



*We Deliver*

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MEN403-C1-S0129

26 November 2019

Renata Constantinou  
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Dear Renata,

## **ANNUAL MONITORING OF TRANSLOCATED MATTED FLAX-LILY FOR THE SOUTH MORANG RAIL EXTENSION PROJECT**

The South Morang Rail Extension Project (SMREP) was a controlled action based on the impacts of two Matters of National Environmental Significance (MNES), matted flax-lily (*Dianella amoena*) and Grassy Eucalypt Woodland of the Victorian Volcanic Plain (GEWVVP). The project was granted approval under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), subject to conditions, which include the implementation of the *Translocation Plan for the Matted Flax-lily (Translocation Plan)*. The current version of the plan is Revision 3 (SMREP 2014) which is referenced throughout this report.

Condition 5 of the EPBC 2010/5313 approval requires ongoing reporting of project compliance with the approval conditions.

As noted in the Translocation Plan (SMREP 2014), on behalf of Public Transport Victoria (PTV), VicTrack have assumed monitoring responsibilities and have engaged Kellogg, Brown & Root Pty Ltd (KBR) to complete the monitoring for 2019. VicTrack are also responsible for implementing management for Receptor Site 4. Parks Victoria are responsible for managing Receptor Sites 1, 2 and 3, on behalf of PTV.

The Translocation Plan was a 10-year management plan that commenced in June 2010. As of May 2020, no further actions are stated and is considered to be complete as of this date. This monitoring report is considered to be the final report of the success of the Translocation Plan.

### **Purpose**

The translocation plan developed for the matted flax-lily requires that an annual report be prepared every year for ten years on the status of the plan and the condition of the translocated plants following translocation.

This report has been prepared to document the results of the monitoring of matted flax-lily and meets the requirement of the translocation plan, which includes the following:

- reporting on the health and success of the translocated plants

- current condition of each of the four receptor sites, including an assessment of the state of threats to translocated matted flax-lily, such as weeds, pest animals and biomass
- proposed recommendations for future management of the translocated matted flax-lily beyond the life of the Translocation Plan, where appropriate
- reporting against each approval condition required for the project under EPBC 2010/5313.

### **Salvage and Translocation**

The salvage of the matted flax-lily from the SMREP corridor took place from 30 September to 6 October 2010. A total of 98 distinct patches were removed from the corridor. From the 98 patches, 422 sections were removed, which resulted in the following distribution of sections:

- 183 sections directly planted into the receptor sites, excluding Receptor Site 3
- 135 sections taken to the nursery for subsequent plantings (delayed translocation)
- 104 sections taken to the nursery for insurance.

The total sections that were planted into each receptor site via direct translocation (September - October 2010) or delayed translocation (which included some insurance plants at the request of Parks Victoria in August 2011) was as follows:

- 50 sections planted into Receptor Site 1, located in Plenty Gorge Parklands, Mill Park
- 186 sections planted into Receptor Site 2, located in Plenty Gorge Parklands, Mernda
- 109 sections planted into Receptor Site 3 (Site 3 includes only delayed translocation plants), located in Plenty Gorge Parklands, Mernda
- 33 sections planted into Receptor Site 4, located on VicTrack owned land, South Morang.

This totals 378 planted salvaged plants, with the 44 remaining plants held and managed at a Parks Victoria nursery for use as insurance plants. As the survival rate exceeded the target of 85 per cent for every year to Year 5, the insurance plants were not required for the Translocation Plan (SMREP 2014) and are now the property of Parks Victoria.

### **Method**

Annual matted flax-lily monitoring was undertaken by two ecologists over two days, on 15 and 18 October 2019 at the four receptor sites. Monitoring was completed in accordance with the reduced monitoring method outlined in the translocation plan (SMREP 2014), which included a presence/absence survey and assessment of general health of each plant.

All of the translocated (direct and delayed translocation) matted flax-lily were monitored. The monitoring of direct translocated plants corresponds with the Year 9 monitoring period, the monitoring of delayed translocated plants corresponds with the Year 8 monitoring period.

Identification of threats and risks to the translocated matted flax-lily are based on observations made by the ecologists over several years monitoring the receptor sites and the species. These observations have informed recommendations for future management.

## Data collection

The assessment of the general health of the plant at the time of translocation was recorded based on five discrete categories ranging from Dead to Very Healthy. Similarly, during the current annual monitoring each section translocated into a receptor site was assigned one of the following health categories:

- Dead; plant generally with dead or dying leaves and no new growth
- Poor health; most leaves in poor condition, evidence of heavy herbivory or large areas of ‘browning’ of the leaves; > 30% of leaf area affected
- Moderate health; leaves either containing some level of ‘browning’ or some herbivory; 10 to 30% of leaf area affected
- Good health; leaves generally healthy, containing minimal evidence of herbivory or ‘browning’; < 10% of leaf area affected
- Very healthy; plant very healthy with no signs of herbivory or ‘browning’.

## Data analysis

Data derived on the health of each plant was assigned an arbitrary health index score ranging from 0 to 100 to allow statistical analysis of health over time (Dead 0, Poor 25, Moderate 50, Good health 75, and Very healthy 100).

Plant health was analysed using T–tests (Excel 2010) to determine whether change in health was statistically significant. T–tests are a simple measure of similarity, used to compare the mean of two data sets and determine if they are significantly different. Results with p-values of <0.05 were considered to be a significant change, and results with p-values of <0.01 were considered to be highly significant.

## Results

### Plant health

In total 378 direct and delayed translocated matted flax-lily sections were monitored. This includes 183 direct translocated sections and 195 delayed translocation sections. Of these, 17 plant sections were not located during the current monitoring, with no above ground material present. These plants were assigned a rating of ‘Dead’ in the general health assessment. Therefore the current survival rate for the translocated matted flax-lily is 95.5 per cent.

In comparison to the two previous years’ monitoring (2017 and 2018), there has been a decrease in survival rate from 2018, down from 96.8. However, there is an increase from the survival rate recorded in 2017 of 95 per cent (19 dead) (KBR 2017), which was the lowest recorded survival rate over the 10 year monitoring period.

The final recorded survival rate following 10 years of management and monitoring is 10.5 per cent above the required target survival rate of 85 per cent (SMREP 2014). The translocation of the matted flax-lily is therefore considered to be successful.

A review of the plants considered dead from 2018, shows a change in the presence and survival of plants. Of the 17 not observed in 2019, ten were also not observed in 2018. The remaining seven plants had not been previously recorded as 'dead'. Four plants considered 'dead' in 2018 had reappeared and observed as present in 2019.

Overall, there has been a decrease in survival rate but a significant increase (P-value = <0.01) in the plant health from 2018 to 2019, see Figure 1. This was primarily due to a large increase in the number of plants considered Very Healthy, generally observed from plants within Receptor Sites 2 and 3. There is also an increase in the number of poor health plants, including from 2017 to 2018, followed by a significant increase observed between 2018 and 2019. This occurred from the health observations in Receptor Site 1, which recorded significant drops in health.

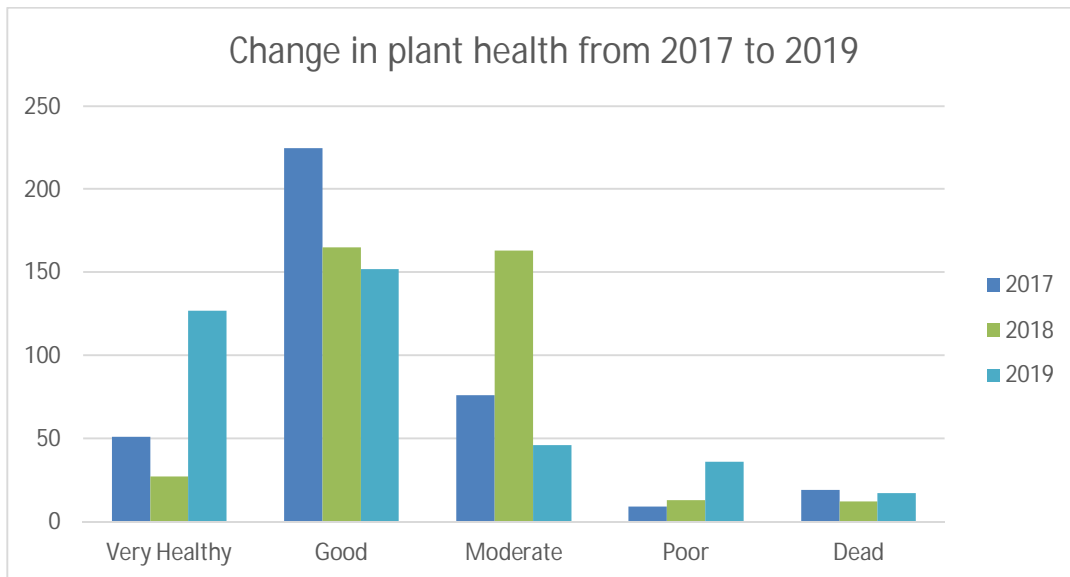


Figure 1. Change in plant health of all translocated matted flax-lily since 2017

### **Direct translocation**

The overall plant health (i.e. average health index) has increased significantly (P-value = <0.01) from the results recorded in 2018 (Table 1). The current average state of the direct translocation plants is good. This is the first increase in health from the previous years' monitoring since 2015.

Of note is the poor to moderate health observed in Receptor Site 1. This site, generally of good condition, has rarely observed an overall health rating of less than good (75). The current average index of 35 is well below the next lowest average health index of 68 observed at 1 month and 8 years post translocation.

There was a significant increase in health observed at Receptor Site 2, increasing in average health by 25 index points. Those within Receptor Site 4 are in a steady state and have had minimal changes in health since 2017.

**Table 1 Average health results for direct translocation matted flax -lily**

Time since translocation	Site 1	Site 2	Site 4	Overall
Baseline	81	82	78	82
1 month	68**	63**	80	65**
3 months	79**	72**	84	74**
6 months	97**	93**	96**	94**
12 months	96	93	96	94
18 months	72**	67**	81**	68**
2 years	75	53**	91*	61**
3 years	94**	67**	88	74**
4 years	78**	65	81	69*
5 years	86	94**	93	93**
6 years	97*	91	99	93
7 years	79**	74**	76**	75**
8 years	68*	61**	73	64**
9 years	35**	86**	73	76**

*Significance of mean health variables using T-test where \*P<0.05 and P<0.01\*\**

**Delayed translocation**

The overall average plant health of the delayed translocation plants showed a significant (P-value = <0.01) increase from 2018 (Table 2). The greatest increase was observed in Receptors Site 3, which increased in average index by 17, with Receptor Site 2 increasing in average health index by 13.

A significant decrease was observed in Receptor Site 1 plants, with the lowest recorded health since 18 months post translocation, which was conducted in at the end of summer (February) in 2012. However, due to the low numbers of delayed translocation plants in Receptor Site 1, this did not affect overall average health. A decrease was also observed in health for plants in Receptor Site 4, however, this was not significant.

**Table 2 Average health results for delayed translocation matted flax-lily**

Time since translocation	Site 1	Site 2	Site 3	Site 4	Overall
Baseline	75	79	81	79	80
1 month	49**	31**	43**	81	43**
3 months	75**	70**	71**	81	72**
12 months	88	73	95**	96**	88**
18 months	24**	16**	24**	25**	22**
2 years	100**	55**	57**	83**	62**

Time since translocation	Site 1	Site 2	Site 3	Site 4	Overall
3 years	76**	50	53*	94*	57*
4 years	89**	80**	75**	96	79**
5 years	98*	79	46**	100	73**
6 years	85**	54**	60	79**	62**
7 years	76	52	58	90*	60
8 years	27**	65**	75**	85	69**

Significance of mean health variables using T-test where \* $P < 0.05$  and  $P < 0.01$ \*\*

## Site Condition and Recommended Management

### Receptor Site 1

Receptor Site 1 is located toward the southern end of the Plenty Gorge Parklands, Mill Park, and is managed by Parks Victoria.

This site has regularly been considered to be in very good condition, however, a mob of 20-plus kangaroos were observed within the site. Based on the low level of biomass observed across the site, it appears as though the mob had been residing within the site for a prolonged period (Figure 2).



Figure 2. Grazed vegetation surrounding a patch of translocated matted flax-lily within Receptor Site 1.

As observed in Figure 2, the kangaroos have largely reduced biomass across the site. This has reduced the amount of biomass within the site, particularly of annual species, including indigenous species, and exotic grasses.

There is still a high cover of native species, particularly kangaroo grass (*Themeda triandra*), however, species such as chocolate lilies (*Arthropodium strictum*), bulbine lilies (*Bulbine bulbosa*), onion orchids (*Microtis unifolia*) and sun-orchids (*Thelymitra* spp.), which have been recorded previously, were significantly reduced in extent.

Several exotic species are present across the site, with perennial exotic grasses, phalaris (*Phalaris aquatica*) and cocksfoot (*Dactylis glomerata*) and annual grasses, sweet vernal grass (*Anthoxanthum*



*odoratum*), soft brome (*Bromus hordeaceus*) and large quaking-grass (*Briza maxima*), the most prevalent weeds present. High threat weeds are also present around the site, including bridal creeper (*Asparagus asparagoides*), briar rose (*Rosa rubiginosa*) and blackberry (*Rubus fruticosus* spp. agg.), though generally at low levels.

The majority of these high threat weeds are generally located away from the translocated plants. These species are not currently a direct threat to the health of the translocated plants, but it is recommended they be controlled through ongoing park management.

Kangaroo grazing is considered to be primary threat to the health of translocated matted flax-lily. It was noted that the health of translocated matted flax-lilies had decreased over the site as the majority of plants had been grazed low (Figure 3).

A review of the perimeter fence identified a single entry point for kangaroos. A hole near the entrance gate appears to be the only clear breach within the fence that would allow kangaroo entry through the fence. Observations by Parks Victoria staff, following several attempts to eject the kangaroos from the site, noted kangaroos repeatedly jumping the fence to occupy the site.

A single potential entry point was identified for rabbits along the western boundary, bordering Heaths Drain. Rabbit droppings were observed within the site, however, there does not appear to be significant rabbit activity within the site that is affecting the matted flax-lilies.

It is recommended that Parks Victoria monitoring the grazing levels on the matted flax-lily and guard plants that are being grazed heavily. Although kangaroos appear to prefer the site, it is recommended that regular attempts be made in future to expel the mob from the site, particularly if vegetation is subject to intense grazing over a prolonged period, and during flowering periods for matted flax-lily.



Figure 3. Evidence of kangaroo grazing on translocated matted flax-lily in Receptor Site 1

### **Receptor Site 2**

Receptor Site 2 is located in the northern end of Plenty Gorge Parklands, accessed from Bridge Inn Road, Mernda and is managed by Parks Victoria.

Recent targeted management of Receptor Site 2, likely assisted by low rainfall and some light grazing, has resulted in reduced biomass cover throughout the majority of the site, particularly along the eastern half of the site where the translocated matted flax-lily is present. However, there is still high cover of exotic grasses that are impacting directly on the health of matted flax-lily, including Chilean needle-grass (*Nassella neesiana*), phalaris, cocksfoot and Yorkshire fog (*Holcus lanatus*) (Figure 4).





Figure 4. Current condition of Receptor Site 2 with high exotic grass cover

There appears to be a slight increase in the cover of high threat herbaceous and woody species including, spear thistle (*Cirsium vulgare*), blackberry, Montpellier broom (*Genista monspesullana*), hawthorn (*Crateagus monogyna*) and Paterson's curse (*Echium plantagineum*). The increase appears to have followed low cover of these weeds observed in 2018, where monitoring was completed post weed-spraying targeted broad-leaf weeds.

Rabbits are entering through several breaches in the fence, mainly along the western boundary with the Plenty River and around the site entrance gate, where the skirt has been dug beneath and lifted. The grazing is considered to be light with only localised patches occasionally grazed. No matted flax-lily were observed to be subject to grazing and is not currently impacted. The continuation of light grazing within the site may have contributed to the increase in health of matted flax-lily observed within the site.

It was observed during the monitoring that the 10 matted flax-lily considered 'dead' within Receptor Site 2, were located among tall and thick grass, mainly in the north western corner, where there is minimal grazing apparent and biomass is high. This observation is consistent with previous years and it is therefore considered that uncontrolled biomass is a primary threat to the health of the matted flax-lily.

Ongoing management should target grassy weeds that can generate a high level of biomass that eventually outcompete matted flax-lily for space and resources. Management could consider allowing kangaroo grazing within the site to assist in maintaining biomass levels of exotic grasses. This should be completed in conjunction with targeted weed control of broad-leaf and woody weeds, plus high threat grassy weeds such as Chilean needle-grass, phalaris and Yorkshire fog. In particularly targeted weed control should concentrate on the western (Plenty River) side of the site, as biomass and weed levels are greatest and matted flax-lily health is most affected.

Parks Victoria has indicated that kangaroo numbers within the park are high and recent dry conditions are likely to result in heavy grazing. Any encouragement of grazing within the site would need to be monitored and excluded if grazing results in very low biomass. It is preferred that grazing be considered from February to August, inclusive, after matted flax-lily has had a chance to flower and seed.

### Receptor Site 3

Receptor Site 3 is located at the northern end of Plenty Gorge Parklands, on the west side of Plenty River and to the south of Receptor Site 2. The translocated matted flax-lilies have been planted within two discrete areas within the site. The site is managed by Parks Victoria.

Receptor Site 3 was subject to a recent revegetation project throughout the site, excluding the two areas containing translocated matted flax-lily. This was completed in 2016 and has resulted in high levels of native grass. It was noted during the current monitoring that there has been a significant increase in exotic grass cover amongst the revegetated areas, particularly of annual grasses, including giant brome (*Bromus diandrus*), squirreltail fescue (*Vulpia bromoides*) and sweet vernal grass. Perennial exotic grasses, Yorkshire fog and Chilean needle-grass are also increasing in cover through the revegetated area.

The two areas containing translocated matted flax-lily have been subject to recent management and maintenance. It is likely that this maintenance has resulted in the increase in average health of translocated matted flax-lily. It appears as though weed spraying and hand weeding has occurred within the areas surrounding the matted flax-lilies (Figure 5).



Figure 5. Northern area of translocated matted flax-lily within Receptor Site 3

Likely as a result of recent management, the immediate biomass around the translocated matted flax-lily had been significantly reduced, controlled or completely removed. These actions appear to have benefited the health of the plants, allowing space to grow (Figure 6).

The north eastern boundary of the receptor site contains the highest concentration of weeds. This area has high concentrations of Chilean needle-grass, which are likely to be a constant source of weed seed into the adjacent northern translocation plot. The site also has an infestation of the high threat woody weed, Montpellier broom.





Figure 6. Regenerating matted flax-lily within a sprayed Chilean needle-grass tussock within Receptor Site 3

It is recommended that the recent weed control is followed up where possible to maintain the weeds within the two plots, including targeting the high threat exotic grasses, Yorkshire fog, Chilean needle-grass and sweet vernal grass. Priority should be given within close proximity (at least 1 m) of the translocated matted flax-lily.

It is recommended that regular weed control occur within the re-seeded area to maintain the high quality condition.

No evidence of animal activity was observed within the site.

Ongoing management of the site should target the following, where possible:

- Biomass control and target control of Chilean needle-grass, Yorkshire fog and sweet vernal grass around translocated matted flax-lily;
- Target control of perennial exotic grasses within the revegetation areas.
- Woody weed control throughout the site.

#### **Receptor Site 4**

Receptor Site 4 is located on VicTrack land to the south of the South Morang rail station car park. The site is managed by VicTrack. A 0.82 ha section of the site along the northern boundary was removed to facilitate the Mernda Rail Extension Project. Approximately 1.22 ha of the woodland remains, including the two plots comprising Receptor Site 4 along the southern boundary.



The two plots containing the translocated matted flax-lily are high in exotic annual grass cover, including annual rye-grass (*Lolium rigidum*), soft brome and large quaking-grass. These species were observed to be overcrowding the translocated matted flax-lily (Figure 7). Native species, common woodruff (*Asperula conferta*) and kidney weed (*Dichondra repens*), planted into the site, and are also contributing to high biomass levels around the translocated plants. Biomass levels of annual exotic grasses and competing native species are of greater cover in the western plot.



Figure 7. Exotic grasses and common woodruff outcompeting matted flax-lily (located at the base of the red flag)

No evidence of vandalism or animal use of the site was observed. Rabbit activity was observed within the wider woodland site, however, no grazing or other rabbit activity was observed in the fenced plots.

It is recommended that some light weed control occur within these plots on a regular basis (preferred annually), where possible. Ideally, weed control should be completed around late September targeting the growth and flowering stages of annual and exotic grasses and broad-leaf weeds, prior to setting seed. The timing is beneficial for matted flax-lily, which flowers and sets seed in late spring, early summer.

In consideration of the completion of the Translocation Plan, it is recommended the small rabbit-fence delineating the Receptor Site within the wider woodland site, is removed. This will integrate the translocation area into the overall site, to include in the woodlands' biomass and weed management.



### Compliance with EPBC Act conditions

The following table (Table 3) describes how SMREP and PTV have demonstrated compliance with each of the EPBC approval conditions for the project (referral number EPBC 2010/5313).

**Table 3 Compliance with EPBC Act conditions**

Conditions of approval	Compliance with approval conditions
<p>1. For the protection of the endangered matted flax-lily (<i>Dianella amoena</i>) and the critically endangered Grassy Eucalypt Woodland of the Victorian Volcanic Plan (GEWVVP) within the rail reserve, adjacent E6 road easement, McDonald Road reserve and South Morang Protection Zone (see Attachment 1) the Matters of National Environmental Significance, Document No. SMREP-APP-PW-ENV-010, Revision 0, South Morang Rail Extension Project (September 2010), must be implemented.</p>	<p>Implementation of this plan occurred during the construction phase of the project. Construction is now complete and there are no remaining actions that are required to be implemented.</p>
<p>2. For the protection of the endangered <i>D. amoena</i> the Translocation Plan for Matted Flax-lily, Document No. SMREP-REP-PW-ENV-002, Revision 1, South Morang Rail Extension Project (September 2010), must commence prior to the commencement of construction and be implemented for a period of at least 10 years.</p>	<p>The salvage effort to translocate affected matted flax-lily began on 30 September 2010 and was completed on 6 October 2010. Construction commenced on the 13 October 2010, following the salvage of matted flax-lily. This report reviews the state of plant and receptor site health and the management actions being implemented.</p>
<p>3. Within 7 days of construction commencing the person taking the action must advise the Department in writing of the actual date of commencement.</p>	<p>An email was sent by Shelley Heron (SMREP Environment &amp; Approvals Manager) to Narelle Sutherland (Department Assessment Officer) to confirm the commencement of construction on 15 October 2010.</p>
<p>4. If ownership and/or management of the protected land are to be transferred to another party, the person taking the actions must provide the Department with evidence that the other party has agreed to assume all the management responsibilities in accordance with the Translocation Plan and MNES Plan, and the conditions of this approval prior to any transfer occurring.</p>	<p>PTV has assumed the overall responsibility of the project approvals, with assistance from VicTrack, who have agreed to complete monitoring and reporting actions of all sites and management actions for Receptor Site 4. PTV and VicTrack have been assigned responsibility of actions within the current Translocation Plan, issued to the Department on 22 September 2014.</p>
<p>5. Within three months of every 12 month anniversary of the commencement of salvage of material for the translocation of <i>D. amoena</i>, the person taking the actions must submit to the Department a report addressing compliance with the conditions of this approval. Annual reports must be provided</p>	<p>This report demonstrates compliance with this condition.</p>

<b>Conditions of approval</b>	<b>Compliance with approval conditions</b>
until the Minister is satisfied that the proponent has complied with all conditions of the approval.	
6. If the person taking the action wishes to carry out any activity otherwise than in accordance with the MNES Plan or Translocation Plan referred to in condition 1 and 2 the person taking the action must submit for the Minister’s approval a revised version of the MNES Plan or Translocation Plan. The varied activity shall not commence until the Minister has approved the varied MNES Plan or Translocation Plan in writing. If the Minister approves such a revised plan that plan must be implemented in place of the MNES Plan or Translocation Plan originally approved.	Revision 3 (May 2014) of the Translocation Plan was submitted to the Department on 22 September 2014.
7. If the Minister believes that it is necessary or desirable for the better protection of listed threatened species and communities (under sections 18 and 18A of the EPBC Act) to do so, the Minister may request that the person taking the action make specified revisions to the MNES Plan or Translocation Plan approved pursuant to condition 1 and 2 and submit the revised MNES Plan or Translocation Plan, for the Minister’s approval. The person taking the action must comply with any such request. The revised approved MNES Plan or Translocation Plan must be implemented. Unless the Minister has approved the revised MNES Plan or Translocation Plan then the person taking the action must continue to implement the MNES Plan or Translocation Plan originally approved, referred to in condition 1 and 2.	No such request has been made.
8. The person taking the action must maintain accurate records substantiating all activities associated with or relevant to the above conditions of approval, including measures taken to implement the MNES Plan or Translocation Plan required by this approval, and make them available upon request to the Department. Such records may be subject to audit by the Department or an independent auditor in accordance with section 458 of the EPBC Act, or used to verify compliance with the conditions of approval. Summaries of audits will be posted on the Departments website. The results of audits may also be publicised through the general media.	Records on the health of the matted flax-lily have been compiled and reported on in this report.

## Conclusion

Overall the survival rate for the translocated matted flax-lily at the completion of monitoring was 95.5 per cent. This is well above the required target survival rate of 85 per cent and it is therefore considered that the translocation has successfully managed to establish or contribute to the populations at each of the four receptor sites.

Observations during the life of the Translocation Plan indicate that the species is most susceptible to competition and high levels of biomass, particularly from perennial exotic grasses that form dense clumps and leave little to no space for matted flax-lily to grow and spread into. Grasses that have an apparent allelopathic effect, such as Yorkshire fog, phalaris and sweet vernal grass, are also considered to be high threat for the species, as this was observed to impact the species presence and health.

The fluctuations in the survival rate and reappearance of individuals previously considered 'dead' further indicates that the species responds positively to management actions that remove biomass, including via grazing, weed control and burning. This is evident through the re-emergence of plants after spraying of exotic grass weeds, most recently observed in Receptor Site 3 (see Figure 6, above).

It is recommended that to assist in the long term survival of the matted flax-lily at the three sites in Plenty Gorge and the site in the South Morang woodland, owned and maintained by VicTrack, that management of biomass occur, where possible. Management should preference the control of biomass, particularly of high threat exotic grasses. This could be achieved through a variety of actions including:

- Receptor Sites 1, 2 and 3, Plenty Gorge Parklands (managed by Parks Victoria):
  - herbicide spraying, targeting high threat exotic grasses, including Chilean needle-grass, Yorkshire fog, phalaris, brome species and sweet vernal grass.
  - controlled burning, particularly where sites can be included in wider planned burns within the park.
  - occasional or opportunistic grazing. This is primarily for Receptor Site 2 managed by Parks Victoria, however, may be employed within other receptor sites. This may include by allowing kangaroo and or rabbit grazing to occur for a short period. It is recommended that this be monitored to restrict or prevent grazing, if grazing is significantly impacting several matted flax-lilies.
- Receptor Site 4 (managed by VicTrack):
  - herbicide spraying, targeting high threat exotic grasses, including Chilean needle-grass, Yorkshire fog, phalaris, brome species and sweet vernal grass.
  - targeted mowing of patches of exotic grasses. This should target October, during the flowering and seeding period of target weeds.

If you have any queries regarding the above please contact me at adam.rigg@kbr.com or on (03) 9828 5421.

Yours sincerely,



Adam Rigg  
Senior Ecologist

## References

Carter, 2010. National Recovery Plan for the Matted Flax-lily *Dianella amoena*. Prepared by Oberon Carter, Arthur Rylah Institute for Environmental Research, Department of Sustainability and Environment, Heidelberg, Victoria.

Kellogg Brown & Root Pty Ltd (KBR) 2017, Translocation Plan for the Matted Flax-lily; Year 7 Annual Report, MEN403-C1-S00120. Report prepared for VicTrack.

Kellogg Brown & Root Pty Ltd (KBR) 2018, Translocation Plan for the Matted Flax-lily; Year 8 Annual Report, MEN403-C1-S0127. Report prepared for VicTrack.

South Morang Rail Extension Project (SMREP), 2010. Translocation Plan for Matted Flax-lily, SMREP-REP-PW-ENV-002 Revision 1.

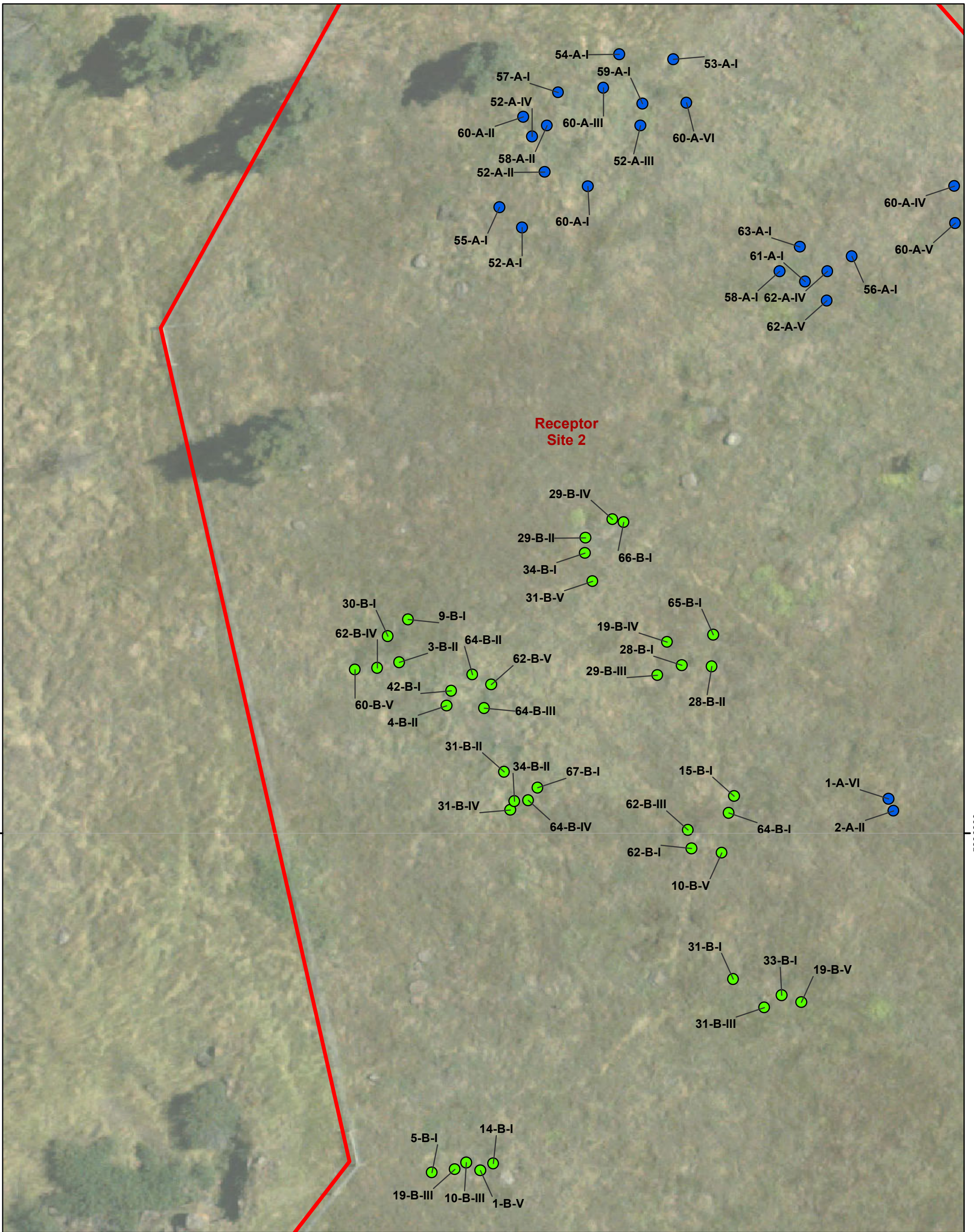
South Morang Rail Extension Project (SMREP), 2013. Translocation Plan for Matted Flax-lily, SMREP-REP-PW-ENV-002 Revision 3.

South Morang Rail Extension Project (SMREP), 2017. Translocation Plan for Matted Flax-lily, SMREP-REP-PW-ENV-002 Revision 4. Prepared by AECOM-GHD for the Level Crossing Removal Project.

## Attachments

Attachment A – Locations of translocated matted flax-lily





5836300

5836300

# South Morang Rail Extension Project



0 5 10 m  
1:275 when printed at A3

DATUM GDA 1994, PROJECTION MGA ZONE 55

## LEGEND

- Direct Translocation (A)
- Delayed Translocation (B&C)
- Receptor Site
- South Morang Grassy Eucalypt Woodland

01

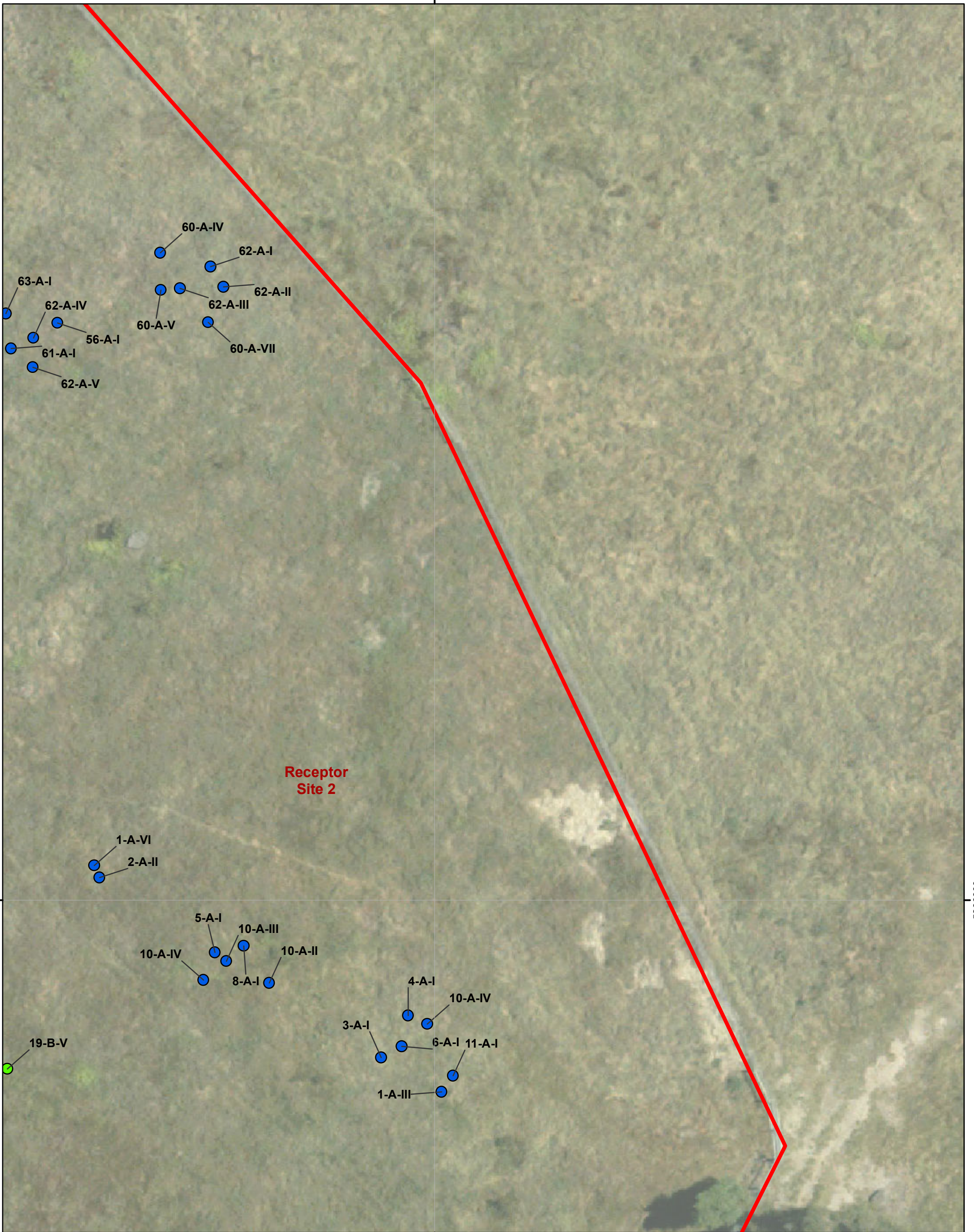
CLIENT South Morang Rail Extension Project  
 PROJECT ID South Morang Rail Extension  
 CREATED BY JC  
 LAST MODIFIED JC 5/06/2014  
 DRG NO MET005-G-MAP-005-B

REVISION

**B**



332700



5836300

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# South Morang Rail Extension Project



0 5 10 m  
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DATUM GDA 1994, PROJECTION MGA ZONE 55

## LEGEND

- Direct Translocation (A)
- Delayed Translocation (B&C)
- Receptor Site
- South Morang Grassy Eucalypt Woodland

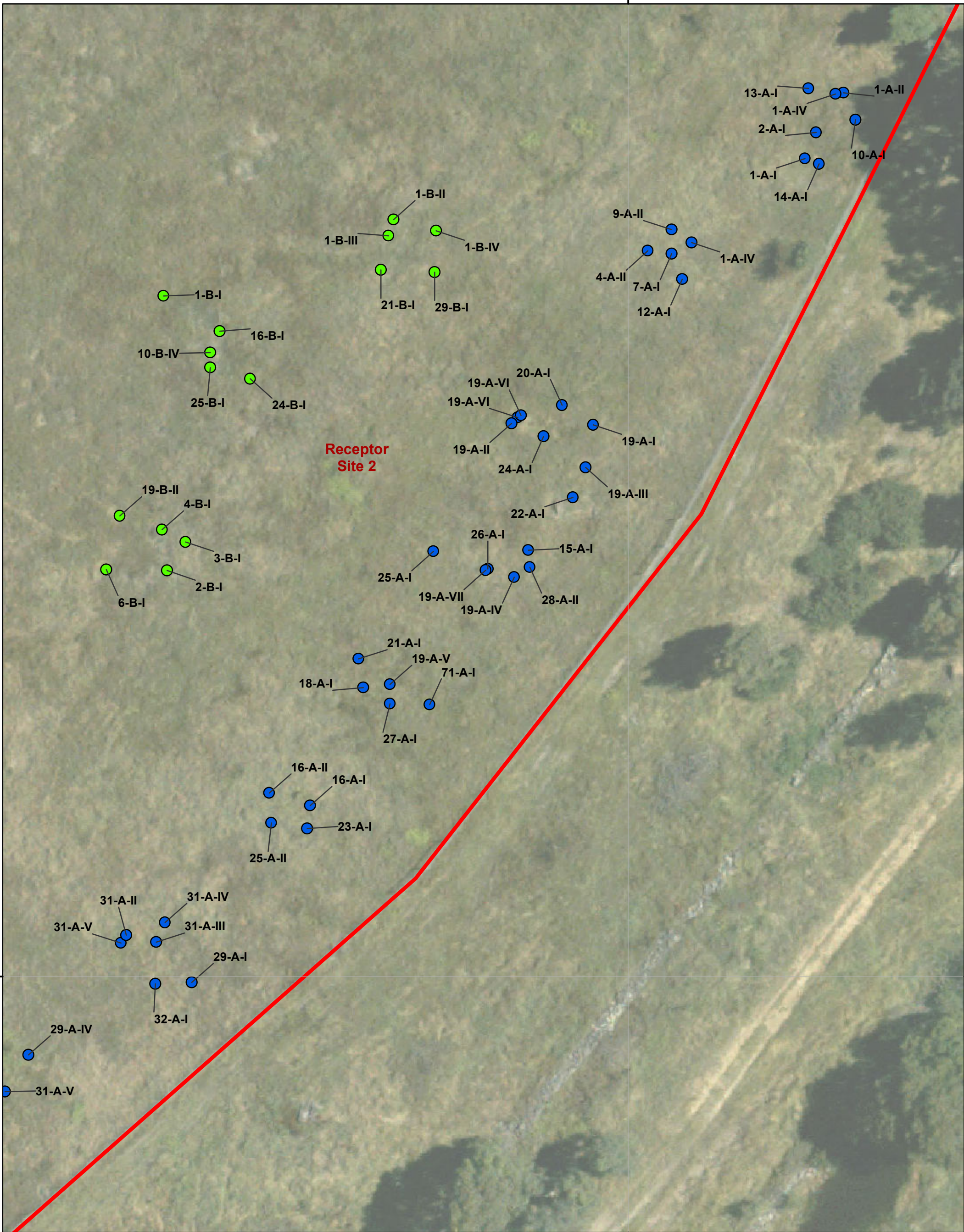
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CLIENT South Morang Rail Extension Project  
 PROJECT ID South Morang Rail Extension  
 CREATED BY JC  
 LAST MODIFIED JC 5/06/2014  
 DRG NO MET005-G-MAP-005-B

REVISION

# B





# South Morang Rail Extension Project



0 5 10  
m  
1:275 when printed at A3

DATUM GDA 1994, PROJECTION MGA ZONE 55

## LEGEND

- Direct Translocation (A)
- Delayed Translocation (B&C)
- Receptor Site
- South Morang Grassy Eucalypt Woodland

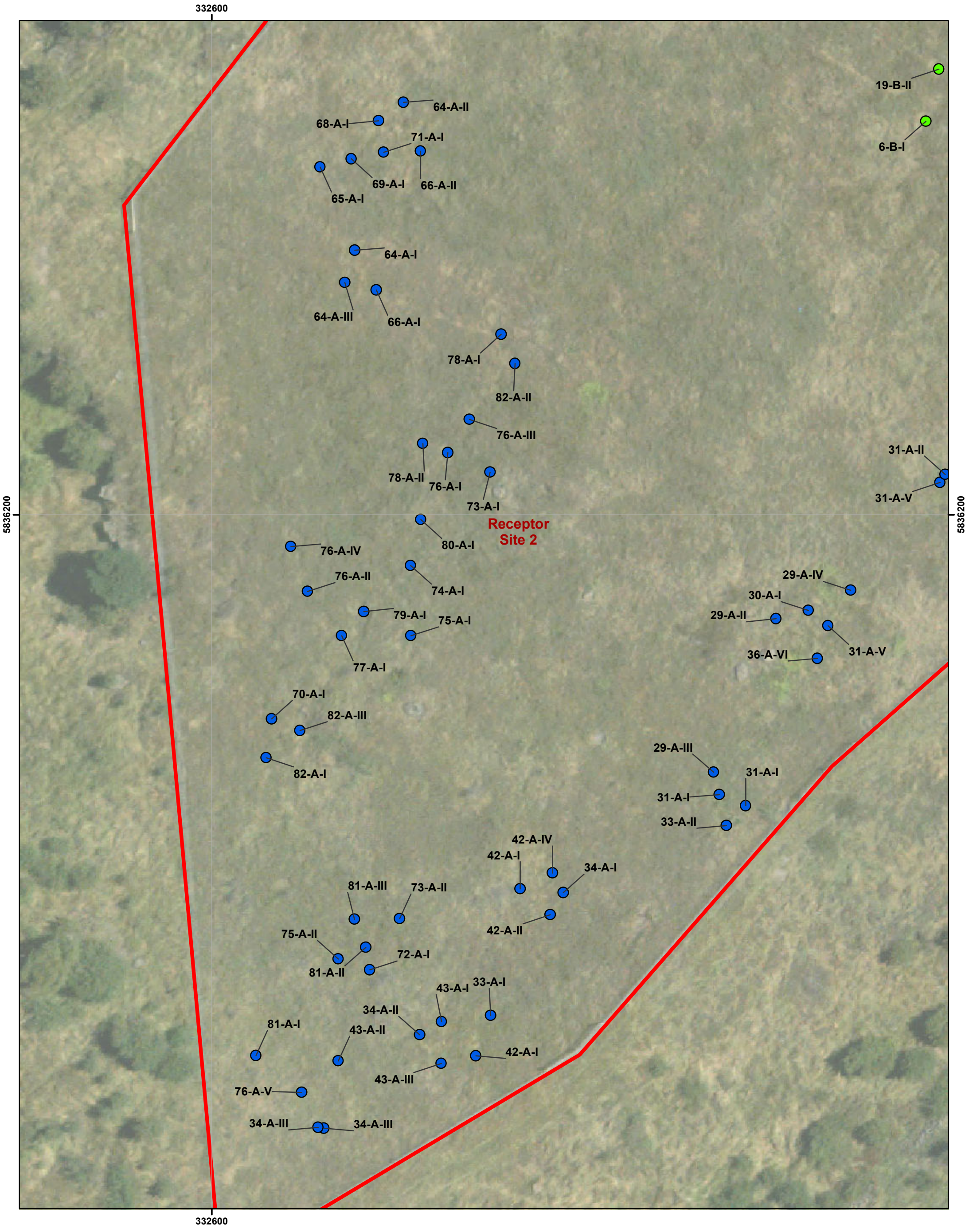
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CLIENT South Morang Rail Extension Project  
 PROJECT ID South Morang Rail Extension  
 CREATED BY JC  
 LAST MODIFIED JC 5/06/2014  
 DRG NO MET005-G-MAP-005-B

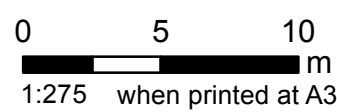
REVISION

# B





# South Morang Rail Extension Project



DATUM GDA 1994, PROJECTION MGA ZONE 55

## LEGEND

- Direct Translocation (A)
- Delayed Translocation (B&C)
- Receptor Site
- South Morang Grassy Eucalypt Woodland

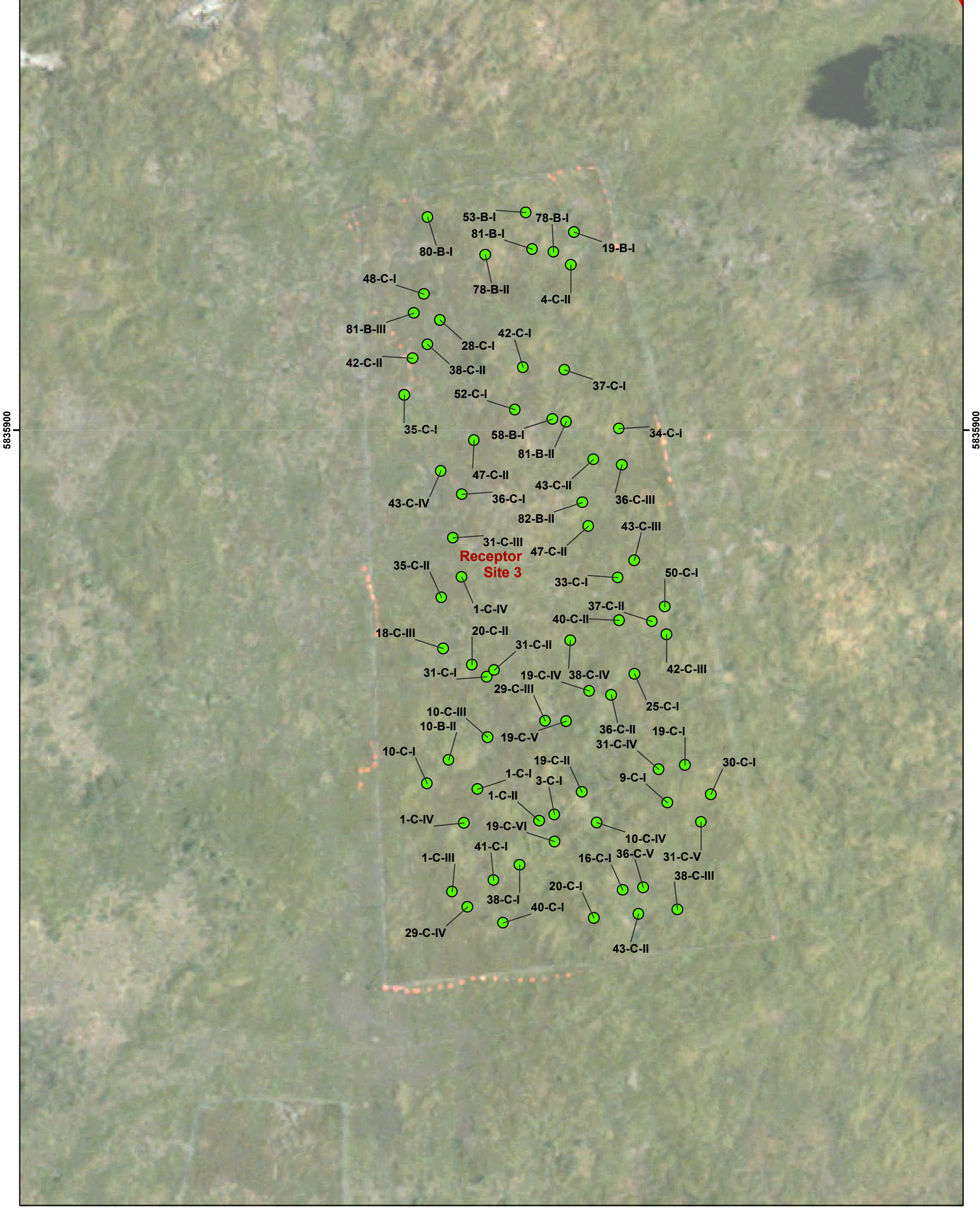
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CLIENT South Morang Rail Extension Project  
 PROJECT ID South Morang Rail Extension  
 CREATED BY JC  
 LAST MODIFIED JC 5/06/2014  
 DRG NO MET005-G-MAP-005-B

REVISION

# B

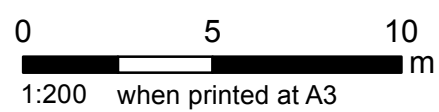




5835900

5835900

# South Morang Rail Extension Project



DATUM GDA 1994, PROJECTION MGA ZONE 55

## LEGEND

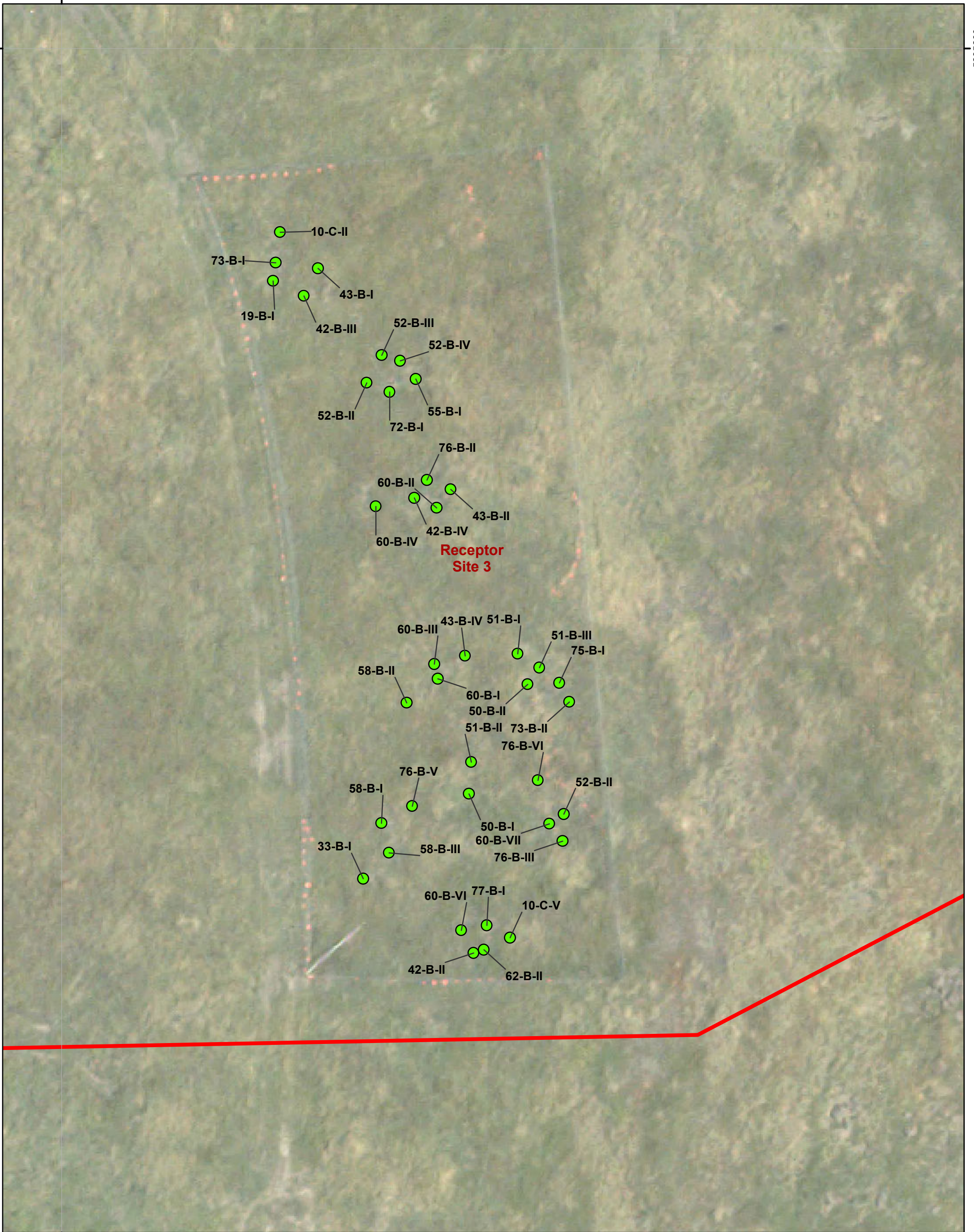
- Direct Translocation (A)
- Delayed Translocation (B&C)
- Receptor Site
- South Morang Grassy Eucalypt Woodland

**05**

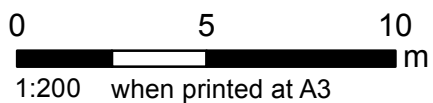
CLIENT South Morang Rail Extension Project  
 PROJECT ID South Morang Rail Extension  
 CREATED BY JC  
 LAST MODIFIED JC 5/06/2014  
 DRG NO MET005-G-MAP-005-B

REVISION  
**B**





# South Morang Rail Extension Project



DATUM GDA 1994, PROJECTION MGA ZONE 55

## LEGEND

- Direct Translocation (A)
- Delayed Translocation (B&C)
- Receptor Site
- South Morang Grassy Eucalypt Woodland

**06**

CLIENT South Morang Rail Extension Project  
 PROJECT ID South Morang Rail Extension  
 CREATED BY JC  
 LAST MODIFIED JC 5/06/2014  
 DRG NO MET005-G-MAP-005-B

REVISION

**B**



329800



329800

# South Morang Rail Extension Project



0 5 10 m  
1:200 when printed at A3

DATUM GDA 1994, PROJECTION MGA ZONE 55

## LEGEND

- Direct Translocation (A)
- Delayed Translocation (B&C)
- Receptor Site
- South Morang Grassy Eucalypt Woodland

**07**

CLIENT South Morang Rail Extension Project  
 PROJECT ID South Morang Rail Extension  
 CREATED BY JC  
 LAST MODIFIED JC 5/06/2014  
 DRG NO MET005-G-MAP-005-B

REVISION

**B**



329900

5831400

5831400



329900

# South Morang Rail Extension Project



0 5 10 m  
1:200 when printed at A3

DATUM GDA 1994, PROJECTION MGA ZONE 55

## LEGEND

- Direct Translocation (A)
- Delayed Translocation (B&C)
- Receptor Site
- South Morang Grassy Eucalypt Woodland

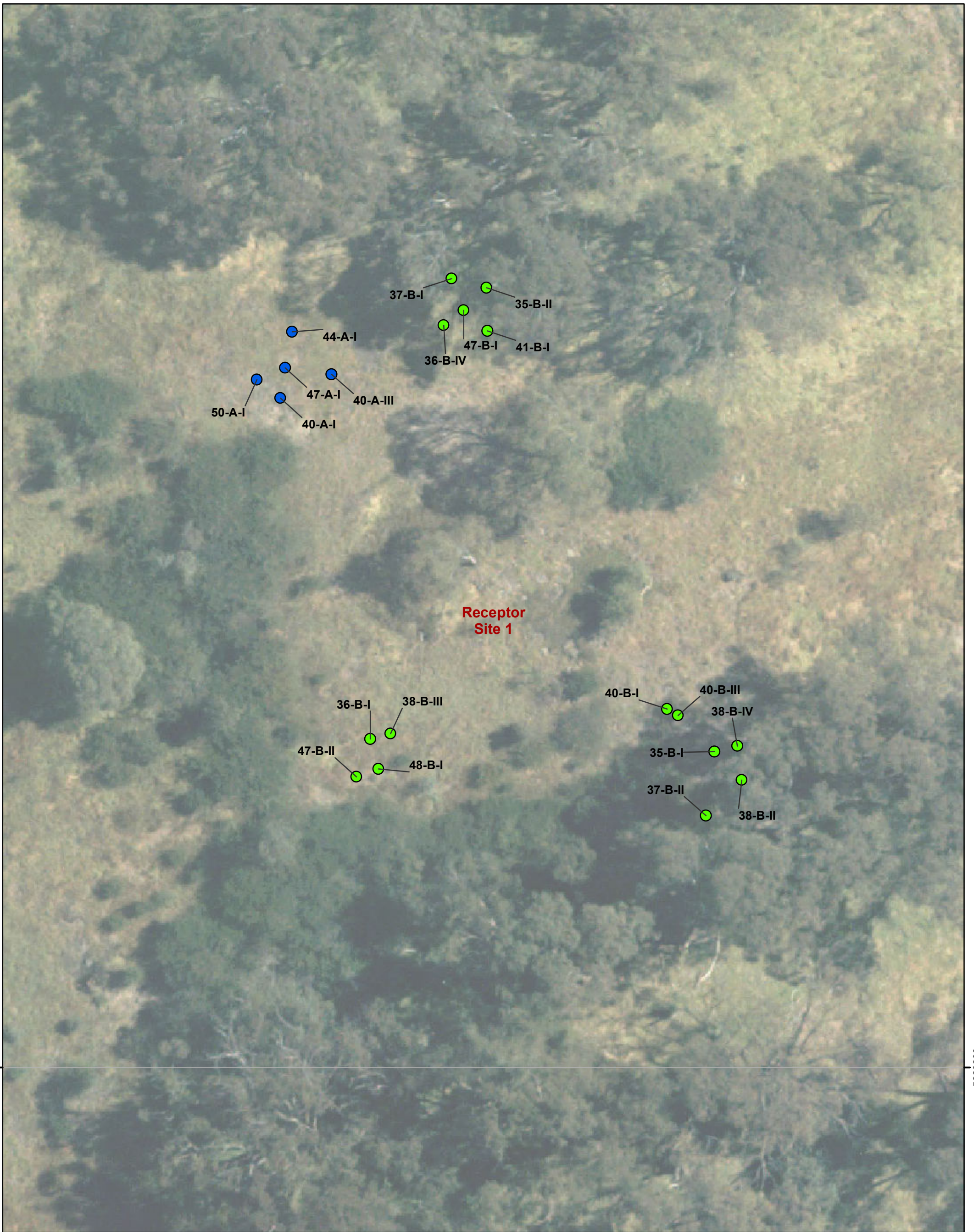
**08**

CLIENT South Morang Rail Extension Project  
 PROJECT ID South Morang Rail Extension  
 CREATED BY JC  
 LAST MODIFIED JC 5/06/2014  
 DRG NO MET005-G-MAP-005-B

REVISION

**B**





# South Morang Rail Extension Project



0 5 10 m  
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DATUM GDA 1994, PROJECTION MGA ZONE 55

## LEGEND

- Direct Translocation (A)
- Delayed Translocation (B&C)
- Receptor Site
- South Morang Grassy Eucalypt Woodland

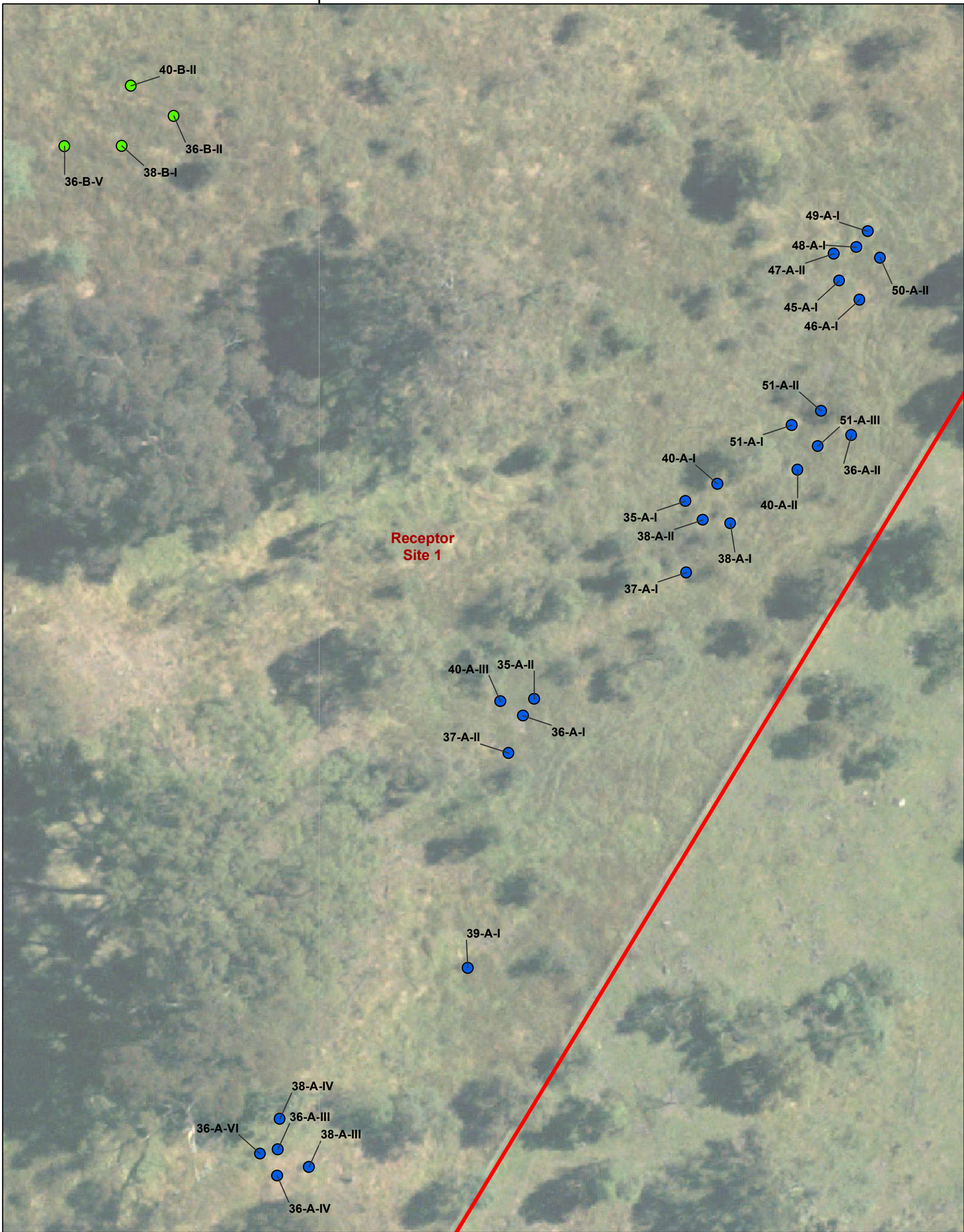
**09**

CLIENT South Morang Rail Extension Project  
 PROJECT ID South Morang Rail Extension  
 CREATED BY JC  
 LAST MODIFIED JC 5/06/2014  
 DRG NO MET005-G-MAP-005-B

REVISION

**B**





# South Morang Rail Extension Project



0 5 10  
m  
1:250 when printed at A3

DATUM GDA 1994, PROJECTION MGA ZONE 55

## LEGEND

- Direct Translocation (A)
- Delayed Translocation (B&C)
- Receptor Site
- South Morang Grassy Eucalypt Woodland

**10**

CLIENT South Morang Rail Extension Project  
 PROJECT ID South Morang Rail Extension  
 CREATED BY JC  
 LAST MODIFIED JC 5/06/2014  
 DRG NO MET005-G-MAP-005-B

REVISION

**B**