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M2G Planting (Tree & Shrub) Monitoring Report

Construction Corridor (Autumn 2016)

Prepared for
Icon Water

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Abbreviations

ABBREVIATION	DESCRIPTION
BGGW	Box Gum Grassy Woodland
BWA	Bulk Water Alliance
EMP	Ecological Monitoring Sub-plan
ERG	Environment Reference Group
HLPS	High Lift Pump Station
LLPS	Low Lift Pump Station
LRTEMP	Landscape Rehabilitation and Terrestrial Ecology Management Plan
M2G	Murrumbidgee to Googong Water Transfer Project
ORMP	Offset Rehabilitation Management Plan

1 Introduction

1.1 Background

Eco Logical Australia (ELA) was commissioned by Icon Water (formerly ACTEW Corporation) to deliver terrestrial ecological services as required by the environmental approval process for the Murrumbidgee to Googong Water Transfer Project (M2G). A component of that service is to provide post-construction rehabilitation monitoring in accordance with the Landscape Rehabilitation Management Plan (LRMP) for the M2G project, which has been undertaken by Blue Gum Ecological Consulting on behalf of ELA.

The following report examines the results of the autumn 2016 monitoring survey for rehabilitation planting within the M2G construction corridor and structure sites. This is the eighth in a series of bi-annual surveys documenting the progress of tree and shrub plantings.

1.2 Study area

The study area extends from the Low Lift Pump Station (LLPS) at Angle Crossing on the Murrumbidgee River to the discharge facility at Burra Creek; situated near the intersection of Williamsdale and Burra Roads. The pipeline construction corridor is approximately 12 km in length (**Figures 1-4, Appendix 1**).

The study area falls within the Williamsdale (8726-4N) 1:25,000 Map Sheet and is part of the South-east Highlands Bioregion (Commonwealth of Australia 2012).

1.3 Study aims

The original aim of the study was to monitor representative sub-sets of both herbaceous and woody rehabilitation planting, however, it became increasingly difficult to discriminate between planted and non-planted herbaceous specimens and this component of the monitoring program was discontinued in spring 2014[1]. Monitoring of woody plantings (trees and shrubs) has continued without interruption.

1.4 Planting regime

Almost 5,000 woody seedlings, comprising nine native tree and eleven native shrub species[2], were planted within the M2G construction corridor and structure sites during spring 2011 and autumn 2012 (**Table 1**). In addition, 19 non-native tree and shrub species were planted in the eastern sections of the construction corridor at the request of landowners.

As was reported previously an additional 1,300 woody seedlings were planted prior to spring 2015, of these approximately 158 specimens were located at monitoring sites.

Species selection and planting distribution were guided by former vegetation type, spatial characteristics and vegetation lost as a result of construction. Additional woody plantings were included as part of compensatory measures for habitat loss as well as for amenity.

[1] Concurrent plot-based monitoring of herbaceous *seeding* (as well as data collection of *non-seeded* regenerative growth) was unaffected and the results are presented in a separate report.
[2] Since the original planting at least two other native genus have been added: Dodonaea and Grevillea.

Table 1: Species and quantity planted within the M2G construction corridor and structure sites during spring 2011 and autumn 2012.

Scientific Name	Common Name	Total plantings pipeline corridor	Total plantings structures	Total
Native tree				
Eucalyptus blakelyi	Blakely's Red Gum			
Eucalyptus bridgesiana	Apple Box			
Eucalyptus mannifera	Brittle Gum			
Eucalyptus melliodora	Yellow Box			
Eucalyptus polyanthemos	Red Box			
Eucalyptus pauciflora	Snow Gum			
Eucalyptus rubida	Candlebark Gum			
Eucalyptus viminalis	Manna Gum			
Callitris endlicheri	Black Cypress Pine			
Sub-total		**624**	**148**	**772**
Native shrub				
Acacia dealbata	Silver Water			
Acacia genistifolia	Spreading Wattle			
Acacia rubida	Red Stemmed Wattle			
Acacia siculiformis	Dagger Wattle			
Banksia marginata	Silver Banksia			
Bursaria spinosa	Hairy Bursaria			
Leptospermum myrtifolium	Myrtle Tea Tree			
Leptospermum obovatum	River Tea Tree			
Kunzea ericoides	Burgan			
Cassinia longifolia	Shiny Cassinia			
Indigofera australis	Austral Indigo			
Sub-total		**3,016**	**1,055**	**4,071**
Non-native tree/shrub				
Ulmus parvifolia	Chinese Elm			
Quercus robur 'Fastigiata'	Upright English Oak			
Castanea sativa	European Chestnut			
Populus spp.	Poplar (TBC)			
Pyrus ussuriensis	Manchurian Pear			
Sub-total		**19**	**-**	**19**
Total native trees/shrub		**3,640**	**1,203**	**4,843**
Total non-native tree/shrub		**19**	**-**	**19**

2 Methods

2.1 Monitoring regime

Permanent monitoring sites were established and are sampled on a bi-annual basis (autumn and spring/summer).

The current monitoring survey was conducted in March 2016.

2.2 Selection of monitoring sites

Twelve tree and shrub monitoring sites were selected from approximately 80 planting arrays within the M2G construction corridor and structure sites (**Figures 1 – 4, Appendix 1**). Six sites (TSP 1-6) are situated in the ACT and six (TSP 7-12) in NSW (**Table 2**).

The spatial arrangement of sampling sites was influenced by the original placement of planting arrays (most of which were located in areas of former native vegetation), which resulted in fewer sampling sites in the eastern non-native section of the construction corridor than in the central and western sections. Sample sites were also selected to include variations in slope and aspect, soil moisture and vegetation types.

Sample sites were marked with a red-tipped wooden stake, at which grid co-ordinates and photographs were taken.

Table 2: Tree and shrub (TSP) monitoring sites within the construction corridor and structure sites.

Site ID^	Approx. chainage from LLPS	Co-ordinates	Jurisdiction	Property
TSP1	250	691345 - 6060236	ACT	PCS (Murrumbidgee R. corridor)
TSP2	1025	691964 - 6060519	ACT	PCS (Murrumbidgee R. corridor)
TSP3	1350	692256 - 6060605	ACT	Icon leasehold
TSP4	1900	692592 - 6060707	ACT	Icon leasehold
TSP5	2325	693226 - 6060578	ACT	Icon leasehold
TSP6	2650	693528 - 6060505	ACT	Icon leasehold
TSP7	3040	693927 - 6060542	NSW	Smith
TSP8	4975	695663 - 6060392	NSW	Lonergan
TSP9	5475	696175 - 6060305	NSW	Lonergan
TSP10	6425	697084 - 6060204	NSW	Johanson
TSP11	9300	699277 - 6061925	NSW	Latimer
TSP12	11900	701346 - 6063099	NSW	Discharge facility

2.3 Survey techniques

A simple quantitative sampling method was used to measure tree and shrub planting success. Specimens were counted, identified to at least genus level and their health determined according to the following criteria:

- *Good Health* - indicated by vigorous growth, fully leaved with expected colouration for that species;

- *Poor Health* - stems or leaves discoloured, foliage limited or easily dislodged, specimen may appear stunted or heavily browsed;
- *Dead* - absence of leaves, stem or leaves entirely discoloured or desiccated with no visible living vegetative material.

2.4 Key Performance Target

The current Key Performance Target (KPT) for tree and shrub plantings is **90%** survival rate, which was arbitrarily set by the BWA and the planting contractor in early 2012. Unfortunately, the KPT provided in the M2G Landscape Rehabilitation and Terrestrial Ecology Management Plan (LRTEMP) does not explicitly refer to a **90%** target.

A previous recommendation to reduce the KPT to 70% is yet to be endorsed.

3 Results

3.1 Overview

The total sample population was **739**, of which **365 (49.4%)** specimens were in good health, **74 (10.0%)** in poor health and **300 (40.6%)** either dead or missing (**Table 3**). Overall, there was a **2.8%** improvement in specimen health from the previous spring monitoring session, but this was offset to some extent by a **1.4%** increase in dead and missing specimens.

Seven sites (1, 2, 3, 4, 5, 10 & 11) exhibited improved specimen health, four sites (6, 7, 9 and 12) declined and one site (8) showed no change (**Chart 1**).

Although total planting health improved slightly no site met the current 90% KPT. Two sites (7 & 8) had more than **80%** of plantings in good health (although these sites account for less than 5% of the total sample population), and Site 6, which previously achieved 95.7% after recent replanting, has had a significant decline in planting health falling to **49.1%** (**Chart 1**).

Consistent with previous results planting success was higher in NSW (**68.5%)** than in the ACT (**38.2%)** (**Chart 1**), though the trend for the ACT has improved slightly.

Extrapolating the current results to the total planted population (**Table 1**) would yield approximately **2,392** plantings in good health, **484** in poor health and **1,966** dead or missing. Given a sample error of +/- 5%, the total number of plantings in good health could vary from **2,635** to **2,150**.

Details of each monitoring site are provided in Sub-Sections 3.1.1 to 3.1.12, below (*Note: bracketed numbers in the central column provide results from the previous spring 2015 monitoring period*). Full data sets are provided in **Table 5** in **Appendix 2** with comparisons from previous results in **Table 4** and **Chart 2.**

Table 3: Summary of tree and shrub monitoring results for the autumn 2016 monitoring period. Sites 1 to 6 occur in the ACT and 7 to 12 in NSW.

Site ID	Seedling Health			Combined Poor/Dead*	Total Plantings	% Health		Additional Plantings prior to spring 2015
	Good	Poor	Dead*			Good	Poor/Dead*	
TSP1	30	11	51	62	92	32.6	67.4	Unknown [A]
TSP2	67	2	58	60	127	52.7	47.3	
TSP3	31	8	56	64	95	32.6	67.4	33
TSP4	9	4	63	67	76	11.8	88.2	4
TSP5	13	1	5	6	19	68.4	31.6	16
TSP6	28	15	14	29	57	49.1	50.9	55
Total ACT	***178***	***41***	***247***	***288***	***466***	***38.2***	***61.8***	
TSP7	20	4	0	4	24 (23)	83.3	16.7	7
TSP8	8	0	1	1	9	88.9	11.1	
TSP9	12	6	6	12	24	50.0	50.0	
TSP10	97	10	32	42	139	69.7	30.3	20 [B]
TSP11	8	1	3	4	12	66.7	33.3	
TSP12	42	12	11	23	65	64.6	35.4	23 [B]
Total NSW	***187***	***33***	***53***	***86***	***273***	***68.5***	***31.5***	
Total plantings	**365**	**74**	**300**	**374**	**739** (738)			
Av. per site	**30.4**	**6.2**	**25.0**	**31.2**	**61.6**			
%	**49.4**	**10.0**	**40.6**	**50.6**	**100.0**			

( ) = previous total as at spring 2015
*** = Includes missing specimens**
[A] = included an undetermined number new plantings post-spring 2015
[B] = estimate

Chart 1: Proportion of plantings in good health at each site during all monitoring periods. ACT sites = TSP 1-6 and NSW sites = TSP 7-12.

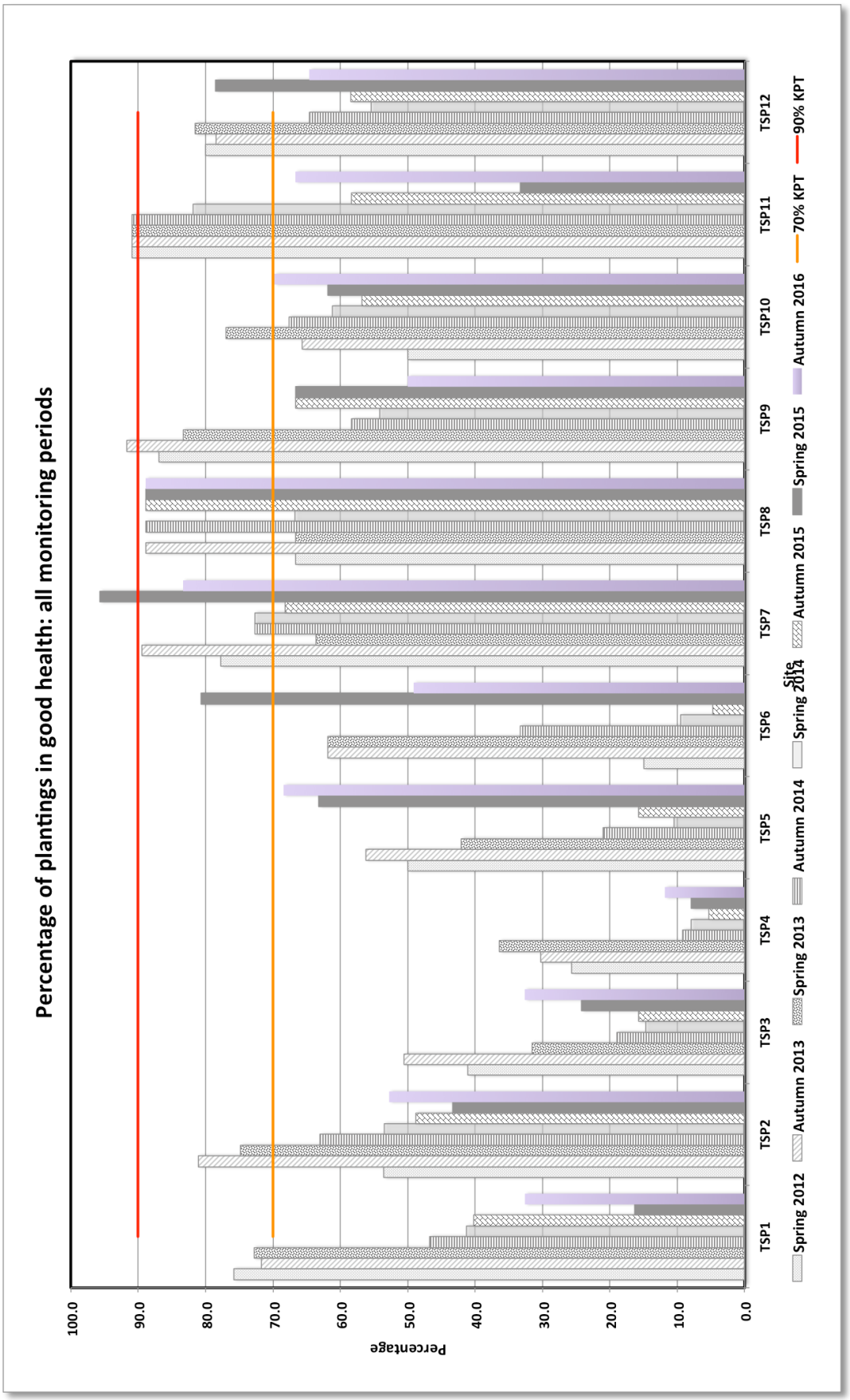
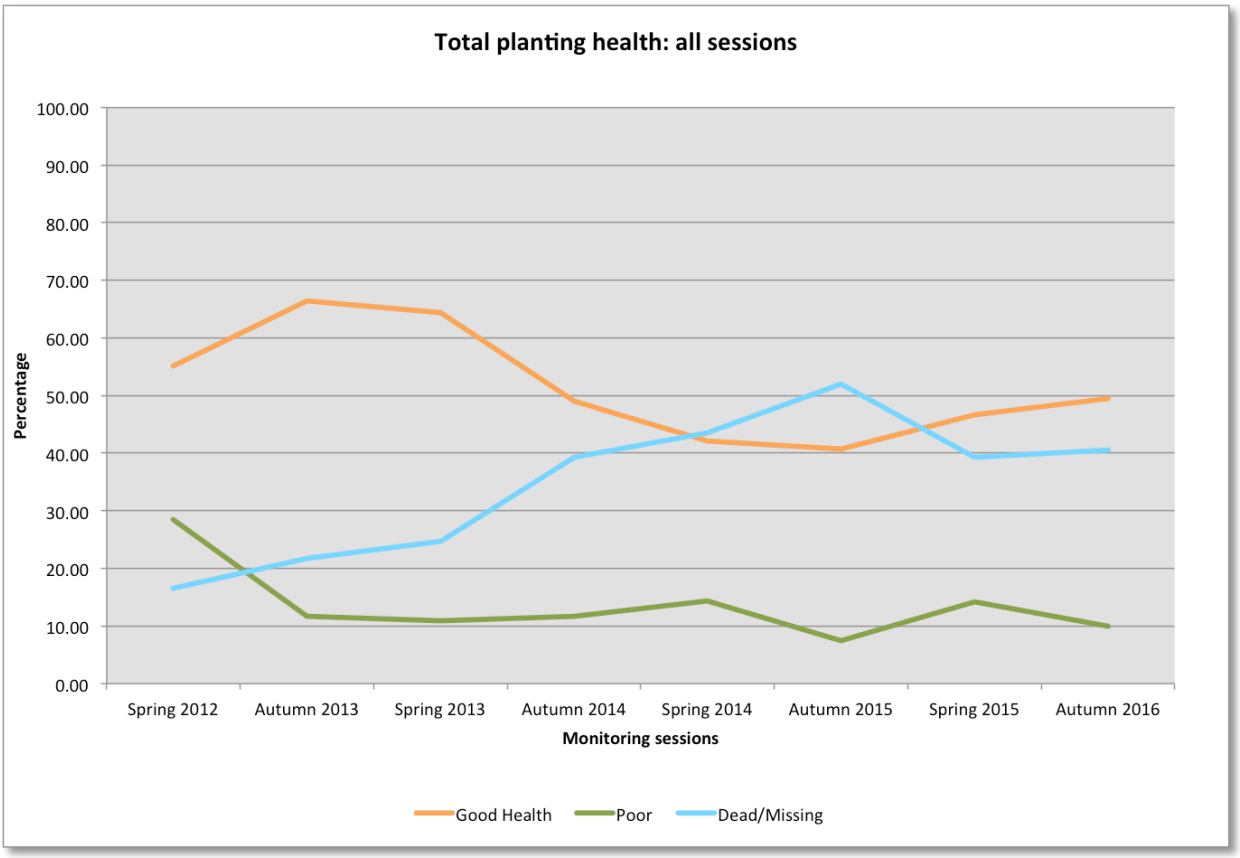


Table 4: Comparison of tree and shrub monitoring results from all sessions.

Monitoring period	Seedling Health			Poor/Dead* Combined	Total Plantings	New Plantings
	Good	Poor	Dead*			
Spring 2012						
Total number	364	188	109	297	661	-
Av. per site	30.3	15.7	9.1	24.8		
%	*55.1*	*28.5*	*16.5*	*45.0*		
Autumn 2013						
Total number	458	81	150	231	689	-
Av. per site	38.2	6.7	12.5	19.2		
%	*66.5*	*11.7*	*21.8*	*33.5*		
Spring 2013						
Total number	451	76	173	249	700	-
Av. per site	37.6	6.3	14.4	20.7		
%	*64.4*	*10.9*	*24.7*	*35.6*		
Autumn 2014						
Total number	343	82	275	357	700	-
Av. per site	28.6	6.8	22.9	20.7		
%	*49.0*	*11.7*	*39.3*	*35.6*		
Spring 2014						
Total number	295	100	305	405	700	-
Av. per site	24.6	8.3	25.4	33.7		
%	*42.1*	*14.3*	*43.6*	*57.9*		
Autumn 2015						
Total number	285	52	364	416	701	-
Av. per site	23.8	4.3	30.3	33.7		
%	*40.7*	*7.4*	*51.9*	*59.3*		
Spring 2015						
Total number	344	105	289	394	738	158
Av. per site	28.7	8.8	24.1	32.8		
%	*46.6*	*14.2*	*39.2*	*53.4*		
Autumn 2016						
Total number	365	74	300	374	739	? (TSP1)
Av. per site	30.4	6.2	25	31.2		
%	*49.4*	*10.0*	*40.6*	*50.6*		

*** Includes missing specimens**

Chart 2: Total planting health across all monitoring periods.



3.1.1 Monitoring site TSP1

Jurisdiction	**ACT**	**TSP1** Situated within the Murrumbidgee River Corridor immediately W and NW of the HLPS, about 250 m from the LLPS. Planting health improved by **16.3%** with **32.6%** of plantings currently in good condition. Contained an undetermined number of new plantings. **Recommendation: Provide sufficient maintenance for remaining specimens.**
Co-ordinates	691345 – 6060236	
No. of tree & shrub species planted	**8**	
Specimen health		
Good	**30** (15)	
Poor	**11** (25)	
Dead / Missing	**50** (52)	
Total plantings	**92**	

Plate 1: Monitoring Site TSP1. The image on the left is from spring 2015 and the right autumn 2016.

3.1.2 Monitoring site TSP2

Jurisdiction	**ACT**
Co-ordinates	691964 – 6060519
No. of tree & shrub species planted	**5**
Specimen health	
Good	**67** (55)
Poor	**2** (14)
Dead / Missing	**58** (58)
Total plantings	**127**

TSP2 is located within the Murrumbidgee River Corridor, about 1,025 m from the LLPS.

Planting health improved by **9.4%** with **52.7%** of plantings currently in good condition. Replanting was not undertaken at this site.

Recommendation: Provide sufficient maintenance for remaining specimens.

Plate 2: Monitoring Site TSP2. The image on the left is from spring 2015 and the right autumn 2016.

3.1.3 Monitoring site TSP3

Jurisdiction	**ACT**
Co-ordinates	691964 – 6060519
No. of tree & shrub species planted	**6** (5)
Seedling health	
Good	**31** (23)
Poor	**8** (18)
Dead / Missing	**56** (54)
Total plantings	**95**

TSP3 is located within the Murrumbidgee River Corridor, about 1,350 m from the LLPS.

Planting health improved by **8.4%** with **32.6%** of specimens currently in good condition.

Recommendation: Provide sufficient maintenance for remaining specimens.

Plate 3: Monitoring Site TSP3. The image on the left is from spring 2015 and the right autumn 2016.

3.1.4 Monitoring site TSP4

Jurisdiction	**ACT**
Co-ordinates	692592 – 6060707
No. of tree & shrub species planted	**3**
Seedling health	
Good	**9** (6)
Poor	**4** (6)
Dead / Missing	**63** (64)
Total plantings	**76**

TSP4 is located about 1,900 m from the LLPS within the ACT.

Planting health improved by **3.9%** with **11.8%** of specimens currently in good condition.

Note: Most plantings either perished or were removed prior to autumn 2014.

Recommendation: Additional planting is not recommended for this site.

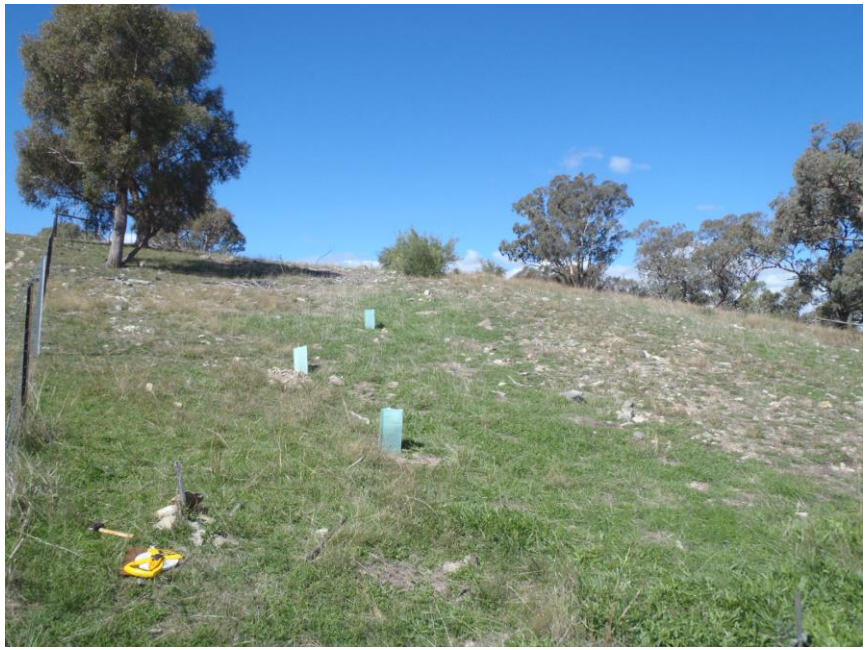


Plate 4: Monitoring Site TSP4. The image on the left is from spring 2015 and the right autumn 2016.

3.1.5 Monitoring site TSP5

Jurisdiction	**ACT**
Co-ordinates	693226 – 6060578
No. of tree & shrub species planted	**4** (3)
Seedling health	
Good	**13** (12)
Poor	**1** (2)
Dead / Missing	**5** (5)
Total plantings	**19**

TSP5 is located about 2,325 m from the LLPS within the ACT.

Planting health increased by **5.2%** with **68.4%** of specimens currently in good condition.

Recommendation: Provide sufficient maintenance for new plantings

Plate 5: Monitoring Site TSP5. The image on the left is from spring 2015 and the right autumn 2016.

3.1.6 Monitoring site TSP6

Jurisdiction	**ACT**	
Co-ordinates	693528 – 6060505	**TSP6** is located about 2,650 m from the LLPS - west of and adjacent to the Monaro Hwy within the ACT.
No. of tree & shrub species planted	**4** (3)	
Seedling health		Significant decline in planting health, falling from 80.7% in spring 2015 (following replanting) to **49.1%** during the current survey**.**
Good	**28** (46)	
Poor	**15** (5)	
Dead / Missing	**14** (6)	**Recommendation: Provide sufficient maintenance for new plantings.**
Total plantings	**57**	

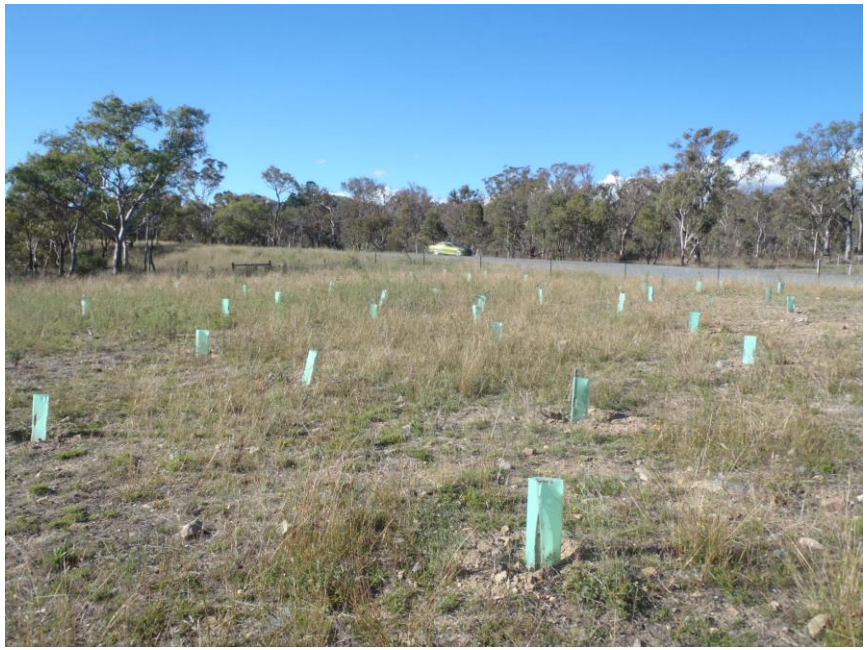


Plate 6: Monitoring Site TSP6. The image on the left is from spring 2015 and the right autumn 2016.

3.1.7 Monitoring site TSP7

Jurisdiction	**NSW**
Co-ordinates	693927 – 6060542
No. of tree & shrub species planted	**4** (4)
Seedling health	
Good	**20** (22)
Poor	**4** (0)
Dead / Missing	**0** (1)
Total plantings	**24** (23)

TSP7 is located about 3,040 m from the LLPS within the Smith property, NSW.

There was a 12.4% decline in planting health, falling from 95.7% in spring 2015 (when replanted) to **83.3%** during the current survey**.**

Recommendation: Provide sufficient maintenance for new plantings.

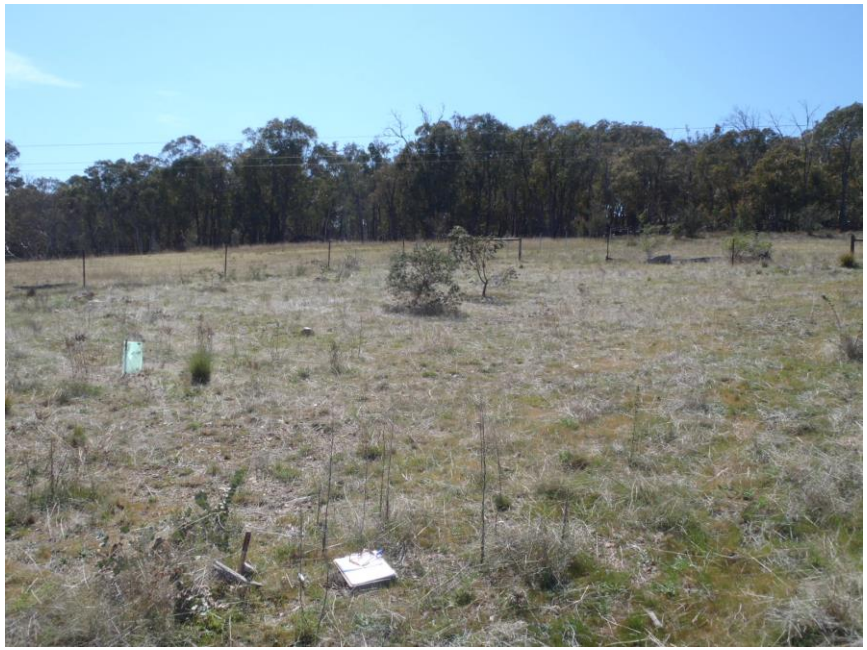


Plate 7: Monitoring Site TSP7. The image on the left is from spring 2015 and the right autumn 2016.

3.1.8 Monitoring site TSP8

Jurisdiction	**NSW**	TSP8 is located about 4,975 m from the LLPS within the Lonergan property, NSW. The proportion of specimens in good health remained constant at **88.9%**. Tree heights range from 1m – 4 m. Replanting was not undertaken at this site. **Recommendation: Provide sufficient planting maintenance.**
Co-ordinates	695663 – 6060392	
No. of tree & shrub species planted	**2**	
Seedling health		
Good	**8** (8)	
Poor	**0** (0)	
Dead / Missing	**1** (1)	
Total plantings	**9**	

Plate 8: Monitoring Site TSP8. The image on the left is from spring 2015 and the right autumn 2016.

3.1.9 Monitoring site TSP9

Jurisdiction	**NSW**
Co-ordinates	696175 – 6060305
No. of tree & shrub species planted	**3**
Seedling health	
Good	**12** (16)
Poor	**6** (6)
Dead / Missing	**6** (2)
Total plantings	**24**

TSP9 is located about 5,475 m from the LLPS within the Lonergan property, NSW.

Planting health declined by 16.7% with **50.0%** of specimens currently in good condition. At least two plantings had significant lerp infestation with other plantings engulfed by rank pasture grass, which may have a limiting effect on future planting success.

Recommendation: Provide sufficient planting maintenance; i.e. reduce the density of groundcover herbage.

Plate 9: Monitoring Site TSP9. The image on the left is from spring 2015 and the right autumn 2016.

3.1.10 Monitoring site TSP10

Jurisdiction	**NSW**
Co-ordinates	697084 – 6060204
No. of tree & shrub species planted	**8**
Seedling health	
Good	**97** (86)
Poor	**10** (20)
Dead / Missing	**32** (33)
Total plantings	**139**

TSP10 is located about 6,425 m from the LLPS within the Johanson property, NSW.

Planting health increased by 7.8% with **69.7%** of specimens currently in good condition.

Some tree guards remain choked with herbage, which may have a limiting effect on planting health.

Recommendation: Provide sufficient planting maintenance.

Plate 10: Monitoring Site TSP10. The image on the left is from spring 2015 and the right autumn 2016.

3.1.11 Monitoring site TSP11

Jurisdiction	**NSW**
Co-ordinates	699277 – 6061925
No. of tree & shrub species planted	**3**
Seedling health	
Good	**8** (4)
Poor	**1** (4)
Dead / Missing	**3** (4)
Total plantings	**12**

TSP11 is located about 9,300 m from the LLPS within the Latimer property, NSW.

Planting health increased by **33.4%** with **66.7%** of plantings currently in good condition. It seems that some specimens previously identified as poor have exhibited some recovery with one specimen previously identified as dead exhibiting basal growth.

Most plantings were engulfed by pasture grass, which may have a limiting effect on planting health.

Recommendation: Provide additional planting maintenance, in particular, reduce the density of groundcover vegetation.

Plate 11: Monitoring Site TSP11. The image on the left is from spring 2015 and the right autumn 2016.

3.1.12 Monitoring site TSP12

Jurisdiction	**NSW**
Co-ordinates	701346 – 6063099
No. of tree & shrub species planted	**4**
Seedling health	
Good	**42** (51)
Poor	**12** (5)
Dead / Missing	**11** (9)
Total plantings	**65**

TSP12 is located about 11,900 m from the LLPS near the discharge facility, NSW.

Planting health decreased by 13.9% with **64.6%** of specimens currently in good condition.

Recommendation: Provide sufficient planting maintenance.

Plate 12: Monitoring Site TSP12. The image on the left is from spring 2015 and the right autumn 2016.

3.2 Weeds

Noxious species and broad-leaf weeds such as *Conyza* sp. (Fleabane), *Verbena bonariensis* (Purple-top), *Hypericum perforatum* (St John's Wort) and *Echium vulgare* (Viper's Bugloss) have a wide distribution within the construction corridor and are discussed in greater detail in the M2G Seeding (Plot) Monitoring Report, Autumn 2016.

Groundcover smothering of plantings was observed in the eastern and central sections of the corridor, particularly at Sites 9, 10 and 11, which are associated with non-native pasture.

3.3 Threatened plants

No new observations to report.

3.4 Threatened fauna

No new observations to report.

3.5 Main Observations

- plantings in good health increased from **46.6%** to **49.4%**
- plantings in poor heath declined from **14.2%** to **10.1%**
- dead or missing plantings increased slightly from **39.2%** to **40.6%**
- Planting success in NSW continues to outperform the ACT, with **68.5%** and **38.2%**, respectively, in good condition.

3.6 Key Performance Targets

Recommendations to lower the KPTs to 70% were proposed in the autumn 2015 report.

3.7 Replanting

Apart for TSP 1, there was no other indication of additional replanting post-spring 2015.

3.8 Comments & Suggested Actions

Planting maintenance should be improved, particularly watering at exposed or elevated situations, and reducing the amount of smothering herbage around plantings on properties associated with non-native pasture.

As previously stated, the current KPT (90%) is considered onerous and would require continued long-term re-planting and maintenance strategy to keep pace with anticipated losses, and ultimately the current target may never be achieved. In our opinion the KPT should be reduced to a more realistic and achievable target of 70%.

4 Conclusion

The current monitoring survey was conducted in March 2016 and marks the eighth successive seasonal monitoring survey since the commencement of the study in spring 2012. The study measured the performance of rehabilitation planting using a simple quantitative method to determine planting success or failure.

The current survey found **365** (49.4%) specimens to be in good health, **74** (10.0%) in poor health and **300** (40.6%) either dead or missing. This result represents a modest **2.8%** improvement in specimen health compared to the previous monitoring period.

Proposed actions include, improved planting maintenance and reduce the current KPT of 90% to 70%.

References

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LRTEMP (2014). Murrumbidgee to Googong Water Transfer: Landscape Rehabilitation & Terrestrial Ecology Management Plant. Version 2 (January 2014). ACTEW Corporation Ltd.

Appendix 1: Figures

Figures 1 – 4 display the locations of the tree and shrub monitoring sites within the M2G construction corridor:

- **Figure 1**: Western section
- **Figure 2**: Central-western section
- **Figure 3**: Central-eastern section
- **Figure 4**: Eastern section

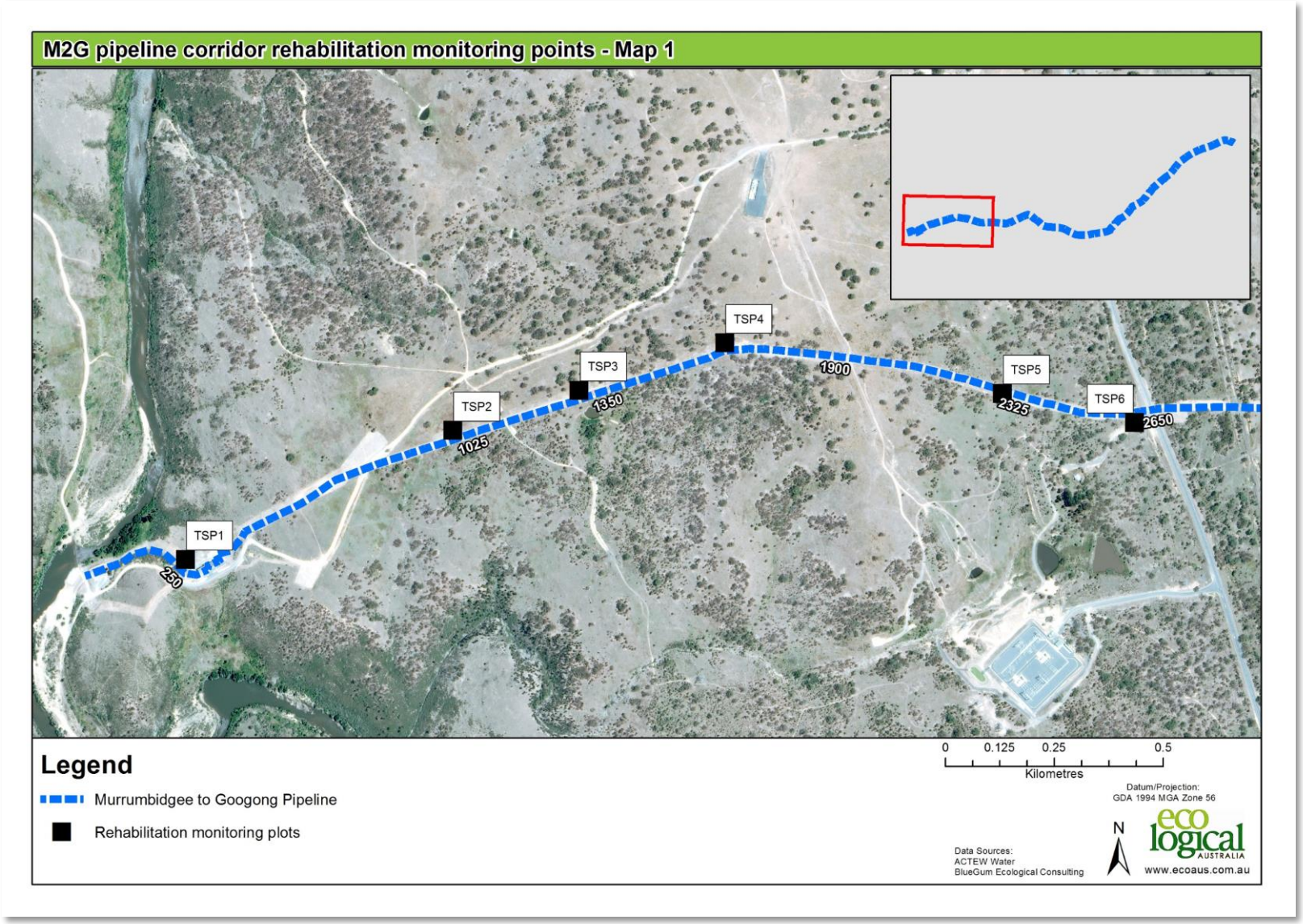

Figure 1: Location of tree and shrub monitoring sites within the western section of the M2G construction corridor.

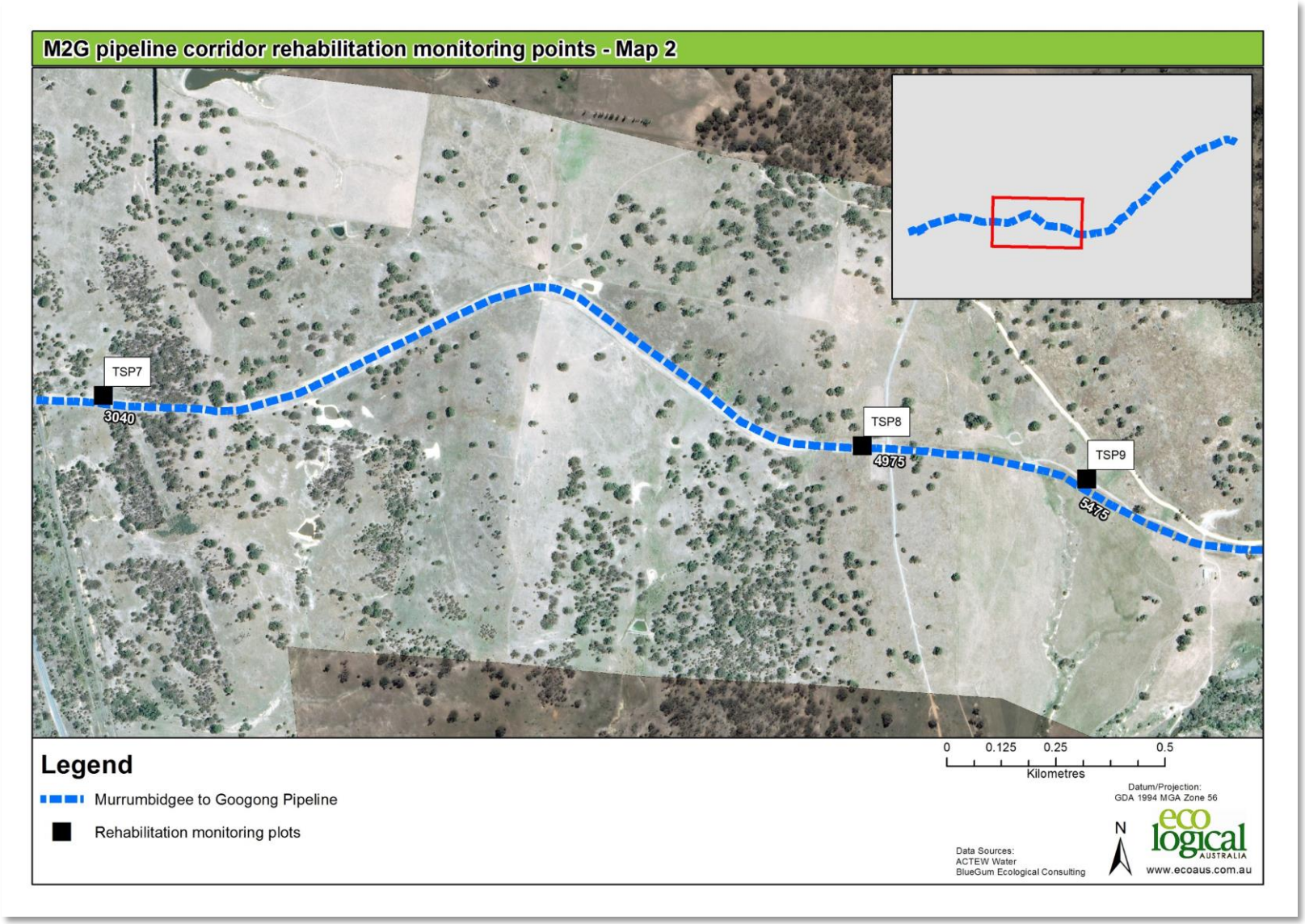

Figure 2: The location of tree and shrub monitoring sites within the central-western section of the M2G construction corridor.

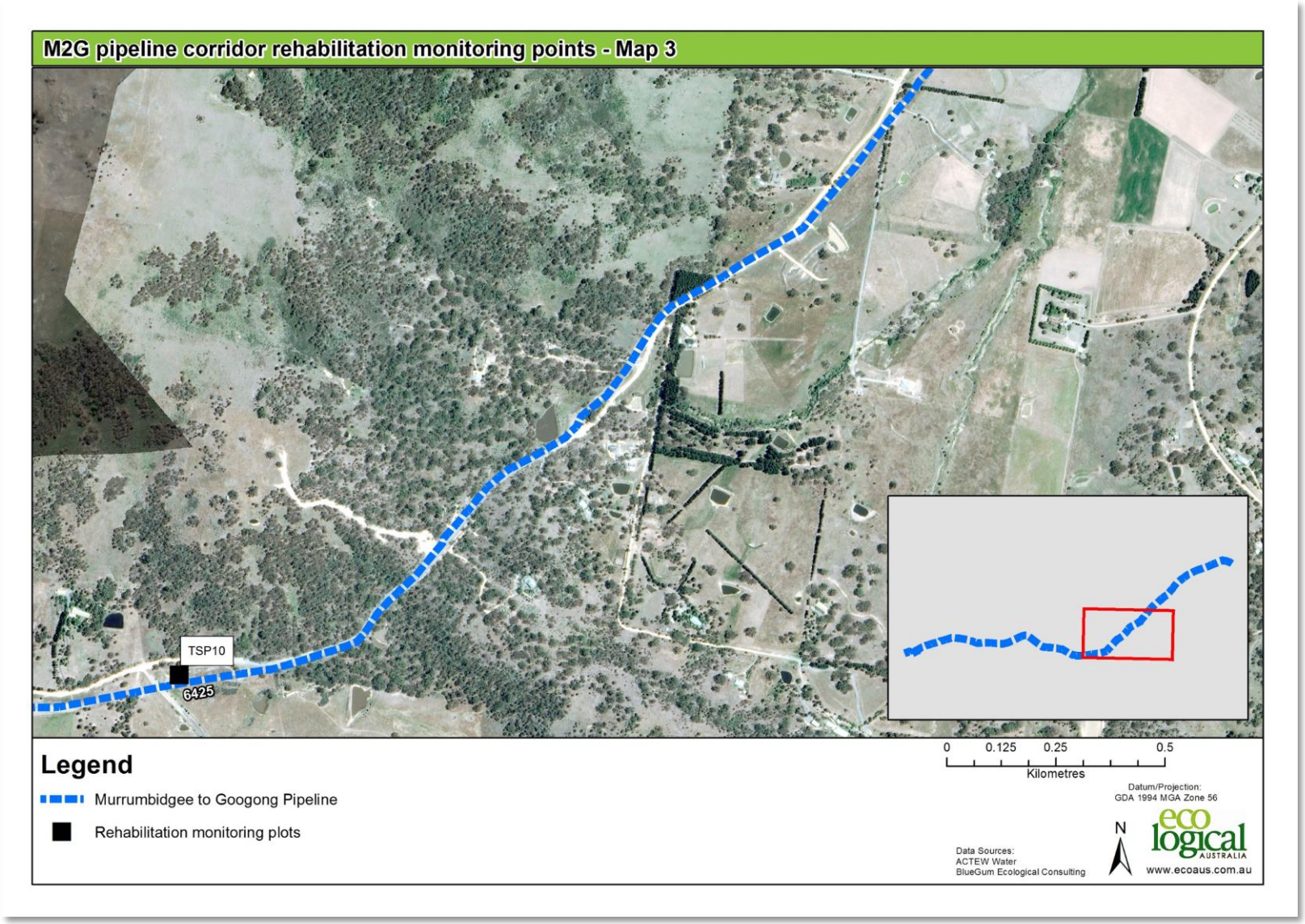

Figure 3: The location of tree and shrub monitoring sites within the central-eastern section of the M2G construction corridor.

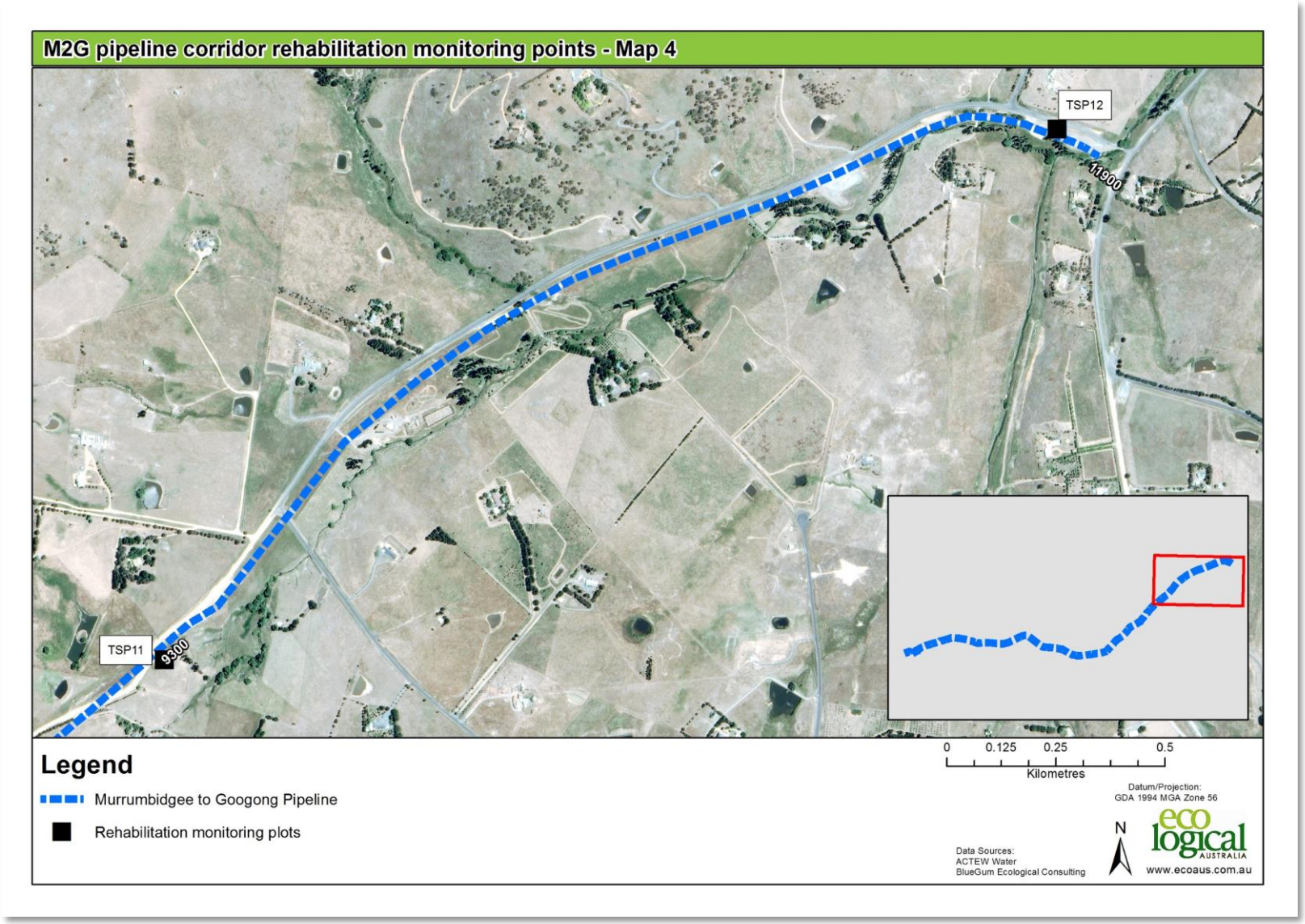

Figure 4: The location of tree and shrub monitoring sites within the eastern section of the M2G construction corridor.

Appendix 2: Floristic data – tree & shrub plantings

Table 5: Tree and shrub planting data from twelve sample sites: autumn 2016 monitoring session.

- **Figures in the dead column are not necessarily species specific.**

Site ID	Species	Good Health	Poor Health*	Dead	Missing	Total	New Plantings
TSP1	*Acacia sp.*	10	6	1		17	
TSP1	*Bursaria spinosa*	2	1			3	
TSP1	*Cassinia sp.*	5	2			7	
TSP1	*E. mannifera*	5	1			6	
TSP1	*E. melliodora*	7	1			8	3?
TSP1	*Unknown Euc.*					-	
TSP1	*Grevillea sp.*					-	
TSP1	*Hakea sp.*	1				1	
TSP1	*Leptospermum sp.*					-	
TSP1	*Unknown*			3	47	50	
Total		**30**	**11**	**4**	**47**	**92**	**3?**
% good						**32.6%**	
% poor/dead/missing						**67.4%**	
TSP2	*Acacia sp.*	51	2	3	1	57	
TSP2	*Bursaria spinosa*	6				6	
TSP2	*Cassinia sp.*					-	
TSP2	*Grevillea sp.*	5				5	
TSP2	*Kunzea sp.*					-	
TSP2	*Leptospermum/Kunzea sp.*	5				5	
TSP2	*Unknown*				54	54	
Total		**67**	**2**	**3**	**55**	**127**	**0**
% good						**52.7%**	
% poor/dead/missing						**47.3%**	
TSP3	*Acacia sp.*	21	5			26	
TSP3	*Bursaria spinosa*	4				4	
TSP3	*Dodonaea sp.*	4				4	
TSP3	*Eucalyptus melliodora*	1				1	
TSP3	*Eucalyptus polyanthemos*		1			1	
TSP3	*Leptospermum/Kunzea sp.*	1	2		2	5	
TSP3	*Unknown*			5	49	54	
Total		**31**	**8**	**5**	**51**	**95**	**?**
% good						**32.6%**	
% poor/dead/missing						**67.4%**	

Site ID	Species	Good Health	Poor Health*	Dead	Missing	Total	New Plantings
TSP4	*Acacia sp.*	8	3	1		12	
TSP4	*Bursaria spinosa*					-	
TSP4	*Dodonaea sp.*	1	1			2	
TSP4	*Leptospermum sp.*					-	
TSP4	*Unknown*				62	62	
Total		**9**	**4**	**1**	**62**	**76**	
% good						**11.8%**	
% poor/dead/missing						**88.2%**	
TSP5	*Acacia sp.*	5	1	1		7	
TSP5	*Cassinia sp.*	5				5	
TSP5	*Dodonaea sp.*	2				2	
TSP5	*E. bridgesiana*	1				1	
TSP5	*E. dives**					-	
TSP5	*E. melliodora*					-	
TSP5	*Unknown*			1	3	4	
Total		**13**	**1**	**2**	**3**	**19**	
% good						**68.4%**	
% poor/dead/missing						**31.6%**	
TSP6	*Acacia sp.*	9	9			18	
TSP6	*Dodonaea sp.*	6	1			7	
TSP6	*E. blakelyi*					-	
TSP6	*E. bridgesiana*	5	2			7	
TSP6	*E. melliodora*	8	3			11	
TSP6	*Unknown Eucalyptus*			1			
TSP6	*Unknown*			7	6	13	
Total		**28**	**15**	**8**	**6**	**57**	
% good						**49.1%**	
% poor/dead/missing						**50.9%**	
TSP7	*E. blakelyi*	2				2	
TSP7	*E. bridgesiana*	7	1			8	
TSP7	*E. melliodora*	8	3			11	
TSP7	*E. polyanthemos*	1				1	?
TSP7	*E. dives*					-	
TSP7	*Unknown Eucalyptus* [A]	2				2	
TSP7	*Unknown*					-	
Total		**20**	**4**	**0**	**0**	**24** (23)	**?**
% good						**83.3%%**	
% poor/dead/missing						**16.7%**	
TSP8	*E. mannifera*	3				3	
TSP8	*E. melliodora*	5				5	
TSP8	*Leptospermum sp.*					-	
TSP8	*Unknown*				1	1	
Total		**8**	**0**	**0**	**1**	**9**	**0**
% good						**88.9%**	

Site ID	Species	Good Health	Poor Health*	Dead	Missing	Total	New Plantings
% poor/dead/missing						**11.1%**	
TSP9	*E. blakelyi*	4	1			5	
TSP9	*E. melliodora*	7	5			16	
TSP9	*E. polyanthemos*	1				1	
TSP9	*Unknown*			3	3	6	
Total		**12**	**6**	**3**	**3**	**24**	**0**
% good						**50.0%**	
% poor/dead/missing						**50.0%**	
TSP10	*Acacia sp.*	23	2			25	
TSP10	*Callistemon sp.*	11				11	
TSP10	*Dodonaea sp.*	2				2	
TSP10	*E. blakelyi*	1				1	
TSP10	*E. bridgesiana*	5				5	
TSP10	*E. mannifera*	6	2	1		9	
TSP10	*E. melliodora*	13	2			15	
TSP10	*E. polyanthemos*	36	4			40	
TSP10	*Unknown Eucalyptus*						
TSP10	*Unknown*			6	25	31	
Total		**97**	**10**	**7**	**25**	**139**	
% good						**69.7%**	
% poor/dead/missing						**30.3%**	
TSP11	*E. blakelyi*	2		1		3	
TSP11	*E. bridgesiana*	3	1			4	
TSP11	*E. melliodora*	3				3	
TSP11	*Unknown*				2	1	
Total		**8**	**1**	**1**	**2**	**12**	**0**
% good						**66.7%**	
% poor/dead/missing						**33.3%**	
TSP12	*Acacia sp.*	17	8			25	
TSP12	*Bursaria spinosa*	8	1			7	
TSP12	*Cassinia sp.*					1	
TSP12	*Dodonaea sp.*	3				3	
TSP12	*E. mannifera*	2	2			5	
TSP12	*E. melliodora*	2				1	
TSP12	*E. polyanthemos*		1			1	
TSP12	*Leptospermum/Kunzea*	10				10	
TSP12	*Unknown*			6	5	7	
Total		**42**	**12**	**6**	**5**	**65**	
% good						**64.6%**	
% poor/dead/missing						**35.4%**	
TOTAL		**365**	**74**	**40**	**260**	**739**	

A = Unknown *eucalypt*, probably *E. bridgesiana*

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