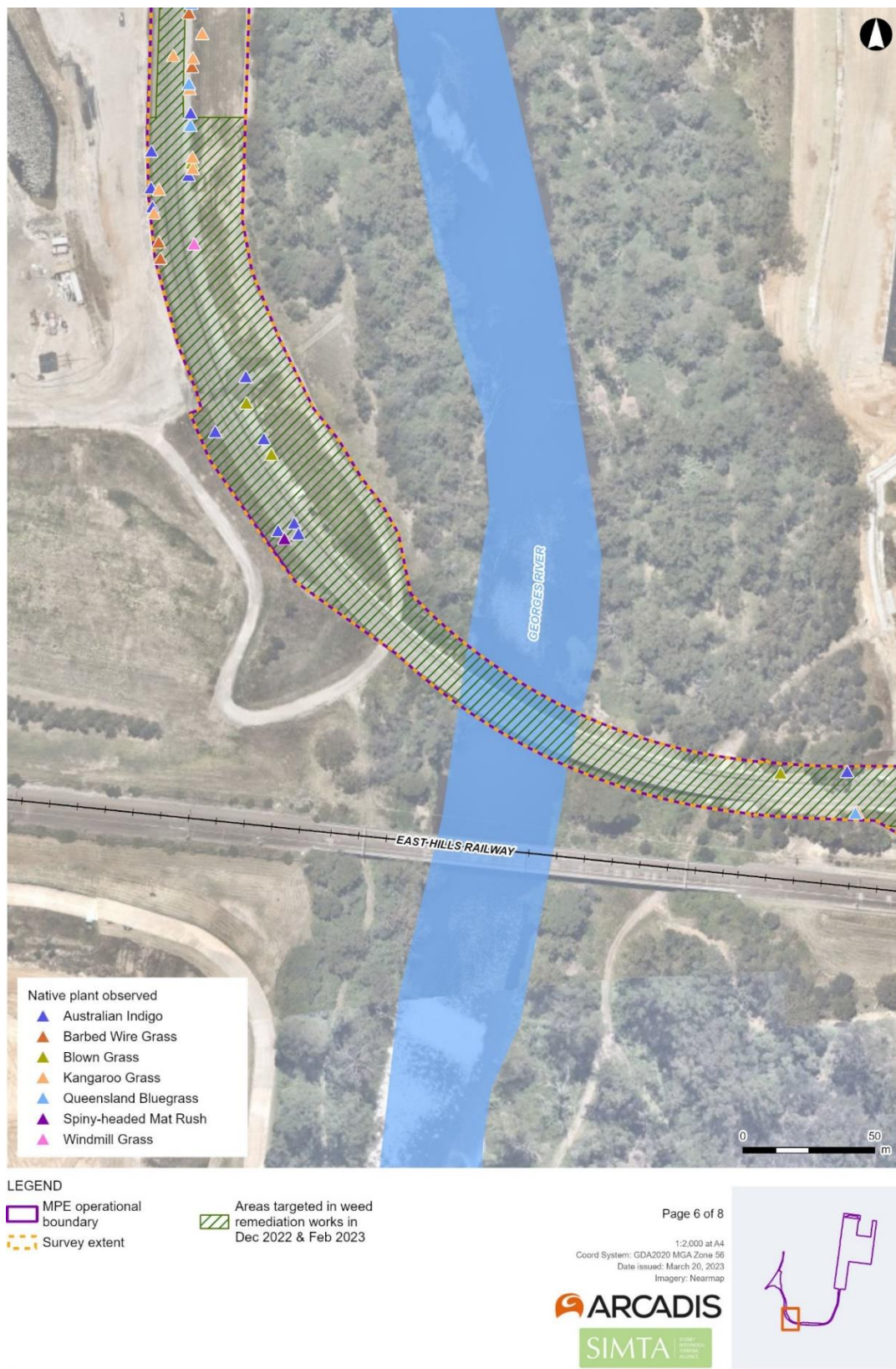


Figure 7. Native plants, weed covers and aggressive weeds identified across the MPE operational facility. The coloured areas under the "Priority & key weeds" legend area areas that have high-density weeds (Map 6 of 8)

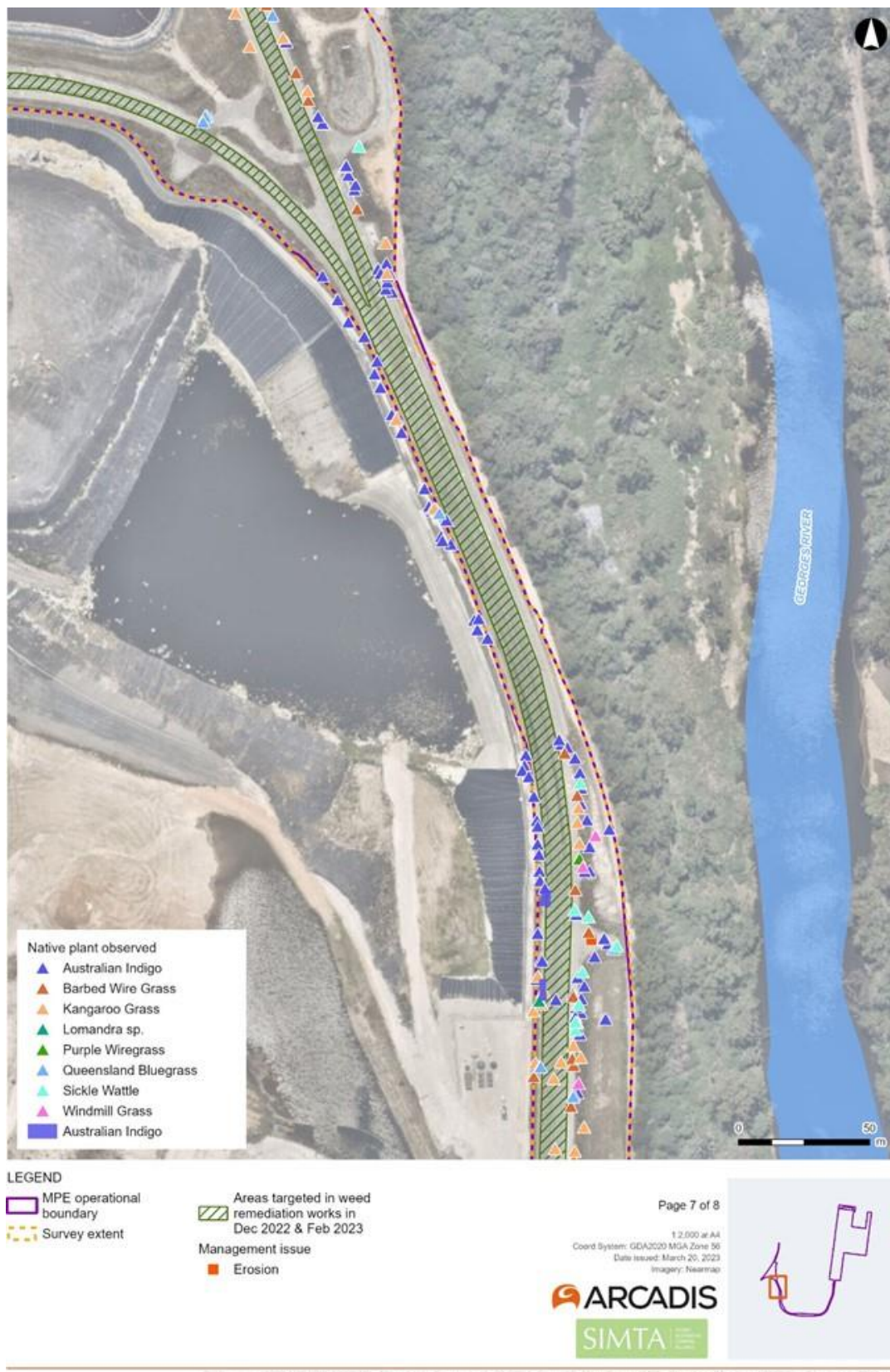


Figure 8. Native plants, weed covers and aggressive weeds identified across the MPE operational facility. The coloured areas under the "Priority & key weeds" legend area areas that have high-density weeds (Map 7 of 8)

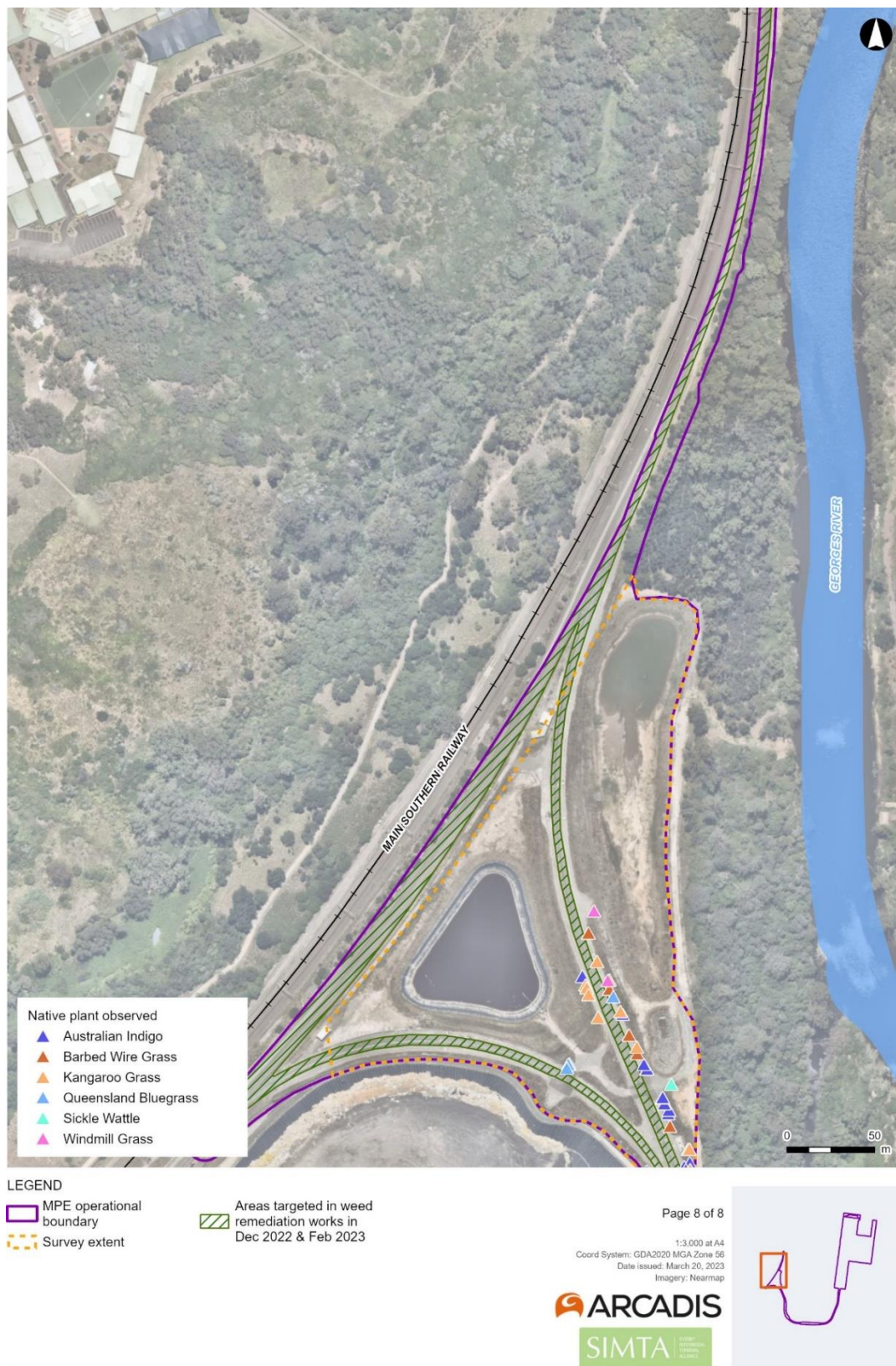


Figure 9. Native plants, weed covers and aggressive weeds identified across the MPE operational facility. The coloured areas under the "Priority & key weeds" legend area areas that have high-density weeds (Map 8 of 8)

## Recommendations

Recommended actions documented in previous weed monitoring reports are included in *Appendix A: Recommended Actions Catalogue*. The catalogue has been reviewed and updated to reflect works which have been completed and is considerate of the revegetation methodology proposed by Spray Grass Solutions and Cumberland Plain Seeds.

The majority of weed remediation and management action recommendations documented in the previous weed monitoring report are still applicable to the management of the site. These include:

- Targeted weed remediation to continue in October 2024 and is to be conducted using the same methods and at the same locations as previously conducted.
- Targeted weed remediation works to continue along revegetated soft batters. Weed remediation works will focus on controlling priority and key weed species. Hand weeding should be conducted for individuals, whereas slashing and herbicide spraying should be adopted to target larger patches of weeds. However, extreme care must be taken when conducting any weed management along the rail corridor, as many native grasses have become established. A suggested process to target weeds along revegetated soft batters is presented in the methodology section of this report and Figure 11. Hand weeding is only feasible on annual species such as *Themeda quadrivalvis* (Grader Grass) and *Senecio madagascariensis* (Fireweed) due to their relatively small root system.
- Priority and aggressive weed species outside revegetated Rail Link areas should be removed. Weeds that should be targeted include *Senecio madagascariensis* (Fireweed).
- Large patches of *Eragrostis curvula* (African Lovegrass), *Chloris gayana* (Rhodes Grass) and *Themeda quadrivalvis* (Grader Grass) between the Rail Link and the East Hills train line should be slashed regularly to prevent seeding events (Figure 4 and Figure 9). This will reduce the colonisation of these grasses into revegetation areas. However, slashing should only occur when plants are not seeding to prevent further spread. Furthermore, as more native species become established in these areas, slashing may impact their growth; therefore, non-targeted slashing should be avoided.
- Continue to collect litter from within the Rail Link and in adjacent areas.
- Soft batters within the trunk drainage system and retention basin/swale at the north-eastern extent of the facility should be inspected for weed growth. Weed levels should be controlled through herbicide application, slashing and hand weeding. Weed remediation works should be conducted in accordance with the approved Weed Management Plan.

Application of herbicide within the Rail Link and in areas adjacent to the Moorebank biobank site should be conducted to prevent overspray (off-target poisoning). If herbicide application occurs, recommended herbicides for tussock grass, such as *Chloris gayana* (Rhodes Grass) and *Eragrostis curvula* (African Lovegrass), include glyphosate or flupropanate, while plants are actively growing during summer and spring. Native vegetation outside the Rail Link fence must not be impacted by herbicide during weed remediation works.

No herbicide spraying should be conducted outside the Rail Link corridor, specifically adjacent to ecologically sensitive areas south of the MPE Operational facility (Figure 3). Manual weed remediation works in ecologically sensitive areas should not extend beyond the construction envelope of the RALP project. If further clarification is necessary, the project ecologist should be consulted.

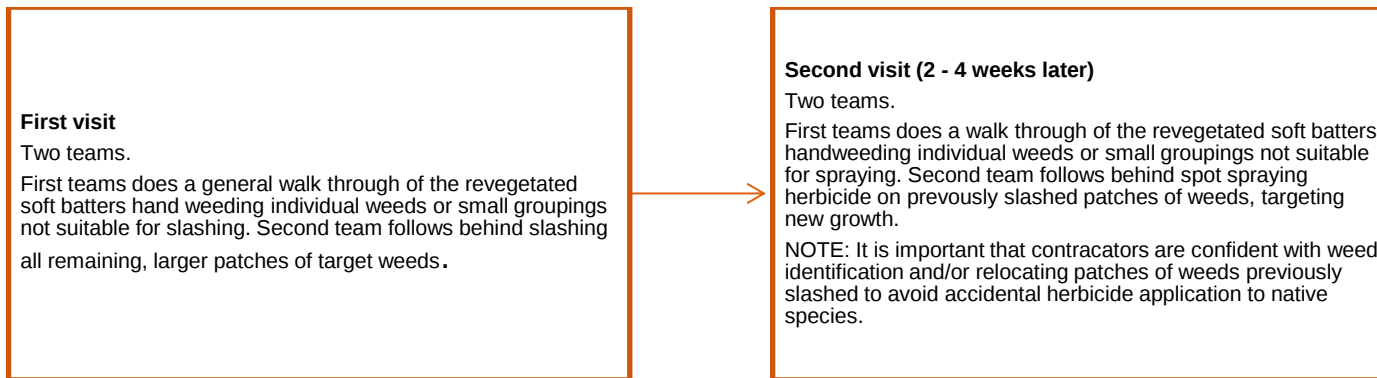


Figure 10. Suggested process to controlling target weeds on revegetated soft batters

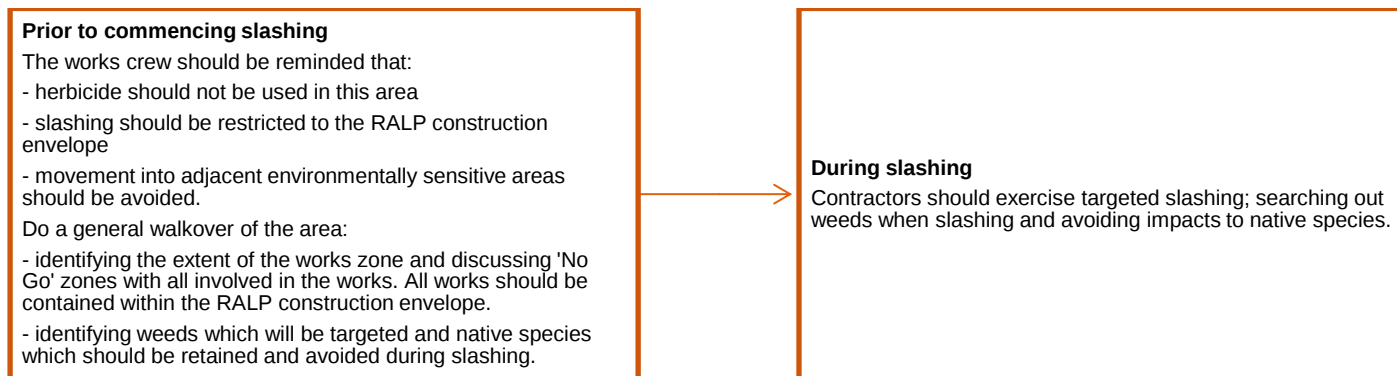


Figure 11. Slashing target weeds within the RALP construction envelope adjacent to ecologically sensitive areas

## References

Arcadis (2019a) Urban Design and Landscape Plan. Moorebank Precinct East Stage 1

Arcadis (2019b) Operational Flora and Fauna Management Plan. Moorebank Logistics Park – East Precinct

Arcadis (2019c) Landscape Vegetation Management Sub Plan. Moorebank Precinct East Stage 2

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## APPENDIX A. RECOMMENDED ACTIONS CATALOGUE

| Month of logging | Recommended action                                                                                                                                                                                                                 | Status<br>(Not started, Commenced, Complete) | Comments                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| April 2020       | Eradicate priority weeds species, including Bridal Creeper, Alligator Weed, Lantana, Fireweed and African Olive                                                                                                                    | Commenced                                    | Lantana, African Olive, Fireweed and Bridal Creeper remain within the Rail Link. These weed species should be prioritised for removal.                                                                                                                                                                                                                                                                                                                                                            |
| April 2020       | Remove key and aggressive weed species within Rail Link, including Golden Wreath Wattle, Moth Vine, Castor Oil Plant, Small-leafed Privet, Grader Grass and Balloon Vine                                                           | Commenced                                    | <p>Grader Grass has been observed colonising remediated areas within the Rail Link. This species should be removed to prevent further colonisation and infestations.</p> <p>Golden Wreath Wattle, Moth Vine and Castor Oil Plant on the southern side of the Rail Link in the area between the operational boundary and the East Hills line rail corridor. Consideration should be given to the management of these areas to reduce encroachment into recently remediated areas.</p>              |
| June 2020        | Planning should commence to revegetate soft batters and un-developed areas within the MPE operational facility with native species in accordance with the approved Urban Design and Landscaping Plan (Arcadis 2019a, Arcadis 2020) | Commenced                                    | <p>Revegetation has commenced for remediated areas using a hydro-mulch containing a seed palette commensurate with the UDLP (Arcadis 2020).</p> <p>Additional striking of native seed was observed during the February 2022 monitoring inspection within the Rail Link. The following native species were observed growing Hickory Wattle, Indigofera, Windmill Grass, Queensland Bluegrass, Couch Grass, Kangaroo Grass, Kidney Weed, Barbed Wire Grass, Blown Grass, and Creeping Saltbush.</p> |

| Month of logging | Recommended action                                                                                                                                                                             | Status<br>(Not started, Commenced, Complete) | Comments                                                                                                                                                                                                                                                                                                                                                                                                                |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| October 2020     | Exotic species, specifically <i>Medicago polymorpha</i> (Burr medic), should be removed from grassland on either side of the Rail Link at its eastern extent, closest to the operational area. | Commenced                                    | Targeted manual removal, including slashing, has been conducted for exotic species outside the Rail Link corridor fencing. A qualified bush regeneration contractor should be used to avoid impacts on native species. Strictly no herbicide should be used in this area, and works should not extend beyond the RALP construction envelope. Where possible, contractors should not access/pass through adjacent areas. |
| October 2021     | Collect litter scattered through the Rail Link corridor and in adjacent areas                                                                                                                  | Commenced                                    | Litter remains in the Rail Link corridor and adjacent areas.                                                                                                                                                                                                                                                                                                                                                            |
| October 2021     | Control aggressive weed species Coolatai Grass and Paterson's Curse within the Rail Link                                                                                                       | Commenced                                    | New instances of aggressive weed species Coolatai Grass and Paterson's Curse within the Rail Link should be removed as soon as practicable to avoid the spread of these species into ecologically sensitive areas adjacent to the Rail Link.                                                                                                                                                                            |
| February 2022    | Continued targeted slashing of woody and herbaceous weeds within the Rail Link.                                                                                                                | Commenced                                    | Continue regular slashing of large woody weeds to remove the fertile seed head and discourage further germination of these weeds within the Rail Link.                                                                                                                                                                                                                                                                  |
| October 2022     | Prioritise weed remediation works for priority and key weed species which have experienced accelerated growth in recent months.                                                                | Commenced                                    | Areas of particularly high biomass of priority and key weed species should be prioritised for weed remediation works in coming months to avoid mass seeding events.                                                                                                                                                                                                                                                     |
|                  | Begin remediation of soft batters which have slipped following extreme rainfall events in recent weeks                                                                                         | Not started                                  | Areas within the operational facility, including a number of areas within the Rail Link, require urgent batter remediation in areas of batter slipping.                                                                                                                                                                                                                                                                 |

| Month of logging | Recommended action                                                                                                                                  | Status<br>(Not started, Commenced, Complete) | Comments                                                                                                                                                                                                           |
|------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| December 2022    | Begin weed remediation of gravel and ballast areas along Rail link                                                                                  | Commenced                                    | Removal of all vegetation in gravel and ballast areas due along Rail Link corridor using slashing and herbicide due to safety concerns of train operators and prevent spread of weeds.                             |
| December 2022    | Continue weed remediation works along the soft batters within the Rail Link corridor.                                                               | Commenced                                    | Future weed remediation works should include targeted slashing and spraying of priority and key weed species, whilst avoiding native species by hand weeding within a one metre buffer zone of native individuals. |
| February 2023    | Continue weed remediation works along the soft batters within the Rail Link corridor beyond Georges River bridge.                                   | Commenced                                    | Future weed remediation works should include targeted slashing and spraying of priority and key weed species, whilst avoiding native species by hand weeding within a one metre buffer zone of native individuals. |
| April 2023       | No weed remediation has occurred since February 2023. Expected to recommence in June 2023, in same areas that have previously been remediated.      | Commenced                                    | Future weed remediation works should include targeted slashing and spraying of priority and key weed species, whilst avoiding native species by hand weeding within a one metre buffer zone of native individuals. |
| June 2023        | Continue weed remediation works along the soft batters within the Rail Link corridor                                                                | Commenced                                    | Future weed remediation works should include targeted slashing and spraying of priority and key weed species, whilst avoiding native species by hand weeding within a one metre buffer zone of native individuals. |
| October 2023     | Toolijooa Environmental Restoration inducted as primary weed control contractors.<br>Weed remediation recommenced throughout the Rail Link corridor | Commenced                                    | Future weed remediation works should include targeted slashing and spraying of priority and key weed species, whilst avoiding native species by hand weeding within a one metre buffer zone of native individuals. |

## APPENDIX B. REMEDIATION PROGRESS PHOTOGRAPHS



April 2021



October 2023



October 2024



April 2021



October 2023



October 2024



April 2021



October 2023



October 2024



April 2021



October 2023



October 2024



April 2021



October 2023



October 2024



April 2021



October 2023



October 2024



April 2021



October 2023



October 2024

Photo point not yet established

Photo point not yet established



N/A

## APPENDIX C. PROFILES: PRIORITY WEEDS



Lantana



Fireweed



Alligator Weed



African Olive



Bridal Creeper



Peruvian Primrose

## APPENDIX D. PROFILES: KEY WEEDS



Rhodes Grass



African Love Grass



Patterson's Curse



Coolatai Grass



Grader Grass



Red Natal Grass

## APPENDIX E. PLANT SPECIES INVENTORY

| Scientific name                    | Common name          | Exotic | Priority/key weed |
|------------------------------------|----------------------|--------|-------------------|
| <i>Acacia falcata</i>              | Hickory Wattle       |        |                   |
| <i>Acacia parramattensis</i>       | Parramatta Wattle    |        |                   |
| <i>Acacia saligna</i>              | Golden Wreath Wattle | *      |                   |
| <i>Alternanthera philoxeroides</i> | Alligator weed       | *      | Priority          |
| <i>Alternanthera pungens</i>       | Khaki Weed           | *      |                   |
| <i>Araujia sericifera</i>          | Moth Vine            | *      |                   |
| <i>Asparagus asparagoides</i>      | Bridal Creeper       | *      | Priority          |
| <i>Atriplex semibaccata</i>        | Creeping Saltbush    |        |                   |
| <i>Austrodanthonia spp.</i>        | -                    |        |                   |
| <i>Avena spp.</i>                  | Oats                 | *      |                   |
| <i>Bidens pilosa</i>               | Cobbler's Pegs       | *      |                   |
| <i>Brassica rapa</i>               | Field Mustard        | *      |                   |
| <i>Briza maxima</i>                | Quaking Grass        | *      |                   |
| <i>Briza minor</i>                 | Shivery Grass        | *      |                   |
| <i>Cenchrus clandestinus</i>       | Kikuyu Grass         | *      |                   |
| <i>Centaureum spp.</i>             | -                    | *      |                   |
| <i>Chloris gayana</i>              | Rhodes Grass         | *      | Key               |
| <i>Chloris truncata</i>            | Windmill Grass       |        |                   |
| <i>Cirsium vulgare</i>             | Spear Thistle        | *      |                   |
| <i>Convolvulus erubescens</i>      | Pink Bindweed        |        |                   |
| <i>Conyza bonariensis</i>          | Flaxleaf Fleabane    | *      |                   |
| <i>Cyclospermum leptophyllum</i>   | Slender Celery       | *      |                   |
| <i>Cynodon dactylon</i>            | Common Couch         |        |                   |
| <i>Cymbopogon refractus</i>        | Barbed Wire Grass    |        |                   |
| <i>Cyperus eragrostis</i>          | Umbrella Sedge       | *      |                   |
| <i>Daviesia ulicifolia</i>         | Gorse Bitter Pea     |        |                   |
| <i>Dichanthium sericeum</i>        | Queensland Bluegrass |        |                   |
| <i>Dichondra repens</i>            | Kidney Weed          |        |                   |
| <i>Echium plantagineum</i>         | Paterson's Curse     | *      | Key               |
| <i>Eragrostis brownii</i>          | Brown's Lovegrass    |        |                   |
| <i>Eragrostis curvula</i>          | African Lovegrass    | *      | Key               |
| <i>Euchiton spp.</i>               | -                    |        |                   |
| <i>Ficinia nodosa</i>              | Knobby Club-rush     |        |                   |
| <i>Foeniculum vulgare</i>          | Fennel               | *      |                   |
| <i>Glycine clandestina</i>         | -                    |        |                   |

| Scientific name                       | Common name             | Exotic | Priority/key weed |
|---------------------------------------|-------------------------|--------|-------------------|
| <i>Hardenbergia violacea</i>          | False Sarsaparilla      |        |                   |
| <i>Hypochoeris radicata</i>           | Catsear                 | *      |                   |
| <i>Indigofera australis</i>           | Australian Indigo       |        |                   |
| <i>Juncus usitatus</i>                | -                       |        |                   |
| <i>Lantana camara</i>                 | Lantana                 | *      | Priority          |
| <i>Lachnagrostis filiformis</i>       | Blown Grass             |        |                   |
| <i>Lactuca serriola</i>               | Prickly Lettuce         | *      |                   |
| <i>Linum trigynum</i>                 | French Flax             | *      |                   |
| <i>Lolium perenne</i>                 | Perennial Ryegrass      | *      |                   |
| <i>Lomandra longifolia</i>            | Spiny-headed Mat-rush   |        |                   |
| <i>Lysimachia arvensis</i>            | Scarlet Pimpernel       | *      |                   |
| <i>Ludwigia peruviana</i>             | Peruvian water primrose | *      | Priority          |
| <i>Medicago polymorpha</i>            | Burr Medic              | *      |                   |
| <i>Melilotus alba</i>                 | Bokhara                 | *      |                   |
| <i>Melinis repens</i>                 | Red Natal Grass         | *      | Key               |
| <i>Modiola caroliniana</i>            | Red-flowered Mallow     | *      |                   |
| <i>Olea europaea subsp. cuspidate</i> | African Olive           | *      | Priority          |
| <i>Paspalum dilatatum</i>             | Paspalum                | *      |                   |
| <i>Persicaria decipiens</i>           | Slender Knotweed        |        |                   |
| <i>Phytolacca octandra</i>            | Inkweed                 | *      |                   |
| <i>Plantago lanceolata</i>            | Lamb's Tongues          | *      |                   |
| <i>Portulaca oleracea</i>             | Common Purslane         |        |                   |
| <i>Rumex crispus</i>                  | Curled Dock             | *      |                   |
| <i>Senecio madagascariensis</i>       | Fireweed                | *      | Priority          |
| <i>Setaria parviflora</i>             | -                       | *      |                   |
| <i>Sida rhombifolia</i>               | Paddy's Lucerne         | *      | Key               |
| <i>Solanum nigrum</i>                 | Black-berry Nightshade  | *      |                   |
| <i>Solanum sisymbriifolium</i>        |                         | *      |                   |
| <i>Sonchus oleraceus</i>              | Common Sowthistle       | *      |                   |
| <i>Tagetes minuta</i>                 | Stinking Roger          | *      |                   |
| <i>Themeda quadrivalvis</i>           | Grader Grass            | *      | Key               |
| <i>Themeda triandra</i>               | -                       |        |                   |
| <i>Trifolium arvense</i>              | Haresfoot Clover        | *      |                   |
| <i>Trifolium repens</i>               | White Clover            | *      |                   |
| <i>Trifolium michelianum</i>          | Bolansa Clover          | *      |                   |
| <i>Verbena bonariensis</i>            | Purpletop               | *      |                   |

| Scientific name                          | Common name    | Exotic | Priority/key weed |
|------------------------------------------|----------------|--------|-------------------|
| <i>Verbena rigida</i> var. <i>Rigida</i> | Veined Verbena | *      |                   |

Date

29/01/2025

To

From

Copy to

Subject

MPE operational facility – Weed monitoring report December 2024

## Introduction

Arcadis has been commissioned to conduct bi-monthly weed monitoring surveys within Moorebank Precinct East (MPE) operational facility at Moorebank Intermodal Precinct. The MPE operational facility includes the following:

- Import and Export Terminal (IMEX)
- Rail Access Land Package (RALP)
- Warehouses, distribution facilities and freight village
- Stormwater trunk drainage infrastructure and landscaping areas

Regular monitoring of the MPE operational facility will inform the land manager of weed cover and the presence of any weeds listed as 'priority' for the Greater Sydney Local Land Services region under the *Biosecurity Act 2015*.

## Background

Arcadis has been monitoring the MPE operational facility for weed occurrence since April 2020. High levels of weed cover within the Rail Link have been observed across most of the monitoring period, except for during weed monitoring events immediately following remediation works. Routine weed remediation works have commenced as of December 2022 along the rail link corridor, with future remediation works planned continuously planned when relevant.

The RALP, which includes the MPE operational Rail Link, has seen significant change and works over the time Arcadis has conducted weed monitoring. The soft batters on either side of the Rail Link have had varying levels of exotic cover. Additionally, works conducted in the Moorebank Precinct West (MPW) in 2023/24 have changed the layout and vegetation spread in the RALP. Several weed remediation events have occurred since the inception of weed monitoring, detailed below in Table 1.

Table 1 Summary of weed events throughout monitoring history

| Timing        | Summary of events                                                                                                                                                                                                                                                                  | Weed contractor       |
|---------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| Spring 2020   | <ul style="list-style-type: none"><li>• Weeds removed from batters and revegetated with native species, as per the Urban Design and Landscaping Plan (UDLP) for MPE</li><li>• Cumberland Plain Seeds were procured to provide technical oversight of revegetation effort</li></ul> | Spray Grass Solutions |
| December 2021 | <ul style="list-style-type: none"><li>• As per recommendations from Spray Grass Solutions and Cumberland Plain Seeds, the</li></ul>                                                                                                                                                |                       |

| Timing                     | Summary of events                                                                                                                                                                                                        | Weed contractor                     |
|----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|
|                            | <p>monitoring methodology was changed</p> <ul style="list-style-type: none"> <li>Changes included reporting on cover on 'priority' weeds species and key weeds specific to the project.</li> </ul>                       |                                     |
| December 2022 to June 2023 | <ul style="list-style-type: none"> <li>Weed remediation works commenced</li> <li>Priority weed species were targeted</li> <li>Native species were identified throughout the RALP to avoid accidental removal.</li> </ul> | P&E Services                        |
| December 2023 to present   | <ul style="list-style-type: none"> <li>Weed remediation works continued</li> <li>Regular maintenance of priority weed species via slashing, hand removal and herbicide spraying</li> </ul>                               | Toolijooa Environmental Restoration |

## Methodology

Arcadis ecologist Kate Mauger attended the MPE operational facility on 12 December 2024. Monitoring involved traversing the MPE operational facility on foot, surveying landscaped areas, stormwater infrastructure and soft batters adjoining the Rail Link. The areas surveyed are presented in Figure 1.

The weather on the 12 December was sunny, with a maximum temperature of 28°C, and the weather recorded at Holsworthy Aerodrome (station 066161) (BOM 2024).

### IMEX, warehouses and drainage infrastructure

In soft landscaped areas surrounding the IMEX, warehouses, freight village and within drainage infrastructure, the following activities were conducted:

- Identifying and mapping the occurrence of weeds listed as priority
- Mapping and estimating the per cent foliage cover of exotic species
- Mapping and estimating the per cent foliage cover of priority weeds
- Recording and mapping the extent of weed remediation works

The cover of exotic species and priority weeds were estimated based on the area of cover within a patch and categorised as per Table 2.

*Table 2. Categories to describe percent cover of weeds*

| Categories | Percentage cover of weeds within a patch (%) |
|------------|----------------------------------------------|
| Low        | 5 – 25                                       |

| Categories | Percentage cover of weeds within a patch (%) |
|------------|----------------------------------------------|
| Moderate   | 25 – 75                                      |
| High       | 75 – 100                                     |

The location of weed infestations, priority weed species and observed weed remediation works were recorded on an Arc-GIS enabled iPad.

## Rail Link

Following the meeting held in December 2021 regarding revegetating the Rail Link, the monitoring methodology for weeds within the Rail Link has been refined to focus on key and priority weed species rather than all exotic species.

Priority weed species are any exotic species listed under the *Biosecurity Act 2015* for the Greater Sydney Local Land Services Area, and key weed species have been identified as site-specific exotic plants with the potential to have detrimental outcomes for the recruitment of native seedlings or impacts on adjacent ecologically sensitive areas. A list of priority and key weed species known from the Rail Link is included in Table 3.

Table 3 Priority and key weed species subject to control within the Rail Link

| Priority weed species                                        | Key weed species                              |
|--------------------------------------------------------------|-----------------------------------------------|
| <i>Alternanthera philoxeroides</i> (Alligator weed)          | <i>Chloris gayana</i> (Rhodes Grass)          |
| <i>Asparagus asparagoides</i> (Bridal Creeper)               | <i>Echium plantagineum</i> (Paterson's Curse) |
| <i>Lantana camara</i> (Lantana)                              | <i>Eragrostis curvula</i> (African Lovegrass) |
| <i>Ludwigia peruviana</i> (Ludwigia)                         | <i>Hyparrhenia hirta</i> (Coolatai Grass)     |
| <i>Olea europaea</i> subsp. <i>cuspidata</i> (African Olive) | <i>Themeda quadrivalvis</i> (Grader Grass)    |
| <i>Senecio madagascariensis</i> (Fireweed)                   |                                               |

## Study Limitations

The data presented within this report is restricted to what was observed and recorded by the attending Arcadis ecologists during the site assessment on 15 December 2024.

Monitoring of weeds was restricted to the operational facility; weeds were not assessed within the bounds of the active construction areas surrounding new warehouses.

Surveys were not undertaken in areas extending beyond the junction between the QUBE Rail Link and the Southern Sydney Freight Line (SSFL).



## Results

Observations made by the attending ecologists during the December 2024 weed monitoring survey are summarised below.

### IMEX, warehouses and drainage infrastructure

Weed cover is generally low in soft landscaped areas surrounding the IMEX. A greater cover of weedy species are present along the batters of drainage infrastructure along the western boundary of the precinct and in the north-eastern corner around the basins. Further sapling and stands of *Acacia falcata* (Hickory Wattle) continue to grow unimpeded by weeds.

Although weeds are present around the warehouse areas, they are not causing infestations or inhibiting the growth of native species. Large areas of the native *Cynodon dactylon* (Couch Grass) is present across most of these areas and is generally outcompeting weed species..

Occurrences of weeds in the warehouse area and associated drainage infrastructure is restricted to scattered individuals of *Senecio madagascariensis* (Fireweed), *Plantago lanceolata* (Plantain), *Trifolium arvense* (Clover) and exotic grasses like *Sporobolus africanus* (Parramatta Grass), *Paspalum urvillei* (Giant Paspalum) and *Ehrharta erect* (Panic Veldtgrass).

The drainage lines and lower lying areas of the basins are showing strong resilience to weed infiltration. Native species dominate these areas and have a high cover and density. Some sections of the drainage channel and basins are dominated by *Bulboschoenus fluviatilis* (Marsh club-rush) whilst other are dominated by *Typha orientalis* (Bulrush). Where space is present between stands of theses native emergent species small clumps of *Persicaria decipiens* (Slender Knotweed), *Daviesia ulicifolia*, *Ficinia nodosa* (Knotted Club-rush), *Carex tereticaulis* and *Juncus usitatus* are present. Other native species such as *Imperata cylindrica* and *Lomandra longifolia* were observed in the drainage channels.

Photos for each area discussed above and illustrated in Table 4

Table 4 Photos for each monitoring area of MPE

| Area of MPE                                               | Photo                                                                                                                                                                                                                                |
|-----------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>IMEX building and adjacent drainage infrastructure</p> |  <p><i>Plate 1 IMEX building drainage infrastructure (no change since October 2024)</i></p>                                                       |
| <p>Warehouse areas</p>                                    |  <p><i>Plate 2 Stabilized erosion areas with rainfall brining increased litter into drainage infrastructure (no change from August 2024)</i></p> |

| Area of MPE                                     | Photo                                                                                                                                                                                                                      |
|-------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Eastern boundary drainage infrastructure</p> |  <p><i>Plate 3 Erosion from persistent rain events evident in areas with limited vegetation cover (no change since October 2024)</i></p> |

## Rail Access Land Package (RALP)

During the December 2024 weed monitoring survey, bush regenerators from Toolijooa Environmental Restoration (Toolijooa) were conducting weed control works within the RALP.

There was little difference in the cover and density of exotic species between the October and December surveys due to the ongoing management, and generally slow recruitment during the summer months.

Native species were observed to be growing well. Mature tussocks of native grass species, which have been avoided during slashing works, were observed with spent seed heads. With additional support from bush regenerators, it is anticipated that the fallen seed will germinate and establish and in turn the cover of native grasses will increase.

The status of weeds and weed remediation works observed during the December 2024 monitoring survey has been compared against a series of recommended actions developed during the baseline monitoring survey (Table 5). Overall, the status of weed management works by Toolijooa is performing well against these criteria.

Table 5 Weed remediation works tracking

| Priority | Action                                                                                       | Action description                                                                                                                                                                                                                                                                                                                                                                                                                             | December '23 performance assessment                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|----------|----------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1        | Eradicate 'priority' weeds                                                                   | Target 'priority' weed species through manual removal and herbicide treatment. Herbicide application should consider timing (i.e., applying herbicide when weeds are actively growing) and best practice methodologies. Areas outlined by coloured polygons in Figure 3 - Figure 10 should be prioritised.                                                                                                                                     | One priority weed species are present within the Rail Link: <i>Senecio madagascariensis</i> (Fireweed) (Figure 3 - Figure 10). These should be removed as a priority. Progress has been made through remediation works within the Rail link corridor. Continued management must be undertaken to work towards eradication.                                                                                                                                                                                                                                                                                                                                                                                      |
| 2        | Removal of key and aggressive weed species                                                   | <p>Key weed species, including African Lovegrass, Rhodes Grass, Paterson's Curse, Coolatai Grass and Grader Grass, should be removed from revegetated areas of soft batter.</p> <p>Aggressive weed species, including Moth Vine and Castor Oil Plant, should be removed from all operational areas using a combination of manual and herbicide control. Areas outlined by coloured polygons in Figure 3 - Figure 10 should be prioritised.</p> | <p>Key weed species, including Rhodes Grass, African Lovegrass, Coolatai Grass, Paterson's Curse, and Grader Grass, are colonising soft batters in the Rail Link. These weeds should be removed.</p> <p>Progress has been made through remediation works within the Rail Link Corridor. Continued management must be undertaken to work towards eradication.</p>                                                                                                                                                                                                                                                                                                                                                |
| 3        | Suppress further colonisation of environmental weeds and encroachment into areas of bushland | Control of exotic species adjacent to the biobank site and ecologically sensitive areas. Manual removal should be adopted in areas adjacent to threatened flora locations. Areas outlined by coloured polygons in Figure 3 - Figure 10 should be prioritised.                                                                                                                                                                                  | <p>Weed growth is increasing on soft batters adjacent to the biobank site and ecologically sensitive areas.</p> <p>Manual removal, including routine slashing, has not recently been adopted to prevent present weeds from reaching seeding maturity and further encroaching on adjacent high-value areas (biobank site and ecologically sensitive areas containing threatened plant species). All works should be restricted to the operational area and not extend into the biobank site or identified ecologically sensitive areas.</p> <p>Slashing should only be conducted when weed species are not in flower to prevent further spread. Appropriate slashing time is during winter for most species.</p> |

| Priority | Action                                                                                           | Action description                                                                                                                                                                                                       | December '23 performance assessment                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|----------|--------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 4        | Slashing of invasive grasses to prevent seeding.                                                 | Management of invasive grasses such as Rhodes Grass and African Love Grass through regular mowing or slashing. Areas outlined by coloured polygons in Figure 3 - Figure 10 should be prioritised.                        | <p>Slashing has been adopted to manage the regrowth of invasive grasses (African Lovegrass, Grader Grass) within the Rail Link in ballast and gravel areas. Some areas beyond the Georges River bridge are yet to be managed.</p> <p>Slashing should be used to manage large expanses of exotic grassland to prevent seeding events. However, as native grasses become established, extreme care must be taken, and indiscriminate slashing must be avoided. A contractor with knowledge of native species should be employed to carry out this task, in failing that, an ecologist should be on site to monitor weed remediation.</p> |
| 5        | Reduce cover of weeds within the Rail Link                                                       | Reduction of weed cover by applying control methods commensurate with the Operational Flora and Fauna Management Plan (Arcadis 2019). Areas outlined by coloured polygons in Figure 3 - Figure 10 should be prioritised. | <p>Works should involve targeted slashing of mature plants and removing flowering and seed heads to minimise seeding. Targeted slashing has been previously employed to control weed colonisation on soft batters. However, it must be continued to limit the re-colonisation of weeds within the Rail Link.</p> <p>Future weed control actions will focus on removing and reducing the cover of priority and key weed species and suppressing the further colonisation of common weeds, which is consistent with the rehabilitation methodology proposed by Spray Grass Solutions and Cumberland Plain Seeds.</p>                     |
| 6        | Remove herbaceous and woody weeds within the operational area and trunk drainage infrastructure. | Reduction in herbaceous and woody weeds by applying control methods commensurate with the Operational Flora and Fauna Management Plan (Arcadis 2019)                                                                     | Weed cover has generally remained low within trunk drainage infrastructure and at the north-eastern extent of the MIP East operational facility.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |

## Erosion

Geo-mesh fabric and boulders used to remediate erosion prone areas around the IMEX and drainage infrastructure were observed to be in good condition and serving their purpose of stabilisation during the December 2024 surveys.

Batter slumping is still present within drainage infrastructure in the warehouse area. Although some outlets have been stabilised with large boulders, the erosion is still present and will continue to erode during heavy rainfall events. (Plate 3).

Previous areas of batter slumping within the RALP have accumulated more vegetation and the risk of further deterioration has been reduced, however targeted stabilised of these areas is recommended once construction in the rail corridor is completed.

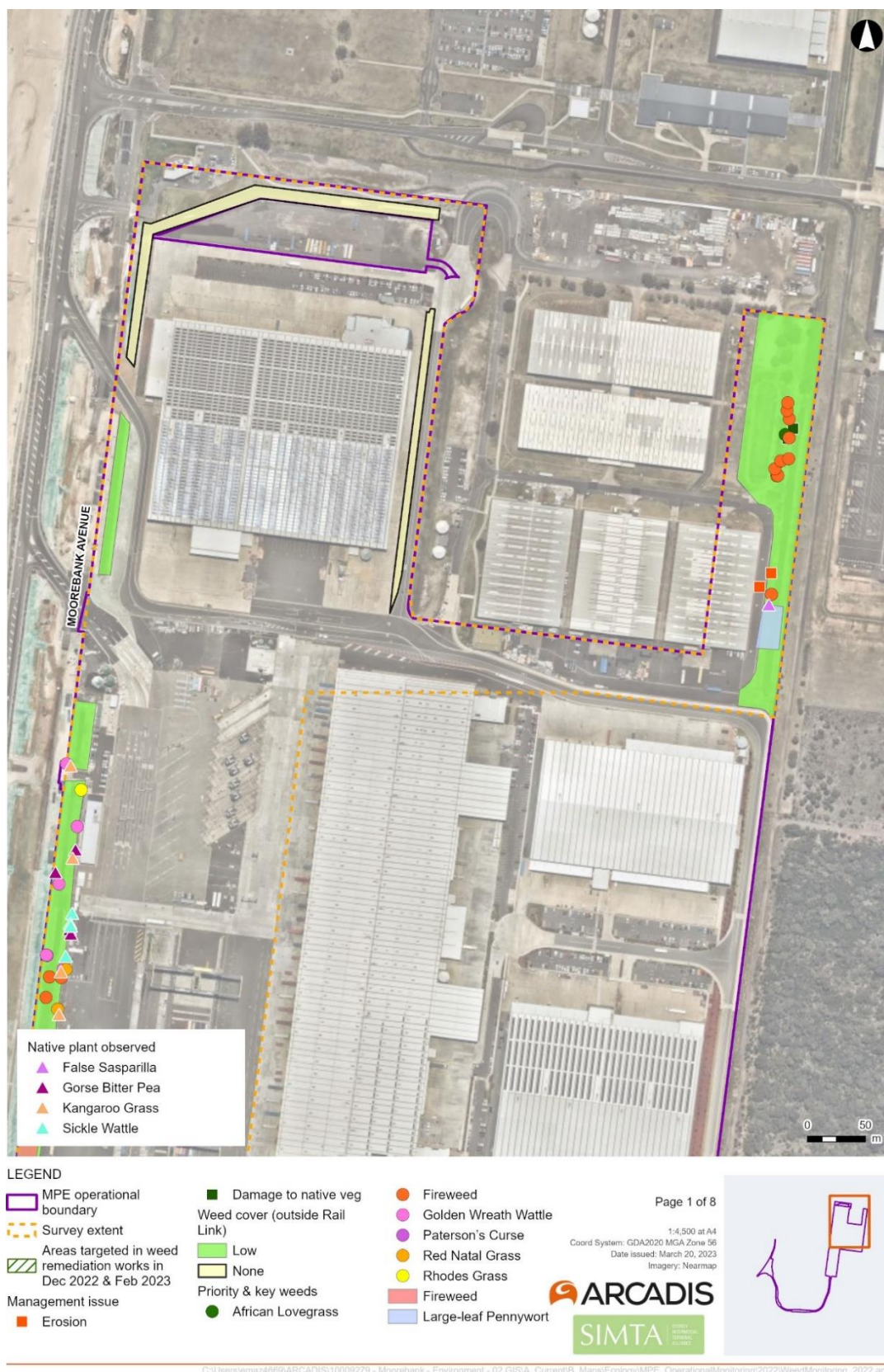


Figure 2 Native plant, weed covers and aggressive weeds identified across the MPE operational facility (Map 1 of 8).

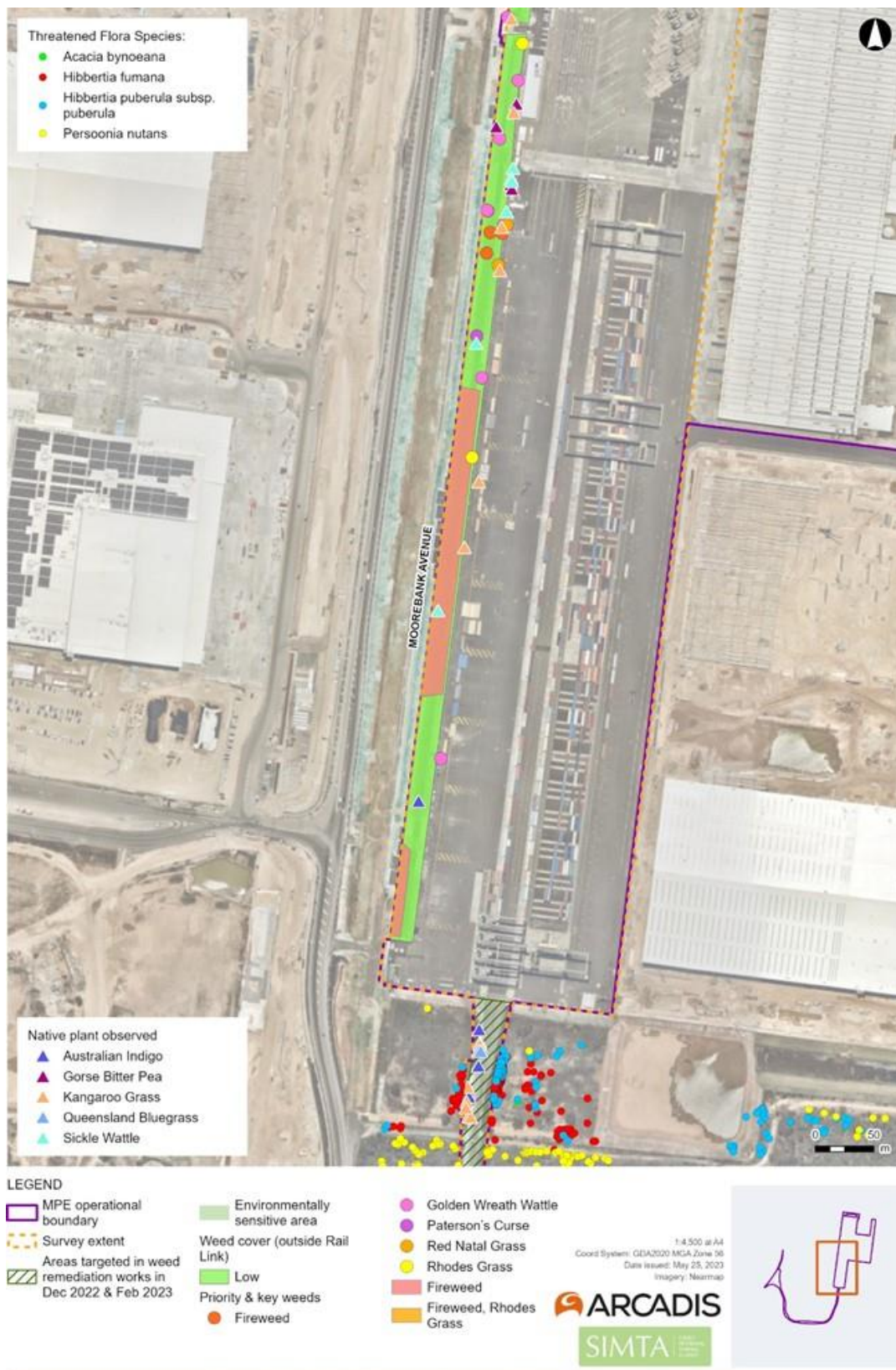


Figure 3 Native plants, weed covers and aggressive weeds identified across the MPE operational facility. The coloured areas under the "Priority & key weeds" legend area areas that have high-density weeds (Map 2 of 8)

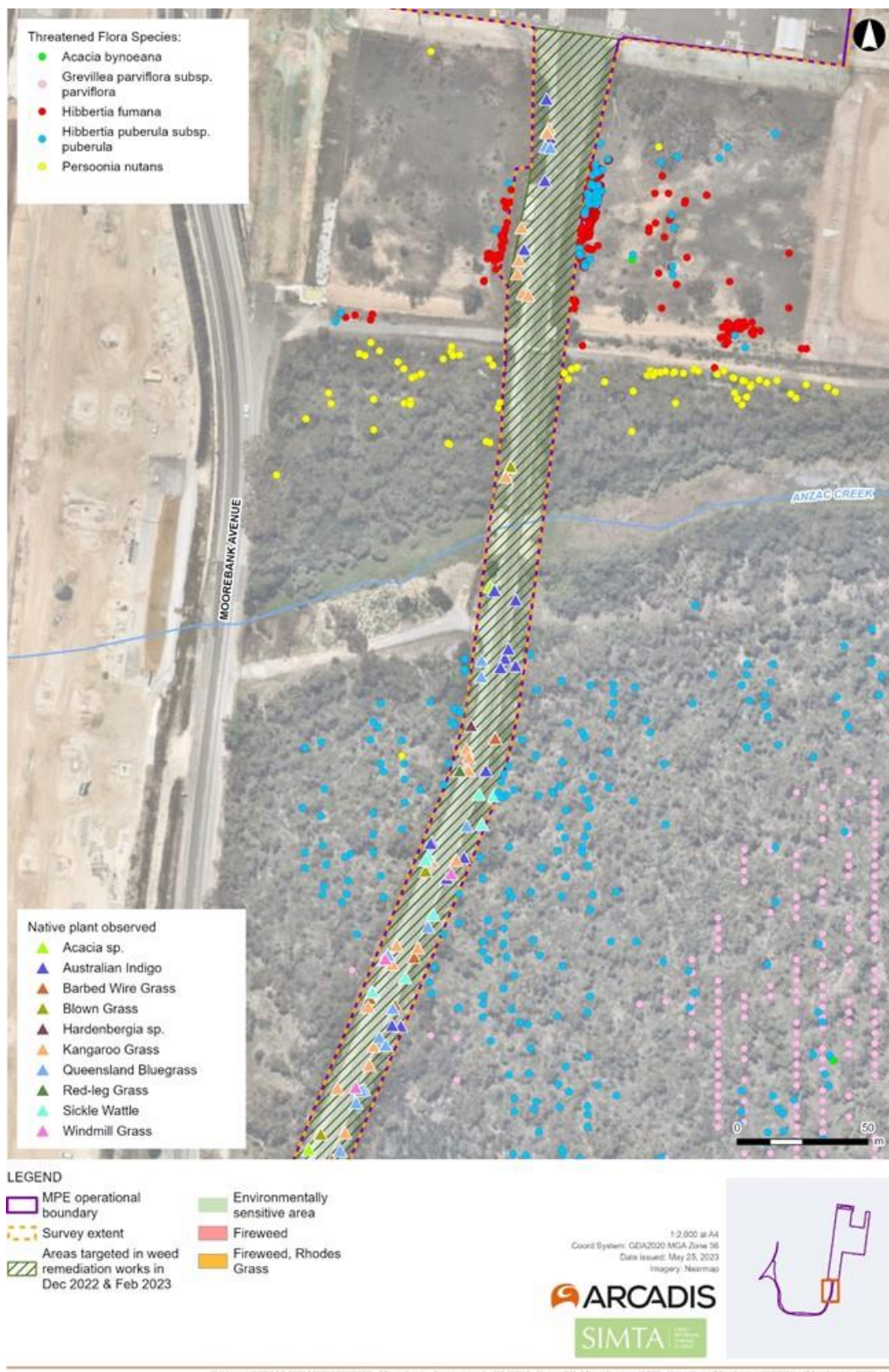


Figure 4 Native species, weed covers and aggressive weeds identified across the MPE operational facility. The coloured areas under the "Priority & key weeds" legend area areas that have high-density weeds (Map 3 of 8)

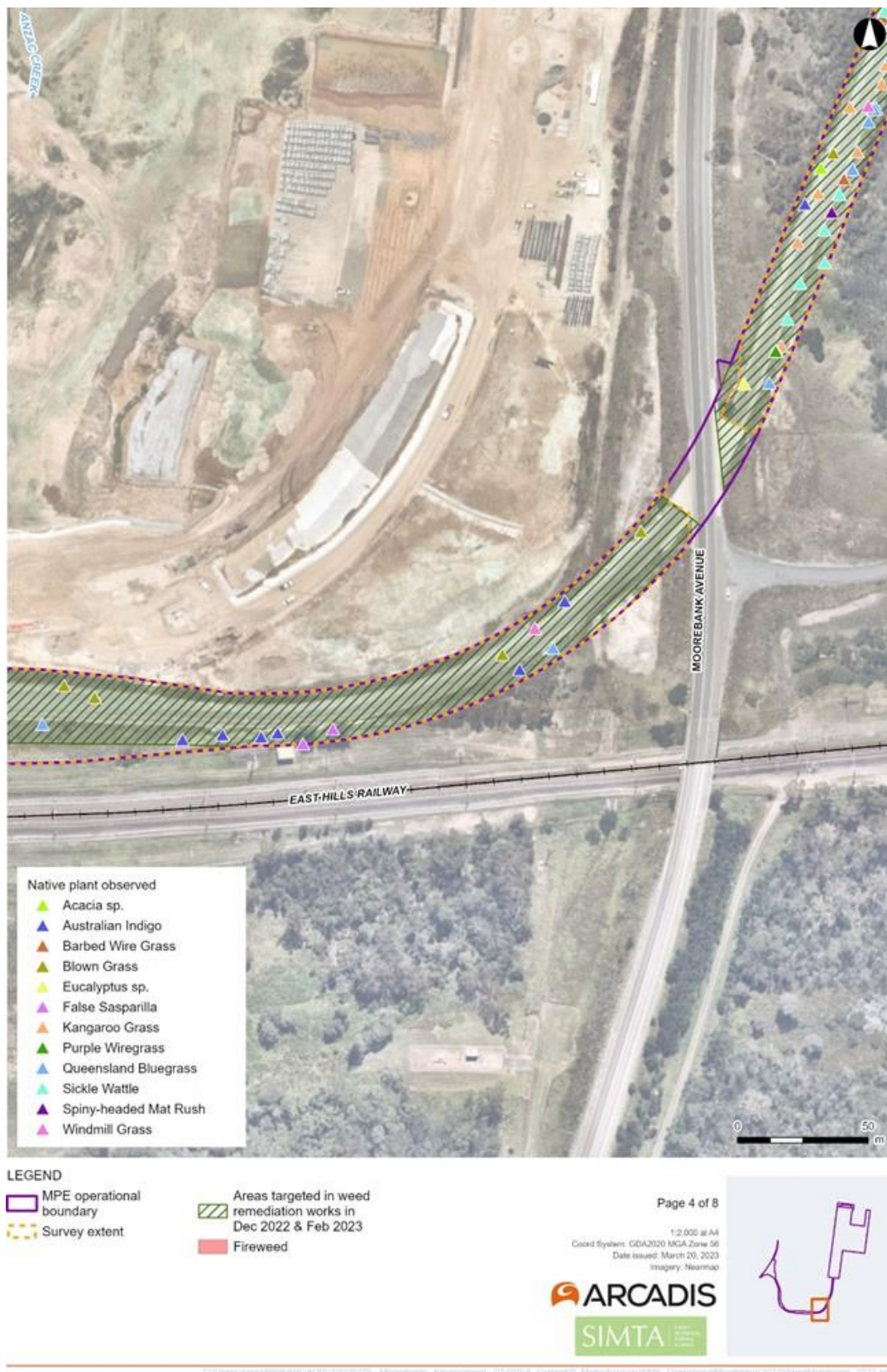




Figure 6. Native plant, weed covers and aggressive weeds identified across the MPE operational facility (Map 5 of 8)

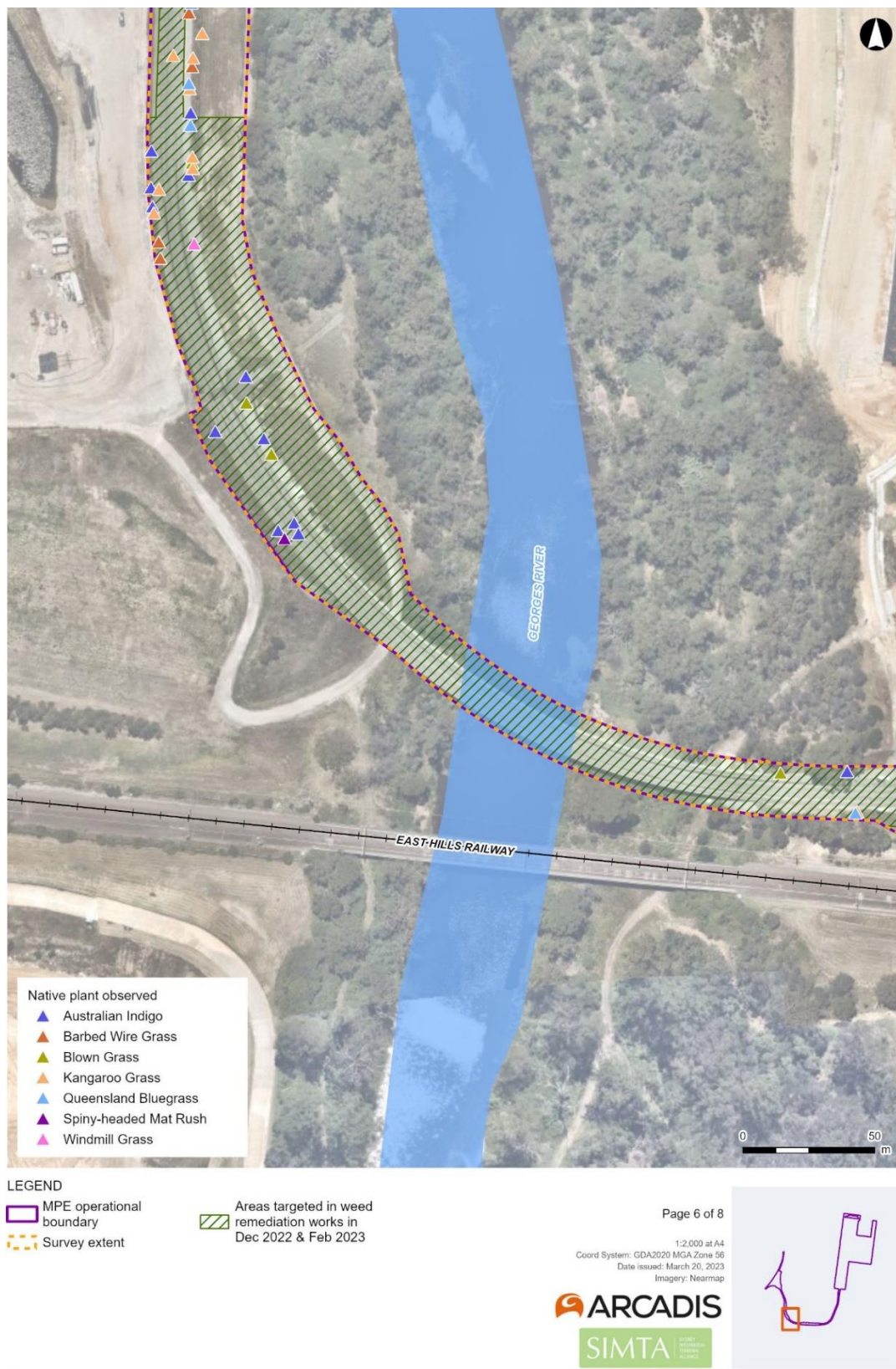


Figure 7. Native plants, weed covers and aggressive weeds identified across the MPE operational facility. The coloured areas under the "Priority & key weeds" legend area areas that have high-density weeds (Map 6 of 8)

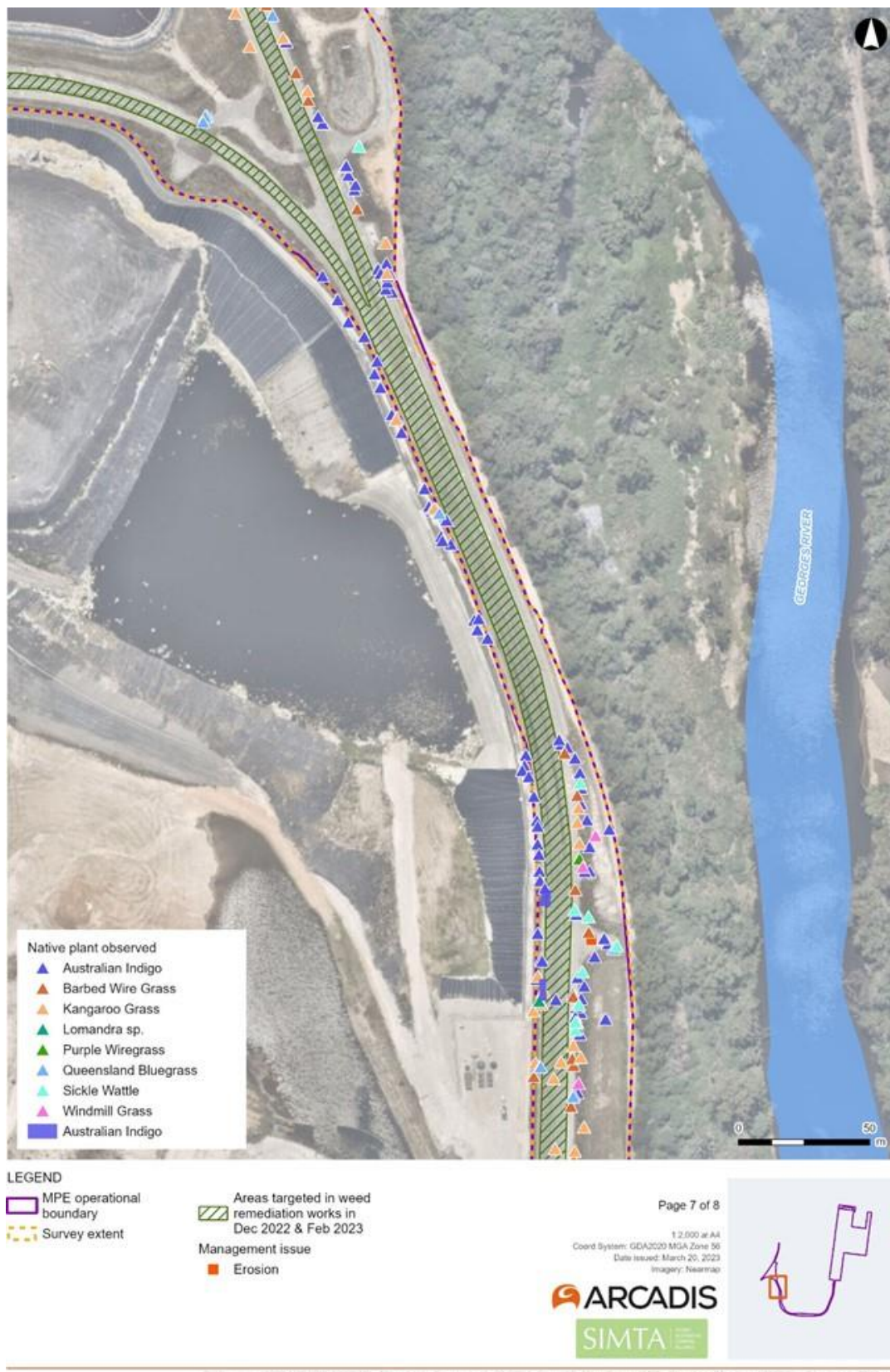


Figure 8. Native plants, weed covers and aggressive weeds identified across the MPE operational facility. The coloured areas under the "Priority & key weeds" legend area areas that have high-density weeds (Map 7 of 8)

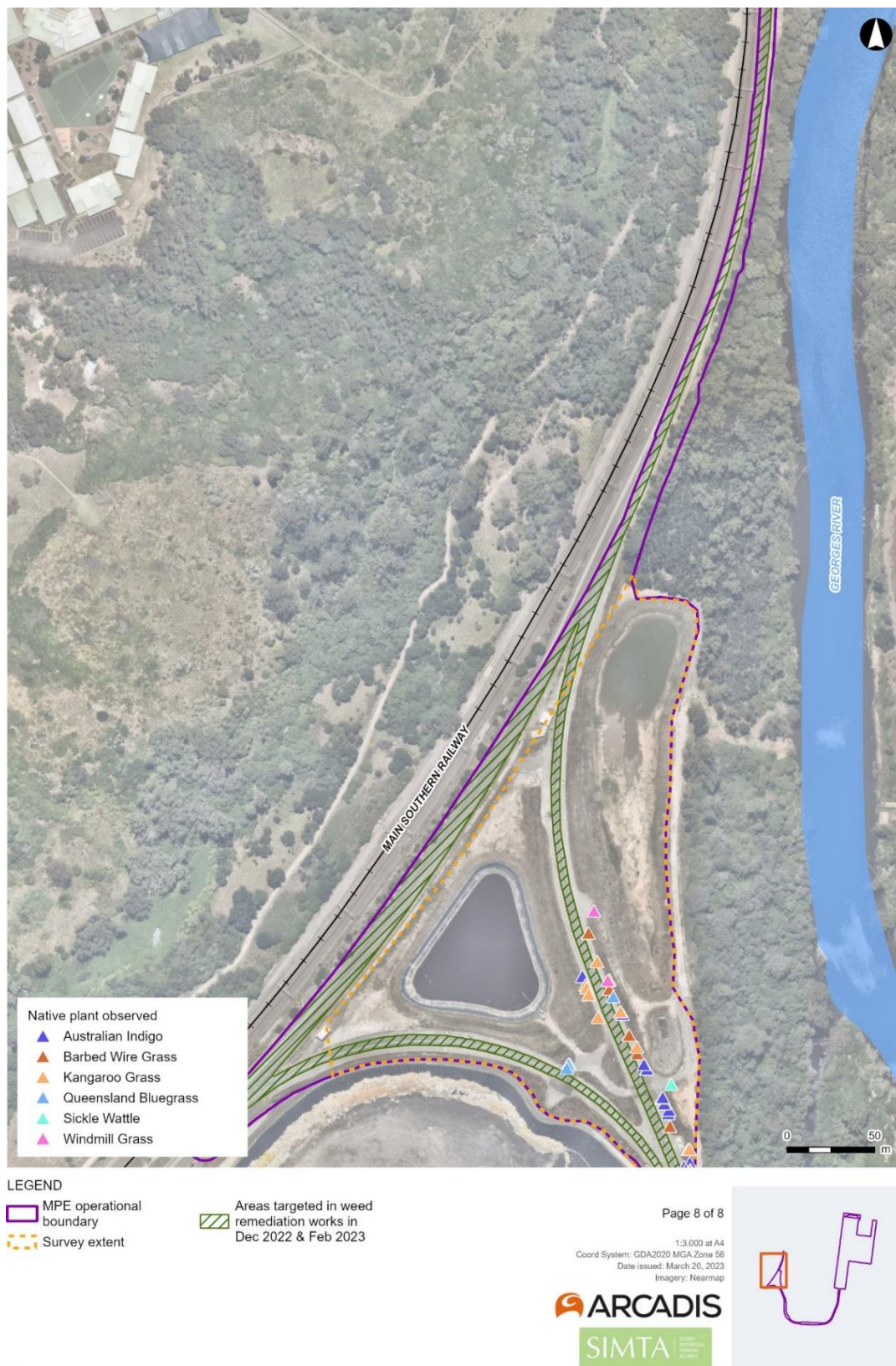


Figure 9. Native plants, weed covers and aggressive weeds identified across the MPE operational facility. The coloured areas under the "Priority & key weeds" legend area areas that have high-density weeds (Map 8 of 8)

## Recommendations

Recommended actions documented in previous weed monitoring reports are included in *Appendix A: Recommended Actions Catalogue*. The catalogue has been reviewed and updated to reflect works which have been completed and is considerate of the revegetation methodology proposed by Spray Grass Solutions and Cumberland Plain Seeds.

The majority of weed remediation and management action recommendations documented in the previous weed monitoring report are still applicable to the management of the site. These include:

- Targeted weed remediation to continue in December 2024 and is to be conducted using the same methods and at the same locations as previously conducted.
- Targeted weed remediation works to continue along revegetated soft batters. Weed remediation works will focus on controlling priority and key weed species. Hand weeding should be conducted for individuals, whereas slashing and herbicide spraying should be adopted to target larger patches of weeds. However, extreme care must be taken when conducting any weed management along the rail corridor, as many native grasses have become established. A suggested process to target weeds along revegetated soft batters is presented in the methodology section of this report and Figure 11. Hand weeding is only feasible on annual species such as *Themeda quadrivalvis* (Grader Grass) and *Senecio madagascariensis* (Fireweed) due to their relatively small root system.
- Priority and aggressive weed species outside revegetated Rail Link areas should be removed. Weeds that should be targeted include *Senecio madagascariensis* (Fireweed).
- Large patches of *Eragrostis curvula* (African Lovegrass), *Chloris gayana* (Rhodes Grass) and *Themeda quadrivalvis* (Grader Grass) between the Rail Link and the East Hills train line should be slashed regularly to prevent seeding events (Figure 4 and Figure 9). This will reduce the colonisation of these grasses into revegetation areas. However, slashing should only occur when plants are not seeding to prevent further spread. Furthermore, as more native species become established in these areas, slashing may impact their growth; therefore, non-targeted slashing should be avoided.
- Continue to collect litter from within the Rail Link and in adjacent areas.
- Soft batters within the trunk drainage system and retention basin/swale at the north-eastern extent of the facility should be inspected for weed growth. Weed levels should be controlled through herbicide application, slashing and hand weeding. Weed remediation works should be conducted in accordance with the approved Weed Management Plan.

Application of herbicide within the Rail Link and in areas adjacent to the Moorebank biobank site should be conducted to prevent overspray (off-target poisoning). If herbicide application occurs, recommended herbicides for tussock grass, such as *Chloris gayana* (Rhodes Grass) and *Eragrostis curvula* (African Lovegrass), include glyphosate or flupropanate, while plants are actively growing during summer and spring. Native vegetation outside the Rail Link fence must not be impacted by herbicide during weed remediation works.

No herbicide spraying should be conducted outside the Rail Link corridor, specifically adjacent to ecologically sensitive areas south of the MPE Operational facility (Figure 3). Manual weed remediation works in ecologically sensitive areas should not extend beyond the construction envelope of the RALP project. If further clarification is necessary, the project ecologist should be consulted.

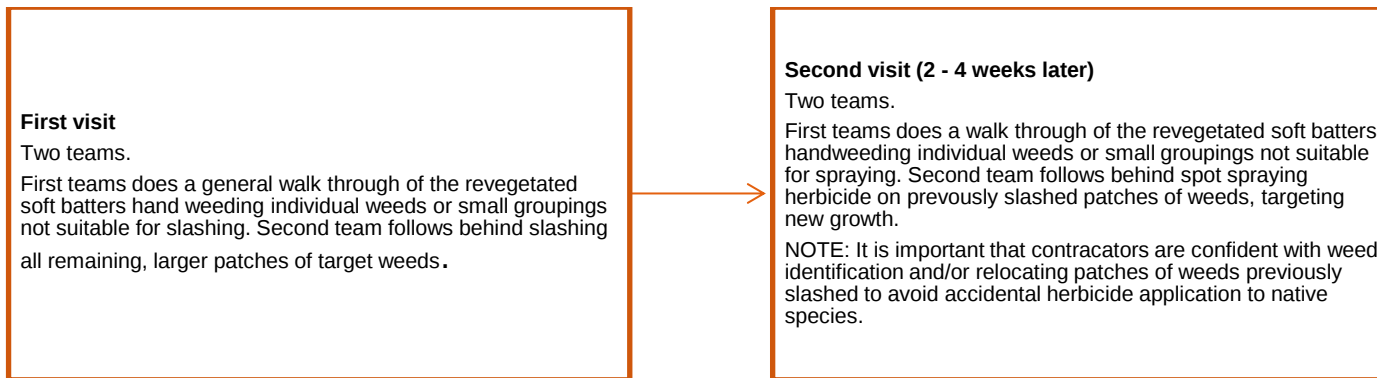


Figure 10. Suggested process to controlling target weeds on revegetated soft batters

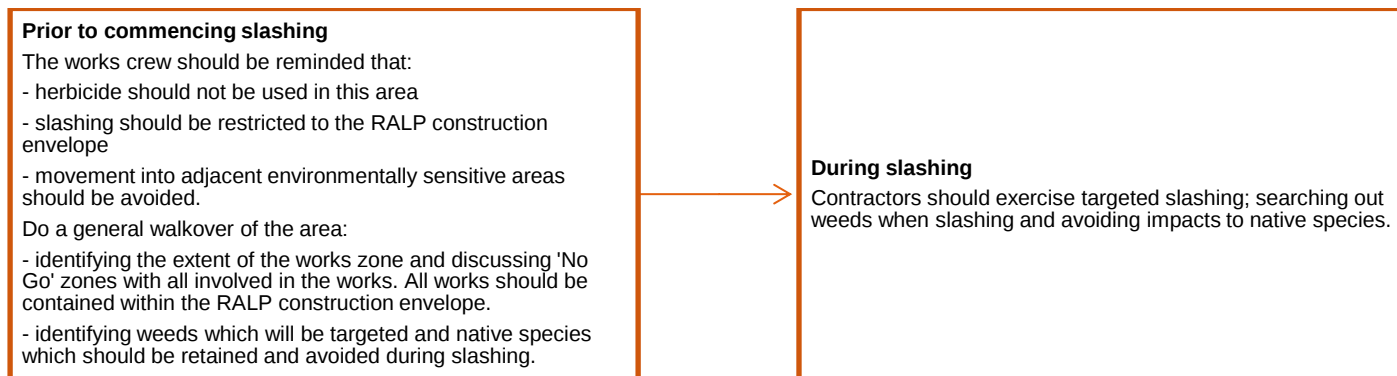


Figure 11. Slashing target weeds within the RALP construction envelope adjacent to ecologically sensitive areas

## References

Arcadis (2019a) Urban Design and Landscape Plan. Moorebank Precinct East Stage 1

Arcadis (2019b) Operational Flora and Fauna Management Plan. Moorebank Logistics Park – East Precinct

Arcadis (2019c) Landscape Vegetation Management Sub Plan. Moorebank Precinct East Stage 2

Arcadis (2020) MPE Operational – Weed Monitoring Report December 2020

Arcadis (2020) Urban Design and Landscape Plan. Moorebank Precinct East Stage 2

Bureau of Meteorology (BOM) (2021) Climate Data Online. Weather and Climate: Holsworthy Aerodrome NSW (station 066161) <http://www.bom.gov.au/climate/dwo/IDCJDW2161.latest.shtml>

NSW Department of Primary Industries (DPI) (accessed 2021) NSW WeedWise. priority weeds for the Greater Sydney. <https://weeds.dpi.nsw.gov.au/WeedBiosecurities?AreaId=3>

## APPENDIX A. RECOMMENDED ACTIONS CATALOGUE

| Month of logging | Recommended action                                                                                                                                                                                                                 | Status<br>(Not started, Commenced, Complete) | Comments                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| April 2020       | Eradicate priority weeds species, including Bridal Creeper, Alligator Weed, Lantana, Fireweed and African Olive                                                                                                                    | Commenced                                    | Lantana, African Olive, Fireweed and Bridal Creeper remain within the Rail Link. These weed species should be prioritised for removal.                                                                                                                                                                                                                                                                                                                                                            |
| April 2020       | Remove key and aggressive weed species within Rail Link, including Golden Wreath Wattle, Moth Vine, Castor Oil Plant, Small-leafed Privet, Grader Grass and Balloon Vine                                                           | Commenced                                    | <p>Grader Grass has been observed colonising remediated areas within the Rail Link. This species should be removed to prevent further colonisation and infestations.</p> <p>Golden Wreath Wattle, Moth Vine and Castor Oil Plant on the southern side of the Rail Link in the area between the operational boundary and the East Hills line rail corridor. Consideration should be given to the management of these areas to reduce encroachment into recently remediated areas.</p>              |
| June 2020        | Planning should commence to revegetate soft batters and un-developed areas within the MPE operational facility with native species in accordance with the approved Urban Design and Landscaping Plan (Arcadis 2019a, Arcadis 2020) | Commenced                                    | <p>Revegetation has commenced for remediated areas using a hydro-mulch containing a seed palette commensurate with the UDLP (Arcadis 2020).</p> <p>Additional striking of native seed was observed during the February 2022 monitoring inspection within the Rail Link. The following native species were observed growing Hickory Wattle, Indigofera, Windmill Grass, Queensland Bluegrass, Couch Grass, Kangaroo Grass, Kidney Weed, Barbed Wire Grass, Blown Grass, and Creeping Saltbush.</p> |

| Month of logging | Recommended action                                                                                                                                                                             | Status<br>(Not started, Commenced, Complete) | Comments                                                                                                                                                                                                                                                                                                                                                                                                                |
|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| December 2020    | Exotic species, specifically <i>Medicago polymorpha</i> (Burr medic), should be removed from grassland on either side of the Rail Link at its eastern extent, closest to the operational area. | Commenced                                    | Targeted manual removal, including slashing, has been conducted for exotic species outside the Rail Link corridor fencing. A qualified bush regeneration contractor should be used to avoid impacts on native species. Strictly no herbicide should be used in this area, and works should not extend beyond the RALP construction envelope. Where possible, contractors should not access/pass through adjacent areas. |
| December 2021    | Collect litter scattered through the Rail Link corridor and in adjacent areas                                                                                                                  | Commenced                                    | Litter remains in the Rail Link corridor and adjacent areas.                                                                                                                                                                                                                                                                                                                                                            |
| December 2021    | Control aggressive weed species Coolatai Grass and Paterson's Curse within the Rail Link                                                                                                       | Commenced                                    | New instances of aggressive weed species Coolatai Grass and Paterson's Curse within the Rail Link should be removed as soon as practicable to avoid the spread of these species into ecologically sensitive areas adjacent to the Rail Link.                                                                                                                                                                            |
| February 2022    | Continued targeted slashing of woody and herbaceous weeds within the Rail Link.                                                                                                                | Commenced                                    | Continue regular slashing of large woody weeds to remove the fertile seed head and discourage further germination of these weeds within the Rail Link.                                                                                                                                                                                                                                                                  |
| December 2022    | Prioritise weed remediation works for priority and key weed species which have experienced accelerated growth in recent months.                                                                | Commenced                                    | Areas of particularly high biomass of priority and key weed species should be prioritised for weed remediation works in coming months to avoid mass seeding events.                                                                                                                                                                                                                                                     |
|                  | Begin remediation of soft batters which have slipped following extreme rainfall events in recent weeks                                                                                         | Not started                                  | Areas within the operational facility, including a number of areas within the Rail Link, require urgent batter remediation in areas of batter slipping.                                                                                                                                                                                                                                                                 |

| Month of logging | Recommended action                                                                                                                                  | Status<br>(Not started, Commenced, Complete) | Comments                                                                                                                                                                                                           |
|------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| December 2022    | Begin weed remediation of gravel and ballast areas along Rail link                                                                                  | Commenced                                    | Removal of all vegetation in gravel and ballast areas due along Rail Link corridor using slashing and herbicide due to safety concerns of train operators and prevent spread of weeds.                             |
| December 2022    | Continue weed remediation works along the soft batters within the Rail Link corridor.                                                               | Commenced                                    | Future weed remediation works should include targeted slashing and spraying of priority and key weed species, whilst avoiding native species by hand weeding within a one metre buffer zone of native individuals. |
| February 2023    | Continue weed remediation works along the soft batters within the Rail Link corridor beyond Georges River bridge.                                   | Commenced                                    | Future weed remediation works should include targeted slashing and spraying of priority and key weed species, whilst avoiding native species by hand weeding within a one metre buffer zone of native individuals. |
| April 2023       | No weed remediation has occurred since February 2023. Expected to recommence in June 2023, in same areas that have previously been remediated.      | Commenced                                    | Future weed remediation works should include targeted slashing and spraying of priority and key weed species, whilst avoiding native species by hand weeding within a one metre buffer zone of native individuals. |
| June 2023        | Continue weed remediation works along the soft batters within the Rail Link corridor                                                                | Commenced                                    | Future weed remediation works should include targeted slashing and spraying of priority and key weed species, whilst avoiding native species by hand weeding within a one metre buffer zone of native individuals. |
| December 2023    | Toolijooa Environmental Restoration inducted as primary weed control contractors.<br>Weed remediation recommenced throughout the Rail Link corridor | Commenced                                    | Future weed remediation works should include targeted slashing and spraying of priority and key weed species, whilst avoiding native species by hand weeding within a one metre buffer zone of native individuals. |

## APPENDIX B. REMEDIATION PROGRESS PHOTOGRAPHS



April 2021



December 2023



December 2024



April 2021



December 2023



December 2024



April 2021



December 2023



December 2024



April 2021



December 2023



December 2024



April 2021



December 2023



December 2024



April 2021



December 2023



December 2024



April 2021

Photo point not yet established



December 2023

Photo point not yet established



December 2024



N/A

## APPENDIX C. PROFILES: PRIORITY WEEDS



Lantana



Fireweed



Alligator Weed



African Olive



Bridal Creeper



Peruvian Primrose

## APPENDIX D. PROFILES: KEY WEEDS



Rhodes Grass



African Love Grass



Patterson's Curse



Coolatai Grass



Grader Grass



Red Natal Grass

## APPENDIX E. PLANT SPECIES INVENTORY

| Scientific name                    | Common name          | Exotic | Priority/key weed |
|------------------------------------|----------------------|--------|-------------------|
| <i>Acacia falcata</i>              | Hickory Wattle       |        |                   |
| <i>Acacia parramattensis</i>       | Parramatta Wattle    |        |                   |
| <i>Acacia saligna</i>              | Golden Wreath Wattle | *      |                   |
| <i>Alternanthera philoxeroides</i> | Alligator weed       | *      | Priority          |
| <i>Alternanthera pungens</i>       | Khaki Weed           | *      |                   |
| <i>Araujia sericifera</i>          | Moth Vine            | *      |                   |
| <i>Asparagus asparagoides</i>      | Bridal Creeper       | *      | Priority          |
| <i>Atriplex semibaccata</i>        | Creeping Saltbush    |        |                   |
| <i>Austrodanthonia spp.</i>        | -                    |        |                   |
| <i>Avena spp.</i>                  | Oats                 | *      |                   |
| <i>Bidens pilosa</i>               | Cobbler's Pegs       | *      |                   |
| <i>Brassica rapa</i>               | Field Mustard        | *      |                   |
| <i>Briza maxima</i>                | Quaking Grass        | *      |                   |
| <i>Briza minor</i>                 | Shivery Grass        | *      |                   |
| <i>Cenchrus clandestinus</i>       | Kikuyu Grass         | *      |                   |
| <i>Centaureum spp.</i>             | -                    | *      |                   |
| <i>Chloris gayana</i>              | Rhodes Grass         | *      | Key               |
| <i>Chloris truncata</i>            | Windmill Grass       |        |                   |
| <i>Cirsium vulgare</i>             | Spear Thistle        | *      |                   |
| <i>Convolvulus erubescens</i>      | Pink Bindweed        |        |                   |
| <i>Conyza bonariensis</i>          | Flaxleaf Fleabane    | *      |                   |
| <i>Cyclospermum leptophyllum</i>   | Slender Celery       | *      |                   |
| <i>Cynodon dactylon</i>            | Common Couch         |        |                   |
| <i>Cymbopogon refractus</i>        | Barbed Wire Grass    |        |                   |
| <i>Cyperus eragrostis</i>          | Umbrella Sedge       | *      |                   |
| <i>Daviesia ulicifolia</i>         | Gorse Bitter Pea     |        |                   |
| <i>Dichanthium sericeum</i>        | Queensland Bluegrass |        |                   |
| <i>Dichondra repens</i>            | Kidney Weed          |        |                   |
| <i>Echium plantagineum</i>         | Paterson's Curse     | *      | Key               |
| <i>Eragrostis brownii</i>          | Brown's Lovegrass    |        |                   |
| <i>Eragrostis curvula</i>          | African Lovegrass    | *      | Key               |
| <i>Euchiton spp.</i>               | -                    |        |                   |
| <i>Ficinia nodosa</i>              | Knobby Club-rush     |        |                   |
| <i>Foeniculum vulgare</i>          | Fennel               | *      |                   |
| <i>Glycine clandestina</i>         | -                    |        |                   |

| Scientific name                       | Common name             | Exotic | Priority/key weed |
|---------------------------------------|-------------------------|--------|-------------------|
| <i>Hardenbergia violacea</i>          | False Sarsaparilla      |        |                   |
| <i>Hypochoeris radicata</i>           | Catsear                 | *      |                   |
| <i>Indigofera australis</i>           | Australian Indigo       |        |                   |
| <i>Juncus usitatus</i>                | -                       |        |                   |
| <i>Lantana camara</i>                 | Lantana                 | *      | Priority          |
| <i>Lachnagrostis filiformis</i>       | Blown Grass             |        |                   |
| <i>Lactuca serriola</i>               | Prickly Lettuce         | *      |                   |
| <i>Linum trigynum</i>                 | French Flax             | *      |                   |
| <i>Lolium perenne</i>                 | Perennial Ryegrass      | *      |                   |
| <i>Lomandra longifolia</i>            | Spiny-headed Mat-rush   |        |                   |
| <i>Lysimachia arvensis</i>            | Scarlet Pimpernel       | *      |                   |
| <i>Ludwigia peruviana</i>             | Peruvian water primrose | *      | Priority          |
| <i>Medicago polymorpha</i>            | Burr Medic              | *      |                   |
| <i>Melilotus alba</i>                 | Bokhara                 | *      |                   |
| <i>Melinis repens</i>                 | Red Natal Grass         | *      | Key               |
| <i>Modiola caroliniana</i>            | Red-flowered Mallow     | *      |                   |
| <i>Olea europaea subsp. cuspidate</i> | African Olive           | *      | Priority          |
| <i>Paspalum dilatatum</i>             | Paspalum                | *      |                   |
| <i>Persicaria decipiens</i>           | Slender Knotweed        |        |                   |
| <i>Phytolacca octandra</i>            | Inkweed                 | *      |                   |
| <i>Plantago lanceolata</i>            | Lamb's Tongues          | *      |                   |
| <i>Portulaca oleracea</i>             | Common Purslane         |        |                   |
| <i>Rumex crispus</i>                  | Curled Dock             | *      |                   |
| <i>Senecio madagascariensis</i>       | Fireweed                | *      | Priority          |
| <i>Setaria parviflora</i>             | -                       | *      |                   |
| <i>Sida rhombifolia</i>               | Paddy's Lucerne         | *      | Key               |
| <i>Solanum nigrum</i>                 | Black-berry Nightshade  | *      |                   |
| <i>Solanum sisymbriifolium</i>        |                         | *      |                   |
| <i>Sonchus oleraceus</i>              | Common Sowthistle       | *      |                   |
| <i>Tagetes minuta</i>                 | Stinking Roger          | *      |                   |
| <i>Themeda quadrivalvis</i>           | Grader Grass            | *      | Key               |
| <i>Themeda triandra</i>               | -                       |        |                   |
| <i>Trifolium arvense</i>              | Haresfoot Clover        | *      |                   |
| <i>Trifolium repens</i>               | White Clover            | *      |                   |
| <i>Trifolium michelianum</i>          | Bolansa Clover          | *      |                   |
| <i>Verbena bonariensis</i>            | Purpletop               | *      |                   |

| Scientific name                          | Common name    | Exotic | Priority/key weed |
|------------------------------------------|----------------|--------|-------------------|
| <i>Verbena rigida</i> var. <i>Rigida</i> | Veined Verbena | *      |                   |