

Annual Compliance Report

17 October 2018 to 16 October 2019 EPBC 2013/7057
Spring Mountain Mixed Use Master Planned Community
Development, Spring Mountain, Queensland
Prepared for Lend Lease Communities (Springfield) Pty Limited
15 January 2020

Job No. 7243 E



Document Control

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1. Introduction

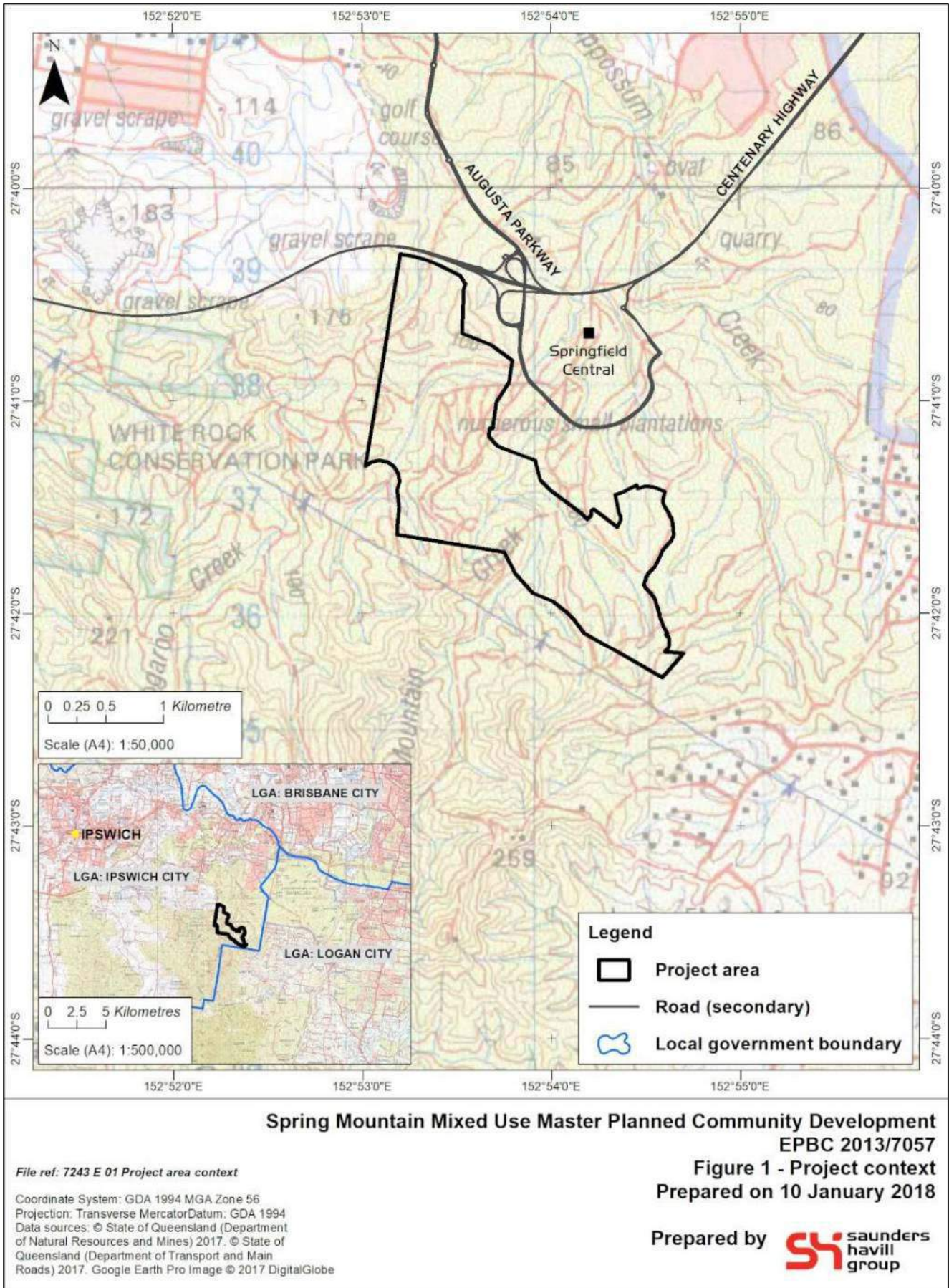
The Environmental Management Division of **Saunders Havill Group** was engaged by **Lend Lease Communities (Springfield) Pty Limited** (Lend Lease) to prepare this Annual Compliance Report for the Spring Mountain Mixed Use Master Planned Community Development at Spring Mountain, Queensland. This report provides an assessment of project compliance with the approval granted under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (ref EPBC 2013/7057), and is specifically required by condition 13 of the approval granted on 23 December 2015 (refer **Appendix A**).

The project area covers approximately 387 hectares (ha) and is located within 1 kilometre (km) of Springfield Central (refer to project context map at **Figure 1**). Within the project area, an impact to 255 ha of Matters of National Environmental Significance (MNES) habitat being koala habitat and grey-headed flying-fox foraging habitat was permitted under the approval conditions. Furthermore, due to the presence of *Plectranthus habrophyllus* in pockets throughout the project area, any impacts on these plants must be compensated by planting in the on-site conservation area. The non-administrative approval conditions are related to the management of impacts and offsets for these three MNES.

1.1. Approval details

Commonwealth reference	EPBC 2013/7057
Approval holder	Lend Lease Communities (Springfield) Pty Limited
ACN	087 876 864
Approval date	23 December 2015
Expiry date of approval	31 December 2040
Approved action	To construct a mixed-use development (including residential, commercial and community development and associated infrastructure) on a 387 ha site at Spring Mountain, Queensland
Controlling provision	Approved – listed threatened species and communities (sections 18 & 18A)
Project commencement	17 October 2016
Reporting period	Year 3 — 17 October 2018 to 16 October 2019
Address	Grande Avenue, Spring Mountain
Local government area	Ipswich City Council

Figure 1: Project context



Spring Mountain Mixed Use Master Planned Community Development
EPBC 2013/7057
Figure 1 - Project context
Prepared on 10 January 2018


File ref: 7243 E 01 Project area context

Coordinate System: GDA 1994 MGA Zone 56
 Projection: Transverse Mercator Datum: GDA 1994
 Data sources: © State of Queensland (Department of Natural Resources and Mines) 2017. © State of Queensland (Department of Transport and Main Roads) 2017. Google Earth Pro Image © 2017 DigitalGlobe

Prepared by **SH** saunders havill group

1.2. Declaration of accuracy

In making this declaration, I am aware that sections 490 and 491 of the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act) make it an offence in certain circumstances to knowingly provide false or misleading information or documents. The offence is punishable on conviction by imprisonment or a fine, or both. I declare that all the information and documentation supporting this compliance report is true and correct in every particular. I am authorised to bind the approval holder to this declaration and that I have no knowledge of that authorisation being revoked at the time of making this declaration.

Signed	
Full name	Adam Hutchinson
Position	Senior Environmental Scientist
Organisation	Saunders Havill Group ABN 24 144 972 949
Date	15 January 2020

1.3. Description of activities

Construction activities at Springfield Rise, the estate name of the Spring Mountain mixed use master planned community, commenced on 17 October 2016 and the estate was officially launched to the public in March 2017. Throughout the second and third years of operations, the estate continued to be managed across several villages (*i.e.*, stages) which are at various phases of construction and completion. Villages 6, 8 and 13 are the most established, with hundreds of residents now residing in these locales.

The Springfield Rise masterplan is presented in **Figure 2**. During year 3, additional roads became operational across the project areas, including Grande Avenue which includes fauna elements. Rehabilitation works continued throughout the period.

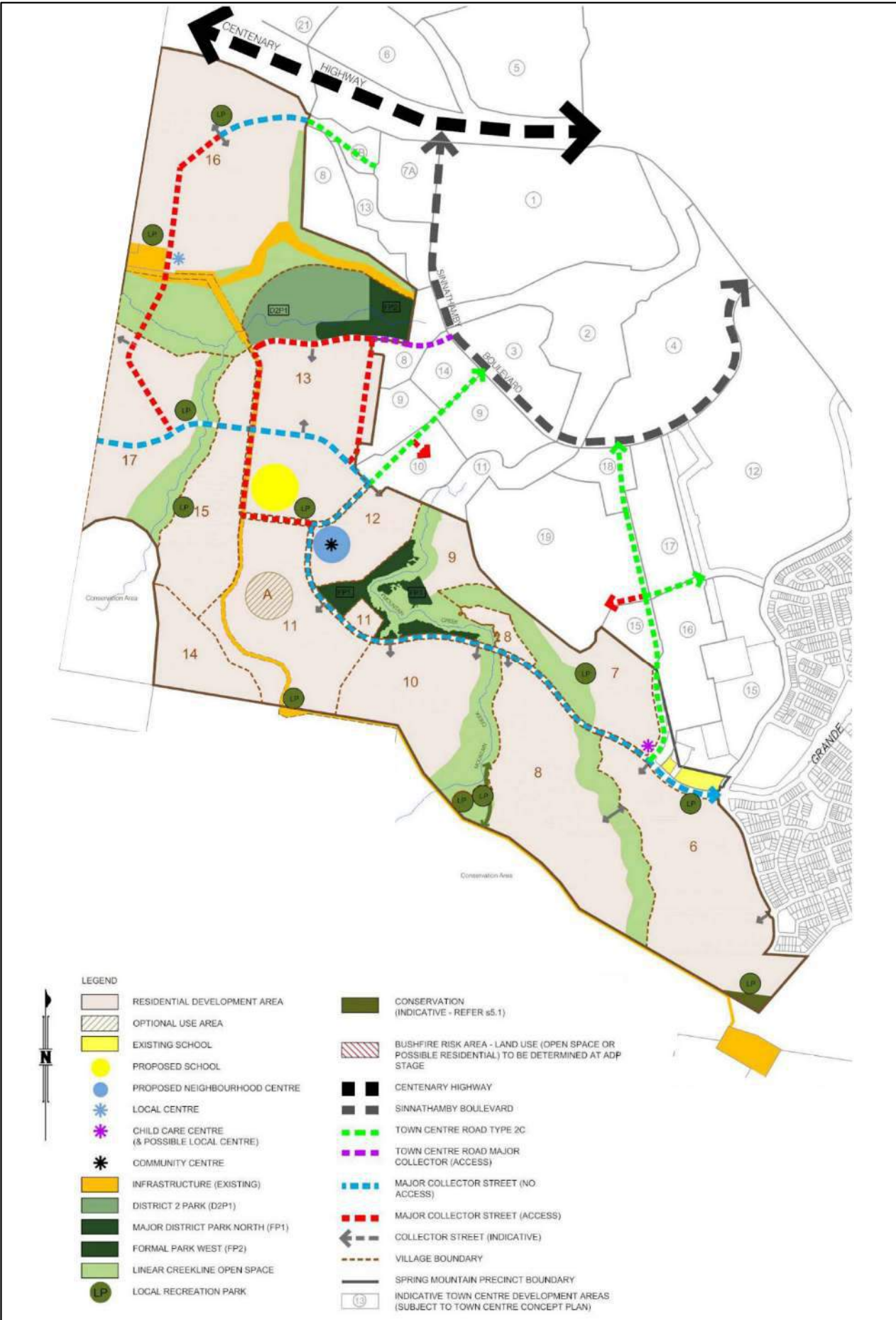
A major milestone for the project during year 3 was the opening of the Springfield Central Sports Complex in October 2019. Spring Mountain State School, which was completed during year 2, opened in January 2019. The school is located in Village 13 on a 6.5 ha site.

The following activities were initiated and/or completed during year 3 of the project:

- Opening of Sportstar Drive and the adjacent sporting field.
 - Participation from Brisbane Heat Cricket Team.
- Lendlease Community Grants.
- Community activities:

- Celebrated Neighbour Day, Australia's annual celebration of community held on the last Sunday of March every year.
- Visit from the Teenage Mutant Ninja Turtles at the Display Village.
- Celebration of Dino Day with local radio station 97.3FM Street Team.
- Christmas markets at the Orion Springfield Central and carols at the Robelle Domain.
- Community Playgroup at Spring Mountain State School.
- Spring Mountain Offset Area works:
 - Weed management activities as per the certified Voluntary Declaration under the Queensland *Vegetation Management Act 1999*;
 - Fuel reduction zone works as part of the Ipswich City Council-approved *Ipswich Fire Management Strategic Plan* (adopted at Council Ordinary Meeting 30 May 2017); and
 - SAT surveys across the certified Voluntary Declaration area.
- Estate area works:
 - Site preparation;
 - Pre-clearance surveys and reports;
 - Temporary management infrastructure (e.g., vegetation and fauna fencing, signage);
 - Vegetation clearing in selected villages;
 - Earthworks;
 - Infrastructure installation — sewer, water, power, etc.;
 - Opening of internal roads within Villages 10, 12, 15 and part of 11;
 - Creating new land titles;
 - Widespread landscaping works to support the estate;
 - Protection and weed removal measures at the *Plectranthus habrophyllus* locations; and
 - Weed removal and replanting of environmental corridors.

Figure 2: Springfield Rise village layout

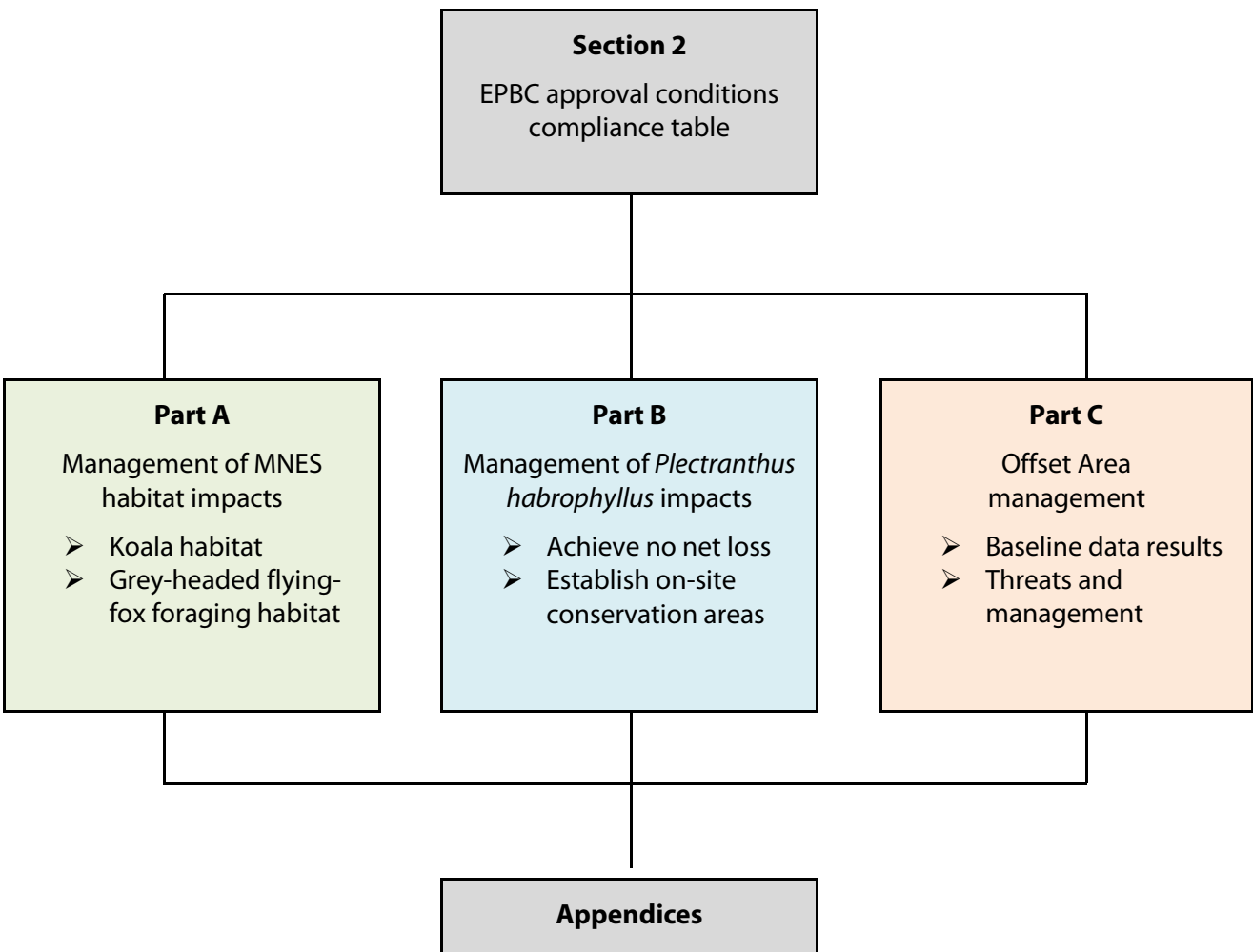


1.4. Report structure

The approval includes ten site-specific approval conditions and a further twelve administrative approval conditions. Site-specific conditions have been categorised into:

1. Impact management
2. *Plectranthus habrophyllus* management
3. Offset Area management (habitat for the koala and grey-headed flying-fox)

The approval conditions include a number of ‘outcomes based’ conditions and Parts A, B and C of this report detail how the implemented management actions will achieve, or are achieving, the outcomes. This includes details of the management strategies and any adaptations that occur during the term of the approval. The compliance table is presented in **Section 2** followed by Parts A, B and C, and Appendices as illustrated below.



2. EPBC approval conditions compliance table

The EPBC approval conditions for the Springfield Rise residential estate are replicated in **Table 1** with a designation on compliance or non-compliance if the condition was applicable during the reporting period, and evidence and comments as necessary. A copy of the EPBC approval and conditions is provided in **Appendix A**.

Table 1: EPBC approval conditions compliance table

Condition number / reference	Condition	Is the project compliant with this condition?	Evidence / comments
1	The approval holder must not clear more than 255 hectares of MNES habitat.	Compliant	The approval conditions define MNES habitat as koala habitat and grey-headed flying-fox foraging habitat. A total of approximately 222.7 ha of MNES habitat has been cleared since the commencement of the action through until 16 October 2019.
2	To minimise adverse impacts to koalas from vegetation clearing and construction activities there must be no koala injury or mortality as a result of vegetation clearing and construction activities at the project site.	Compliant	A suitably qualified and experienced fauna spotter catcher was present on-site during vegetation clearing and construction activities which had the potential to impact wildlife clearing. The fauna spotter catcher post-works reporting, presented in Appendix B , stipulates that one Koala was observed during clearing activities associated with Village 11 in July 2019. The Koala was not observed to be injured. An exclusion zone was established and the Koala left to relocate via own volition. Nil injuries or mortalities as a result of the vegetation clearing and construction activities was recorded during this reporting period.
3	To minimise adverse impacts to koalas from vehicle strike and in order to maintain safe koala movement opportunities through the project site the approval holder must: <ul style="list-style-type: none"> a. implement the measures specified in Table 3-3 of the Fauna Management Plan prior to operation, and maintain these measures for the life of the approval; 	Compliant	The management measures in Table 3-3 are listed below with comments on the status of implementation following each measure. The operation of the measures did not commence during the relevant period (<i>i.e.</i> , under construction) and the construction of these measures in accordance with Figure 3-1 of the Fauna Management Plan was ongoing. Construction will cease and the measures will be operational when the area is certified as being practically complete by Ipswich City Council.

Condition number / reference	Condition	Is the project compliant with this condition?	Evidence / comments
	<ul style="list-style-type: none"> b. ensure koala road crossings are placed in the locations specified at Figure 3-1 of the Fauna Management Plan prior to operation, and maintain these measures for the life of the approval; c. implement measures sufficient to identify any koala injury and mortality at the project site; and d. if koala injury or mortality occurs, then revise management measures in consultation with a suitably qualified person to reduce the likelihood of adverse impacts to koalas; and inform the Department, either as part of annual compliance reporting required under condition 13 or as a separate notification in writing. 		<ul style="list-style-type: none"> • primary road network posted speed limit no greater than 60 kilometres per hour (km/h) and all other components of the road network posted speed limit no greater than 50 km/h. <p><i>The current constructed and operational road network has been signed 50 km/h or 60km/h in accordance with the road type designation. Roads completed during year 3 were located within Villages 10, 12, 15 and part of 11, where internal roads are signed 50 km/h. Grande Avenue, a major connector road, was opened and is signed 60 km/h.</i></p> <ul style="list-style-type: none"> • design and construct dedicated road crossing treatments where roads transect retained habitat areas including – <ul style="list-style-type: none"> - Bridging structures make provision for dry land passage through the retention of either the embankments of watercourses beneath a bridge, or elevated portions of road bridging dry land wherever possible. Where this is not achievable, the bridging structure will incorporate a dedicated Koala “boardwalk” between each end of the bridge - Where culverts are required for “at grade” crossings, the design will accommodate minimum portal dimensions, fauna movement “furniture” treatments, and targeted rehabilitation of entrance areas (+ retreat/refuge poles as required). - Where grade separated crossings are not implemented, treatments associated with “at grade” crossings should include “slow zones” which limit traffic speeds and raise driver awareness (including speed reduction or other traffic calming devices, awareness signs and other awareness heightening treatments such as the use of cat’s eye road reflectors).

Condition number / reference	Condition	Is the project compliant with this condition?	Evidence / comments
			<ul style="list-style-type: none"> - Directional (exclusion) fencing is to be considered in conjunction with grade separated crossings (underpasses) where roads intersect with retained habitat areas. <p><i>Fauna movement 'furniture' treatments and targeted rehabilitation of entrances including refuge poles has been adapted and included in culvert design (Appendix C). Some areas where direction fencing exists is going through final stages of completion. Of note, Grande Avenue is a major connector road and was opened during year 3 – this road includes fauna elements and furniture through the culvert (Appendix C).</i></p> <ul style="list-style-type: none"> • Roadside vegetation management measures are to be undertaken at key locations (e.g., dedicated “at grade” and grade separated crossing locations) to increase the visibility of Koalas entering the roadway. <p><i>Where road crossing treatments have been completed, vegetation management measures have been implemented (Appendix C). Remaining road crossing treatments are currently under construction and the associated vegetation management measures will be completed as part of practical completion works for the road area.</i></p> <ul style="list-style-type: none"> • Implement measures to improve driver awareness, and thereby minimise the incidence of fauna-vehicle collisions, including: <ul style="list-style-type: none"> a) The installation of general signage to signal the presence of Koalas within the site will be undertaken at all primary (strategic) road entry points to the site. b) More specific signage treatments will be installed to signal areas within the site where there is an increased likelihood of encountering Koalas on the road. Circumstances where such signage will be installed, including (but not limited to) any section of road or residential street which intersects with a retained habitat area.

Condition number / reference	Condition	Is the project compliant with this condition?	Evidence / comments
4	<p>To minimise adverse impacts to koalas from domestic dog attack and to exclude koalas from entering residential areas within the project site, the approval holder must:</p> <ol style="list-style-type: none"> a. implement measures to prevent domestic dog attacks on koalas, including limiting the movement of domestic dogs, creating dog exclusion zones and signage as specified at section 3.4 of the Fauna Management Plan; and b. ensure koala exclusion fencing is constructed and located as specified at section 3.4 of the Fauna Management Plan 	Compliant	<p>c) "Cat's eye" reflectors to be installed in conjunction with the specific signage treatment zones.</p> <p><i>Driver awareness measures will be installed as part of completing roads across the project at locations agreed with Ipswich City Council (refer Appendix C). Signage will be installed along roads traversing retained habitat areas once construction is complete.</i></p> <ul style="list-style-type: none"> • Annual monitoring event to assess Koala usage and an integrity audit of structures to be implemented for each of five years - to be initiated at the beginning of the "off-maintenance" period for each crossing treatment. <p><i>For road crossings that have been completed, initial monitoring events have occurred and will continue. Remaining road crossing treatments still under construction have not entered the off-maintenance/practical completion period.</i></p> <p>Works that have the potential to impact fauna (e.g., clearing) are completed under the supervision of a fauna spotter catcher. During the reporting period, there were nil known instances of koala injury or mortality associated with project construction.</p> <p>Residential allotments with frontage to retained koala habitat are issued with the Lend Lease <i>Key Design Outcome Fence Requirement</i> notice which stipulates the fencing requirements for particular allotments (Appendix D). Additionally, Lend Lease continue to install koala exclusion fencing on particular allotments as shown in Appendix E.</p> <p>A public education and awareness campaign is being established and as new residents move to the estate, they receive campaign material explaining the importance of dog control between the hours of 6pm and 6am and general management approaches to reduce the potential for dog and koala interactions.</p>

Condition number / reference	Condition	Is the project compliant with this condition?	Evidence / comments
	prior to operation, and maintained for the life of the approval.		Landscaping and signage associated with retained habitat areas are largely still under construction. Greenspaces for public use are also under construction. Signage will be installed as part of completing the construction works associated with these spaces. Koala exclusion fencing was observed in areas that construction has been completed.
5	<p>To minimise adverse impacts to <i>Plectranthus habrophyllus</i>, there must be no net loss of <i>P. habrophyllus</i> at the project site as a result of the proposed action, as defined by the following milestones:</p> <ul style="list-style-type: none"> a. by six months after the commencement of the action and annually for three years thereafter, there must be 0% cover of weeds of national significance in the on-site conservation areas and buffer areas; b. by one year after the commencement of construction there must be 80% survival of planted <i>P. habrophyllus</i>; c. by three years after the commencement of construction, there must be an increase in the number of mature <i>P. habrophyllus</i> in the on-site conservation areas that is greater than the number of <i>P. habrophyllus</i> removed during construction; and d. by three years after the commencement of construction, there must be evidence of recruitment from planted <i>P. habrophyllus</i> individuals. 	<p>5 a) Compliant 5 b) Not applicable 5 c) Not applicable 5 d) Not applicable</p>	<p>Site pre-clearance surveys did not identify <i>Plectranthus habrophyllus</i> in the construction activities area (refer to Section 4). Consequently, nil specimens of <i>P. habrophyllus</i> were adversely impacted and there were nil plantings of the species.</p> <p>5 a) The first and only on-site conservation area was identified and confirmed on 24 October 2017. Subsequently, a buffer area of 20 m was established and weed removal works occurred within six months (by 24 April 2018). Follow-up weed removal work was completed in October 2018. Continued assessment of the condition of the on-site conservation area were completed during year 3, and photos of current condition are provided in Part B of this report.</p> <p>5 b) There were nil <i>P. habrophyllus</i> removed for the purposes of construction during the reporting period and therefore no net loss. This condition is not applicable.</p> <p>5 c) and 5 d) The three-year anniversary of the commencement of construction is 17 October 2019. No <i>P. habrophyllus</i> specimens have been removed as a result of construction, and therefore no specimens have been planted. This condition is not applicable.</p>
6	The approval holder must undertake a monitoring program. The monitoring program must be planned and undertaken so that the	Compliant	Civil contractor Shadforth maintains a permanent office at the estate to oversee construction work. Shadforth also hold a copy of all environmental approval

Condition number / reference	Condition	Is the project compliant with this condition?	Evidence / comments
	<p>data gathered is adequate to: inform adaptive management; and demonstrate whether milestones and outcomes described in conditions 2, 5 and 8 have been met. The monitoring program must:</p> <ul style="list-style-type: none"> a. include daily surveys for injured or dead koalas during vegetation clearing and construction activities; b. include pre-clearance surveys of all areas that will be cleared to establish the number of mature <i>P. habrophyllus</i> that will be lost as a result of the proposed action; c. establish quadrats within each of the on-site conservation areas where <i>P. habrophyllus</i> has been planted and at control sites that contain remnant <i>P. habrophyllus</i> populations where supplemental planting has not occurred; and d. be undertaken by a suitably qualified person. 		<p>documents which are made available to site contractors and visitors. As part of Shadforth’s contract with Lend Lease, a weekly report is provided to the latter which details incidents and issues, and also communicates general comments or concerns relating to the construction project.</p> <p>Furthermore, the site induction material informs contractors and visitors of the Fauna Management Plan obligations including the requirement to notify Shadforth of any incident pertaining to fauna including koalas. All vegetation clearing activities were completed with a fauna spotter catcher in attendance and as detailed in the reports (refer Appendix B). The presence of a fauna spotter catcher during clearing works is a requirement under this approval and State and Local government approvals.</p> <p>With these controls in place, Lend Lease has not become aware of any injured or dead koalas as a consequence of vegetation clearing and construction activities. During the reporting period, one Koala was identified at Village 11 – the Koala was observed to be in good condition as detailed in the fauna spotter catcher reports (Appendix B). Clearing works ceased immediately, an exclusion area was established and the Koala left to relocate via its own volition.</p> <p>Pre-clearance surveys were completed for all areas and none identified <i>P. habrophyllus</i> in the impact area (refer Part B). Surveys of the on-site conservation areas completed thus far confirmed the presence of four specimens during the relevant period. These specimens are inspected quarterly and subsequent weed removal works are completed when necessary. Compensatory planting of <i>P. habrophyllus</i> has not occurred and therefore no monitoring of plantings is required.</p>
7	To compensate for the loss of koala habitat and grey-headed flying-fox foraging habitat the approval holder must:	Compliant	A voluntary declaration under the <i>Vegetation Management Act 1999</i> was certified by DNRM over the Offset Area on 10 October 2016, which was prior to the commencement of the action on 17 October 2017.

Condition number / reference	Condition	Is the project compliant with this condition?	Evidence / comments
	<p>a. secure, prior to the commencement of the action, the offset containing 293 hectares of MNES habitat within the Offset Area at Annex 1;</p> <p>b. provide the Department with the offset attributes, shapefile and map(s) clearly defining the location and boundaries of each offset, within 2 weeks of lodgement of the offset with the Titles Office; and</p> <p>c. ensure the Agreement is registered on the title on which each offset is located, and provide the Department with evidence of lodgement with the Titles Office, within 2 weeks of lodgement. Provide a copy of the signed agreement within 2 weeks of receipt from the Titles Office.</p> <p>The approval holder must ensure any proposal for alternative offsets is agreed to in writing with the Department.</p> <p>Note: Offsets for different species may overlap where they share the same habitat requirements.</p>		<p>A copy of the correspondence from DNRM confirming the certification of the Offset Area is provided in Appendix F. The certification area is greater than the Offset Area due to agreements between the approval holder and third parties to manage other conservation areas adjacent to the Offset Area. These other areas also comprise koala habitat and grey-headed flying-fox foraging habitat. The certification includes maps that define the location and boundaries of the Offset Area. A shapefile of the Offset Area containing 293 hectares of MNES habitat was provided to the Department on 10 October 2016.</p> <p>After certifying the voluntary declaration, DNRM register the dealing on the land title as part of their internal processes. This process is triggered once the certification is granted. A copy of the Offset Area land titles with the registered voluntary declaration listed under administrative advices are provided in Appendix G. DNRM lodged the administrative advice/dealing on 11 October 2016. There has been no proposal for alternative offsets during the relevant period.</p>
8	<p>To compensate for impacts to koala habitat and grey-headed flying-fox foraging habitat the approval holder must achieve the following outcomes as compared to baseline offset habitat quality and extent, unless agreed in writing with the Department:</p> <p>a. by 20 years after the commencement of construction, there must be a gain in habitat quality across 90% of the offset.</p>	Not applicable	<p>Habitat quality data was collected in order to establish a baseline during 2017 (year 1). This data, and data collected throughout the subsequent 19 years, will be used to assess habitat quality improvements across the Offset Area. The baseline and subsequent data is presented in Part C of this report.</p>
9	<p>To mitigate impacts on koala and <i>P. habrophyllus</i>, the approval holder must develop a fire management strategy for the project site and the offset, incorporating advice from a suitably qualified person regarding the impacts of the fire management strategy on koala and <i>P. habrophyllus</i>.</p>	Compliant	<p>Fire management strategies in the residential villages are completed in accordance with the Ipswich City Council approval conditions. A copy of the Village 8 Bushfire Assessment Report as an example of the detail developed fire management strategies is provided in Appendix H.</p> <p>Offset Area fire management is under the direction of Ipswich City Council which takes action within the Offset Area in conjunction with the larger network of natural</p>

Condition number / reference	Condition	Is the project compliant with this condition?	Evidence / comments
10	<p>The approval holder must adaptively manage koala habitat, grey-headed flying-fox foraging habitat and <i>P. habrophyllus</i> to achieve the outcomes described in conditions 1-9. This must include:</p> <ul style="list-style-type: none"> a. developing and implementing a strategy (or strategies) to achieve the outcomes and milestones outlined in conditions 1-9, in consultation with a suitably qualified person (noting that the plan does not require approval by the Minister and is not an 'action management plan' under the EPBC Act); b. documented process of adaptive management and continual improvement, including using data from monitoring and experimentation trials to inform adaptive management; and c. where there is a reasonable risk (or evidence) that outcomes or milestones are not likely to be achieved: revising management measures in consultation with a suitably qualified person; increasing the level of effort to achieve the outcomes; and informing the Department, 	Compliant	<p>area estates in the local government area. A copy of the <i>White Rock – Spring Mountain Fire Management Strategic Plan and Risk Dashboard</i>—where the Offset Area is located—is provided in Appendix I. The establishment of fuel reduction zones had been initiated in late October 2018. The first annual conservation inspection was completed on 8 August 2019, where discussions on fire management, existing fuel loads and planned fuel reduction burns were had with Ipswich City Council representatives.</p> <p>Commenced efforts to manage fuel loads include weed removal across the conservation area in accordance with the Conservation Weed Management Progress Areas provided in Appendix N.</p> <p>During the second year of activities, the pre-clearance procedure was well-established and had successfully ensured vegetation clearing occurred only where and when permitted under the approval documents.</p> <p>An amendment to the pre-clearance procedure was recognised as necessary in late August 2018 due to the observation of a sick koala in the clearing works area. The koala’s poor health was not attributable to the clearing or construction works. Subsequently, pre-clearance reporting established a management procedure to be followed if this situation arises again.</p> <p>Offset Area management concentrated on weed management, maintaining and establishing access trails and revegetation activities. Weed removal and revegetation activities are managed under a multi-million dollar contract. As with any large-scale weed removal and revegetation project, works are timed to take advantage of seasonal variations and avoid the duplication of work that typically results from poorly timed site works.</p> <p>During this reporting period, methods to monitor Koala presence were altered to a grid-based methodology. Extensive coverage of the site now exists and recorded points are</p>

Condition number / reference	Condition	Is the project compliant with this condition?	Evidence / comments
	either as part of annual compliance reporting required under condition 13 or as a separate notification in writing.		Based on the achieved milestones and ongoing capture of information, the strategy to achieve the requirements of Conditions 1-9 is presented in Part C of this report. This strategy will be amended as required as part of the ACR to reflect the progress towards achieving the objectives and milestones in the approval conditions.
Administrative conditions			
11	Within 7 days after the commencement of the action, the approval holder must advise the Department in writing of the actual date of commencement of the action.	Not applicable	The action commenced and notification provided to the Department prior to this reporting period.
12	The approval holder must maintain accurate records substantiating all activities associated with or relevant to the conditions of approval, including measures taken to implement the management plan, report or strategy 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 Department's website. The results of audits may also be publicised through the general media.	Compliant	Lend Lease and Saunders Havill Group jointly maintain records of activities pertaining to the approval and conditions. A request to make them available to the Department did not occur during the reporting period.
13	Within three months of every 12 month anniversary of the commencement of the action, the approval holder must publish a report on their website addressing compliance with each of the conditions of this approval, including implementation of any management plans as specified in the conditions. Documentary evidence providing proof of the date of publication and non-compliance with any of the conditions of this approval must be	Compliant	The anniversary of the commencement of the action is 17 October and the ACR must be published on the Lend Lease website no later than 16 January 2020. When the ACR is published, DoEE will be notified along with evidence of the publication. The ACR for the period ending 16 October 2019 was published on the Lend Lease website on 15 January 2020. Notice of this publication was provided to the Department on this same day.

Condition number / reference	Condition	Is the project compliant with this condition?	Evidence / comments
	provided to the Department at the same time as the compliance report is published, until agreed in writing with the Department.		
14	The approval holder must notify the Department in writing of any non - compliance with conditions as soon as practicable and within no more than 2 business days of becoming aware of the non - compliance.	Compliant	A non-compliance with the approval conditions was not identified during the reporting period.
15	Upon the direction of the Minister, the approval holder must ensure that an independent audit of compliance with the conditions of approval is conducted and a report submitted to the Minister. The independent auditor must be approved by the Minister prior to the commencement of the audit. Audit criteria must be agreed to by the Minister and the audit report must address the criteria to the satisfaction of the Minister.	Not applicable	A direction from the Minister was not received during the reporting period.
16	<p>The approval holder may choose to revise a management plan, program or strategy approved by the Minister under conditions 1 - 9 without submitting it for approval under section 143A of the EPBC Act, if the taking of the action in accordance with the revised plan, program or strategy would not be likely to have a new or increased impact. If the approval holder makes this choice they must:</p> <ul style="list-style-type: none"> a. notify the Department in writing that the approved plan, program or strategy has been revised and provide the Department with an electronic copy of the revised plan, program or strategy; d. implement the revised plan, program or strategy from the date that the plan, program or strategy is submitted to the Department; and e. for the life of this approval, maintain a record of the reasons the approval holder considers that taking the action in 	Not applicable	The approval holder did not choose to revise a management plan, program or strategy approved by the Minister during the reporting period.

Condition number / reference	Condition	Is the project compliant with this condition?	Evidence / comments
	accordance with the revised plan, program or strategy would not be likely to have a new or increased impact.		
17	The approval holder may revoke their choice under condition 16 at any time by notice to the Department. If the approval holder revokes the choice to implement a revised plan, program or strategy, without approval under section 143A of the Act, the plan, program or strategy approved by the Minister must be implemented.	Not applicable	The approval holder did not choose to revise a management plan, program or strategy approved by the Minister during the reporting period.
18	Condition 16 does not apply if the revisions to the approved plan, program or strategy include changes to environmental offsets provided under the plan, program or strategy in relation to a matter protected by a controlling provision for the action, unless otherwise agreed in writing by the Minister. This does not otherwise limit the circumstances in which the taking of the action in accordance with a revised plan, program or strategy would, or would not, be likely to have new or increased impacts.	Not applicable	The approval holder did not choose to revise a management plan, program or strategy approved by the Minister during the reporting period.
19	<p>If the Minister gives a notice to the approval holder that the Minister is satisfied that the taking of the action in accordance with the revised plan, program or strategy would be likely to have a new or increased impact, then:</p> <ul style="list-style-type: none"> a. Condition 16 does not apply, or ceases to apply, in relation to the revised plan, program or strategy; and b. The approval holder must implement the plan, program or strategy approved by the Minister. <p>To avoid any doubt, this condition does not affect any operation of conditions 16, 17 and 18 in the period before the day the notice is given.</p> <p>At the time of giving the notice the Minister may also notify that for a specified period of time that condition 16 does not apply for one or</p>	Not applicable	The approval holder did not choose to revise a management plan, program or strategy approved by the Minister during the reporting period.

Condition number / reference	Condition	Is the project compliant with this condition?	Evidence / comments
	more specified plans, programs or strategies required under the approval.		
20	Conditions 16, 17, 18 and 19 are not intended to limit the operation of section 143A of the EPBC Act which allows the approval holder to submit a revised plan, program or strategy to the Minister for approval.	Not applicable	The approval holder did not choose to revise a management plan, program or strategy approved by the Minister during the reporting period.
21	If, at any time after five years from the date of this approval, the approval holder has not substantially commenced the action, then the approval holder must not substantially commence the action without the written agreement of the Minister.	Not applicable	The approval holder commenced construction on 17 October 2016.
22	Unless otherwise agreed to in writing by the Minister, the approval holder must publish all management plans, reports or strategies referred to in these conditions of approval on their website. Each management plan, report or strategy must be published on the website within 1 month of being approved by the Minister or being submitted under condition 1 - 9.	Compliant	The applicable management plans, reports and strategies are published on the Lend Lease Springfield Rise website: https://communities.lendlease.com/queensland/springfield-rise/living-in-springfield-rise/sustainability-and-environment/ .

3. Part A – MNES habitat impact management

Approvals relating to impacts on ecological matters were collated from Commonwealth, State and Local governments for the project and included several overarching environmental management plans. Each contractor was provided a copy of the approval documents, however, the size of the project warranted the preparation of consolidated document packages that stipulated environmental management requirements pertinent to each stage of construction. This resulted in the preparation of Site Based Management Plans which detailed measures for vegetation management (clearing and protection), protection of MNES fauna (koala and grey-headed flying-fox) and other native wildlife, maintenance of safe wildlife movement opportunities, fauna habitat rehabilitation, threatened flora management and pest management. A typical Site Based Management Plan prepared during the reporting period is provided in **Appendix J** and these plans are available on the Lend Lease Springfield Rise website:

<http://communities.lendlease.com/springfield-rise/living-in-springfield-rise/sustainability-and-environment/>.

As part of managing the smaller work areas of the project, a second supporting document was developed: Springfield Rise — Environmental Pre-Start Checklist (**Photo 1**). This checklist was integral to ensuring construction proceeded within the demarcated limits, suitable fencing was installed across the work area and the necessary checks for threatened fauna were completed prior to the clearing of any vegetation. The flow diagram below illustrates the key steps in this process. After completing the checklist and all required parties sign-off, vegetation clearance activities may proceed under the supervision of a fauna spotter catcher. An example of a completed checklist is provided in **Appendix K**.

Key steps to commencing impact work at each Village

<p>Environmental Coordinator <i>prepare work area document package, source documents required from third parties</i></p> <p>AND</p> <p>Survey <i>demarcate clearing extent</i></p>	<p>Environmental Coordinator review Survey demarcation</p>				<p>Clearing work may commence within demarcated limits and under the supervision of Fauna Spotter Catcher</p>
	<p>AND</p> <p>Fauna Spotter Catcher undertake survey</p>	<p>Project Engineer advises Environmental Pre-start Checklist ready to be circulated and provides supporting documents</p>	<p>All Stakeholders complete Environmental Pre-start Checklist</p>	<p>Environmental Coordinator issues document package (SBMP, Environmental Pre-start Checklist and supporting documents)</p>	
	<p>AND</p> <p>Environmental Coordinator undertake <i>P. habrophyllus</i> survey</p>				

8	Has the appointed Fauna Spotter completed pre-clearance surveys and reports?			
9	Has the appointed Fauna Spotter identified any sensitive areas for consideration in clearing methods? Please provide a summary.			
10	Have all contractors, subcontractors and associated personnel been instructed on environmental procedures and controls?			
11	Has a Council pre-start been completed?			

NOTE: If the answer to any question above is NO then the clearing activity will not proceed.

Compliance Awareness

All works are to be undertaken in accordance with the <<Project area>> Environmental Pre-Start Package which includes the <<Project area>> and this <<Project area>> Environmental Pre-Start Checklist and attachments.

Signing below demonstrates acknowledgement of the environmental pre-start procedures and requirements listed in the checklist above and associated attachments.

Name	Company	Position	Signature	Date
		Client Representative		
		Site Contractor		
		Clearing Contractor		
		Fauna Spotter Catcher		
		Project Engineer		
		Environmental Coordinator		

#	Control Measure	Date:		Compliance Comments
		Yes	No	
	Contractor:	Construction Stage/ Activity:		
	Date work is to start:			
	Date work is to cease:			
1	Is the works extent within the EPBC 2013/7057 referral area?			
2	Are clearing extents marked out and fenced? (N.B. Fencing is required as per ICC permits unless instructed otherwise by Council, Fauna Spotter or Environmental Coordinator)			
2	Has the fencing of clearing extents demarcation been inspected by the Environmental Coordinator?			
3	Has sign off been provided by the Environmental Coordinator for demarcation areas?			
4	Has certification for pre-clearance flora been provided? (N.B. Exemptions/permits for protected plants under the ICA must be obtained by EHP where works occur in a High Risk Area). Please provide date and reference.			
5	Have pre-clearance checks surveys for <i>Plectranthus habrophyllus</i> been completed over the clearing area?			
6	Are <i>Plectranthus habrophyllus</i> 'no-go' zones identified within the clearing area been demarcated, fenced, signed and inspected by the Environmental Coordinator and Contractor?			
7	Will works involve clearing within a Fisheries mapped waterway for waterway barrier works? If so, are works compliant with applicable self-assessable codes and / or permits?			
8	Will works involve clearing within a watercourse defined under the Water Act 2000? If so, are works compliant with applicable exemptions and / or permits?			

Photo 1: Environmental Pre-start Checklist template example

3.1. Adaptive management

The Environmental Pre-Start Checklist and Site Based Management Plan support an adaptive management framework for vegetation clearance activities. During the first year of construction a change to the on-ground procedure for demarcating and confirming the vegetation clearance area became necessary. The change was the result of the survey contractor demarcating a clearing area that differed slightly to that stipulated in the Site Based Management Plan prepared by the environmental coordinator. The error was an artefact of contractors utilising different software to manage spatial data. To avoid this error reoccurring, after the survey contractor demarcates the vegetation clearance area, the environmental coordinator attends site to confirm the demarcated area is as per the Site Based Management Plan.

During the second year of works, the identification of a sick koala in the clearing area occurred. The koala's health was unrelated to vegetation clearing or construction activities, however the management plans in place for such occurrences did not include a procedure to manage this type of event. Action taken at the time included stopping work and establishing an exclusion area around the koala. Following this, a site meeting was held to discuss the procedure forward. In conjunction with consultation with a representative from the Ipswich Koala Protection Society, it was decided to trap the koala (using approved methods) and transport the koala to Moggill Koala Hospital. This work was completed by the project fauna spotter catcher. As a result of this, management plans associated with pre-clearance survey and reporting include a procedure for this scenario.

During the third year of works, no additional changes were made to the Environmental Pre-Start Checklist and Site Based Management Plan. A Koala was identified during clearing works associated with Village 11 – the action taken was instructed by the current Site Based Management Plans and allowed the Koala to move away by its own volition.

3.2. Review of impacts

The removal of vegetation from the development area impacted MNES habitat which is defined under the approval conditions as koala habitat and grey-headed flying-fox foraging habitat. As of 16 October 2019, a total of 222.7 ha of MNES habitat was impacted. The approval conditions permit an impact of 255 ha of MNES habitat therefore the approval holder has complied with the approved limit (condition 1).

The Site Based Management Plan and Environmental Pre-Start Checklist are procedures in place that control impacts on MNES habitat and prevent injuries to wildlife during construction works. **Photos 2 to 5** illustrate the on-ground demarcation of clearing areas. A fauna spotter catcher has been present throughout clearing works and the post-works reporting indicates the implementation of the current management system is successful as nil Koala injuries or mortalities resulting from vegetation clearing or construction activities have occurred (refer to **Appendix B**).

As villages throughout the estate become operational, the measures relating to ongoing fauna management will be established. These include culverts for fauna movement, vehicle speed control signage, driver awareness signage and fencing controls to prevent koala and domestic dog interactions. Many of these have become operational in year 3 (*i.e.*, certified as meeting practical completion by Ipswich City Council) and

examples of this fauna measures are presented in **Appendix C**. This includes 'furniture' for fauna movement through culverts, fauna exclusion fencing to prevent fauna crossing highly frequented roads, and suitable fencing bounding residence to prevent dog-Koala interactions.



Photo 2: Survey demarcation of clearing area



Photo 3: Environmental Coordinator review of Survey



Photo 4: Clearing area within demarcated limits



Photo 5: Clearing area boundary

4. Part B – *Plectranthus habrophyllus* impact management

During the assessment and approval phase, consultant Yurrah undertook a detailed analysis (desktop and ground-truthing) of potential *Plectranthus habrophyllus* habitat throughout the referral area. Specimens and habitat were found to occur in small pockets as shown in the referral documentation.

As part of completing the Environmental Pre-Start Checklist for each stage, these locations were surveyed prior to any clearing work to determine if the plant was present and if so, how many individuals would be removed. The latter information was required as part of complying with Condition 5 which stipulates there must be an increase in the number of mature *P. habrophyllus* in the on-site conservation areas that is greater than the number removed during construction.

P. habrophyllus has similar attributes to other *Plectranthus sp.* including the non-threatened *P. suaveolens* and *P. parviflorus*, and it can be difficult to differentiate between these species. In order to clarify how to distinguish *P. habrophyllus* from the non-threatened *Plectranthus sp.* during pre-clearance surveys, Saunders Havill Group liaised with the Queensland Herbarium to ensure a conclusive understanding of the differences between the species was held. Pre-clearance surveys during most of the year 1 reporting period used this knowledge to determine if *P. habrophyllus* would be impacted and subsequently, nil specimens were located in both the impact and on-site conservation areas.

Towards the end of the year 1 ACR period, four samples of *Plectranthus sp.* were collected from across the locality (*i.e.*, within and outside the referral area) and sent to the Queensland Herbarium for identification as a confirmatory measure. The Queensland Herbarium advised one of the four samples was *P. habrophyllus* and the remaining were *P. parviflorus*. Saunders Havill Group further surveyed the suitable habitats in the surrounds and confirmed the presence of another three specimens (**Figure 3**). A 20 metre buffer area exists around the four specimens and these areas comprise the on-site conservation area as defined under the approval (refer **Photos 6 to 9**). Weed removal work in these areas was completed within six months of their establishment—by April 2018 (year 2)—and repeated in early October 2018 (year 2) to address regenerating Lantana. The areas containing *Plectranthus habrophyllus* were monitored again in March 2019 to confirm *in situ* retention of the specimens and assess weed status. This inspection confirmed *P. habrophyllus* were present *in situ* (refer **Photos 10 to 15**). Additional specimens were not identified at these quadrat control sites nor in the vicinity during year 3 inspections.

There remains potential for other environmental corridors throughout the project site to contain *P. habrophyllus* specimens. As construction expands across the site, additional surveys for the species will take place and on-site conservation areas established where *P. habrophyllus* specimens are confirmed in retained habitat areas. Weed eradication works will subsequently occur in these on-site conservation areas with the goal of removing weeds of national significance within 6 months of identification of the protected species.



Photo 6: Flagging demarcation around conservation area containing *Plectranthus habrophyllus*



Photo 7: Flagging demarcation of on-site conservation area (captured March 2019)



Photo 8: **Flagging around two *Plectranthus habrophyllus* specimens**



Photo 9: **Flagging demarking on-site conservation area**



Photo 10: *Plectranthus habrophyllus* specimens within the on-site conservation area



Photo 11: Flagging around one *Plectranthus habrophyllus* specimen.



Photo 12: Weed status within conservation area on-site



Photo 13: Weed removal work in the on-site conservation area (captured March 2019)

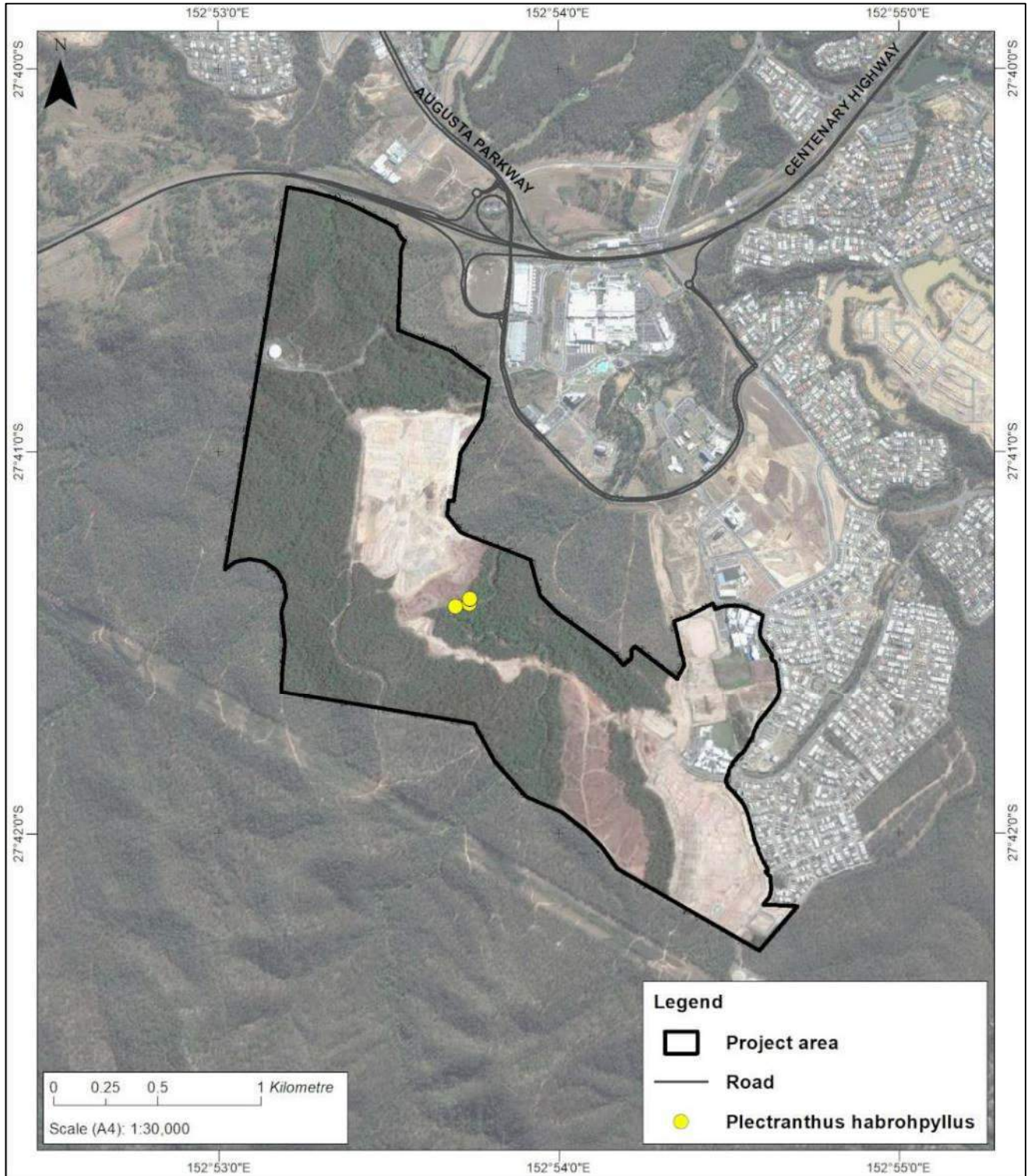


Photo 14: Monitoring inspection – one *Plectranthus habrophyllus* specimen remains *in situ*



Photo 15: Monitoring inspection – one *Plectranthus habrophyllus* specimen remains *in situ*.

Figure 3: Location of *in situ* *P. habrophyllus*



File ref: 7243 E 03 Location of *in situ* *Plectranthus habrophyllus*

Coordinate System: GDA 1994 MGA Zone 56
 Projection: Transverse Mercator Datum: GDA 1994
 Data sources: © State of Queensland (Department of Natural Resources and Mines) 2017. © State of Queensland (Department of Transport and Main Roads) 2017. Google Earth Pro Image © 2017 DigitalGlobe

**Spring Mountain Mixed Use Master Planned Community Development
 EPBC 2013/7057**

**Figure 3 - Location of *in situ* *Plectranthus habrophyllus*
 Prepared on 11 January 2018**

Prepared by **SH** saunders
 havill
 group

5. Part C – Offset area management

The 293 ha offset under Condition 7 of the approval comprises seven land parcels that provide koala habitat and grey-headed flying-fox foraging habitat (refer **Appendix A**). The offset parcels (listed below) surround the project area and form part of the regional biodiversity corridors. The Offset Area was legally secured on 10 October 2016 prior to the commencement of construction on 17 October 2016 using the Voluntary Declaration process administered under the *Vegetation Management Act 1999*.

The Offset Area land parcels are:

1. part 740/SP179412
2. 747/SP189043
3. 748/SP189044
4. part 751/SP189053
5. 752/SP189053
6. part 753/SP189054
7. 745/SP242282

The primary objective to managing the Offset Area is to achieve a gain in habitat quality across 90% of the offset before 17 October 2036. The approval conditions define this as:

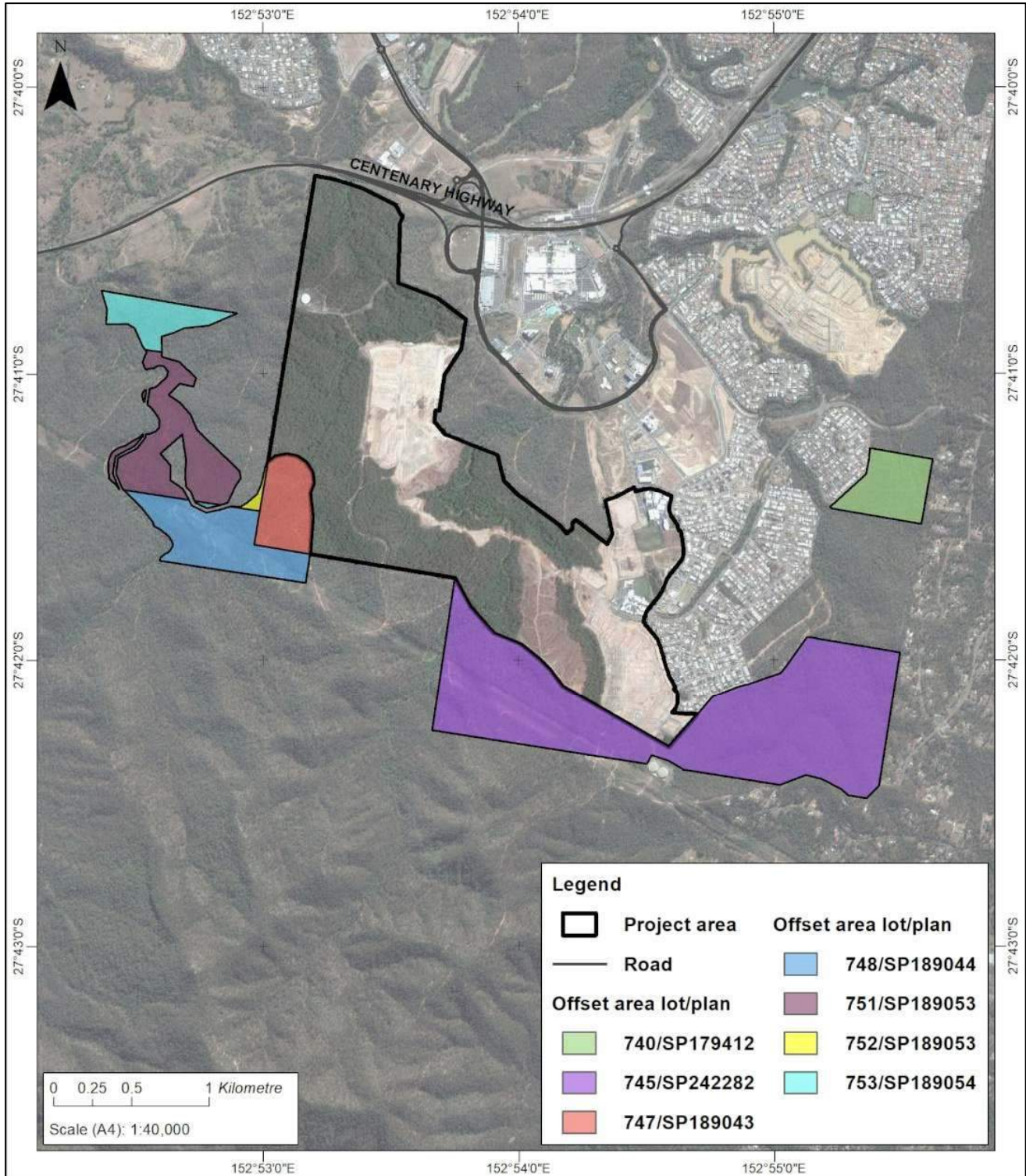
An improvement in the quality and extent of koala habitat and grey-headed flying-fox foraging habitat in comparison to baseline environmental conditions at the offset compared with an unmanaged control site.

The current quality and extent are influenced by several factors including the presence of weeds and pest animals, and vegetation attributes (e.g., species diversity, ecological dominant layer). To arrive at a baseline metric, habitat quality assessments were completed across the Offset Area and at a control site south of the Offset Area during the first year of the action (refer **Figure 4** and **Figure 5**). The assessment was completed using the *Guide to Determining Terrestrial Habitat Quality* published by the Queensland Department of Environment and Heritage Protection (2017). The detailed results are presented in **Appendix L** and summarised in **Table 2**.

Table 2: Baseline habitat quality 2016/2017

Location	Habitat quality score
Offset Area	7.44
Control site	6.92

Figure 4: Legally secured Offset Area



**Spring Mountain Mixed Use Master Planned Community Development
EPBC 2013/7057**

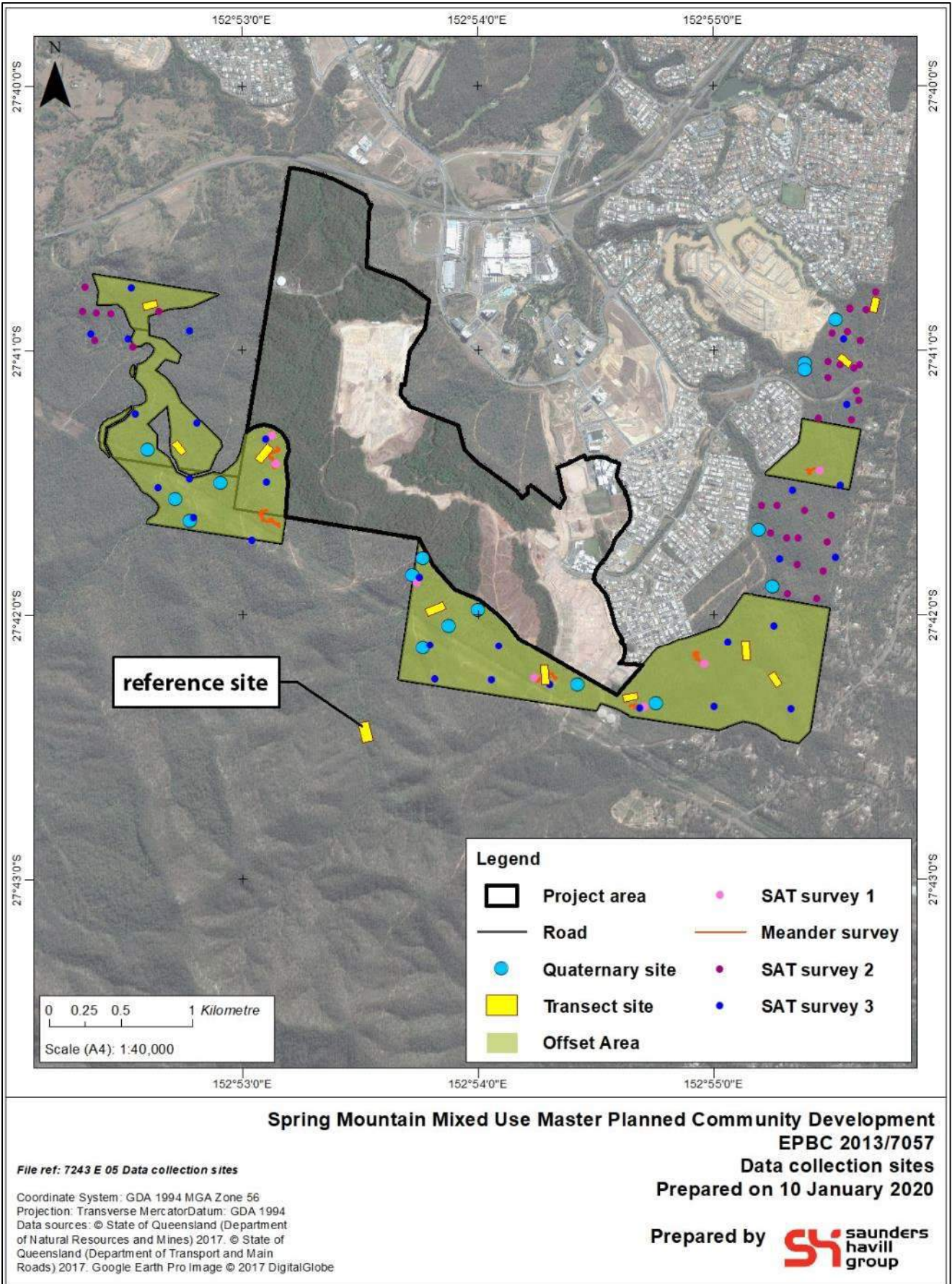
**Figure 4 - Legally secured offset area
Prepared on 11 January 2018**

File ref: 7243 E 04 Legally secured offset area

Coordinate System: GDA 1994 MGA Zone 56
 Projection: Transverse Mercator Datum: GDA 1994
 Data sources: © State of Queensland (Department of Natural Resources and Mines) 2017. © State of Queensland (Department of Transport and Main Roads) 2017. Google Earth Pro Image © 2017 DigitalGlobe

Prepared by **saunders
havill
group**

Figure 5: Data collection sites



5.1. SAT survey

Additional scat meander-SAT (Spot Assessment Technique) surveys were completed to support the existing baseline in year 2 (SAT survey 2 – 2018). The scat meander-SAT method is an assessment of koala activity involving a search for any koalas and signs of koala usage. The scat meander-SAT method involves actively searching for koala scats and then identifying the tree where a koala or scats was found. The nearest suitable koala habitat tree is then identified and the same data recorded. The next closest habitat tree to the first tree is then assessed and so on until 30 trees have been recorded. The number of trees showing evidence of koalas is expressed as a percentage of the total number of trees sampled to indicate the frequency of koala usage. Assessment of each tree involves a systematic search for koala scats beneath the tree within 1 m radius of the trunk. After approximately two person minutes of searching for scats, the base of the trunk is observed for scratches and the crown for koala.

Additional SAT surveys were undertaken in year 3 (SAT survey 3 – 2019), and involved an adapted methodology; a regularised, grid-based (RGB) sampling protocol. This method was considered suitable to capture the entirety of the offset area and collect sufficient data. The RGB sampling was undertaken using the SAT methodology. The utilisation of the SAT methodology in conjunction with an RGB protocol at the landscape-level has been proven to be an especially powerful tool in the identification of areas utilised by Koala, and is considered suitable for long-term monitoring purposes (Phillips and Callaghan 2011).

A total of 29 locations were surveyed utilising the RGB SAT protocol across the offset area and immediately adjacent conservation lands to provide a contextual assessment of usage. This was in addition to the two previous survey efforts utilising the scat meander-SAT methodology which occurred at 37 locations (**Figure 5**).

Evidence of koala usage in the form of scats was low at all locations except for two; one having medium usage and one high (**Table 3; Photos 16 to 19**). The area where high usage was recorded has undergone rehabilitation in August 2018. These estimates are taken from the Australian Koala Foundation Koala activity level classification table (following Philips and Callaghan 2011) using the East Coast (med-high) Activity Category. Over subsequent years, the SAT grid will be revisited to collect additional data at baseline survey sites.

Table 3: SAT survey results year 1 to year 3

Survey ID	SAT site no.	Evidence of koala use (%)	Koala use (high/medium/low)
1	1	10.00	Low
1	2	13.33	Low
1	3	10.00	Low
1	4	6.67	Low
1	5	6.67	Low
1	6	6.67	Low
1	7	3.33	Low

Survey ID	SAT site no.	Evidence of koala use (%)	Koala use (high/medium/low)
2	1	0.00	Low
2	2	0.00	Low
2	3	0.00	Low
2	4	0.00	Low
2	5	0.00	Low
2	6	6.67	Low
2	7	0.00	Low
2	8	3.33	Low
2	9	0.00	Low
2	10	0.00	Low
2	11	0.00	Low
2	12	0.00	Low
2	13	3.33	Low
2	14	13.33	Low
2	15	3.33	Low
2	16	0.00	Low
2	17	0.00	Low
2	18	13.33	Low
2	19	3.33	Low
2	20	3.33	Low
2	21	0.00	Low
2	22	0.00	Low
2	23	0.00	Low
2	24	43.33	High
2	25	10.00	Low
2	26	3.33	Low
2	27	0.00	Low
2	28	3.33	Low
2	29	0.00	Low
2	30	3.33	Low
3	1	3.33	Low
3	2	6.67	Low
3	3	13.33	Low
3	4	3.33	Low
3	5	0	Low

Survey ID	SAT site no.	Evidence of koala use (%)	Koala use (high/medium/low)
3	6	0	Low
3	7	13.33	Low
3	8	13.33	Low
3	9	20	Low
3	10	6.67	Low
3	11	0	Low
3	12	10	Low
3	13	33.33	High
3	14	0	Low
3	15	6.67	Low
3	16	10	Low
3	17	6.67	Low
3	18	0	Low
3	19	0	Low
3	20	13.33	Low
3	21	0	Low
3	22	0	Low
3	23	0	Low
3	24	0	Low
3	25	0	Low
3	26	3.33	Low
3	27	23.33	Medium
3	28	3.33	Low
3	29	20	Low



Photo 16: Survey event 3, SAT ID 27, medium usage



Photo 17: Scats located at medium usage area during survey event 3, SAT ID 27



Photo 18: Vegetation within high usage area – Survey 3, SAT ID 13



Photo 19: Vegetation within high usage area – Survey 3, SAT ID 13

5.2. Threats

There are several environmental threats that may interfere the approval holder's efforts towards achieving the milestone and these were assessed alongside opportunities to counteract or control each with active management measures.

These threats are:

1. Weeds — specifically weeds of national significance such as *Lantana sp.*
2. Pest animal management — wild dogs are known to occupy the region
3. Erosion — restorative actions will rectify the historical and recent impacts
4. Unlawful access — prevent unauthorised access during the management period

To support the future achievement of the gain in habitat quality milestone for benefit of the grey-headed flying-fox and koala, several management actions are underway to address the threats. These actions are discussed in the following subsections and detailed in **Table 4**. This table will be reviewed annually as part of completing the Annual Compliance Report and the status/results of actions discussed accordingly.

5.2.1 Weed management

An extensive survey of dominant weeds throughout the Offset Area was completed in year 1 and identified *Lantana camara* as the prevailing weed species. This survey informed a weed management works package issued to contractors interested in undertaking the weed eradication work (**Appendix M**). Weed removal will provide an opportunity for koala habitat and grey-headed flying-fox foraging habitat to establish in these areas and therefore expanding the available habitat for these species. Habitat quality will considerably improve in these areas which currently provide very little value wherever *Lantana camara* is a dominant species in the landscape.

Weed species are concentrated along drainage lines throughout the Offset Area and surveys post treatment works will determine the success of works, and if additional treatments are necessary. Surveys are completed concurrent with the weed eradication program which commenced in August 2018. Ongoing works are conducted, where post initial works are carried out 4 weeks following initial works and ongoing works to allow ongoing eradication during the 120-month maintenance period between the practical completion and off maintenance of works. These results, in addition to plans showing the status of works and general photos of works completed thus far are provided in **Appendix N and O**. The Offset Area-wide weed survey extents were not remapped given the early stage of eradication works. The works program across various parts of the Offset Area and follow-up works are timed to deliver as much efficiency and coordination as possible. The overall management objective is to reduce the presence of weeds of national significance to 5% of the total 293 ha Offset Area and this objective remains achievable.

Planting of native vegetation to assist natural regeneration was undertaken in areas where weeds had a stronghold and once treated, revegetation was employed to provide bank stability and assist the establishment of koala and grey-headed flying-fox habitat (refer **Appendices N and O**). A total of 3,120 seedlings were planted in the Offset Area (Area 2) during the reporting period, where ~1,400 were planted during year 2.

5.2.2 Pest animal management

Periodic inspections and third party publications have confirmed wild dogs are a dominant threat in the Offset Area. The airborne thermal camera survey also confirmed their presence. Other threats include red foxes, feral pigs and cane toads. Managing pest animals in the Offset Area and greater locality is a combined effort with the land owner Ipswich City Council. The approval holder has identified the scope of works required to address the dog presence however, whilst a high intensity of effort towards weed management is underway, the timing of surveillance and trapping of pest animals is not ideal. Additionally, the full-time presence of people are a deterrent. Once weed management works are less intensive, the pest control strategy will move to the next stage of implementation.

5.2.3 Erosion

Several parts of the Offset Area are heavily eroded for a multitude of reasons:

- historical unlawful access and use of the Offset Area by 4WD, trail bikes and all-terrain vehicles (ATV); and
- historical management of the area as part of a larger network of land did not focus solely on addressing erosion in the Offset Area.

Consequently, as part of weed eradication and general management works, the approval holder has continued to address areas of significant erosion and establishing tracks for maintenance and access purposes. Subject to future weather events and scenarios beyond the approval holder's control, only minor maintenance works are scheduled from hereon. As part of erosion remediation work, native vegetation that will benefit the grey-headed flying-fox and koala is planted in areas to assist regeneration (refer **Appendix O**).

5.2.4 Unlawful access

The Offset Area has been accessed unlawfully in the past by people utilising the area for recreational purposes (e.g., 4WD, trail bikes and ATV). Preventing access is difficult when a presence in the area is not ongoing, however, since the approval holder commenced construction, undesired access to the Offset Area has become easier to prevent due to the works area adjoining the Offset Area. Many fences and gates that prevent access are keyed and therefore secure, and the civil contractor's daily presence deters trespassers onto the adjoining Offset Area. During years 2 and 3, the presence of weed management contractors also acted as a deterrent. Nonetheless, unlawful access will continue to be monitored and action implemented where necessary.

Long-term management of the Offset Area will require diligent monitoring of access points (i.e., gates) and fences to ensure trespassers do not gain access and negate the approval holder's efforts towards improving the Offset Area. While the civil contractor maintains an on-site presence, ad hoc reviews of Offset Area security will occur in conjunction with other Offset Area management actions. During year 3, site assessment of gates and the ability for trespassers to access the site was monitored in August 2019. As a result of this, additional fencing was observed to have been erected either side of gates to reduce potential access from trespassers.

Table 4: Offset area management actions summary

Current threat / quality improvement restoration	Base case	Improvement proposed	Achievement criteria	Measured by	Timeframes	Reporting	Funded by:
<p>1. Removal of Weeds of National Significance (WONS — namely <i>Lantana sp.</i>)</p>	<p>17% of the 293 ha Offset Area has been assessed as containing <i>Lantana sp.</i> of varying infestations (approx. 50 ha effected by weeds).</p>	<p>Reduction and management of WONS through the Offset Area</p>	<p>Decrease and maintain WONS cover in the offset area to 5% or less (12% improvement to area of offset = 35 ha of land)</p>	<p>Weed Survey Extent Mapping – repeated annually / measured against base line study already completed.</p>	<p>WONS reduced through the offset area to 5% by 3 years post the commencement of the Action. WONS maintained at 5% or below for 10 years post the Commencement of Construction.</p>	<p>Weed Survey Extent Mapping results included in the ACR for the project. In 2018, weed management works commenced and continued throughout 2019 (refer Appendices N and O). The total reduction of WONS through the offset area has not been attained due to the inability to complete weed survey mapping across the area. This is a result of total weed removal not being met due to the elevated risk of bushfires in the latter of the 2019 reporting period. As a result, an adaptive</p>	<p>All weed management to be funded by the Approval Holder using licensed and registered contractors.</p>

Current threat / quality improvement restoration	Base case	Improvement proposed	Achievement criteria	Measured by	Timeframes	Reporting	Funded by:
						management approach has been adopted and areas where weed removal has been possible have been monitored accordingly. During the following reporting period, an assessment of improvement (<i>i.e.</i> , extent mapping) will be sought when imminent bushfire risks are reduced and will be reported on in the subsequent ACR.	
2. Pest Management — Wild (& Unwanted) Dog usage of Offset Area	<ol style="list-style-type: none"> 1. Site survey observed Wild Dog species and located fresh Wild Dog prints across the Offset Area. 2. Ipswich City Council White Rock – Spring Mountain 	Reduction and management of pest species (namely Wild Dogs).	Decrease of pest species throughout the 293 ha Offset Area (requires coordination with adjoining conservation land parcels).	Results of pest trapping, capture and removal program. <i>(Exact numbers of the local / contextual Wild Dog population are unknown – results will be</i>	Program to undertake quarterly trappings for two consecutive years and biannually thereafter. Program to be implemented for the	Program will include an annual pest management report to be included as part of the ACR for the project. The pest trapping, capture and removal program was delayed due to the high intensity of	Pest trapping, capture and removal program to be funded by the Approval Holder using suitably qualified pest management contractor/s.

Current threat / quality improvement restoration	Base case	Improvement proposed	Achievement criteria	Measured by	Timeframes	Reporting	Funded by:
	<p><i>Conservation Estate – Tier 2 Management Plan</i> lists Wild Dogs, Red Foxes, Feral Pigs and Cane Toads as significant pest issues. This conservation estate land is contiguous with the Offset Area (i.e., no dividing fence).</p>			<p><i>measured on the trapped animals as a minimum being a reduction in the population – if reduction is not demonstrated intensity of program and trapping will be revised.)</i></p>	<p>life of the offset (20 years).</p>	<p>personnel working in the Offset Area completing weed management works acting as a deterrent. Once safer, the on-ground component of the trapping, capture and removal program will commence.</p>	
	<p>3. <i>2011 Environmental Impact Assessment</i> (Aurecon) for the adjoining Department of Defence bushland property to the east of the Offset Area located wild dogs as part of site surveys.</p>						

Current threat / quality improvement restoration	Base case	Improvement proposed	Achievement criteria	Measured by	Timeframes	Reporting	Funded by:
	<p>4. Wild Dogs and Foxes were recorded on the Spring Mountain project as listed in the <i>November 2013 Austecology MNES vertebrate Fauna Assessment</i>. This land is contiguous with the Offset Area.</p>						
<p>3. Koala Habitat and Grey-headed Flying Fox Foraging Habitat Replanting and Regeneration</p>	<p>At existing major erosion points and areas of extensive weed removal, revegetation — inclusive of MNES habitat trees — will be reinstated.</p> <p>Low-level vegetation values within the powerline easement which</p>	<p>Increases in koala habitat and grey-headed flying-fox foraging habitat resources (food and shelter trees).</p> <p>Improve vegetation values within the powerline easement in accordance with planting protocols for such infrastructure.</p>	<p>Reinstated existing degraded areas, and those created through mass weed removal with revegetation, inclusive of suitable habitat species.</p>	<p>Number of MNES habitat trees replanted within the offset area = equal or greater than 1,500 trees.</p> <p><i>(Estimated 20-25% of land infested with Lantana sp. — 50.1 ha, sporadically requiring patch and broad areas of revegetation.</i></p>	<p>All tree planting complete on or before 3 years post commencement of construction (<i>i.e.</i>, 17 October 2019).</p> <p><i>(Timeframe to allow for weed management measures to occur prior to tree planting.)</i></p>	<p>Tree installation reporting within the ACR period for which it occurs.</p> <p>The year 3 ACR confirms the total tree milestone was achieved during year 3.</p> <p>Success of tree planting and survival rates reported on</p>	<p>Replanting to be completed by a registered and experienced contractor at the cost of the Approval Holder.</p>

Current threat / quality improvement restoration	Base case	Improvement proposed	Achievement criteria	Measured by	Timeframes	Reporting	Funded by:
	connects habitat areas.			<p><i>Assume MNES habitat tree density of 150 trees per hectare = total 1,503-1,880 trees.)</i></p> <p>Biennial surveys of koala and grey-headed flying-fox presence. Methods employed may include SAT surveys, drone survey, general/ad hoc observations and meander surveys.</p> <p>Easement area comprises a vegetated corridor that supports adjoining habitat values.</p>		<p>annually for life of the offset (20 years). <i>(Note 1,500 trees is the minimum outcome therefore additional trees have been planted to account for stock failure or other losses. Where determined by the ACR, additional trees will be planted.)</i></p> <p>Relevant ACR period to present results of biennial surveys that assess the presence of koala and grey-headed flying-fox.</p>	
<p>4. Reduce unlawful access and use of the Offset Area by 4WD, trail bikes and</p>	<p>Historically the Offset Area included a number of unlawful access tracks and entry points resulting in</p>	<p>Reduce unlawful access and use by 4WD, trail bikes and ATV.</p>	<p>Installation of new or substantial upgrades and extensions to barrier fencing at identified</p>	<p>Evidence of securement (e.g., photographs) provided during ACR.</p>	<p>Two securement points completed every two years. All six securement points constructed and operational with</p>	<p>Evidence of barrier installation, monitoring and success provided as part of relevant period ACR.</p>	<p>The Approval Holder will install and maintain barrier and access point infrastructure.</p>

Current threat / quality improvement restoration	Base case	Improvement proposed	Achievement criteria	Measured by	Timeframes	Reporting	Funded by:
all-terrain vehicles (ATV)	degraded and eroded sections throughout the Offset Area. Six locations around the periphery of the offset land have been identified as being historically used to unlawfully access the Offset Area.		locations of unlawful entry. Maintenance of access point during the offset management period to confirm success of securement works. Alteration and further upgrades to security points where demonstrated to be unsuccessful.	Annual review of installed and upgraded security measures for measurement of success (observation evidence of tyre tracks and damage circumventing barrier structures) Reporting on any adaptive alterations to security not shown to be successful (e.g., extension of fencing where new tracks show access occurring around the fence).	six years of the commencement of the action. Infrastructure to be in place for the life of the offset (20 years).		
5. Overall improvement of the quality of the Offset Area to 9/10.	Offset quality value of 7-8/10 under the <i>Guide to Determining Terrestrial Habitat Quality – Queensland</i> Department of	Improve the quality of MNES habitat to 9/10.	By measure of achieving a 9/10 average score at the transect locations from surveys completed in accordance with the	Data collected from the transect locations at 5 year intervals for the life of the offset (20 years).	Achieve MNES habitat quality of 9/10 at the year 20 ACR. Demonstrate an improvement of	Transect data to be presented in a report completed in accordance with <i>Guide to Determining Terrestrial Habitat</i>	The Approval Holder will fund the transect data collection and reporting.

Current threat / quality improvement restoration	Base case	Improvement proposed	Achievement criteria	Measured by	Timeframes	Reporting	Funded by:
	<p>Environment and Heritage Protection.</p> <p>Value score is derived from eight transects completed throughout the Offset Area.</p> <p>Reference area transect also completed — score 6.92/10.</p>		<p><i>Guide to Determining Terrestrial Habitat Quality – Queensland Department of Environment and Heritage Protection.</i></p>	<p>If the quality is assessed as not improving at the first five year interval, this will trigger a review of management measures to determine suitable actions that can be implemented to achieve the 9/10 objective.</p>	<p>Offset Area quality, subject to external factors (e.g., fire), at each five year interval.</p>	<p><i>Quality – Queensland Department of Environment and Heritage Protection and to form part of the ACR for the relevant period.</i></p>	

6. Appendices

Appendix A

EPBC approval and conditions granted 23 December 2015

Appendix B

Fauna spotter catcher post-works reporting

Appendix C

Fauna movement solutions – photos of construction works/progress

Appendix D

Lend Lease Key Design Outcome Fence Requirement notice

Appendix E

Lend Lease fencing detail

Appendix F

Certified PMAV document package

Appendix G

Copy of land titles for EPBC Act Offset Area

Appendix H

Village 8 Bushfire Management Report

Appendix I

White Rock – Spring Mountain Fire Management Strategic Plan and Risk Dashboard

Appendix J

Village 17 Site Based Management Plan

Appendix K

Village 17 Environmental Pre-start Checklist

Appendix L

Habitat quality assessment results

Appendix M

Weed Management Plans

Appendix N

Weed management progress results

Appendix O

Weed management and rehabilitation photo monitoring

Appendix A

EPBC approval and conditions granted
23 December 2015



Approval

Spring Mountain Mixed Use Master Planned Community Development, Queensland (EPBC 2013/7057)

This decision is made under sections 130(1) and 133 of the *Environment Protection and Biodiversity Conservation Act 1999*.

Proposed action

Person to whom the approval is granted Lend Lease Communities (Springfield) Pty Limited

Proponent's ACN (if applicable) ACN 087 876 864

Proposed action To construct a mixed use development (including residential, commercial and community developments and associated infrastructure) on a 387ha site at Spring Mountain, Queensland [See EPBC Act referral 2013/7057].

Approval decision

Controlling Provision	Decision
Listed threatened species and communities (sections 18 & 18A)	Approved

Conditions of approval

This approval is subject to the conditions specified below.

Expiry date of approval

This approval has effect until 31 December 2040.

Decision-maker

Name and position Deb Callister
Acting First Assistant Secretary
Environment Standards Division

Signature

Date of decision 23 December 2015

CONDITIONS

1. The approval holder must not clear more than 255 hectares of **MNES habitat**.
2. To minimise adverse impacts to **koalas** from **vegetation clearing and construction activities** there must be no **koala** injury or mortality as a result of **vegetation clearing and construction activities** at the **project site**.
3. To minimise adverse impacts to **koalas** from vehicle strike and in order to maintain safe **koala** movement opportunities through the **project site** the approval holder must:
 - a. implement the measures specified in Table 3-3 of the **Fauna Management Plan** prior to **operation**, and maintain these measures for the life of the approval;
 - b. ensure **koala road crossings** are placed in the locations specified at Figure 3-1 of the **Fauna Management Plan** prior to **operation**, and maintain these measures for the life of the approval;
 - c. implement measures sufficient to identify any **koala** injury and mortality at the **project site**; and
 - d. if **koala** injury or mortality occurs, then revise management measures in consultation with a **suitably qualified person** to reduce the likelihood of adverse impacts to **koalas**; and inform the **Department**, either as part of annual compliance reporting required under condition 13 or as a separate notification in writing.
4. To minimise adverse impacts to **koalas** from domestic dog attack and to exclude **koalas** from entering residential areas within the **project site**, the approval holder must:
 - a. implement measures to prevent domestic dog attacks on **koalas**, including limiting the movement of domestic dogs, creating dog exclusion zones and **signage** as specified at section 3.4 of the **Fauna Management Plan**; and
 - b. ensure **koala exclusion fencing** is constructed and located as specified at section 3.4 of the **Fauna Management Plan** prior to **operation**, and maintained for the life of the approval.
5. To minimise adverse impacts to **Plectranthus habrophyllus**, there must be no net loss of **P. habrophyllus** at the **project site** as a result of the proposed action, as defined by the following milestones:
 - a. by six months after the **commencement of the action** and annually for three years thereafter, there must be 0% cover of **weeds of national significance** in the **on-site conservation areas** and **buffer areas**;
 - b. by one year after the **commencement of construction** there must be 80% survival of planted **P. habrophyllus**;
 - c. by three years after the **commencement of construction**, there must be an increase in the number of mature **P. habrophyllus** in the **on-site conservation areas** that is greater than the number of **P. habrophyllus** removed during **construction**; and
 - d. by three years after the **commencement of construction**, there must be evidence of recruitment from planted **P. habrophyllus** individuals.

6. The approval holder must undertake a monitoring program. The monitoring program must be planned and undertaken so that the data gathered is adequate to: inform adaptive management; and demonstrate whether milestones and outcomes described in conditions 2, 5 and 8 have been met. The monitoring program must:
 - a. include daily surveys for injured or dead koalas during **vegetation clearing and construction activities**;
 - b. include pre-clearance surveys of all areas that will be cleared to establish the number of mature *P. habrophyllus* that will be lost as a result of the proposed action;
 - c. establish quadrats within each of the **on-site conservation areas** where *P. habrophyllus* has been planted and at **control sites** that contain remnant *P. habrophyllus* populations where supplemental planting has not occurred; and
 - d. be undertaken by a **suitably qualified person**.
7. To compensate for the loss of **koala habitat** and **grey-headed flying-fox foraging habitat** the approval holder must:
 - a. **secure**, prior to the **commencement of the action**, the **offset** containing 293 hectares of **MNES habitat** within the offset area at **Annex 1**;
 - b. provide the Department with the **offset attributes, shapefile** and map(s) clearly defining the location and boundaries of each offset, within 2 weeks of lodgement of the offset with the **Titles Office**; and
 - c. ensure the **Agreement** is registered on the title on which each offset is located, and provide the Department with evidence of lodgement with the **Titles Office**, within 2 weeks of lodgement. Provide a copy of the signed **agreement** within 2 weeks of receipt from the **Titles Office**.

The approval holder must ensure any proposal for alternative offsets is agreed to in writing with the **Department**.

Note: Offsets for different species may overlap where they share the same habitat requirements.

8. To compensate for impacts to **koala habitat** and **grey-headed flying-fox foraging habitat** the approval holder must achieve the following outcomes as compared to baseline **offset** habitat quality and extent, unless agreed in writing with the **Department**:
 - a. by 20 years after the **commencement of construction**, there must be a **gain in habitat quality** across 90% of the **offset**.
9. To mitigate impacts on **koala** and *P. habrophyllus*, the approval holder must develop a fire management strategy for the **project site** and the **offset**, incorporating advice from a **suitably qualified person** regarding the impacts of the fire management strategy on **koala** and *P. habrophyllus*.
10. The approval holder must adaptively manage **koala habitat, grey-headed flying-fox foraging habitat** and *P. habrophyllus* to achieve the outcomes described in conditions 1-9. This must include:

- a. developing and implementing a strategy (or strategies) to achieve the outcomes and milestones outlined in conditions 1-9, in consultation with a **suitably qualified person** (noting that the plan does not require approval by the **Minister** and is not an 'action management plan' under the **EPBC Act**);
- b. a documented process of adaptive management and continual improvement, including using data from monitoring and experimentation trials to inform adaptive management; and
- c. where there is a reasonable risk (or evidence) that outcomes or milestones are not likely to be achieved: revising management measures in consultation with a **suitably qualified person**; increasing the level of effort to achieve the outcomes; and informing the **Department**, either as part of annual compliance reporting required under condition 13 or as a separate notification in writing.

Administrative conditions

11. Within 7 days after the **commencement of the action**, the approval holder must advise the **Department** in writing of the actual date of **commencement of the action**.
12. The approval holder must maintain accurate records substantiating all activities associated with or relevant to the conditions of approval, including measures taken to implement the management plan, report or strategy 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 **Department's** website. The results of audits may also be publicised through the general media.
13. Within three months of every 12 month anniversary of the **commencement of the action**, the approval holder must publish a report on their website addressing compliance with each of the conditions of this approval, including implementation of any management plans as specified in the conditions. Documentary evidence providing proof of the date of publication and non-compliance with any of the conditions of this approval must be provided to the **Department** at the same time as the compliance report is published, until agreed in writing with the **Department**.
14. The approval holder must notify the **Department** in writing of any non - compliance with conditions as soon as practicable and within no more than 2 business days of becoming aware of the non - compliance.
15. Upon the direction of the **Minister**, the approval holder must ensure that an independent audit of compliance with the conditions of approval is conducted and a report submitted to the **Minister**. The independent auditor must be approved by the **Minister** prior to the commencement of the audit. Audit criteria must be agreed to by the **Minister** and the audit report must address the criteria to the satisfaction of the **Minister**.
16. The approval holder may choose to revise a management plan, program or strategy approved by the **Minister** under conditions 1 - 9 without submitting it for approval under section 143A of the EPBC Act, if the taking of the action in accordance with the revised plan, program or strategy would not be likely to have a **new or increased impact**. If the approval holder makes this choice they must:

- a. notify the **Department** in writing that the approved plan, program or strategy has been revised and provide the **Department** with an electronic copy of the revised plan, program or strategy;
 - b. implement the revised plan, program or strategy from the date that the plan, program or strategy is submitted to the **Department**; and
 - c. for the life of this approval, maintain a record of the reasons the approval holder considers that taking the action in accordance with the revised plan, program or strategy would not be likely to have a **new or increased impact**.
17. The approval holder may revoke their choice under condition 16 at any time by notice to the **Department**. If the approval holder revokes the choice to implement a revised plan, program or strategy, without approval under section 143A of the Act, the plan, program or strategy approved by the **Minister** must be implemented.
18. Condition 16 does not apply if the revisions to the approved plan, program or strategy include changes to environmental offsets provided under the plan, program or strategy in relation to a matter protected by a controlling provision for the action, unless otherwise agreed in writing by the **Minister**. This does not otherwise limit the circumstances in which the taking of the action in accordance with a revised plan, program or strategy would, or would not, be likely to have **new or increased impacts**.
19. If the **Minister** gives a notice to the approval holder that the **Minister** is satisfied that the taking of the action in accordance with the revised plan, program or strategy would be likely to have a **new or increased impact**, then:
- a. Condition 16 does not apply, or ceases to apply, in relation to the revised plan, program or strategy; and
 - b. The approval holder must implement the plan, program or strategy approved by the **Minister**.

To avoid any doubt, this condition does not affect any operation of conditions 16, 17 and 18 in the period before the day the notice is given.

At the time of giving the notice the **Minister** may also notify that for a specified period of time that condition 16 does not apply for one or more specified plans, programs or strategies required under the approval.

20. Conditions 16, 17, 18 and 19 are not intended to limit the operation of section 143A of the **EPBC Act** which allows the approval holder to submit a revised plan, program or strategy to the **Minister** for approval.
21. If, at any time after five years from the date of this approval, the approval holder has not **substantially commenced the action**, then the approval holder must not **substantially commence the action** without the written agreement of the **Minister**.
22. Unless otherwise agreed to in writing by the **Minister**, the approval holder must publish all management plans, reports or strategies referred to in these conditions of approval on their website. Each management plan, report or strategy must be published on the website within 1 month of being approved by the **Minister** or being submitted under condition 1 – 9.

DEFINITIONS

Agreement - the executed agreement between the approval holder and the relevant landowner, to secure the land for long-term protection.

Buffer areas means 20 metre buffers around areas containing remnant or planted *P. habrophyllus*.

Commencement of the action means the date **construction** is first undertaken, excluding fences and signage, associated with the proposed action.

Construction includes any preparatory works required to be undertaken including clearing vegetation, the erection of any onsite temporary structures and the use of heavy duty equipment for the purpose of breaking the ground for buildings or infrastructure including any works for the creation of vegetation buffers.

Control sites means sites to be monitored concurrently with a **project site** or **offset site**, to provide evidence of the relative impacts or improvements as a result of the proposed action.

Department means the Australian Government Department or any other agency administering the **EPBC Act** from time to time.

EPBC Act means the *Environment Protection and Biodiversity Conservation Act 1999* (Commonwealth).

EPBC Act Environment Offsets Policy (October 2012) is the Policy guiding the use of offsets under the *Environment Protection and Biodiversity Conservation Act 1999*, published by the then Department of Sustainability, Environment, Water, Population and Communities, October 2012.

Fauna Management Plan means the document titled *Saunders Havill Group's Spring Mountain Fauna Management Plan 17 July 2015* (FMP).

Gain in habitat quality means an improvement in the quality and extent of **koala habitat** and **grey-headed flying-fox foraging habitat** in comparison to baseline environmental conditions at the **offset** and compared with an unmanaged control site.

Grey-headed flying-fox means the native species *Pteropus poliocephalus*, protected under the **EPBC Act**.

Grey-headed flying-fox foraging habitat means the known native food trees, including eucalypts (genera *Eucalyptus*, *Corymbia* and *Angophora*), melaleucas and banksias that are the primary food for the species.

Koala means the native species *Phascolarctos cinereus* (combined populations of Qld, NSW and the ACT), protected under the **EPBC Act**.

Koala habitat means any forest or woodland containing species that are known **koala** food trees or shrubland with emergent food trees. This can include remnant and non – remnant vegetation in natural, agricultural, urban and peri-urban environments and is defined by the vegetation community present and the vegetation structure; **koalas** do not necessarily have to be present.

Koala exclusion fencing is fencing constructed and located to prevent access by **koalas** to residences within the **project site**.

Koala road crossings are road crossings, including underpasses, which are specifically designed to facilitate the movement of **koalas**.

Minister means the Minister administering the EPBC Act and includes a delegate of the Minister.

MNES means matters of national environmental significance.

MNES habitat means **koala habitat** and **grey-headed flying-fox foraging habitat**.

New or increased impact means a new or increased impact on any matter protected by the controlling provisions for the action, when compared to the plan, program or strategy that has been approved by the **Minister**.

Offset attributes means a '.xls' file capturing relevant attributes of the **offset** site, including the EPBC reference ID number, the physical address of the **offset** site, coordinates of the boundary points in decimal degrees, the **EPBC Act** protected matters that the **offset** compensates for, any additional **EPBC Act** protected matters that are benefiting from the **offset**, and the size of the **offset** in hectares.

On-site conservation areas means areas containing remnant or planted *P. habrophyllus* that are managed primarily for conservation.

Operation means the date of commencement of functioning as a residential development.

Plectranthus habrophyllus or *P. habrophyllus* means the native species protected under the EPBC Act.

Project site is the area defined as 'referral area' in the map at **Annex 2**.

Secure means long-term protection under a legal mechanism that is either establishing a covenant on the title as a voluntary declaration under the *Vegetation Management Act 1999* (Qld), or establishing a Nature Refuge under the *Nature Conservation Act 1992* (Qld).

Shapefile means an ESRI Shapefile containing '.shp', '.shx' and '.dbf' files and other files capturing attributes including at least the EPBC reference ID number and EPBC protected matters present at the relevant site. Attributes should also be captured in '.xls' format.

Signage is appropriately located signs designed to raise awareness of the presence of **Koalas** within the **project site** or mitigate against impacts to **Koalas**.

Substantially commence (d) the action means commencement of clearing the land and construction of infrastructure (i.e. sewerage, power, water, stormwater) associated with the action. This does not include preparatory works.

Suitably qualified person means a person with qualifications in environmental science, ecology or biology from a recognised institute and a minimum of 5 years field experience in flora and fauna management, or as agreed in writing by the **Department**.

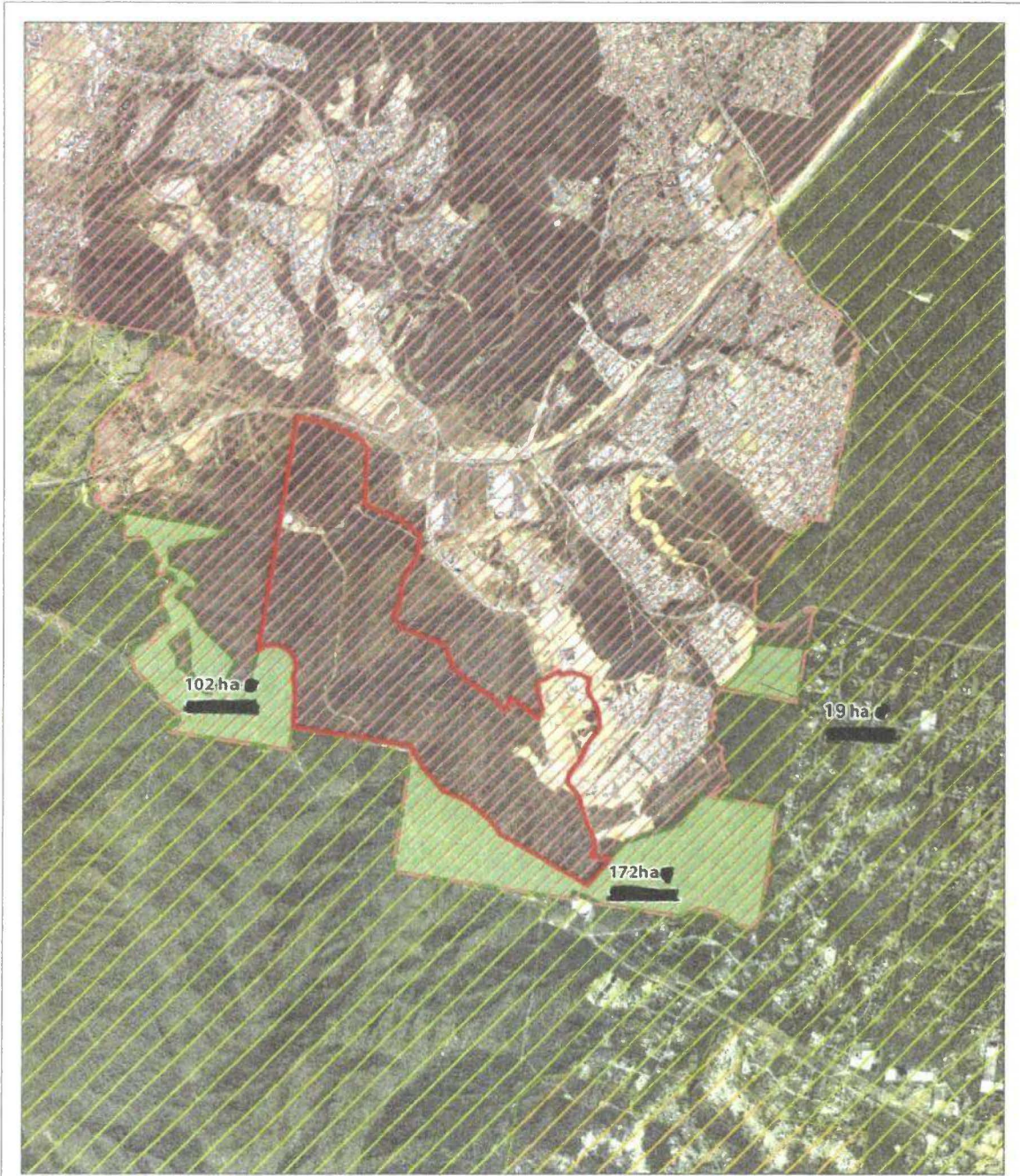
Titles Office means the relevant authority responsible for registering the land title transaction.

Vegetation clearing and construction activities means any activities that destroy, modify or remove vegetation within the **project site**, and those activities required during the construction of infrastructure for the duration of the approval.

Weeds of national significance means the thirty two weeds that have been agreed by Australian governments, based on an assessment process that prioritised these weeds based

on their invasiveness, potential for spread and environmental, social and economic impacts, available at: <http://www.weeds.org.au/docs/WoNS/>.

Annex 1



Legend

- Offset area (293 ha)
- Referral area
- State Controlled Roads
- SEQ Regional Plan 2005-2026**
- Urban Footprint
- Regional Landscape and Rural Production Area
- Rural Living Area

Figure A9 SEQ Regional Plan 2005-2026 zoning

File ref: 7243 E Figure 9 UFP 2005 B
 Date 18/12/2015
 Project Spring Mountain (EPBC)

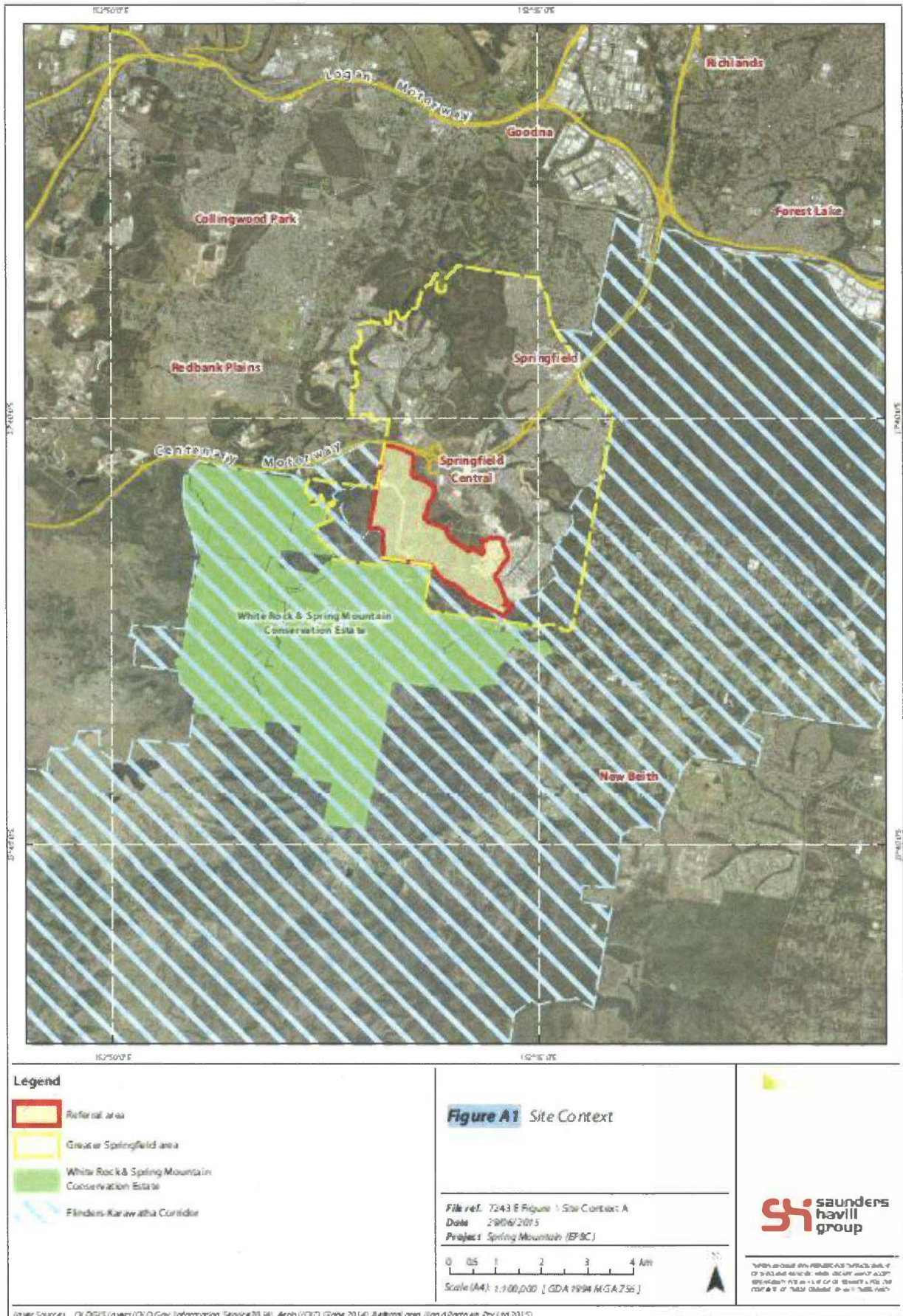
0 0.5 1 2 km N
 Scale (A4): 1:41,000 [GDA 1994 MGA Z56]



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Layer Sources: QLD GIS Layers (QLD Gov. Information Service 2014), Aerial (QLD Globe 2014), Referral area (Land Partners Pty Ltd 2015), SEQRP (DSO 2015)

Annex 2



Appendix B

Fauna spotter catcher post-works reporting

**November
2018**

Fauna Management and Spotter/Catcher Services Report

Springfield Rise – Village 8, Double Local Park
Spring Mountain
Report prepared for Shadforths Civil Contractors



Report prepared by
QLD Fauna Consultancy Pty Ltd
Phone: (07) 3376 9780
Fax: (07) 3376 9740
Email: fauna@qfc.com.au

Date:	12/12/18
Title:	Fauna Management and Spotter/Catcher Services Report Springfield Rise – Village 8, Double Local Park
Author/s:	Bryan Robinson, Ramona Rohwedder
Reviewed by:	Bryan Robinson
Field personnel:	Camille Palmer
Status:	Final Report
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1 Introduction

Qld Fauna Consultancy Pty Ltd has been engaged by Shadforth's Civil Contractors to conduct Fauna Spotter/Catcher and Fauna Management activities for works at Village 8, Double Local Park, Springfield Rise, Spring Mountain, Queensland.

All activities were conducted under the provisions of Rehabilitation Permit (WA0001454) issued to Queensland Fauna Consultancy Pty Ltd by the Department of Environment and Science (DES), formerly the Department of Environment and Heritage Protection (DEHP), approving the observation and relocation of protected animals.

This report covers clearance activities undertaken in November 2018.

2 Methodology

2.1 Clearance Investigations

A standard set of observational and active searching techniques were employed each day during clearance to ascertain and identify existing fauna values for each location. These include:

- Assessment of terrestrial microhabitats such as ground hollows, rock, burrows, leaf litter, fallen branches and bark exfoliations,
- Observation and assessment of occupancy of arboreal microhabitats such as tree hollows, fissures and exfoliations,
- Direct observation of active or exposed fauna,
- Identification of scats, tracks and scratchings to determine fauna present on the site.

All microhabitats were identified and subsequently inspected during clearance.

2.2 Specific methodology for Koalas *Phascolarctos cinereus*

Due to the specific requirements relating to the Koala the following techniques were employed at the clearance site to ascertain presence/absence status:

- Use of binoculars to inspect the crown, forks and trunk of trees;
- 'Drip zone' searches at the base of known food trees for the presence of scats to a radius equal to that of the crown of individual trees;
- Inspection of trunks for scratchings indicative of use by Koalas.

Recent changes to Koala management strategies highlighted in the *Nature Conservation (Koala) Conservation Plan 2017* have resulted in particular conditions placed on vegetation clearance involving the removal of Koala food trees.

Further provisions include the restriction of all clearance that may directly interfere with the tree a Koala is residing in. Koalas are to leave via their own volition and may not be interfered with by any means. Only when Koalas have vacated a tree can clearance operations include the host tree and surrounding vegetation.

2.3 Felling Procedures

Trees identified as having potential fauna values (such as hollows, fissures and exfoliating bark) were clearly marked for supervision during felling and inspected once felled. Efforts were made to determine potentially occupant species by way of investigations for indicative signs (scats, scratchings and tracks). Where no signs were found or occupant species undeterminable, machinery operators were instructed to fell trees in a manner directed at minimising the potential risk of injury to fauna.

Limbs were inspected, and the direction of felling determined with regards to safety of both machinery and operators. Considerations to potentially occupant fauna were assessed and felling procedures formulated. Felling procedures may have included the following techniques:

- Machinery blades were utilised to shake the tree in an attempt to disturb fauna out of hollows or fissures to determine species present.
- If fauna were present, the tree was either left standing overnight to allow the occupant animal(s) time to leave via their own volition, or if species detected were able to be encouraged from the tree by shaking or direct capture by a wildlife spotter(s). The tree was felled with considerations to potentially undetected fauna.
- Where possible potentially occupied trees were felled with the identified microhabitat receiving minimal contact on impact.
- Adjacent felled trees were utilised to absorb the impact of potential fauna bearing trees.

2.4 Communications during Clearance

Each spotter/catcher was equipped with a hand-held radio to make positive communications with machinery operators. Communications by radio and positive hand signals were utilised to indicate intentions to machinery operators.

3 Results

The following daily inventory details fauna-based investigation results for the clearing area. Inspection activities, location, habitat values and fauna found are documented where required.

Tuesday 13th November

- Pre-clearance activities carried out (refer to Methodology) at Springfield Rise (Village 8 Double Local Park)
- Vegetation clearance carried out at Springfield Rise (Village 8 Double Local Park)
- 2 trees flagged
- 1 personnel in attendance

Arboreal Microhabitats: No. flagged tree/s felled: 1

Nest (N) Y N Hollows (H) Y N Arboreal termitaria (ATM) Y N

No. & size of hollow/s (mm): 0

Terrestrial Microhabitats:

Hollow logs Y N Woody debris Y N Rock piles Y N Burrows Y N

Other: Dense leaf litter

Aquatic habitat/s: Dam Y N Creek Y N (Dry) Wetland Y N

No Fauna Found

Wednesday 14th November

- Pre-clearance activities carried out (refer to Methodology) at Springfield Rise (Village 8 Double Local Park)
- Vegetation clearance carried out at Springfield Rise (Village 8 Double Local Park)
- Refer to **Fauna Register** for fauna found
- 0 trees flagged
- 1 personnel in attendance

Arboreal Microhabitats: No. flagged tree/s felled: 1

Nest (N) Y N Hollows (H) Y N Arboreal termitaria (ATM) Y N

No. & size of hollow/s (mm): 0

Terrestrial Microhabitats:

Hollow logs Y N Woody debris Y N Rock piles Y N Burrows Y N

Other: Dense leaf litter

Aquatic habitat/s: Dam Y N Creek Y N (Dry) Wetland Y N

4 Fauna Register

Collectors Name	Date	Time	Capture Location	Capture Location		Count Type	Status	Common Name - Scientific Name	Count	Release Details			Actions				Release Location Description	Comments
				Latitude	Longitude					Date	Latitude	Longitude	R1	R2	D	I		
Camille Palmer	14/11/2018	07:40	Springfield Rise - Double Local Park V8	-27.6974	152.8993	Deceased	Least Concern	Torresian Crow <i>Corvus orru</i>	3 Eggs	NA	NA	NA			X		NA	Eggs broken during felling.

5 Conclusion

All vegetation clearance was supervised as requested by Shadforths Civil Contractors and in accordance with stipulations as expressed in the *Nature Conservation (Koala) Conservation Plan 2017*.

No Koalas were observed during clearance activities. Three Torresian Crow eggs were damaged during clearing works. No other fauna required mitigation.

All supervised clearance activities were conducted with the full co-operation of onsite personnel and machinery operator/s.

6 References

Department of Environment and Heritage Protection (2017) *Nature Conservation (Koala) Conservation Plan 2017*, Queensland State Government – DEHP.

References for nomenclature

Beruldsen, G. (2003) *Australian Birds their Nests and Eggs*, Kenmore Hills: Self Published.

Menkhorst, K. & Knight, F. (2011) *A Field Guide to the Mammals of Australia*. 3rd edn. Oxford University Press, South Melbourne.

Queensland Museum (2007) *Wildlife of Greater Brisbane*, 2nd edition, Brisbane: Queensland Museum Publishers.

Strahan, R. (Ed) (1995) *The Mammals of Australia*. New Holland Publishers, Sydney.



November
2018

Fauna Management and Spotter/Catcher Services Report

Springfield Rise – Village 15 Ultimate Extent
Spring Mountain
Report prepared for Shadforths Civil Contractors



Report prepared by
QLD Fauna Consultancy Pty Ltd
Phone: (07) 3376 9780
Fax: (07) 3376 9740
Email: fauna@qfc.com.au

Date:	12/12/18
Title:	Fauna Management and Spotter/Catcher Services Report Springfield Rise – Village 15 Ultimate Extent, Spring Mountain
Author/s:	Bryan Robinson, Ramona Rohwedder
Reviewed by:	Bryan Robinson
Field personnel:	Jason Raguse
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Filed as:	QFC FMR Shadforths Spring Mountain Village 15 Ultimate Nov 2018.doc

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1 Introduction

Qld Fauna Consultancy Pty Ltd has been engaged by Shadforths Civil Contractors to conduct Fauna Spotter/Catcher and Fauna Management activities for works at Village 15 (Ultimate Extent), Springfield Rise, Spring Mountain, Queensland.

All activities were conducted under the provisions of Rehabilitation Permit (WA0001454) issued to Queensland Fauna Consultancy Pty Ltd by the Department of Environment and Science (DES), formerly the Department of Environment and Heritage Protection (DEHP), approving the observation and relocation of protected animals.

This report covers clearance activities undertaken on 7th November 2018.

2 Methodology

2.1 Clearance Investigations

A standard set of observational and active searching techniques were employed on the day of clearance to ascertain and identify existing fauna values for each location. These include:

- Assessment of terrestrial microhabitats such as ground hollows, rock, burrows, leaf litter, fallen branches and bark exfoliations,
- Observation and assessment of occupancy of arboreal microhabitats such as tree hollows, fissures and exfoliations,
- Direct observation of active or exposed fauna,
- Identification of scats, tracks and scratchings to determine fauna present on the site.

All microhabitats were identified and subsequently inspected during clearance.

2.2 Specific methodology for Koalas *Phascolarctos cinereus*

Due to the specific requirements relating to the Koala the following techniques were employed at the clearance site to ascertain presence/absence status:

- Use of binoculars to inspect the crown, forks and trunk of trees;
- ‘Drip zone’ searches at the base of known food trees for the presence of scats to a radius equal to that of the crown of individual trees;
- Inspection of trunks for scratchings indicative of use by Koalas.

Recent changes to Koala management strategies highlighted in the *Nature Conservation (Koala) Conservation Plan 2017* have resulted in particular conditions placed on vegetation clearance involving the removal of Koala food trees.

Further provisions include the restriction of all clearance that may directly interfere with the tree a Koala is residing in. Koalas are to leave via their own volition and may not be interfered with by any means. Only when Koalas have vacated a tree can clearance operations include the host tree and surrounding vegetation.

2.3 Felling Procedures

Trees identified as having potential fauna values (such as hollows, fissures and exfoliating bark) were clearly marked for supervision during felling and inspected once felled. Efforts were made to determine potentially occupant species by way of investigations for indicative signs (scats, scratchings and tracks). Where no signs were found or occupant species undeterminable, machinery operators were instructed to fell trees in a manner directed at minimising the potential risk of injury to fauna.

Limbs were inspected, and the direction of felling determined with regards to safety of both machinery and operators. Considerations to potentially occupant fauna were assessed and felling procedures formulated. Felling procedures may have included the following techniques:

- Machinery blades were utilised to shake the tree in an attempt to disturb fauna out of hollows or fissures to determine species present.
- If fauna were present, the tree was either left standing overnight to allow the occupant animal(s) time to leave via their own volition, or if species detected were able to be encouraged from the tree by shaking or direct capture by a wildlife spotter(s). The tree was felled with considerations to potentially undetected fauna.
- Where possible potentially occupied trees were felled with the identified microhabitat receiving minimal contact on impact.
- Adjacent felled trees were utilised to absorb the impact of potential fauna bearing trees.

2.4 Communications during Clearance

Each spotter/catcher was equipped with a hand-held radio to make positive communications with machinery operators. Communications by radio and positive hand signals were utilised to indicate intentions to machinery operators.

3 Results

The following daily inventory details fauna-based investigation results for the clearing area. Inspection activities, location, habitat values and fauna found are documented where required.

Wednesday 7th November

- Pre-clearance activities carried out (refer to Methodology) at Springfield Rise (Village 15 Ultimate Extent)
- Vegetation clearance carried out at Springfield Rise (Village 15 Ultimate Extent)
- 0 trees flagged
- 1 personnel in attendance

Arboreal Microhabitats: No. flagged tree/s felled: 4

Nest (N) Y N Hollows (H) Y N Arboreal termitaria (ATM) Y N

Other: Fissure

No. & size of hollow/s (mm): 0-49: 5 50-99: 1

Terrestrial Microhabitats:

Hollow logs Y N Woody debris Y N Rock piles Y N Burrows Y N

Other: Dense leaf litter, bark exfoliations

Aquatic habitat/s: Dam Y N Creek Y N Wetland Y N

Notes: Rainbow Bee-eater *Merops ornatus* excavations found adjacent to clearing with some having birds in attendance. But investigation showed them to be blind ending tunnels with no active nests.

No Fauna Found

4 Conclusion

All vegetation clearance was supervised as requested by Shadforths Civil Contractors and in accordance with stipulations as expressed in the *Nature Conservation (Koala) Conservation Plan 2017*.

No Koalas were observed during clearance activities. No fauna required mitigation during clearance works.

All supervised clearance activities were conducted with the full co-operation of onsite personnel and machinery operator/s.

5 References

Department of Environment and Heritage Protection (2017) *Nature Conservation (Koala) Conservation Plan 2017*, Queensland State Government – DEHP.

References for nomenclature

Beruldsen, G. (2003) *Australian Birds their Nests and Eggs*, Kenmore Hills: Self Published.

Menkhorst, K. & Knight, F. (2011) *A Field Guide to the Mammals of Australia*. 3rd edn. Oxford University Press, South Melbourne.

Queensland Museum (2007) *Wildlife of Greater Brisbane*, 2nd edition, Brisbane: Queensland Museum Publishers.



April 2019

Fauna Management and Spotter/Catcher Services Report

Springfield Rise – Town Centre Gully West,
Stage 2 Clearing Extents
Spring Mountain
Report prepared for Shadforths Civil Contractors



Report prepared by

QLD Fauna Consultancy Pty Ltd

Phone: (07) 3376 9780

Fax: (07) 3376 9740

Email: fauna@qfc.com.au

Date:	23/04/19
Title:	Fauna Management and Spotter/Catcher Services Report Springfield Rise – Town Centre Gully West, Stage 2 Clearing Extents
Author/s:	Bryan Robinson, Ramona Rohwedder
Reviewed by:	Bryan Robinson
Field personnel:	Jonathan Pickvance, Scott Lewis
Status:	Final Report
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1 Introduction

Qld Fauna Consultancy Pty Ltd has been engaged by Shadforth's Civil Contractors to conduct Fauna Spotter/Catcher and Fauna Management activities for works at Town Centre Gully West, Stage 2 Clearing Extents, Springfield Rise, Spring Mountain, Queensland.

All activities were conducted under the provisions of Rehabilitation Permit (WA0001454) issued to Queensland Fauna Consultancy Pty Ltd by the Department of Environment and Science (DES), formerly the Department of Environment and Heritage Protection (DEHP), approving the observation and relocation of protected animals.

This report covers clearance activities undertaken in April 2019.

2 Methodology

2.1 Clearance Investigations

A standard set of observational and active searching techniques were employed each day during clearance to ascertain and identify existing fauna values for each location. These include:

- Assessment of terrestrial microhabitats such as ground hollows, rock, burrows, leaf litter, fallen branches and bark exfoliations,
- Observation and assessment of occupancy of arboreal microhabitats such as tree hollows, fissures and exfoliations,
- Direct observation of active or exposed fauna,
- Identification of scats, tracks and scratchings to determine fauna present on the site.

All microhabitats were identified and subsequently inspected during clearance.

2.2 Specific methodology for Koalas *Phascolarctos cinereus*

Due to the specific requirements relating to the Koala the following techniques were employed at the clearance site to ascertain presence/absence status:

- Use of binoculars to inspect the crown, forks and trunk of trees;
- 'Drip zone' searches at the base of known food trees for the presence of scats to a radius equal to that of the crown of individual trees;
- Inspection of trunks for scratchings indicative of use by Koalas.

Recent changes to Koala management strategies highlighted in the *Nature Conservation (Koala) Conservation Plan 2017* have resulted in particular conditions placed on vegetation clearance involving the removal of Koala food trees.

Further provisions include the restriction of all clearance that may directly interfere with the tree a Koala is residing in. Koalas are to leave via their own volition and may not be interfered with by any means. Only when Koalas have vacated a tree can clearance operations include the host tree and surrounding vegetation.

2.3 Felling Procedures

Trees identified as having potential fauna values (such as hollows, fissures and exfoliating bark) were clearly marked for supervision during felling and inspected once felled. Efforts were made to determine potentially occupant species by way of investigations for indicative signs (scats, scratchings and tracks). Where no signs were found or occupant species undeterminable, machinery operators were instructed to fell trees in a manner directed at minimising the potential risk of injury to fauna.

Limbs were inspected, and the direction of felling determined with regards to safety of both machinery and operators. Considerations to potentially occupant fauna were assessed and felling procedures formulated. Felling procedures may have included the following techniques:

- Machinery blades were utilised to shake the tree in an attempt to disturb fauna out of hollows or fissures to determine species present.
- If fauna were present, the tree was either left standing overnight to allow the occupant animal(s) time to leave via their own volition, or if species detected were able to be encouraged from the tree by shaking or direct capture by a wildlife spotter(s). The tree was felled with considerations to potentially undetected fauna.
- Where possible potentially occupied trees were felled with the identified microhabitat receiving minimal contact on impact.
- Adjacent felled trees were utilised to absorb the impact of potential fauna bearing trees.

2.4 Communications during Clearance

Each spotter/catcher was equipped with a hand-held radio to make positive communications with machinery operators. Communications by radio and positive hand signals were utilised to indicate intentions to machinery operators.

3 Results

The following daily inventory details fauna-based investigation results for the clearing area. Inspection activities, location, habitat values and fauna found are documented where required. Fauna photos can be viewed in Appendix A.

Monday 8th April

- Pre-clearance activities carried out (refer to Methodology) at Springfield Rise (TCGW Stage 2)
- Vegetation clearance carried out at Springfield Rise (TCGW Stage 2)
- Refer to **Fauna Register** for fauna found
- 3 trees flagged
- 1 personnel in attendance

Arboreal Microhabitats: No. flagged tree/s felled: 3

Nest (N) Y N Hollows (H) Y N Arboreal termitaria (ATM) Y N

Other: Exfoliating bark

No. & size of hollow/s (mm): 50-99: 1

Terrestrial Microhabitats:

Hollow logs Y N Woody debris Y N Rock piles Y N Burrows Y N

Other: Dense Lantana

Aquatic habitat/s: Dam Y N Creek Y N Wetland Y N

Tuesday 9th April

- Pre-clearance activities carried out (refer to Methodology) at Springfield Rise (TCGW Stage 2)
- Vegetation clearance carried out at Springfield Rise (TCGW Stage 2)
- 0 trees flagged
- 1 personnel in attendance

Arboreal Microhabitats: No. flagged tree/s felled: 0

Nest (N) Y N Hollows (H) Y N Arboreal termitaria (ATM) Y N

Other: Exfoliating bark

No. & size of hollow/s (mm): 0

Terrestrial Microhabitats:

Hollow logs Y N Woody debris Y N Rock piles Y N Burrows Y N

Other: Timber stockpiles, dense leaf litter, bark exfoliations

Aquatic habitat/s: Dam Y N Creek Y N Wetland Y N Other: Gully

No Fauna Found

Wednesday 10th April

- Pre-clearance activities carried out (refer to Methodology) at Springfield Rise (TCGW Stage 2)
- Vegetation clearance carried out at Springfield Rise (TCGW Stage 2)
- 15 trees flagged
- 1 personnel in attendance

Arboreal Microhabitats: No. flagged tree/s felled: 15

Nest (N) Y N (Inactive) Hollows (H) Y N Arboreal termitaria (ATM) Y N

Other: Exfoliating bark

No. & size of hollow/s (mm): 0

Terrestrial Microhabitats:

Hollow logs Y N Woody debris Y N Rock piles Y N Burrows Y N

Other: Timber stockpiles, dense leaf litter, termitaria

Aquatic habitat/s: Dam Y N Creek Y N Wetland Y N Other: Gully

No Fauna Found

Thursday 11th April

- Pre-clearance activities carried out (refer to Methodology) at Springfield Rise (TCGW Stage 2)
- Vegetation clearance carried out at Springfield Rise (TCGW Stage 2)
- 6 trees flagged
- 1 personnel in attendance

Arboreal Microhabitats: No. flagged tree/s felled: 6

Nest (N) Y N Hollows (H) Y N Arboreal termitaria (ATM) Y N

Other: Exfoliating bark

No. & size of hollow/s (mm): 0

Terrestrial Microhabitats:

Hollow logs Y N Woody debris Y N Rock piles Y N Burrows Y N

Other: Timber stockpiles, dense leaf litter, bark exfoliations

Aquatic habitat/s: Dam Y N Creek Y N Wetland Y N Other: Gully

No Fauna Found

4 Fauna Register

Collectors Name	Date	Time	Capture Location	Capture Location		Count Type	Status	Common Name - Scientific Name	Count	Release Details			Actions				Release Location Description	Comments	
				Latitude	Longitude					Date	Latitude	Longitude	R1	R2	D	I			
Jonathan Pickvance	08/04/19	13:13	Springfield Rise – Town Centre Gully West, Stage 2, Spring Mountain	-27.6806	152.8946	Alive	Least Concern	Burton's Snake-lizard <i>Lialis burtonis</i>	1	08/04	-27.6803	152.8950	X					Woody debris	

5 Conclusion

All vegetation clearance was supervised as requested by Shadforth's Civil Contractors and in accordance with stipulations as expressed in the *Nature Conservation (Koala) Conservation Plan 2017*.

No Koalas were observed during clearance activities. No fauna required mitigation during clearance works.

All supervised clearance activities were conducted with the full co-operation of onsite personnel and machinery operator/s.

6 References

Department of Environment and Heritage Protection (2017) *Nature Conservation (Koala) Conservation Plan 2017*, Queensland State Government – DEHP.

References for nomenclature

Menkhorst, K. & Knight, F. (2011) *A Field Guide to the Mammals of Australia*. 3rd edn. Oxford University Press, South Melbourne.

Strahan, R. (Ed) (1995) *The Mammals of Australia*. New Holland Publishers, Sydney.

Wilson, S. (2015) *A Field Guide to Reptiles of Queensland*. 2nd edn, Sydney: New Holland Publishers.

7 Appendix A: Fauna Photos



Burton's Snake-lizard
Lialis burtonis



May 2019

Fauna Management and Spotter/Catcher Services Report

Springfield Rise – Village 15 Borrow Pit and Village 15
Road 1501, Spring Mountain
Report prepared for Shadforth Civil Contractors



Report prepared by
QLD Fauna Consultancy Pty Ltd
Phone: (07) 3376 9780
Fax: (07) 3376 9740
Email: fauna@qfc.com.au

Date:	16/05/19
Title:	Fauna Management and Spotter/Catcher Services Report Springfield Rise – Village 15 Borrow Pit and Village 15 Road 1501, Spring Mountain
Author/s:	Bryan Robinson, Ramona Rohwedder
Reviewed by:	Bryan Robinson
Field personnel:	Brett Bennett
Status:	Final Report
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1 Introduction

Qld Fauna Consultancy Pty Ltd has been engaged by Shadforth Civil Contractors to conduct Fauna Spotter/Catcher and Fauna Management activities for works at Village 15 Borrow Pit and Village 15 Road 1501, Springfield Rise, Spring Mountain, Queensland.

All activities were conducted under the provisions of Rehabilitation Permit (WA0001454) issued to Queensland Fauna Consultancy Pty Ltd by the Department of Environment and Science (DES), formerly the Department of Environment and Heritage Protection (DEHP), approving the observation and relocation of protected animals.

This report covers clearance activities undertaken in May 2019.

2 Methodology

2.1 Clearance Investigations

A standard set of observational and active searching techniques were employed each day during clearance to ascertain and identify existing fauna values for each location. These include:

- Assessment of terrestrial microhabitats such as ground hollows, rock, burrows, leaf litter, fallen branches and bark exfoliations,
- Observation and assessment of occupancy of arboreal microhabitats such as tree hollows, fissures and exfoliations,
- Direct observation of active or exposed fauna,
- Identification of scats, tracks and scratchings to determine fauna present on the site.

All microhabitats were identified and subsequently inspected during clearance.

2.2 Specific methodology for Koalas *Phascolarctos cinereus*

Due to the specific requirements relating to the Koala the following techniques were employed at the clearance site to ascertain presence/absence status:

- Use of binoculars to inspect the crown, forks and trunk of trees;
- 'Drip zone' searches at the base of known food trees for the presence of scats to a radius equal to that of the crown of individual trees;
- Inspection of trunks for scratchings indicative of use by Koalas.

Recent changes to Koala management strategies highlighted in the *Nature Conservation (Koala) Conservation Plan 2017* have resulted in particular conditions placed on vegetation clearance involving the removal of Koala food trees.

Further provisions include the restriction of all clearance that may directly interfere with the tree a Koala is residing in. Koalas are to leave via their own volition and may not be interfered with by any means. Only when Koalas have vacated a tree can clearance operations include the host tree and surrounding vegetation.

2.3 Felling Procedures

Trees identified as having potential fauna values (such as hollows, fissures and exfoliating bark) were clearly marked for supervision during felling and inspected once felled. Efforts were made to determine potentially occupant species by way of investigations for indicative signs (scats, scratchings and tracks). Where no signs were found or occupant species undeterminable, machinery operators were instructed to fell trees in a manner directed at minimising the potential risk of injury to fauna.

Limbs were inspected, and the direction of felling determined with regards to safety of both machinery and operators. Considerations to potentially occupant fauna were assessed and felling procedures formulated. Felling procedures may have included the following techniques:

- Machinery blades were utilised to shake the tree in an attempt to disturb fauna out of hollows or fissures to determine species present.
- If fauna were present, the tree was either left standing overnight to allow the occupant animal(s) time to leave via their own volition, or if species detected were able to be encouraged from the tree by shaking or direct capture by a wildlife spotter(s). The tree was felled with considerations to potentially undetected fauna.
- Where possible potentially occupied trees were felled with the identified microhabitat receiving minimal contact on impact.
- Adjacent felled trees were utilised to absorb the impact of potential fauna bearing trees.

2.4 Communications during Clearance

Each spotter/catcher was equipped with a hand-held radio to make positive communications with machinery operators. Communications by radio and positive hand signals were utilised to indicate intentions to machinery operators.

3 Results

The following daily inventory details fauna-based investigation results for the clearing area. Inspection activities, location, habitat values and fauna found are documented where required. Fauna photos can be viewed in Appendix A.

Tuesday 7th May

- Pre-clearance activities carried out (refer to Methodology) at Springfield Rise (V15 Borrow Pit and Road 1501)
- Vegetation clearance carried out at Springfield Rise (V15 Borrow Pit and Road 1501)
- Refer to **Fauna Register** for fauna found
- 4 trees flagged
- 1 personnel in attendance

Arboreal Microhabitats: No. flagged tree/s felled: 4

Nest (N) Y N Hollows (H) Y N Arboreal termitaria (ATM) Y N

Other: Exfoliating bark

No. & size of hollow/s (mm): 0

Terrestrial Microhabitats:

Hollow logs Y N Woody debris Y N Rock piles Y N Burrows Y N

Other: Termitaria, dense groundcover vegetation

Aquatic habitat/s: Dam Y N Creek Y N (Dry) Wetland Y N

Wednesday 8th May

- Pre-clearance activities carried out (refer to Methodology) at Springfield Rise (V15 Borrow Pit and Road 1501)
- Vegetation clearance carried out at Springfield Rise (V15 Borrow Pit and Road 1501)
- 5 trees flagged
- 1 personnel in attendance

Arboreal Microhabitats: No. flagged tree/s felled: 5

Nest (N) Y N Hollows (H) Y N Arboreal termitaria (ATM) Y N

Other: Exfoliating bark

No. & size of hollow/s (mm): 300+: 4

Terrestrial Microhabitats:

Hollow logs Y N Woody debris Y N Rock piles Y N Burrows Y N

Other: Termitaria, dense leaf litter

Aquatic habitat/s: Dam Y N Creek Y N (Dry) Wetland Y N

No Fauna Found

Thursday 9th May

- Pre-clearance activities carried out (refer to Methodology) at Springfield Rise (V15 Borrow Pit and Road 1501)
- Vegetation clearance carried out at Springfield Rise (V15 Borrow Pit and Road 1501)
- 5 trees flagged
- 1 personnel in attendance

Arboreal Microhabitats: No. flagged tree/s felled: 5

Nest (N) Y N Hollows (H) Y N Arboreal termitaria (ATM) Y N

Other: Exfoliating bark

No. & size of hollow/s (mm): 0-49: 1

Terrestrial Microhabitats:

Hollow logs Y N Woody debris Y N Rock piles Y N Burrows Y N

Other: Termitaria, dense leaf litter

Aquatic habitat/s: Dam Y N Creek Y N (Dry) Wetland Y N

Notes: 1x Hollow tree stump reinstated for habitat

No Fauna Found

Friday 10th May

- Pre-clearance activities carried out (refer to Methodology) at Springfield Rise (V15 Borrow Pit and Road 1501)
- Vegetation clearance carried out at Springfield Rise (V15 Borrow Pit and Road 1501)
- 0 trees flagged
- 1 personnel in attendance

Arboreal Microhabitats: No. flagged tree/s felled: 0

Nest (N) Y N Hollows (H) Y N Arboreal termitaria (ATM) Y N

No. & size of hollow/s (mm): 0

Terrestrial Microhabitats:

Hollow logs Y N Woody debris Y N Rock piles Y N Burrows Y N

Other: Dense leaf litter

Aquatic habitat/s: Dam Y N Creek Y N (Dry) Wetland Y N

No Fauna Found

Monday 13th May

- Pre-clearance activities carried out (refer to Methodology) at Springfield Rise (V15 Borrow Pit and Road 1501)
- Vegetation clearance carried out at Springfield Rise (V15 Borrow Pit and Road 1501)
- 5 trees flagged
- 1 personnel in attendance

Arboreal Microhabitats: No. flagged tree/s felled: 5

Nest (N) Y N Hollows (H) Y N Arboreal termitaria (ATM) Y N

No. & size of hollow/s (mm): 0-49: 1 150-199: 2

Terrestrial Microhabitats:

Hollow logs Y N Woody debris Y N Rock piles Y N Burrows Y N

Other: Dense leaf litter

Aquatic habitat/s: Dam Y N Creek Y N (Dry) Wetland Y N

Notes: 4x arboreal hollows reinstated as terrestrial habitat

No Fauna Found

4 Fauna Register

Collectors Name	Date	Time	Capture Location	Capture Location		Count Type	Status	Common Name - Scientific Name	Count	Release Details			Actions				Release Location Description	Comments
				Latitude	Longitude					Date	Latitude	Longitude	R1	R2	D	I		
Brett Bennett	07/05/19	15:44	Springfield Rise – V15 Borrow Pit and V15 Road 1501, Spring Mountain	-27.6843	152.8874	Deceased	Least Concern	White-crowned Snake <i>Cacophis harriettae</i>	1	NA	NA	NA			X		NA	

5 Conclusion

All vegetation clearance was supervised as requested by Shadforths Civil Contractors and in accordance with stipulations as expressed in the *Nature Conservation (Koala) Conservation Plan 2017*.

No Koalas were observed during clearance activities. One White-crowned Snake was found deceased during clearing works. No other fauna required mitigation.

All supervised clearance activities were conducted with the full co-operation of onsite personnel and machinery operator/s.

6 References

Department of Environment and Heritage Protection (2017) *Nature Conservation (Koala) Conservation Plan 2017*, Queensland State Government – DEHP.

References for nomenclature

Menkhorst, K. & Knight, F. (2011) *A Field Guide to the Mammals of Australia*. 3rd edn. Oxford University Press, South Melbourne.

Strahan, R. (Ed) (1995) *The Mammals of Australia*. New Holland Publishers, Sydney.

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July 2019

Fauna Management and Spotter/Catcher Services Report

Springfield Rise – Village 15
Spring Mountain
Report prepared for Shadforth Civil Contractors



Report prepared by
QLD Fauna Consultancy Pty Ltd
Phone: (07) 3376 9780
Fax: (07) 3376 9740
Email: fauna@qfc.com.au

Date:	05/08/19
Title:	Fauna Management and Spotter/Catcher Services Report Springfield Rise – Village 15, Spring Mountain
Author/s:	Bryan Robinson, Ramona Rohwedder
Reviewed by:	Bryan Robinson
Field personnel:	Brett Bennett
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1 Introduction

Qld Fauna Consultancy Pty Ltd has been engaged by Shadforth Civil Contractors to conduct Fauna Spotter/Catcher and Fauna Management activities for works at Village 15, Springfield Rise, Spring Mountain, Queensland.

All activities were conducted under the provisions of Rehabilitation Permit (WA0001454) issued to Queensland Fauna Consultancy Pty Ltd by the Department of Environment and Science (DES), formerly the Department of Environment and Heritage Protection (DEHP), approving the observation and relocation of protected animals.

This report covers clearance activities undertaken on 19th July 2019.

2 Methodology

2.1 Clearance Investigations

A standard set of observational and active searching techniques were employed on the day of clearance to ascertain and identify existing fauna values for each location. These include:

- Assessment of terrestrial microhabitats such as ground hollows, rock, burrows, leaf litter, fallen branches and bark exfoliations,
- Observation and assessment of occupancy of arboreal microhabitats such as tree hollows, fissures and exfoliations,
- Direct observation of active or exposed fauna,
- Identification of scats, tracks and scratchings to determine fauna present on the site.

All microhabitats were identified and subsequently inspected during clearance.

2.2 Specific methodology for Koalas *Phascolarctos cinereus*

Due to the specific requirements relating to the Koala the following techniques were employed at the clearance site to ascertain presence/absence status:

- Use of binoculars to inspect the crown, forks and trunk of trees;
- ‘Drip zone’ searches at the base of known food trees for the presence of scats to a radius equal to that of the crown of individual trees;
- Inspection of trunks for scratchings indicative of use by Koalas.

Recent changes to Koala management strategies highlighted in the *Nature Conservation (Koala) Conservation Plan 2017* have resulted in particular conditions placed on vegetation clearance involving the removal of Koala food trees.

Further provisions include the restriction of all clearance that may directly interfere with the tree a Koala is residing in. Koalas are to leave via their own volition and may not be interfered with by any means. Only when Koalas have vacated a tree can clearance operations include the host tree and surrounding vegetation.

2.3 Felling Procedures

Trees identified as having potential fauna values (such as hollows, fissures and exfoliating bark) were clearly marked for supervision during felling and inspected once felled. Efforts were made to determine potentially occupant species by way of investigations for indicative signs (scats, scratchings and tracks). Where no signs were found or occupant species undeterminable, machinery operators were instructed to fell trees in a manner directed at minimising the potential risk of injury to fauna.

Limbs were inspected, and the direction of felling determined with regards to safety of both machinery and operators. Considerations to potentially occupant fauna were assessed and felling procedures formulated. Felling procedures may have included the following techniques:

- Machinery blades were utilised to shake the tree in an attempt to disturb fauna out of hollows or fissures to determine species present.
- If fauna were present, the tree was either left standing overnight to allow the occupant animal(s) time to leave via their own volition, or if species detected were able to be encouraged from the tree by shaking or direct capture by a wildlife spotter(s). The tree was felled with considerations to potentially undetected fauna.
- Where possible potentially occupied trees were felled with the identified microhabitat receiving minimal contact on impact.
- Adjacent felled trees were utilised to absorb the impact of potential fauna bearing trees.

2.4 Communications during Clearance

Each spotter/catcher was equipped with a hand-held radio to make positive communications with machinery operators. Communications by radio and positive hand signals were utilised to indicate intentions to machinery operators.

3 Results

The following daily inventory details fauna-based investigation results for the clearing area. Inspection activities, location, habitat values and fauna found are documented where required.

Friday 19th July

- Pre-clearance activities carried out (refer to Methodology) at Springfield Rise (V15)
- Vegetation clearance carried out at Springfield Rise (V15)
- 0 trees flagged
- 1 personnel in attendance

Arboreal Microhabitats: No. flagged tree/s felled: 0

Nest (N) Y N Hollows (H) Y N Arboreal termitaria (ATM) Y N

No. & size of hollow/s (mm): 0

Terrestrial Microhabitats:

Hollow logs Y N Woody debris Y N Rock piles Y N Burrows Y N

Aquatic habitat/s: Dam Y N Creek Y N Wetland Y N

No Fauna Found

4 Conclusion

All vegetation clearance was supervised as requested by Shadforth Civil Contractors and in accordance with stipulations as expressed in the *Nature Conservation (Koala) Conservation Plan 2017*.

No Koalas were observed during clearance activities. No other fauna required mitigation during clearance works.

All supervised clearance activities were conducted with the full co-operation of onsite personnel and machinery operator/s.

5 References

Department of Environment and Heritage Protection (2017) *Nature Conservation (Koala) Conservation Plan 2017*, Queensland State Government – DEHP.

References for nomenclature

Menkhorst, K. & Knight, F. (2011) *A Field Guide to the Mammals of Australia*. 3rd edn. Oxford University Press, South Melbourne.

Strahan, R. (Ed) (1995) *The Mammals of Australia*. New Holland Publishers, Sydney.



July 2019

Fauna Management and Spotter/Catcher Services Report

Springfield Rise – Village 17
Spring Mountain
Report prepared for Shadforth Civil Contractors



Report prepared by
QLD Fauna Consultancy Pty Ltd
Phone: (07) 3376 9780
Fax: (07) 3376 9740
Email: fauna@qfc.com.au

Date:	05/08/19
Title:	Fauna Management and Spotter/Catcher Services Report Springfield Rise – Village 17, Spring Mountain
Author/s:	Bryan Robinson, Ramona Rohwedder
Reviewed by:	Bryan Robinson
Field personnel:	Brett Bennett, Jonathan Pickvance, Rodney Whitaker, Rebecca Ferris
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1 Introduction

Qld Fauna Consultancy Pty Ltd has been engaged by Shadforth Civil Contractors to conduct Fauna Spotter/Catcher and Fauna Management activities for works at Village 17, Springfield Rise, Spring Mountain, Queensland.

All activities were conducted under the provisions of Rehabilitation Permit (WA0001454) issued to Queensland Fauna Consultancy Pty Ltd by the Department of Environment and Science (DES), formerly the Department of Environment and Heritage Protection (DEHP), approving the observation and relocation of protected animals.

This report covers clearance activities undertaken in July 2019.

2 Methodology

2.1 Clearance Investigations

A standard set of observational and active searching techniques were employed each day during clearance to ascertain and identify existing fauna values for each location. These include:

- Assessment of terrestrial microhabitats such as ground hollows, rock, burrows, leaf litter, fallen branches and bark exfoliations,
- Observation and assessment of occupancy of arboreal microhabitats such as tree hollows, fissures and exfoliations,
- Direct observation of active or exposed fauna,
- Identification of scats, tracks and scratchings to determine fauna present on the site.

All microhabitats were identified and subsequently inspected during clearance.

2.2 Specific methodology for Koalas *Phascolarctos cinereus*

Due to the specific requirements relating to the Koala the following techniques were employed at the clearance site to ascertain presence/absence status:

- Use of binoculars to inspect the crown, forks and trunk of trees;
- 'Drip zone' searches at the base of known food trees for the presence of scats to a radius equal to that of the crown of individual trees;
- Inspection of trunks for scratchings indicative of use by Koalas.

Recent changes to Koala management strategies highlighted in the *Nature Conservation (Koala) Conservation Plan 2017* have resulted in particular conditions placed on vegetation clearance involving the removal of Koala food trees.

Further provisions include the restriction of all clearance that may directly interfere with the tree a Koala is residing in. Koalas are to leave via their own volition and may not be interfered with by any means. Only when Koalas have vacated a tree can clearance operations include the host tree and surrounding vegetation.

2.3 Felling Procedures

Trees identified as having potential fauna values (such as hollows, fissures and exfoliating bark) were clearly marked for supervision during felling and inspected once felled. Efforts were made to determine potentially occupant species by way of investigations for indicative signs (scats, scratchings and tracks). Where no signs were found or occupant species undeterminable, machinery operators were instructed to fell trees in a manner directed at minimising the potential risk of injury to fauna.

Limbs were inspected, and the direction of felling determined with regards to safety of both machinery and operators. Considerations to potentially occupant fauna were assessed and felling procedures formulated. Felling procedures may have included the following techniques:

- Machinery blades were utilised to shake the tree in an attempt to disturb fauna out of hollows or fissures to determine species present.
- If fauna were present, the tree was either left standing overnight to allow the occupant animal(s) time to leave via their own volition, or if species detected were able to be encouraged from the tree by shaking or direct capture by a wildlife spotter(s). The tree was felled with considerations to potentially undetected fauna.
- Where possible potentially occupied trees were felled with the identified microhabitat receiving minimal contact on impact.
- Adjacent felled trees were utilised to absorb the impact of potential fauna bearing trees.

2.4 Communications during Clearance

Each spotter/catcher was equipped with a hand-held radio to make positive communications with machinery operators. Communications by radio and positive hand signals were utilised to indicate intentions to machinery operators.

3 Results

The following daily inventory details fauna-based investigation results for the clearing area. Inspection activities, location, habitat values and fauna found are documented where required. Fauna photos can be viewed in Appendix A.

Tuesday 23rd July

- Pre-clearance activities carried out (refer to Methodology) at Springfield Rise (V17)
- Vegetation clearance carried out at Springfield Rise (V17)
- 11 trees flagged
- 1 personnel in attendance

Arboreal Microhabitats: No. flagged tree/s felled: 11

Nest (N) Y N Hollows (H) Y N Arboreal termitaria (ATM) Y N

Other: Exfoliating bark, fissure

No. & size of hollow/s (mm): 0-49: 6 50-99: 3

Terrestrial Microhabitats:

Hollow logs Y N Woody debris Y N Rock piles Y N Burrows Y N

Other: Termitaria, dense leaf litter, bark exfoliations

Aquatic habitat/s: Dam Y N Creek Y N (Dry) Wetland Y N

No Fauna Found

Wednesday 24th July

- Pre-clearance activities carried out (refer to Methodology) at Springfield Rise (V17)
- Vegetation clearance carried out at Springfield Rise (V17)
- Refer to **Fauna Register** for fauna found
- 15 trees flagged
- 3 personnel in attendance

Arboreal Microhabitats: No. flagged tree/s felled: 15

Nest (N) Y N Hollows (H) Y N Arboreal termitaria (ATM) Y N

Other: Exfoliating bark, fissure, Possum drey

No. & size of hollow/s (mm): 0-49: 10 50-99: 4 100-149: 4 150-199: 2 250-299: 1

Terrestrial Microhabitats:

Hollow logs Y N Woody debris Y N Rock piles Y N Burrows Y N

Other: Termitaria, dense leaf litter, bark exfoliations

Aquatic habitat/s: Dam Y N Creek Y N (Dry) Wetland Y N Other: Gully (Dry)

Thursday 25th July

- Pre-clearance activities carried out (refer to Methodology) at Springfield Rise (V17)
- Vegetation clearance carried out at Springfield Rise (V17)
- Refer to **Fauna Register** for fauna found
- 5 trees flagged
- 3 personnel in attendance

Arboreal Microhabitats: No. flagged tree/s felled: 5

Nest (N) Y N Hollows (H) Y N Arboreal termitaria (ATM) Y N

Other: Exfoliating bark, Possum drey, fissure

No. & size of hollow/s (mm): 50-99: 1

Terrestrial Microhabitats:

Hollow logs Y N Woody debris Y N Rock piles Y N Burrows Y N

Other: Termitaria, dense leaf litter, bark exfoliations, timber stockpiles

Aquatic habitat/s: Dam Y N Creek Y N Wetland Y N Other: Gully (Dry)

Friday 26th July

- Pre-clearance activities carried out (refer to Methodology) at Springfield Rise (V17)
- Vegetation clearance carried out at Springfield Rise (V17)
- 7 trees flagged
- 1 personnel in attendance

Arboreal Microhabitats: No. flagged tree/s felled: 7

Nest (N) Y N Hollows (H) Y N Arboreal termitaria (ATM) Y N

Other: Exfoliating bark

No. & size of hollow/s (mm): 0

Terrestrial Microhabitats:

Hollow logs Y N Woody debris Y N Rock piles Y N Burrows Y N

Other: Dense leaf litter, large boulders

Aquatic habitat/s: Dam Y N Creek Y N Wetland Y N

No Fauna Found

4 Fauna Register

Collectors Name	Date	Time	Capture Location	Capture Location		Count Type	Status	Common Name - Scientific Name	Count	Release Details			Actions				Release Location Description	Comments	
				Latitude	Longitude					Date	Latitude	Longitude	R1	R2	D	I			
Brett Bennett	24/07/19	08:41	Springfield Rise – V17, Spring Mountain	-27.6855	152.8863	Alive	Least Concern	Common Ringtail Possum <i>Pseudocheirus peregrinus</i>	2	24/07	NA	NA	X					Self-relocation into adjacent bushland.	
Rodney Whitaker	24/07/19	09:05	Springfield Rise – V17, Spring Mountain	-27.6825	152.8882	Alive	Vulnerable	Koala <i>Phascolarctos cinereus</i>	1	NA	NA	NA				X		Exclusion zone established; left in tree for relocation of own volition.	
Jonathan Pickvance	25/07/19	12:49	Springfield Rise – V17, Spring Mountain	-27.6867	152.8862	Alive	Least Concern	Lace Monitor <i>Varanus varius</i>	1	25/07	-27.6869	152.8863	X					Self-relocation to adjacent tree.	
Rebecca Ferris	25/07/19	12:23	Springfield Rise – V17, Spring Mountain	-27.6866	152.8860	Alive	Least Concern	Tree-base Litter-skink <i>Lygisaurus foliorum</i>	1	25/07	-27.6838	152.8869	X					In leaf litter.	

5 Conclusion

All vegetation clearance was supervised as requested by Shadforth Civil Contractors and in accordance with stipulations as expressed in the *Nature Conservation (Koala) Conservation Plan 2017*.

One Koala was observed during clearance activities. An exclusion zone was established, and the Koala left to relocate via own volition. Other fauna found during clearance works were relocated (or self-relocated) to adjacent localities comprising suitable refugia and feeding resources consistent with individual species requirements.

All supervised clearance activities were conducted with the full co-operation of onsite personnel and machinery operator/s.

6 References

Department of Environment and Heritage Protection (2017) *Nature Conservation (Koala) Conservation Plan 2017*, Queensland State Government – DEHP.

References for nomenclature

Menkhorst, K. & Knight, F. (2011) *A Field Guide to the Mammals of Australia*. 3rd edn. Oxford University Press, South Melbourne.

Strahan, R. (Ed) (1995) *The Mammals of Australia*. New Holland Publishers, Sydney.

Wilson, S. (2015) *A Field Guide to Reptiles of Queensland*. 2nd edn, Sydney: New Holland Publishers.

7 Appendix A: Fauna Photos



Koala
Phascolarctos cinereus



Lace Monitor
Varanus varius



August 2019

Fauna Management and Spotter/Catcher Services Report

Springfield Rise – Village 15
Spring Mountain
Report prepared for Shadforth Civil Contractors



Report prepared by
QLD Fauna Consultancy Pty Ltd
Phone: (07) 3376 9780
Fax: (07) 3376 9740
Email: fauna@qfc.com.au

Date:	03/09/19
Title:	Fauna Management and Spotter/Catcher Services Report Springfield Rise – Village 15, Spring Mountain
Author/s:	Bryan Robinson, Ramona Rohwedder
Reviewed by:	Bryan Robinson
Field personnel:	Jonathan Pickvance
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1 Introduction

Qld Fauna Consultancy Pty Ltd has been engaged by Shadforth Civil Contractors to conduct Fauna Spotter/Catcher and Fauna Management activities for works at Village 15, Springfield Rise, Spring Mountain, Queensland.

All activities were conducted under the provisions of Rehabilitation Permit (WA0001454) issued to Queensland Fauna Consultancy Pty Ltd by the Department of Environment and Science (DES), formerly the Department of Environment and Heritage Protection (DEHP), approving the observation and relocation of protected animals.

This report covers clearance activities undertaken on 26th August 2019.

2 Methodology

2.1 Clearance Investigations

A standard set of observational and active searching techniques were employed on the day of clearance to ascertain and identify existing fauna values for each location. These include:

- Assessment of terrestrial microhabitats such as ground hollows, rock, burrows, leaf litter, fallen branches and bark exfoliations,
- Observation and assessment of occupancy of arboreal microhabitats such as tree hollows, fissures and exfoliations,
- Direct observation of active or exposed fauna,
- Identification of scats, tracks and scratchings to determine fauna present on the site.

All microhabitats were identified and subsequently inspected during clearance.

2.2 Specific methodology for Koalas *Phascolarctos cinereus*

Due to the specific requirements relating to the Koala the following techniques were employed at the clearance site to ascertain presence/absence status:

- Use of binoculars to inspect the crown, forks and trunk of trees;
- ‘Drip zone’ searches at the base of known food trees for the presence of scats to a radius equal to that of the crown of individual trees;
- Inspection of trunks for scratchings indicative of use by Koalas.

Recent changes to Koala management strategies highlighted in the *Nature Conservation (Koala) Conservation Plan 2017* have resulted in particular conditions placed on vegetation clearance involving the removal of Koala food trees.

Further provisions include the restriction of all clearance that may directly interfere with the tree a Koala is residing in. Koalas are to leave via their own volition and may not be interfered with by any means. Only when Koalas have vacated a tree can clearance operations include the host tree and surrounding vegetation.

2.3 Felling Procedures

Trees identified as having potential fauna values (such as hollows, fissures and exfoliating bark) were clearly marked for supervision during felling and inspected once felled. Efforts were made to determine potentially occupant species by way of investigations for indicative signs (scats, scratchings and tracks). Where no signs were found or occupant species undeterminable, machinery operators were instructed to fell trees in a manner directed at minimising the potential risk of injury to fauna.

Limbs were inspected, and the direction of felling determined with regards to safety of both machinery and operators. Considerations to potentially occupant fauna were assessed and felling procedures formulated. Felling procedures may have included the following techniques:

- Machinery blades were utilised to shake the tree in an attempt to disturb fauna out of hollows or fissures to determine species present.
- If fauna were present, the tree was either left standing overnight to allow the occupant animal(s) time to leave via their own volition, or if species detected were able to be encouraged from the tree by shaking or direct capture by a wildlife spotter(s). The tree was felled with considerations to potentially undetected fauna.
- Where possible potentially occupied trees were felled with the identified microhabitat receiving minimal contact on impact.
- Adjacent felled trees were utilised to absorb the impact of potential fauna bearing trees.

2.4 Communications during Clearance

Each spotter/catcher was equipped with a hand-held radio to make positive communications with machinery operators. Communications by radio and positive hand signals were utilised to indicate intentions to machinery operators.

3 Results

The following daily inventory details fauna-based investigation results for the clearing area. Inspection activities, location, habitat values and fauna found are documented where required.

Monday 26th August 2019

- Pre-clearance activities carried out (refer to Methodology) at Springfield Rise (V15)
- Vegetation clearance carried out at Springfield Rise (V15)
- 2 trees flagged
- One personnel in attendance

Arboreal Microhabitats: No. flagged tree/s felled: 2

Nest (N) Y N (Inactive Australian Magpie nest *Cracticus tibicen*) Hollows (H) Y N

Arboreal termitaria (ATM) Y N Other: Exfoliating bark

No. & size of hollow/s (mm): 0

Terrestrial Microhabitats:

Hollow logs Y N Woody debris Y N Rock piles Y N Burrows Y N

Aquatic habitat/s: Dam Y N Creek Y N (Dry) Wetland Y N

No Fauna Found

4 Conclusion

All vegetation clearance was supervised as requested by Shadforth Civil Contractors and in accordance with stipulations as expressed in the *Nature Conservation (Koala) Conservation Plan 2017*.

No Koalas were observed during clearance activities. No fauna required mitigation during clearance works.

All supervised clearance activities were conducted with the full co-operation of onsite personnel and machinery operator/s.

5 References

Department of Environment and Heritage Protection (2017) *Nature Conservation (Koala) Conservation Plan 2017*, Queensland State Government – DEHP.

References for nomenclature

Beruldsen, G. (2003) *Australian Birds their Nests and Eggs*, Kenmore Hills: Self Published.

Menkhorst, K. & Knight, F. (2011) *A Field Guide to the Mammals of Australia*. 3rd edn. Oxford University Press, South Melbourne.

Strahan, R. (Ed) (1995) *The Mammals of Australia*. New Holland Publishers, Sydney.



August 2019

Fauna Management and Spotter/Catcher Services Report

Springfield Rise – Village 16, Area B
Spring Mountain
Report prepared for Shadforth Civil Contractors



Report prepared by
QLD Fauna Consultancy Pty Ltd
Phone: (07) 3376 9780
Fax: (07) 3376 9740
Email: fauna@qfc.com.au

Date:	03/09/19
Title:	Fauna Management and Spotter/Catcher Services Report Springfield Rise – Village 16, Area B, Spring Mountain
Author/s:	Bryan Robinson, Ramona Rohwedder
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Field personnel:	Brett Bennett, Jonathan Pickvance, Jason Raguse
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1 Introduction

Qld Fauna Consultancy Pty Ltd has been engaged by Shadforth Civil Contractors to conduct Fauna Spotter/Catcher and Fauna Management activities for works at Village 16, Area B, Springfield Rise, Spring Mountain, Queensland.

All activities were conducted under the provisions of Rehabilitation Permit (WA0001454) issued to Queensland Fauna Consultancy Pty Ltd by the Department of Environment and Science (DES), formerly the Department of Environment and Heritage Protection (DEHP), approving the observation and relocation of protected animals.

This report covers clearance activities undertaken in August 2019.

2 Methodology

2.1 Clearance Investigations

A standard set of observational and active searching techniques were employed each day during clearance to ascertain and identify existing fauna values for each location. These include:

- Assessment of terrestrial microhabitats such as ground hollows, rock, burrows, leaf litter, fallen branches and bark exfoliations,
- Observation and assessment of occupancy of arboreal microhabitats such as tree hollows, fissures and exfoliations,
- Direct observation of active or exposed fauna,
- Identification of scats, tracks and scratchings to determine fauna present on the site.

All microhabitats were identified and subsequently inspected during clearance.

2.2 Specific methodology for Koalas *Phascolarctos cinereus*

Due to the specific requirements relating to the Koala the following techniques were employed at the clearance site to ascertain presence/absence status:

- Use of binoculars to inspect the crown, forks and trunk of trees;
- 'Drip zone' searches at the base of known food trees for the presence of scats to a radius equal to that of the crown of individual trees;
- Inspection of trunks for scratchings indicative of use by Koalas.

Recent changes to Koala management strategies highlighted in the *Nature Conservation (Koala) Conservation Plan 2017* have resulted in particular conditions placed on vegetation clearance involving the removal of Koala food trees.

Further provisions include the restriction of all clearance that may directly interfere with the tree a Koala is residing in. Koalas are to leave via their own volition and may not be interfered with by any means. Only when Koalas have vacated a tree can clearance operations include the host tree and surrounding vegetation.

2.3 Felling Procedures

Trees identified as having potential fauna values (such as hollows, fissures and exfoliating bark) were clearly marked for supervision during felling and inspected once felled. Efforts were made to determine potentially occupant species by way of investigations for indicative signs (scats, scratchings and tracks). Where no signs were found or occupant species undeterminable, machinery operators were instructed to fell trees in a manner directed at minimising the potential risk of injury to fauna.

Limbs were inspected, and the direction of felling determined with regards to safety of both machinery and operators. Considerations to potentially occupant fauna were assessed and felling procedures formulated. Felling procedures may have included the following techniques:

- Machinery blades were utilised to shake the tree in an attempt to disturb fauna out of hollows or fissures to determine species present.
- If fauna were present, the tree was either left standing overnight to allow the occupant animal(s) time to leave via their own volition, or if species detected were able to be encouraged from the tree by shaking or direct capture by a wildlife spotter(s). The tree was felled with considerations to potentially undetected fauna.
- Where possible potentially occupied trees were felled with the identified microhabitat receiving minimal contact on impact.
- Adjacent felled trees were utilised to absorb the impact of potential fauna bearing trees.

2.4 Communications during Clearance

Each spotter/catcher was equipped with a hand-held radio to make positive communications with machinery operators. Communications by radio and positive hand signals were utilised to indicate intentions to machinery operators.

3 Results

The following daily inventory details fauna-based investigation results for the clearing area. Inspection activities, location, habitat values and fauna found are documented where required. Fauna photos can be viewed in Appendix A.

Tuesday 6th August

- Pre-clearance activities carried out (refer to Methodology) at Springfield Rise (V16, Area B)
- Vegetation clearance carried out at Springfield Rise (V16, Area B)
- Refer to **Fauna Register** for fauna found
- 13 trees flagged
- 2 personnel in attendance

Arboreal Microhabitats: No. flagged tree/s felled: 13

Nest (N) Y N Hollows (H) Y N Arboreal termitaria (ATM) Y N

Other: Exfoliating bark

No. & size of hollow/s (mm): 0-49: 1 100-149: 2 150-199: 1

Terrestrial Microhabitats:

Hollow logs Y N Woody debris Y N Rock piles Y N Burrows Y N

Other: Termitaria, dense leaf litter, bark exfoliations, timber stockpiles

Aquatic habitat/s: Dam Y N Creek Y N Wetland Y N

Wednesday 7th August

- Pre-clearance activities carried out (refer to Methodology) at Springfield Rise (V16, Area B)
- Vegetation clearance carried out at Springfield Rise (V16, Area B)
- Refer to **Fauna Register** for fauna found
- 3 trees flagged
- 2 personnel in attendance

Arboreal Microhabitats: No. flagged tree/s felled: 6

Nest (N) Y N Hollows (H) Y N Arboreal termitaria (ATM) Y N

Other: Exfoliating bark

No. & size of hollow/s (mm): 0-49: 3 50-99: 1 100-149: 2 200-249: 2 250-299: 1

Terrestrial Microhabitats:

Hollow logs Y N Woody debris Y N Rock piles Y N Burrows Y N

Aquatic habitat/s: Dam Y N Creek Y N Wetland Y N

Thursday 8th August

- Pre-clearance activities carried out (refer to Methodology) at Springfield Rise (V16, Area B)
- Vegetation clearance carried out at Springfield Rise (V16, Area B)
- Refer to **Fauna Register** for fauna found
- 5 trees flagged
- 2 personnel in attendance

Arboreal Microhabitats: No. flagged tree/s felled: 6

Nest (N) Y N Hollows (H) Y N Arboreal termitaria (ATM) Y N

Other: Exfoliating bark

No. & size of hollow/s (mm): 50-99: 1 100-149: 2 200-249: 1

Terrestrial Microhabitats:

Hollow logs Y N Woody debris Y N Rock piles Y N Burrows Y N

Other: Bark exfoliations, dense leaf litter

Aquatic habitat/s: Dam Y N Creek Y N Wetland Y N

Friday 9th August

- Pre-clearance activities carried out (refer to Methodology) at Springfield Rise (V16, Area B)
- Vegetation clearance carried out at Springfield Rise (V16, Area B)
- 7 trees flagged
- 2 personnel in attendance

Arboreal Microhabitats: No. flagged tree/s felled: 7

Nest (N) Y N Hollows (H) Y N Arboreal termitaria (ATM) Y N

Other: Exfoliating bark

No. & size of hollow/s (mm): 50-99: 1

Terrestrial Microhabitats:

Hollow logs Y N Woody debris Y N Rock piles Y N Burrows Y N

Aquatic habitat/s: Dam Y N Creek Y N Wetland Y N

No Fauna Found

4 Fauna Register

Collectors Name	Date	Time	Capture Location	Capture Location		Count Type	Status	Common Name - Scientific Name	Count	Release Details			Actions				Release Location Description	Comments	
				Latitude	Longitude					Date	Latitude	Longitude	R1	R2	D	I			
Brett Bennett, Jonathan Pickvance	06/08/19	12:53	Springfield Rise, Village 16, Area B, Spring Mountain	-27.6657	152.8849	Alive	Least Concern	Eastern Brown Snake <i>Pseudonaja textilis</i>	1	06/08	NA	NA	X					Self-relocation into adjacent bushland.	
Jonathan Pickvance	06/08/19	09:20	Springfield Rise, Village 16, Area B, Spring Mountain	-27.6793	152.8879	Alive	Least Concern	Elegant Snake-eyed Skink <i>Cryptoblepharus pulcher</i>	1	06/08	-27.6799	152.8872	X					On tree trunk	
Jonathan Pickvance	06/08/19	10:59	Springfield Rise, Village 16, Area B, Spring Mountain	-27.6792	152.8886	Alive	Least Concern	Common Brushtail Possum <i>Trichosurus vulpecula</i>	1	06/08	NA	NA	X					Self-relocation	Stag with hollows left standing overnight to allow Possum to self-relocate.

Jonathan Pickvance	06/08/19	14:44	Springfield Rise, Village 16, Area B, Spring Mountain	-27.6769	152.8889	Alive	Least Concern	Elegant Snake-eyed Skink <i>Cryptoblepharus pulcher</i>	2	06/08	-27.6773	152.8889	X				On tree trunk
Jonathan Pickvance	07/08/19	11:28	Springfield Rise, Village 16, Area B, Spring Mountain	-27.6770	152.8871	Alive	Least Concern	Robust Rainbow-Skink <i>Carlia schmelzii</i>	1	07/08	-27.6798	152.8872	X				In woody debris
Jonathan Pickvance	08/08/19	15:40	Springfield Rise, Village 16, Area B, Spring Mountain	-27.6769	152.8882	Alive	Least Concern	Dubious Dtella <i>Gehyra dubia</i>	1	08/08	-27.6793	152.8970	X				Under bark on tree
Jason Raguse	08/08/19	07:55	Springfield Rise, Village 16, Area B, Spring Mountain	-27.6778	152.8883	Alive	Least Concern	Robust Velvet Gecko <i>Nebulifera robusta</i>	1	08/08	-27.6800	152.8875	X				Under bark on tree

5 Conclusion

All vegetation clearance was supervised as requested by Shadforth Civil Contractors and in accordance with stipulations as expressed in the *Nature Conservation (Koala) Conservation Plan 2017*.

No Koalas were observed during clearance activities. Other fauna found during clearance works were relocated (or self-relocated) to adjacent localities comprising suitable refugia and feeding resources consistent with individual species requirements.

All supervised clearance activities were conducted with the full co-operation of onsite personnel and machinery operator/s.

6 References

Department of Environment and Heritage Protection (2017) *Nature Conservation (Koala) Conservation Plan 2017*, Queensland State Government – DEHP.

References for nomenclature

Menkhorst, K. & Knight, F. (2011) *A Field Guide to the Mammals of Australia*. 3rd edn. Oxford University Press, South Melbourne.

Strahan, R. (Ed) (1995) *The Mammals of Australia*. New Holland Publishers, Sydney.

Wilson, S. (2015) *A Field Guide to Reptiles of Queensland*. 2nd edn, Sydney: New Holland Publishers.

7 Appendix A: Fauna Photos



Elegant Snake-eyed Skink
Cryptoblepharus pulcher



Robust Rainbow-Skink
Carlia schmeltzii



Dubious Dtella
Gehyra dubia



Robust Velvet Gecko
Nebulifera robusta



October 2019

Fauna Management and Spotter/Catcher Services Report

Springfield Rise – Town Centre Gully West (Stage 3)
Spring Mountain
Report prepared for Shadforth Civil Contractors



Report prepared by

QLD Fauna Consultancy Pty Ltd

Phone: (07) 3376 9780

Fax: (07) 3376 9740

Email: fauna@qfc.com.au

Date:	01/11/19
Title:	Fauna Management and Spotter/Catcher Services Report Springfield Rise – Town Centre Gully West (Stage 3), Spring Mountain
Author/s:	Bryan Robinson, Ramona Rohwedder
Reviewed by:	Bryan Robinson
Field personnel:	Scott Lewis, Jason Raguse
Status:	Final Report
Filed as:	QFC FMR Shadforth Springfield Rise TCGW Stage 3 Oct 2019.doc

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2.2	Specific methodology for Koalas <i>Phascolarctos cinereus</i>	4
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1 Introduction

Qld Fauna Consultancy Pty Ltd has been engaged by Shadforth Civil Contractors to conduct Fauna Spotter/Catcher and Fauna Management activities for works at Town Centre Gully West (Stage 3 Clearing), Springfield Rise, Spring Mountain, Queensland.

All activities were conducted under the provisions of Rehabilitation Permit (WA0001454) issued to Queensland Fauna Consultancy Pty Ltd by the Department of Environment and Science (DES), formerly the Department of Environment and Heritage Protection (DEHP), approving the observation and relocation of protected animals.

This report covers clearance activities undertaken in October 2019.

2 Methodology

2.1 Clearance Investigations

A standard set of observational and active searching techniques were employed each day during clearance to ascertain and identify existing fauna values for each location. These include:

- Assessment of terrestrial microhabitats such as ground hollows, rock, burrows, leaf litter, fallen branches and bark exfoliations,
- Observation and assessment of occupancy of arboreal microhabitats such as tree hollows, fissures and exfoliations,
- Direct observation of active or exposed fauna,
- Identification of scats, tracks and scratchings to determine fauna present on the site.

All microhabitats were identified and subsequently inspected during clearance.

2.2 Specific methodology for Koalas *Phascolarctos cinereus*

Due to the specific requirements relating to the Koala the following techniques were employed at the clearance site to ascertain presence/absence status:

- Use of binoculars to inspect the crown, forks and trunk of trees;
- 'Drip zone' searches at the base of known food trees for the presence of scats to a radius equal to that of the crown of individual trees;
- Inspection of trunks for scratchings indicative of use by Koalas.

Recent changes to Koala management strategies highlighted in the *Nature Conservation (Koala) Conservation Plan 2017* have resulted in particular conditions placed on vegetation clearance involving the removal of Koala food trees.

Further provisions include the restriction of all clearance that may directly interfere with the tree a Koala is residing in. Koalas are to leave via their own volition and may not be interfered with by any means. Only when Koalas have vacated a tree can clearance operations include the host tree and surrounding vegetation.

2.3 Felling Procedures

Trees identified as having potential fauna values (such as hollows, fissures and exfoliating bark) were clearly marked for supervision during felling and inspected once felled. Efforts were made to determine potentially occupant species by way of investigations for indicative signs (scats, scratchings and tracks). Where no signs were found or occupant species undeterminable, machinery operators were instructed to fell trees in a manner directed at minimising the potential risk of injury to fauna.

Limbs were inspected, and the direction of felling determined with regards to safety of both machinery and operators. Considerations to potentially occupant fauna were assessed and felling procedures formulated. Felling procedures may have included the following techniques:

- Machinery blades were utilised to shake the tree in an attempt to disturb fauna out of hollows or fissures to determine species present.
- If fauna were present, the tree was either left standing overnight to allow the occupant animal(s) time to leave via their own volition, or if species detected were able to be encouraged from the tree by shaking or direct capture by a wildlife spotter(s). The tree was felled with considerations to potentially undetected fauna.
- Where possible potentially occupied trees were felled with the identified microhabitat receiving minimal contact on impact.
- Adjacent felled trees were utilised to absorb the impact of potential fauna bearing trees.

2.4 Communications during Clearance

Each spotter/catcher was equipped with a hand-held radio to make positive communications with machinery operators. Communications by radio and positive hand signals were utilised to indicate intentions to machinery operators.

3 Results

The following daily inventory details fauna-based investigation results for the clearing area. Inspection activities, location, habitat values and fauna found are documented where required.

Wednesday 2nd October 2019

- Pre-clearance activities carried out (refer to Methodology) at Springfield Rise (Town Centre Gully West – Stage 3)
- Vegetation clearance carried out at Springfield Rise (Town Centre Gully West – Stage 3)
- 3 trees flagged
- 2 personnel in attendance

Arboreal Microhabitats: No. flagged tree/s felled: 3

Nest (N) Y N (Inactive) Hollows (H) Y N Arboreal termitaria (ATM) Y N

Other: Exfoliating bark

No. & size of hollow/s (mm): 0

Terrestrial Microhabitats:

Hollow logs Y N Woody debris Y N Rock piles Y N Burrows Y N

Other: Termitaria, dense leaf litter, bark exfoliations

Aquatic habitat/s: Dam Y N Creek Y N Wetland Y N Other: Gully

No Fauna Found

Thursday 3rd October 2019

- Pre-clearance activities carried out (refer to Methodology) at Springfield Rise (Town Centre Gully West – Stage 3)
- Vegetation clearance carried out at Springfield Rise (Town Centre Gully West – Stage 3)
- 1 tree flagged
- 2 personnel in attendance

Arboreal Microhabitats: No. flagged tree/s felled: 1

Nest (N) Y N Hollows (H) Y N Arboreal termitaria (ATM) Y N

Other: Exfoliating bark

No. & size of hollow/s (mm): 0-49: 2

Terrestrial Microhabitats:

Hollow logs Y N Woody debris Y N Rock piles Y N Burrows Y N

Other: Dense leaf litter, bark exfoliations

Aquatic habitat/s: Dam Y N Creek Y N Wetland Y N

No Fauna Found

4 Conclusion

All vegetation clearance was supervised as requested by Shadforth Civil Contractors and in accordance with stipulations as expressed in the *Nature Conservation (Koala) Conservation Plan 2017*.

No Koalas were observed during clearance activities. No fauna required mitigation during clearance works.

All supervised clearance activities were conducted with the full co-operation of onsite personnel and machinery operator/s.

5 References

Department of Environment and Heritage Protection (2017) *Nature Conservation (Koala) Conservation Plan 2017*, Queensland State Government – DEHP.

References for nomenclature

Menkhorst, K. & Knight, F. (2011) *A Field Guide to the Mammals of Australia*. 3rd edn. Oxford University Press, South Melbourne.

Strahan, R. (Ed) (1995) *The Mammals of Australia*. New Holland Publishers, Sydney.

Appendix C

Fauna movement solutions – photos of construction works/progress

Fauna movement solutions – photos of construction works/progress













Appendix D

Lend Lease Key Design Outcome Fence
Requirement notice

KEY DESIGN OUTCOME

Fence Requirement

Stage 3: Lots 2664, 2689, 2690, 2703, 2704, 2716, 2717, 2728-2739

The following requirements set out further items you must consider when designing and siting your home on your block. These requirements are additional to the Springfield Rise Home Design Guidelines. You must comply with the Springfield Rise Home Design Guidelines and this Key Design Outcome.

Springfield Rise at Spring Mountain is subject to a Federal Government environmental approval. This approval has certain conditions that must be complied with. As part of the Federal Approval, the specified lots in this key design outcome are located at the interface of a conservation and/or linear space area and suburban residential area, and as such, these lots must incorporate koala exclusion type fencing to avoid koalas entering into your property.

Requirements

1. Front boundary fencing to the front alignment of the specified lots is prohibited. NB. Where on a corner lot, fencing is allowed to the secondary frontage if it meets the requirements as specified in 2.
2. Fencing must be installed between the house and the side boundary. Any fencing and/or gates to house and side boundary fencing is to be constructed of the following:
 - Solid powder-coated metal sheet fencing; or
 - Any other solid, non-climbable fence/gate materials as approved by Lendlease.

Please sign below to indicate that you have read this document, understand the requirements and will comply with this document as required by the conditions of your contract.

Lot: _____

Name: _____

Signature: _____

Date: _____

Name: _____

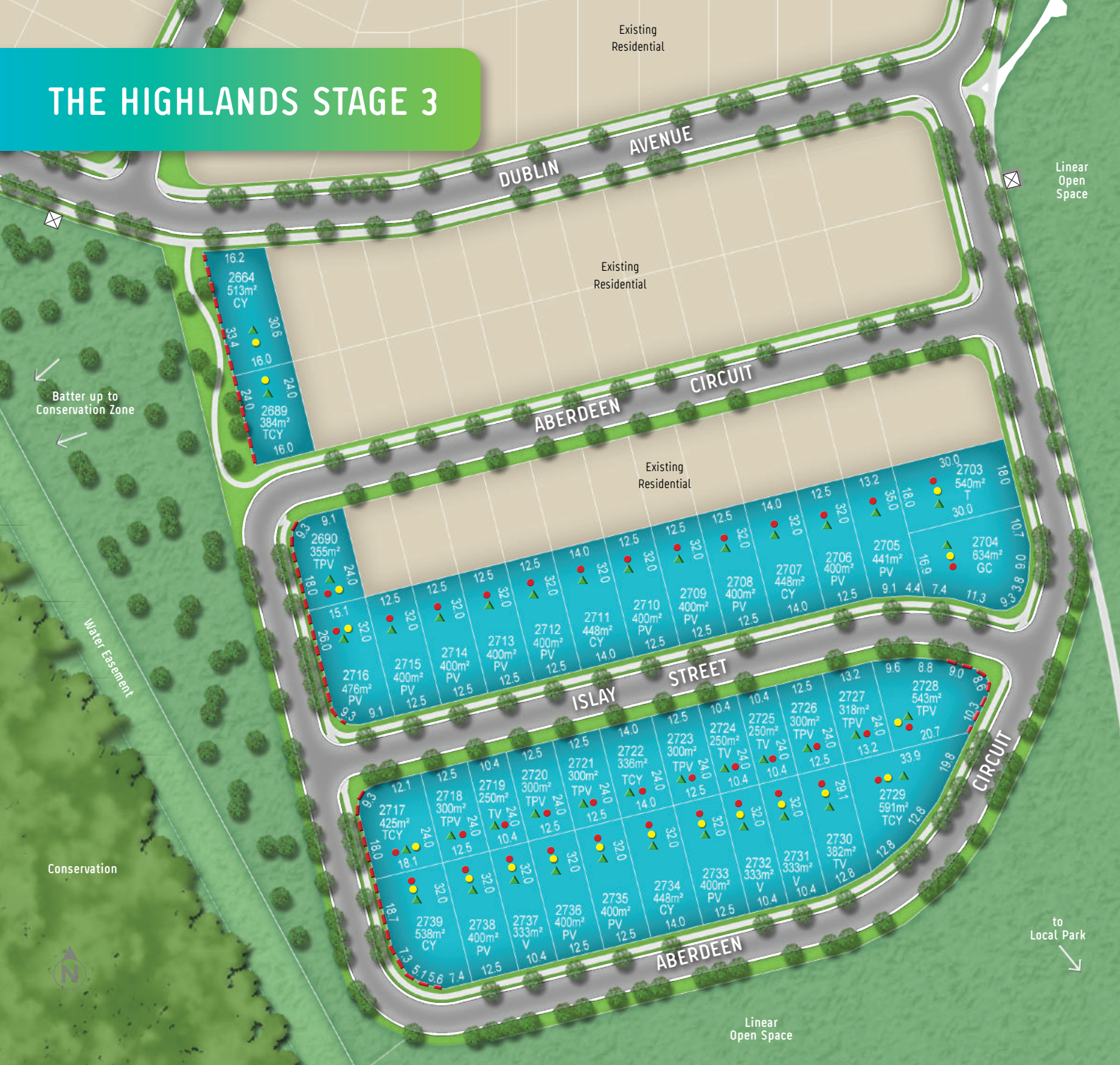
Signature: _____

Date: _____

Appendix E

Lend Lease fencing detail

THE HIGHLANDS STAGE 3



Disclaimer: We have taken care to ensure that these plans have been prepared from all currently available information. However, allotment dimensions, easements and public utility service infrastructure locations could change before final approval is given by the Local and State government authorities. The purchaser should therefore make his or her own enquiries before entering into any contract. The measurements of each block indicate block boundary lengths and widths and are rounded down to the nearest tenth of a metre. Published by Lend Lease Realty Pty Ltd ACN 007 708 572. August 2018

Locality



Legend

- Pedestrian / Cycle Pathways
- Street Trees (Indicative Location Only)
- Engineered Fill
- Bushfire Construction Requirement (AS3959-2009)
- Key Design Outcome - Koala Fencing Requirement
- Colourbond fencing by Lendlease (Woodland Grey)
- Proposed Pad Mount Transformer

Block Types

- T** Traditional Block
- CY** Courtyard Block
- TCY** Town Courtyard Block
- PV** Premium Villa
- TPV** Town Premium Villa Block
- TV** Town Villa Block
- GC** Gallery Collection Block

belong at Springfield Rise at Spring Mountain

springfieldrise.com.au 1800 223 050

SPRINGFIELD RISE AT SPRING MOUNTAIN FAST FACTS

Education

- Close to childcare centres
- Choice of 10 private and public primary schools (with a primary school planned for Springfield Rise at Spring Mountain)
- Choice of 6 private and public high schools
- TAFE Queensland South West
- University of Southern Queensland within walking and cycling distance

Recreation & Open Space

- 13 proposed local parks
- 3 proposed district parks
- 12 proposed sporting fields
- 2.5km of wildlife corridors
- Proposed hard courts, playgrounds and clubhouse
- Walk to Robelle Domain Parklands which includes 11km of boardwalks, sporting fields, playgrounds, water play and Southbank style swimming lagoon
- Direct access to hiking and mountain biking trails in surrounding conservation parks.

Shopping & Lifestyle

- Adjacent to Orion Springfield Central's shops, cinemas, cafes, restaurants and business precincts
- Local village shopping centre, plus easy access to existing neighbourhood centres (Spring Lake Metro, Spring Lake Village and Springfield Fair)
- Close to Bunnings within Springfield Central
- Five minutes drive to Brookwater Golf and Country Club with proposed future international resort and spa
- Just 15 minutes drive to Mt Ommaney Shopping Centre and DFO at Jindalee.

Location

- In the heart of the Greater Springfield Precinct between the city-like amenity of Springfield Central and the beauty of White Rock-Spring Mountain Conservation Estate
- Within the City of Ipswich
- 15 minutes drive from the Ipswich CBD
- 30 minutes drive from Brisbane CBD
- 50 minutes drive from the Gold Coast.

Living Options

Springfield Rise at Spring Mountain will offer a large choice of living options with block sizes from 240m² to 640m² and with house and land packages to suit every lifestyle and budget.

Springfield Rise at Spring Mountain
Sales and Information Centre
84-90 Russell Luhrs Way
Spring Mountain Qld 4300

belong at Springfield Rise at Spring Mountain

springfieldrise.com.au 1800 223 050

THE HIGHLANDS

Discover life at The Highlands, the latest address in Springfield Rise at Spring Mountain. You won't be disappointed by its many features. Bordered by the White Rock – Spring Mountain Conservation Estate to the south, and adjoining one of Spring Mountain's large district parks to the north, you'll be spoilt for choice on your daily walks and cycles. Enjoy the view from the top – the elevation of The Highlands will mean that some lots will offer city views. Plus you'll enjoy the convenience of schools, shops, child care centres and other parks already nearby.

Make your move to The Highlands. You'll wonder why you waited this long to call Springfield Rise at Spring Mountain home.

Appendix F

Certified PMAV document package

File / Ref number: 2016/005033
Unit: Natural Resource Assessment
Phone: 5480 5348

10 October 2016

Ipswich City Council
C/- Mr Murray Saunders
Saunders Havill Group
murraysaunders@saundershavill.com

Dear Mr Saunders

Certification of a voluntary declaration on Lots 11 S31533, 705 SP151175, 740 SP179412, 745 SP242282, 747 SP189043, 748 SP189044, 751 SP189053, 752 SP189053 and 753 SP189054 – Ipswich City Council as an area of high nature conservation value.

This is to advise you that a voluntary declaration on lots 11 S31533, 705 SP151175, 740 SP179412, 745 SP242282, 747 SP189043, 748 SP189044, 751 SP189053, 752 SP189053 and 753 SP189054 – Ipswich City Council has been made—consistent with your agreement—by the Department of Natural Resources and Mines on 10 October 2016. A copy of each of the following documents is attached for your records:

- Declaration notice
- Declared area map sheets 1 and 2
- Declared area Property Map of Assessable Vegetation sheets 1 and 2
- Declared area management plan

Please note, that in accordance with the declaration, management of the declared area, monitoring the condition of the declared area, and reporting on the condition of the declared area will be required. Please refer to the declaration documents for the specifics regarding such requirements. This declaration will be noted on the title of the declared area—binding management, monitoring and reporting responsibilities upon current and future owners.

If you wish to discuss this matter further, please contact me on telephone number 5480 5348.

Yours sincerely



Andrew Collins
Senior Natural Resource Management Officer

Voluntary Declaration notice (2016/005033)

s19E – 19K of the Vegetation Management Act 1999

1. Details of request

- 1.1. **Proponent's name:** Ipswich City Council
- 1.2. **Date request received:** 14 September 2016
- 1.3. **Request:** declaration request as an area that makes a significant contribution to the conservation of biodiversity.
- 1.4. **Property description:** Lots 11 S31533, 705 SP151175, 740 SP179412, 745 SP242282, 747 SP189043, 748 SP189044, 751 SP189053, 752 SP189053 and 753 SP189054 – Ipswich City Council.
- 1.5. **Land tenure:** Freehold
- 1.6. **Decision reference:** 2016/005033

2. Declaration information

2.1. Declaration made:

The Chief Executive of the Department of Natural Resources and Mines declares the area identified on Declared Area Map DAM (2016/005033) as an area of high nature conservation value in accordance with s19F(1) of the *Vegetation Management Act 1999*.

The chief executive considers the declared area to meet the following criteria under s19G of the *Vegetation Management Act 1999*—

The declared area is an area of high nature conservation value under s19G(1)(b), as the area is one or more of the following:

- a wildlife refugium;
- a centre of endemism;
- an area containing a vegetation clump or corridor that contributes to the maintenance of biodiversity;
- an area that makes a significant contribution to the conservation of biodiversity;
- an area that makes a significant contribution to the conservation of biodiversity;
- an area that contributes to the conservation value of a wetland, lake or spring stated in the notice mentioned in section 19F(1) of the declaration;
- another area that contributes to the conservation of the environment.

The documents outlined in 2.2 form part of this declaration.

2.2. Voluntary declaration documents:

The following documents are part of this voluntary declaration, and must be read in conjunction with this notice:

- ✓ Declared area map (DAM 2016/005033)
- ✓ Spring Mountain Estate V-Dec Management Plan, Ref: 7243, 7 October 2016, prepared by Saunders Havill Group.

2.3. **Property Map of Assessable Vegetation**

In accordance with s20B of the *Vegetation Management Act 1999*, the following Property Map of Assessable Vegetation has been prepared for the declared area.

- ✓ Declared area PMAV (PMAV 2016/005034)

2.4. **Date of declaration:** 10 October 2016

3. **Delegated officer's signature**



Andrew Collins
Senior Natural Resource Management Officer

10 October 2016

487000 487500 488000 488500 489000 489500

6938500

6938000

6937500

6937000

6936500

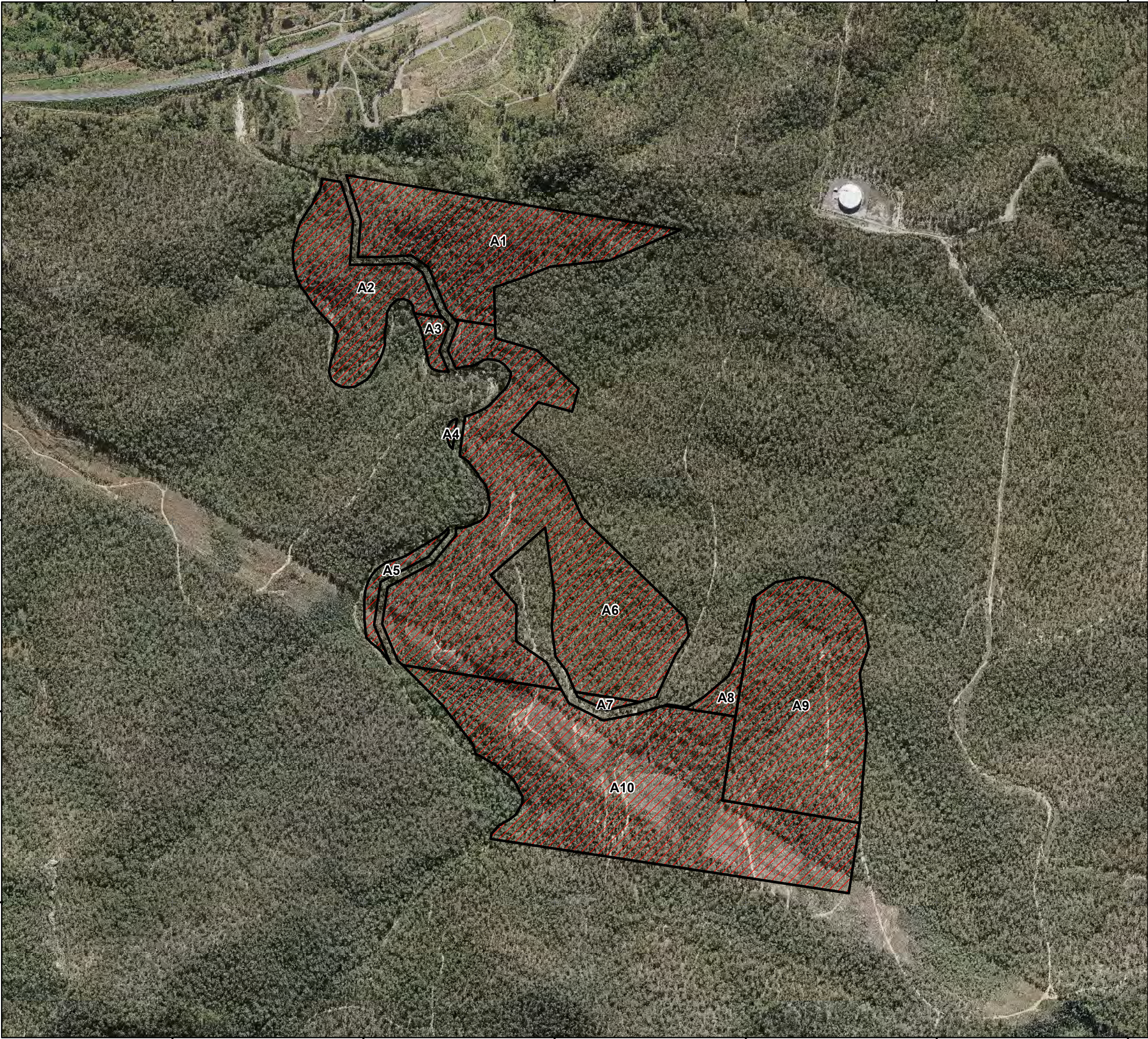
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Declared Area Map

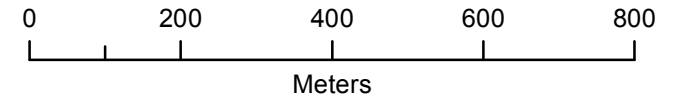
Sheet 1 of 2

DAM 2016/005033



LOT on PLAN

11S31533, 705SP151175, 740SP179412,
 745SP242282, 747SP189043, 748SP189044,
 751SP189053, 752SP189053, 753SP189054



LEGEND

- Subject Lot(s)
- Declared Area (A1 to A14)



Scale: 1:10000
 (original size A3)

Notes:

Property boundary provided by Department of Natural Resources and Mines.
 The property boundaries shown on this plan are approximate only. They are not an accurate representation of the legal boundaries.

Map Information:

Horizontal Datum: GDA 1994
 Projection: Universal Transverse Mercator - Zone 56

Imagery supplied by the Department of Natural Resources and Mines. Ipswich_mosaic_10cm_2015_a.ecw (acquisition dates 04/06/2015 to 06/07/2015)

Based on or contains data provided by the State of Queensland (Department of Natural Resources and Mines) 2016. In consideration of the State permitting use of this data you acknowledge and agree that the State gives no warranty in relation to the data (including accuracy, reliability, completeness, currency or suitability) and accepts no liability (including without limitation, liability in negligence) for any loss, damage or costs (including consequential damage) relating to any use of the data. Data must not be used for direct marketing or be used in breach of the privacy laws.

© The State of Queensland (Department of Natural Resources and Mines) 2016

Map Prepared by: LMO

Department of Natural Resources and Mines
 LMB 383, Gympie, Qld, 4570

© The State of Queensland (Natural Resources and Mines) 2016

Map Preparation Date: 29/09/2016

487000 487500 488000 488500 489000 489500

489000 489500 490000 490500 491000 491500 492000 492500 493000

6938500

6938000

6937500

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Declared Area Map

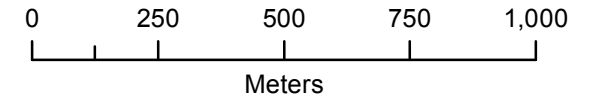
Sheet 2 of 2



DAM 2016/005033

LOT on PLAN

11S31533, 705SP151175, 740SP179412,
745SP242282, 747SP189043, 748SP189044,
751SP189053, 752SP189053, 753SP189054



LEGEND

- Subject Lot(s)
- Declared Area (A1 to A14)



Scale: 1:15000
(original size A3)

Notes:

Property boundary provided by Department of Natural Resources and Mines.
The property boundaries shown on this plan are approximate only. They are not an accurate representation of the legal boundaries.

Map Information:
Horizontal Datum: GDA 1994
Projection: Universal Transverse Mercator - Zone 56

Imagery supplied by the Department of Natural Resources and Mines.
Ipswich_mosaic_10cm_2015_a.ecw
(acquisition dates 04/06/2015 to 06/07/2015)

Based on or contains data provided by the State of Queensland (Department of Natural Resources and Mines) 2016.
In consideration of the State permitting use of this data you acknowledge and agree that the State gives no warranty in relation to the data (including accuracy, reliability, completeness, currency or suitability) and accepts no liability (including without limitation, liability in negligence) for any loss, damage or costs (including consequential damage) relating to any use of the data. Data must not be used for direct marketing or be used in breach of the privacy laws.

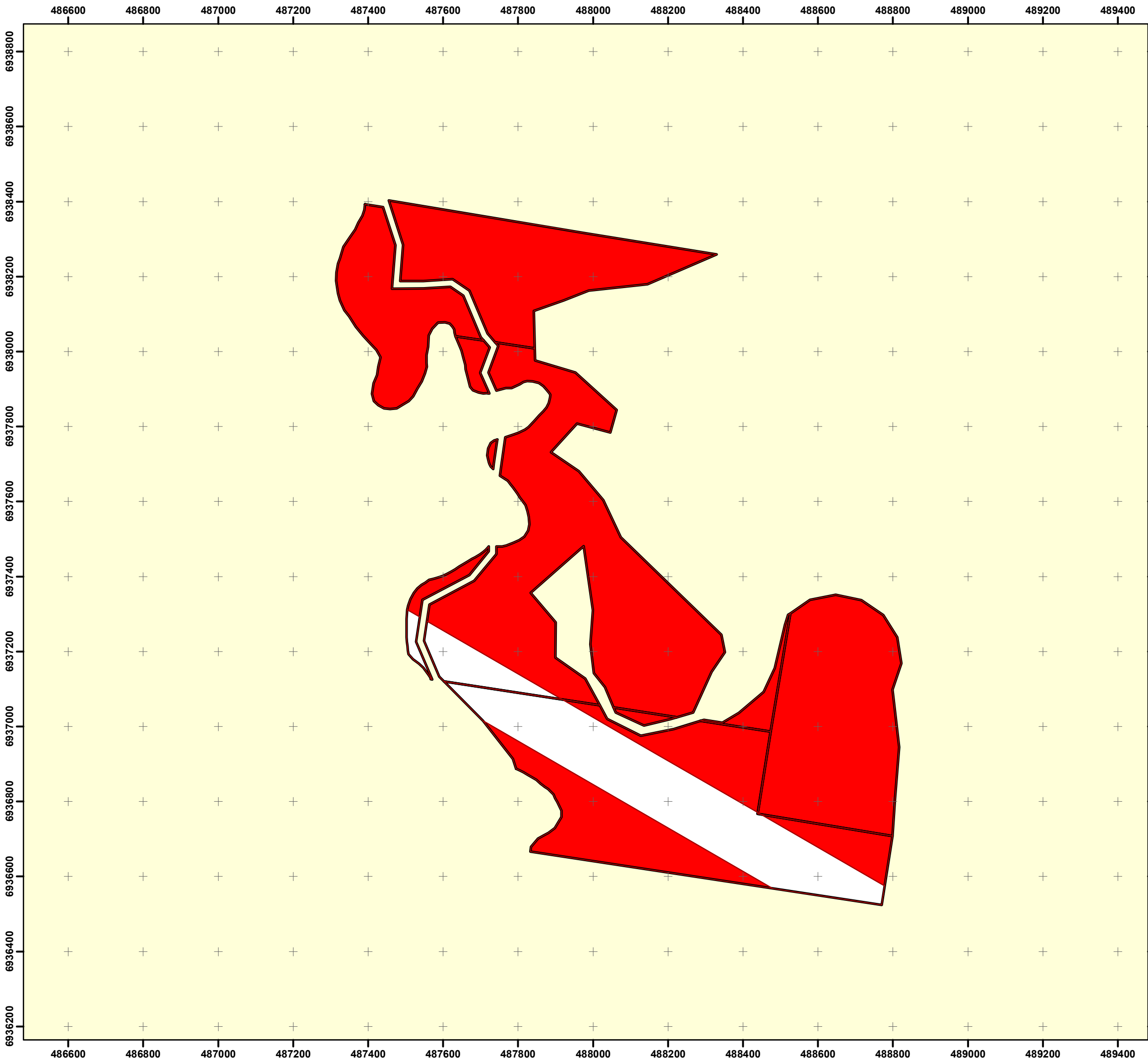
© The State of Queensland (Department of Natural Resources and Mines) 2016

Map Prepared by: LMO
Department of Natural Resources and Mines
LMB 383, Gympie, Qld, 4570

© The State of Queensland (Natural Resources and Mines) 2016

Map Preparation Date: 29/09/2016



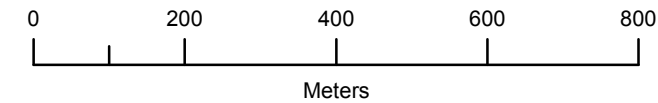


Sheet 1 of 2

Property Map of Assessable Vegetation

PMAV 2016/005034

LOT on PLAN
 11S31533, 705SP151175, 740SP179412,
 745SP242282, 747SP189043, 748SP189044,
 751SP189053, 752SP189053, 753SP189054



Scale: 1:10000
(original size A3)



LEGEND

- Subject Lot(s)
- Area to which the PMAV does not apply
- Vegetation Category Area**
- Category A area
- Category X area

Notes:

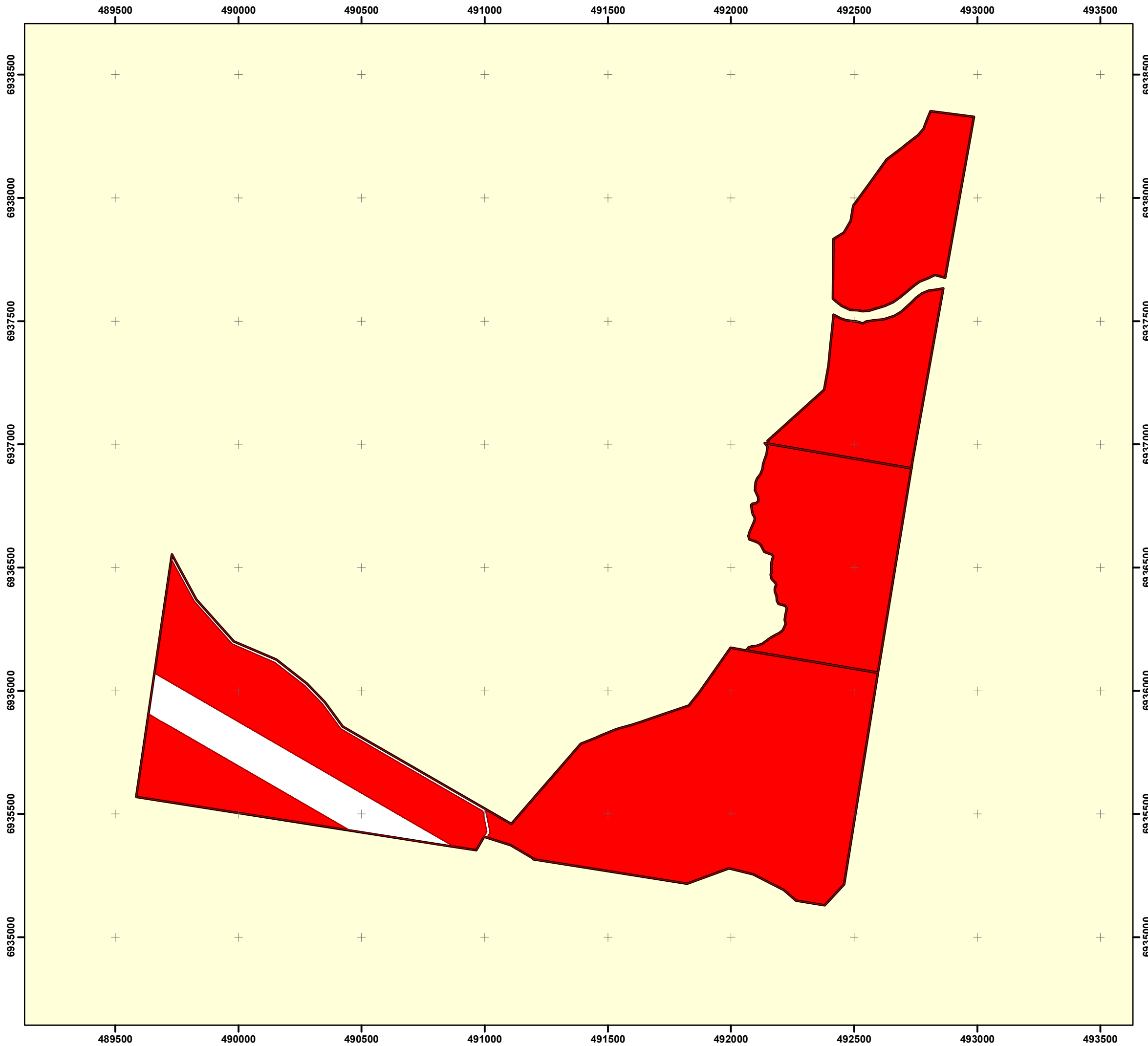
Property boundary provided by Department of Natural Resources and Mines.
 The property boundaries shown on this plan are approximate only.
 They are not an accurate representation of the legal boundaries.

Map Information:
 Horizontal Datum: GDA 1994
 Projection: Universal Transverse Mercator - Zone 56

This PMAV is made under Section 20B(1)(a) of the Vegetation Management Act 1999.

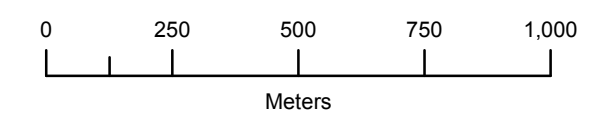
Signed for the Chief Executive of the Department of Natural Resources and Mines by:
 Name: Andrew Collins
 Title: Senior Natural Resource Management Officer
 Signature:
 Date: 10 October 2016

Map Prepared by: LMO
 Department of Natural Resources and Mines
 LMB 383, Gympie, Qld, 4570
 © The State of Queensland (Natural Resources and Mines) 2016
 Map Preparation Date: 27/09/2016



Property Map of Assessable Vegetation
PMAV 2016/005034

LOT on PLAN
 11S31533, 705SP151175, 740SP179412,
 745SP242282, 747SP189043, 748SP189044,
 751SP189053, 752SP189053, 753SP189054



Scale: 1:15000
 (original size A3)



- LEGEND**
- Subject Lot(s)
 - Area to which the PMAV does not apply
- Vegetation Category Area**
- Category A area
 - Category X area

Notes:

Property boundary provided by Department of Natural Resources and Mines.
 The property boundaries shown on this plan are approximate only. They are not an accurate representation of the legal boundaries.

Map Information:
 Horizontal Datum: GDA 1994
 Projection: Universal Transverse Mercator - Zone 56

This PMAV is made under Section 20B(1)(a) of the Vegetation Management Act 1999.

Signed for the Chief Executive of the Department of Natural Resources and Mines by:
 Name: Andrew Collins
 Title: Senior Natural Resource Management Officer
 Signature:
 Date: 10 October 2016

Map Prepared by: LMO
 Department of Natural Resources and Mines
 LMB 383, Gympie, Qld, 4570
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 Map Preparation Date: 27/09/2016

environmental management



Spring Mountain Estate

V-Dec Management Plan

Sinnathamby Boulevard, Springfield Central

Lendlease Communities Australia Pty Ltd

EPBC Ref: 2013/7057

SHG Ref: 7243

May 2016



Document Control

Title	Spring Mountain Estate V-Dec Management Plan
Address	Sinnathamby Boulevard, Springfield Central
Client:	Lendlease Communities Australia Pty Ltd
Job Number	7243

Document Issue

Issue	Date	Prepared By	Checked By
Internal Draft	07.01.2016	Keira Grundy	Murray Saunders
Client Draft	19.02.2016	Keira Grundy	Murray Saunders
ICC Draft	25.05.2016	Keira Grundy	Murray Saunders
Formal NRM Application	24.08.2016	Keira Grundy	Murray Saunders
Approved	07.10.2016	Keira Grundy	Murray Saunders

Disclaimer

This report has been prepared for **Lendlease Communities Australia Pty Ltd**. **Saunders Havill Group** cannot accept responsibility for any use of or reliance upon the contents of this report by any third party.

Reports and/or Plans by Others

Reports and/or plans by others may be included within this Management Plan to support the document.



Executive Summary

This V-Dec Management Plan has been prepared to accompany an application to have a portion of Conservation Land owned by **Ipswich City Council** (ICC) known as the Springfield Wildlife Corridor declared as a Voluntary Declaration (V-Dec) under the *Vegetation Management Act 1999*. This plan forms one of the mandatory supporting requirements for the V-Dec Application and primarily outlines weed removal and maintenance and improvement works to occur over the declared area as agreed with **ICC** (the land owner and applicant).

The Spring Mountain Estate project was deemed a controlled action under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) on the 18th of December 2013 (EPBC 2013/7057) due to impacts on *listed threatened species and communities* (Section 18 & 18A). The project was assessed by Preliminary Documentation and approved with conditions on the 23rd of December 2015. To compensate for the loss of Koala and Grey-headed Flying-fox habitat, 293ha of MNES habitat (shown in Annex 1 of the approval included as **Appendix B**) is required as an environmental offset. Specifically, Condition 7 of the approval requires the offset to be to be legally secured and Condition 8 requires the proponent to demonstrate a gain in habitat quality across the offset area.

Securing of the offset must occur prior to the commencement of the action (i.e. operational works and/or vegetation clearing) by putting in place a legal mechanisms available through Queensland legislation to secure the land. The chosen mechanism is a Voluntary Declaration (V-Dec). To enhance the habitat quality of the offset for MNES, vegetation management and rehabilitation works are proposed to be carried out by **Lendlease Communities Australia** (Lendlease). These have been coordinated in accordance with **ICC's** Works Parks and Recreation Department and primarily include weed eradication and long term weed control, assisted revegetation and rehabilitation, and monitoring and reporting.

The extent of land to be legally secured by **Lendlease** for offset is 293ha. This V-Dec Management Plan seeks a declaration over 396ha in line with titled dedicated by the former land owner, **Springfield Land Corporation**.

The Voluntary Declaration Area incorporates the entire extent of the following cadastral allotments (Lot 11 on S31533, Lot 705 on SP151175, Lot 740 on SP179412, Lot 745 on SP242282, Lot 747 on SP189043, Lot 751 on SP189053, Lot 752 on SP189053, Lot 753 on SP189054 and Lot 748 on SP189044). Within these allotments two registered easements occur providing a range of use rights to **Powerlink** and **Seqwater**. This V-Dec Management Plan and the separately proposed Property Map of Assessable Vegetation (PMAV) maintain these rights completely. This is achieved by ensuring the specific easement areas are not listed as Category A under the PMAV, rather remain mapped as Category X. Secondly, the specific easement dealing numbers and documents referenced in this management plan will continue as current.

This V-Dec Management Plan has been prepared to meet components of Conditions 7 and 8 of the EPBC Approval (2013/7057) and provides details of management intent and management outcomes for the offset area which have been developed in accordance with the template management plan for Voluntary Declarations published by the **Department of Natural Resources and Mines**.



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I. Introduction

The *Environmental Management Division* of **Saunders Havill Group** (SHG) was engaged by **Lendlease Communities Australia Pty Ltd** (Lendlease) to prepare a V-Dec Management Plan for land adjoining Spring Mountain Estate, located at Sinnathamby Boulevard, Springfield Central.

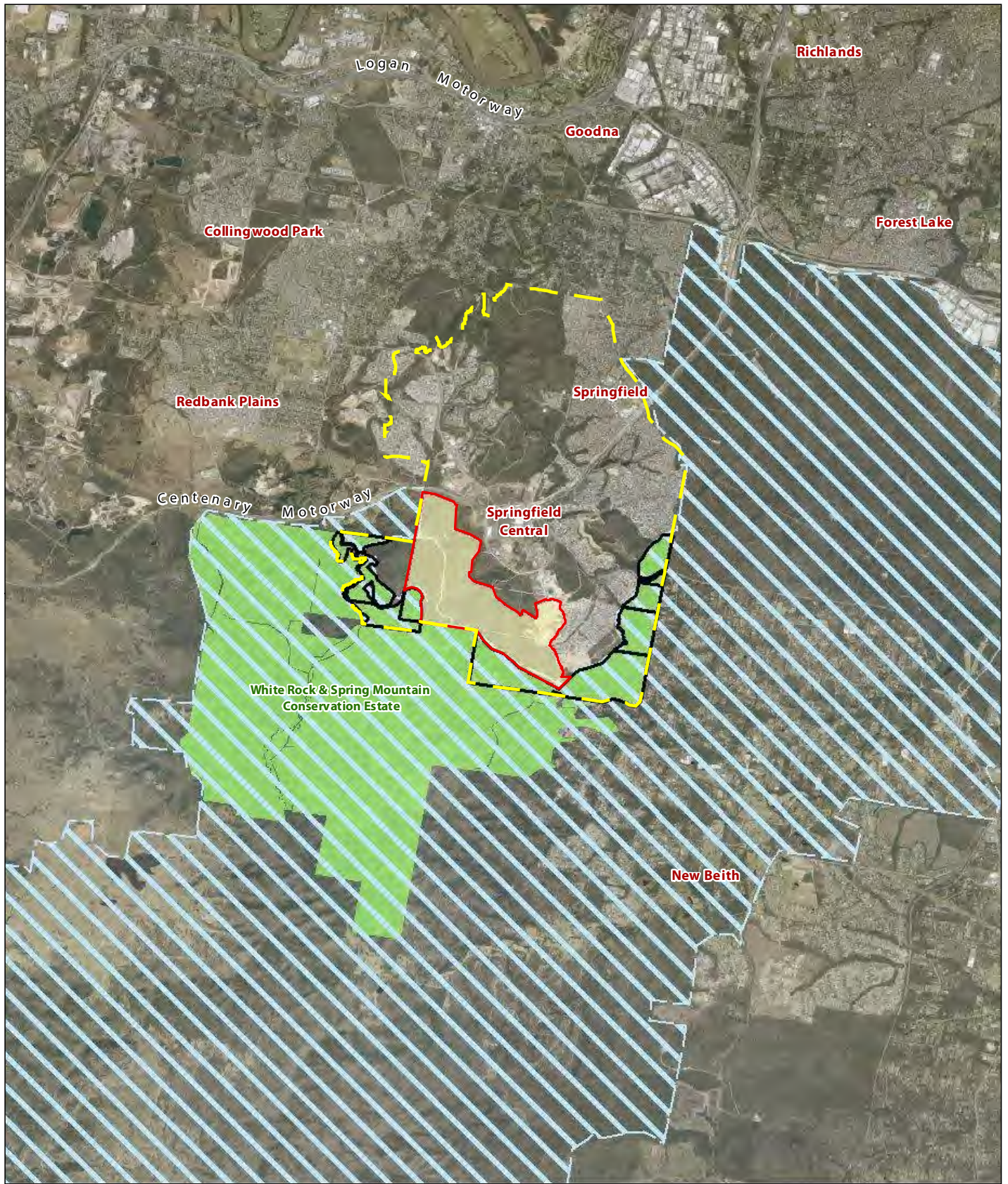
Spring Mountain Estate was referred under the *Environment Protection and Biodiversity Conservation Act* (EPBC Act) on the 19th November 2013 and subsequently declared a “Controlled Action” pursuant to section 18 and 18A (*listed threatened species and communities*) (EPBC Act reference 2013/7057). The trigger for the controlling provision was due to potential impacts on the Koala (*Phascolarctos cinereus*) and Grey-headed Flying-fox (*Pteropus poliocephalus*), which are both listed as Vulnerable under the EPBC Act.

Under the Commonwealth **Department of the Environment’s** (DoE) Preliminary Documentation requests, an offset proposal to compensate for the impacts of clearing 269.5 hectares of habitat critical to the survival of the Koala and 255 hectares of critical habitat for the Grey-headed Flying-fox was prepared in consultation with the DoE. The offset proposal specified using 293ha of the 396ha of remnant vegetation adjoining Flinders–Karawatha Bioregional Corridor which had been previously dedicated by **Springfield Land Corporation** (SLC) to **Ipswich City Council** (ICC) to offset impacts associated with development within the entire approved Springfield Structure Plan (refer **Figure 1**). The impacts compensated for included the development of Spring Mountain Estate.

On the 23rd December 2015, Spring Mountain Estate was approved by the DoE subject to conditions (refer **Appendix B**). Specifically, Condition 7 of the approval requires the approval holder to secure 293ha of MNES habitat for Koala and Grey-headed Flying-fox within the agreed offset proposal site (shown as Annex 1 in the approval included as **Appendix B**) via a legal binding mechanisms available through Queensland legislation; being either by a Covenant on Title, Voluntary Declaration or Nature Refuge. The chosen mechanism in this instance is a V-Dec. In addition, Condition 8 of the approval requires the approval holder to achieve a gain in habitat quality across the offset compared to baseline offset habitat quality and extent.

This V-Dec Management Plan has been prepared to provide details of overarching management intent, actions and outcomes to satisfy the requirements of Condition 7 and Condition 8 of the EPBC Approval and the request for a V-Dec under the *Vegetation Management Act 1999* (VMA). This V-Dec Management Plan has been prepared in accordance with the template management plan for voluntary declarations published by the **Department of Natural Resources and Mines** (NRM). Supporting information is provided in **Appendix A**.

The Voluntary Declaration Area incorporates the entire extent of the following cadastral allotments (Lot 11 on S31533, Lot 705 on SP151175, Lot 740 on SP179412, Lot 745 on SP242282, Lot 747 on SP189043, Lot 751 on SP189053, Lot 752 on SP189053, Lot 753 on SP189054 and Lot 748 on SP189044). Within these allotments two registered easements occur providing a range of use rights to **Powerlink** and **Seqwater**. This V-Dec Management Plan and the separately occurring Property Map of Assessable Vegetation (PMAV) maintain these rights completely. This is achieved by ensuring the specific easement areas are not listed as Category A under the PMAV, rather remain mapped as Category X. Secondly, the specific easement dealing numbers and documents as referenced in this management plan will continue as current.



Legend

- Spring Mountain Project Area
- Greater Springfield area
- White Rock & Spring Mountain Conservation Estate
- Flinders-Karawatha Corridor
- Declared area DCDB

Figure 1 Site Context

File ref. 7243 E Figure 1 Site Context D
Date 24/08/2016
Project Spring Mountain (EPBC)

0 0.5 1 2 3 4 km
 Scale (A4): 1:100,000 [GDA 1994 MGA Z56]



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The main **objective** of the offset is:

To create a self-sustaining ecosystem that provides habitat critical to the survival of the Koala and Grey-headed Flying-fox within a publically owned, locally significant, conservation area within the Flinders–Karawatha Bioregional Corridor.

I.1. Property and Ownership Details:

V-Dec Proponent	Lendlease Communities Australia Pty Ltd
V-Dec Applicant	Ipswich City Council
Name of registered owners:	Ipswich City Council (registered owners)
Postal address:	C/- Saunders Havill 9 Thompson Street Bowen Hills QLD 4006
Phone:	(07)3251 9400
Email:	murraysaunders@saundershavill.com
Size of declared area:	396 ha
Local Government Area:	Ipswich City Council
RPD	Lot 748 on SP189044 Lot 753 on SP189054 Lot 752 on SP189053 Lot 751 on SP189053 Lot 747 on SP189043 Lot 745 on SP242282 Lot 740 on SP179412 Lot 705 on SP151175 Lot 11 on S31533
Tenure	Freehold
EPBC reference	2013/7057

I.2. Description of declared area

The 396 ha V-Dec area is comprised of Lot 11 on S31533, Lot 705 on SP151175, Lot 740 on SP179412, Lot 745 on SP242282, Lot 747 on SP189043, Lot 751 on SP189053, Lot 752 on SP189053, Lot 753 on SP189054 and Lot 748 on SP189044 and located adjacent to the Spring Mountain Estate project site off Centenary Highway and Springfield Greenbank Arterial, Springfield. The V-Dec area which will be declared under section 19F(1)(a) of the *Vegetation Management Act 1999* is shown on the *Declared Area Plan* (refer **Appendix C**) attached to this management plan.



I.3. Registered Interests

Written consent for the declaration has been obtained from all persons and companies who have a registered interest in the area (refer to **Section 4.4**). Registered interests include mortgages, leases, subleases, covenants, profit á prendes, easements and building management statements, that have been registered on title under the *Land Act 1994* or the *Land Title Act 1994*. Persons with a registered interest in the declared area are:

Type	Interest Holder	Lot Number	Easement Details
Easement	Powerlink	751 SP189053	<ul style="list-style-type: none"> ▪ 602589417 (D972698), dated 07/07/1999 ▪ 703230867, dated 17/03/1999
		748 SP189044	<ul style="list-style-type: none"> ▪ 602038460 (D972700), dated 07/07/1999 ▪ 703230867, dated 17/03/1999
		745 SP242282	<ul style="list-style-type: none"> ▪ 601668680 (D972706), dated 07/07/1999 ▪ 601668682 (L886473X), dated 08/07/1999
		747 SP189043	<ul style="list-style-type: none"> ▪ 601668679 (D972702), dated 07/07/1999
Easement	Seqwater	745 SP242282	<ul style="list-style-type: none"> ▪ 711922895, dated 19/08/2013 ▪ 712158705, dated 19/08/2013

I.3.I Existing Infrastructure Rights

Management intent for the V-Dec area is to enhance habitat quality for MNES while maintaining existing conservation values and use rights for registered interests. The existing interests and rights of **Powerlink** and **Seqwater** will not be affected by the making of the V-Dec, specifically:

- The proposed Property Vegetation Management Map (PMAV) (refer **Appendix D**) shows existing easements to remain as Category X which ensures rehabilitation and vegetation management outcomes do not apply to the easement corridors and access tracks. (N.B. Weed removal of declared species will occur through easement areas)
- Registered interests will continue to be able to exercise their rights under any laws or approvals to access and carry out works in the easement.
- Any planned activities that may be carried out (by persons other than registered interests (i.e. **Powerlink** and **Seqwater** and their contractors) within an easement, or that may affect easement holder's access requirements, will require written consent by the easement holder before undertaking those activities.
- Registered interests will be consulted and be required to provide consent to any current bushfire management plans and land maintenance practices, and any future changes to these plans which may affect registered easements or access tracks.
- **ICC** will obtain consent from registered interests prior to making any amendments to the V-Dec Management Plan which may affect the exercise of easement holder's rights and interests within their easement corridors or existing access tracks.



- **ICC** will obtain consent from registered interests for agreeing to any replacement PMAV that changes the vegetation category of the easement corridor.
- **ICC** will obtain consent from registered interests before agreeing to a code for the clearing of vegetation within the V-Dec area that will apply to the easement corridor or the access tracks.
- **ICC** will continue to allow the use of, and maintain, access tracks used by easement holders or provide suitable alternatives with consent of registered interests.



2. Flora Values

The Queensland Government's Regional Ecosystem map shows the site contains areas of Category X (non-remnant) and Category B (remnant) vegetation containing Endangered, Of Concern and Least Concern regional ecosystems. Specifically, RE12.8.24 (Endangered), RE12.9-10.7a (Of Concern), RE12.9-10.2 (Least Concern), RE12.9-10.17 (Least Concern) and RE12.9-10.19 (Least Concern). These Regional Ecosystems are shown in **Figure 2** and described below:

Re12.9-10.2 (Least Concern)

Corymbia citriodora subsp. variegata open forest or woodland usually with *Eucalyptus crebra*. Other species such as *Eucalyptus tereticornis* and *Corymbia intermedia* may be present in scattered patches or in low densities. Understorey can be grassy or shrubby. Shrubby understorey of *Lophostemon confertus* (whipstick form) often present in northern parts of bioregion. Occurs on Cainozoic and Mesozoic sediments.

RE 12.9-10.17 (Least Concern)

Open-forest complex generally with a variety of stringybarks, grey gums, ironbarks and in some areas spotted gum. Canopy trees include *Eucalyptus siderophloia*, *E. propinqua* or *E. major*, *E. acmenoides* or *E. portuensis*, *E. carnea* and/or *E. microcorys* and/or *Corymbia citriodora subsp. variegata*. Other species that may be present locally include *Corymbia intermedia*, *C. trachyphloia*, *Eucalyptus tereticornis*, *E. biturbinata*, *E. moluccana*, *E. longirostrata*, *E. fibrosa subsp. fibrosa* and *Angophora leiocarpa*. *Lophostemon confertus* or Whipstick *Lophostemon confertus* often present in gullies and as a sub canopy or understorey tree. Mixed understorey of grasses, shrubs and ferns. Hills and ranges of Cainozoic and Mesozoic sediments.

12.9-10.17a: *Lophostemon confertus* dominated open forest. Occurs in gullies and southern slopes on Cainozoic and Mesozoic sediments

RE 12.9-10.19 (Least Concern)

Open-forest of *Eucalyptus fibrosa subsp. fibrosa* +/- *Corymbia citriodora subsp. variegata*, *E. acmenoides* or *E. portuensis*, *Angophora leiocarpa*, *E. major* open-forest. Understorey often sparse. Localised occurrences of *Eucalyptus sideroxylon*. Occurs on Cainozoic and Mesozoic sediments.

12.9-10.19a: *Corymbia henryi* +/- *Eucalyptus fibrosa subsp. fibrosa*, *Corymbia citriodora subsp. variegata*, *E. siderophloia*, *E. crebra* open forest. Occurs in coastal areas on Cainozoic and Mesozoic sediments

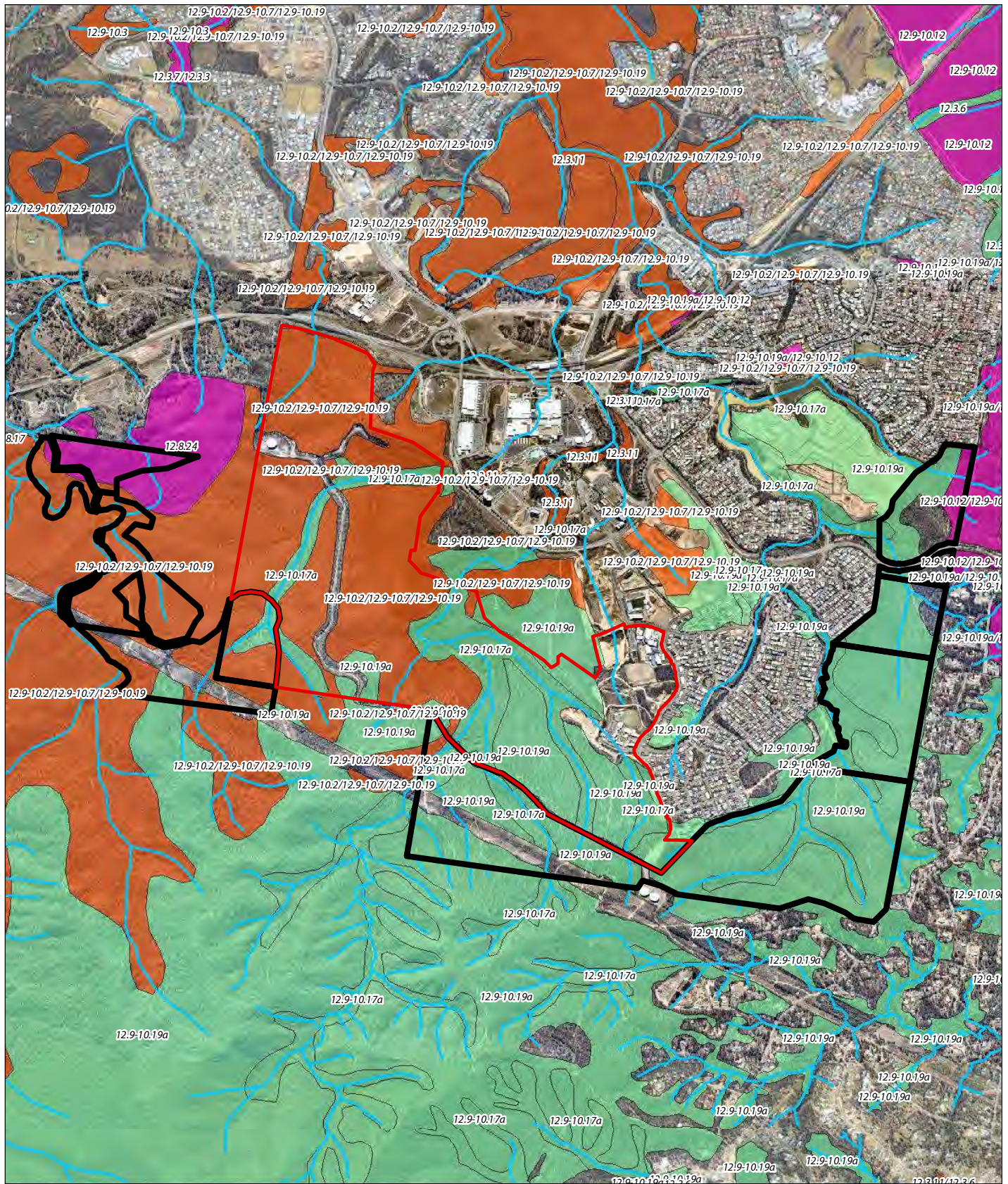
RE 12.9-10.7 (Of Concern)

Eucalyptus crebra +/- *E. tereticornis*, *Corymbia tessellaris*, *Angophora leiocarpa*, *E. melanophloia* woodland. Occurs on Cainozoic and Mesozoic sediments.



12.9-10.7a: *Eucalyptus siderophloia*, *Corymbia intermedia* +/- *E. tereticornis* and *Lophostemon confertus* open forest. Occurs on Cainozoic and Mesozoic sediments in near coastal areas.

RE12.8.24 (Endangered)

Corymbia citriodora subsp. variegata, *Eucalyptus crebra* +/- *E. moluccana* open forest. Occurs on Cainozoic igneous rocks especially lower slopes of rhyolite and trachyte hills (e.g. Moogerah Peaks).



Legend

-  Spring Mountain referral area
-  Declared area
-  Watercourse v1.3
-  Essential Habitat




- Regional Ecosystem v8**
-  Category A or B area containing endangered regional ecosystems
 -  Category A or B area containing of concern regional ecosystems
 -  Category A or B area that is a least concern regional ecosystem

Figure 2 QLD Regulated Vegetation Management - Supporting Map (Regional Ecosystems)

File ref. 7243 E Figure 3 QLD Regional Ecosystems C
 Date 30/05/2016
 Project Spring Mountain (EPBC)

0 200 400 600 800 1,000 m
 Scale (A4): 1:36,000 [GDA 1994 MGA Z56]



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3. Management Intent

The overarching management intent for the V-Dec area is the removal of weeds and protection of native vegetation within the Flinders-Karawatha Bioregional Corridor to prevent the loss of biodiversity and maintain ecological processes. The successful implementation of proposed management mechanisms will assist with the creation of a self-sustaining, continuous area of high quality Koala and Grey-headed Flying-fox habitat, facilitating their persistence within the local landscape. This will help to achieve **ICC's** vision to create a locally significant conservation area within the Flinders-Karawatha Bioregional Corridor.

The intent is to secure the area by a V-Dec under the *Vegetation Management Act 1999* (VMA), which allows landowners to protect areas of native vegetation otherwise not protected by the VMA, with the exception of registered easements. Revegetated regrowth areas will be managed to achieve 'remnant status' and in particular to exhibit the structural and floristic characteristics of Endangered RE12.8.24, Of Concern RE12.9-10-10.2/12.9-10.7/12.9-10.19 and Least Concern RE 12.9-10.19a and RE12.9-10.17a in their undisturbed state. Areas of remnant vegetation will be managed to enhance and sustain their ecological conditions and local environmental values to reduce their exposure to threatening processes including weed invasion, pollution, clearing and disturbance.

3.1. Criteria for Declaration

The V-Dec area satisfies criteria for declaration under the Guide to Voluntary Declarations under the VMA. The V-Dec area is considered an:

- Area of high nature conservation value, specifically:
 - (d) an area that makes a significant contribution to the conservation of biodiversity

3.2. Management Outcomes

The management outcome for the declared area is that the vegetation within the declared area meets the criteria, thresholds and descriptions outlined in the definition of remnant vegetation in the VMA. Additionally, that the entire declaration area is controlled and managed for the removal and suppression of declared weed species. Management outcomes are consistent with the requirements *EPBC Act Environmental Offsets Policy* and generally in accordance with management outcomes of the *Queensland Environmental Offsets Policy 2014*, specifically in terms of:

- Size of the offset area
- Location
- Regional Ecosystem Type
- Habitat Values
- Condition
- Landscape Features, including connectivity
- Biodiversity Values
- Environmental Values

The management outcome does not apply to existing easement corridors and access tracks used to access these easement corridors.



3.3. Activities to achieve the management outcome

The following activities will occur in the declared area. These are primarily limited to weed removal, pest management and supplementary rehabilitation works as agreed with **ICC**, the landowner of the declared area.

1. With the exception of registered easements and access tracks, clearing of native vegetation may only occur in accordance with an exemption defined by Schedule 24 of the *Sustainable Planning Regulation 2009* or a development approval under the *Sustainable Planning Act 2009*.
2. All reasonable measures must be taken to minimise the introduction, establishment and spread of non-native plants. Where non-native plants already occur in the area, all reasonable measures must be taken to remove and control the non-native plants.
3. All reasonable measures must be taken to remove weeds of national environmental significance as declared by the Commonwealth.
4. All reasonable measures must be taken towards undertaking natural and assisted regeneration.
5. All reasonable measure must be taken towards implementing erosion and sediment control.

N.B. Refer to **Appendix E** for the 'V-Dec Management Plan – Weed Management' which provides specific details and management activities.

3.4. Ongoing Activities

The V-Dec area is currently zoned and maintained by **ICC** as part of the Conservation network. Existing restrictions (e.g. no dogs or motorbikes) which apply in this area remain unchanged by this V-Dec. Ongoing activities anticipated to continue within the V-Dec area include:

- All lawful use rights of Powerlink within the extent of the easement area and access tracks.
- All lawful use rights of Seqwater within the extent of the easement area.
- Public access for passive recreation purposes including:
 - Bushwalking
 - Mountain biking
 - Horse riding
 - Bird and fauna watching
- Maintenance of bushfire access and tracks in accordance with **ICC** approved management plans.
- Track and trail access and construction.
- Nature based recreation style embellishments (i.e. signage, seating, shelters etc.)

3.5. Term

The term of this plan is 10 years to achieve the management outcome. As per conditions of the EPBC approval (refer **Appendix B**), the currency period for management of the declaration area is 20 years from the date of Spring Mountain Estate initial construction.

It is noted that an agreement is in place between **ICC** and **Lendlease** detailing the estimated 10 year maintenance term to achieve the outcomes of this V-Dec Management Plan (refer **Section 4**). **Lendlease** will undertake maintenance works until the management outcomes are considered by **NRM** to be achieved. Post achievement, the the V-Dec area will be transferred to **ICC** as part of their larger conservation land holdings. Council will continue to undertake long term management and maintenance of the land in perpetuity. .



4. Management

4.1. Management Actions - Timing of Delivery

It is intended that the V-Dec Area will be managed in perpetuity. In accordance with EPBC approval the currency period for the management proponent within the offset area is 20 years from the commencement of Spring Mountain Estate. The V-Dec Area will undergo significant, active management works by **Lendlease** for the first 10 years from commencement which will include monitoring and adaptive management. After this time and with all agreed works completed, Council will assume responsibilities for maintenance of the broader V-Dec Area.

The following table (**Table 1**) identifies the actions which will be undertaken for the V-Dec Area, by whom and when.

Table 1: Schedule of Management Actions

Management Action	How the action will be carried out	Where the action will be carried out	When the action will be carried out	Who will be carrying out the action
Vegetation Clearing	<p>Vegetation clearing on the V-Dec Area is restricted to:</p> <ol style="list-style-type: none"> that is necessary for the removal of non-native weeds or declared plants, establishing and maintaining boundary fencing, establishing and maintaining fire breaks, establishing and maintaining nature based recreational trails/tracks; establishing and maintaining easements, and ensuring public safety. <p>Where vegetation clearing is sought for any other purpose, not specified in the V-Dec Management Plan, the landowner or person proposing to undertake the clearing must contact the relevant department administering the VMA.</p>	Where required	As required	Lendlease for the first 10 years, Council thereafter
Fire	<p>Fire is to be, where possible, excluded from the V-Dec Area by:</p> <ol style="list-style-type: none"> maintaining firebreaks relative to the V-Dec Area; and firebreaks are to be co-located with existing roads, fence lines and tracks, where possible. <p>Only fire control works in accordance with an approved bushfire management plan can occur within the V-Dec Area.</p>	Where required	As required	Council (in consultations with Lendlease for the first 10 years)
Pest and Animal Management	<p>Minimise the introduction of pest animals and control of existing population of pest animals within the V-Dec Area.</p> <p>Monitor for the presence of feral cats, dogs and foxes, in accordance with ICC's pest control requirements for the Springfield Wildlife Corridor.</p>	Where required	As required	Council (in consultations with Lendlease for the first 10 years)
Weeds	<p>Keep the introduction, establishment and spread of non-native weeds including restricted invasive plants under the <i>Biosecurity Act 2014</i> to ensure that the non-native weeds do not cover more than 10 % of the V-Dec Area.</p> <p>Control existing infestations of non-native weeds including restricted invasive plants under the <i>Biosecurity Act 2014</i> to ensure that the non-native weeds do not cover more than 10 % of the V-Dec Area.</p>	In accordance with the V-dec Weed Management Plan	In accordance with the V-dec Weed Management Plan	Lendlease for the first 10 years, Council thereafter



4.2. Funding

All upfront costs associated with the weed management and revegetation of the V-Dec area will be the responsibility of the proponent (**Lendlease Communities Australia Pty Ltd**). Detailed weed management plans endorsed by Council are included in **Attachment E**. As part of this agreement between **Lendlease** and **ICC**, timeframes and criteria for the works to be considered complete are outlined. If at any stage the success of the weed management and revegetation works do not achieve the criteria outlined in **Attachment E** then the works remain the responsibility of **Lendlease**.

Lendlease is committed to providing ongoing funding for weed management and rehabilitation as set out in this V-Dec Management Plan.

Post achievement of the commitments in this V-Dec Management Plan the maintenance of the V-Dec area will be transferred to **ICC** as part of their larger conservation land holdings.

4.3. Monitoring and Reporting Procedures

The objective on this V-Dec Management Plan is to maintain and enhance the Koala and Grey-headed Flying-fox habitat values through the declaration area. As agreed with **ICC** this to be primarily achieved through weed management works. As such, monitoring and reporting will be undertaken to confirm if this objective has been or is going to be achieved. This includes both short term and long term criteria to measure success. The V-Dec area, which is already functioning as Koala and Grey-headed Flying-fox habitat, is to be managed through weed removal and native regeneration. Monitoring of weed management and regeneration works allows for:

- A review of the pre-established performance indicators for measuring the success of the weed removal and control;
- Ensure level of protection for existing identified native vegetation inclusive of that which has naturally regenerated;
- Review the rate of spread or contraction of weed infestation within the control program;
- Monitor the rate of assisted regeneration and revegetation of desirable native species promoted in areas where weeds have been removed; and
- Identification of new weed threats or other factors which may be affecting areas designated for rehabilitation.

4.3.1 Benchmarks

The weed management and rehabilitation works aim to improve the flora and fauna values of the V-Dec area through weed removal and promoting native species growth. The following breakdown of works are proposed:

- a) Existing Vegetation Areas:
 - Primary weed removal completed
 - Secondary weed removal completed
 - Minimum 90% weed removal from existing vegetation
 - 10% or less weeds present on-site
 - Any additional revegetation required has 85% success rate



b) Revegetation Areas

- All required planting completed
- Evidence of ongoing weed management
- Maximum of 10% plant failures at time of inspection
- Plants established and free of weeds

4.3.2 Monitoring Timeframes

As per the schedule provided in **Table 1**, initial monitoring and reporting of weed removal and revegetation / regeneration works will be undertaken monthly within the works area. Monthly monitoring is to be completed by **Lendlease** for the first 18 months post weed management works. This will determine whether weed removal and regeneration targets are met. Quarterly joint inspections of the weed management areas are to be held between **ICC** and **Lendlease**.

Once the rehabilitated areas have been established, monitoring will continue regularly until final changeover to Council management. The purpose of this monitoring will be to identify:

- Whether weed invasion has been controlled
- Whether the number of individuals within the vegetation community is being sustained or increased by natural recruitment
- Whether adequate levels of biodiversity (genetic variation) are maintained through generations of flora.
- Occurrence and utilisation by native fauna to assess ecosystem restoration.

4.3.3 Reporting

In accordance with EPBC approval requirements, throughout the monitoring of rehabilitation works, results will be recorded as part of a progress report and be made available via **Lendlease** project website within 10 business days of the monitoring event. This will allow for an assessment of whether the rehabilitation works are achieving set objectives and targets and will trigger corrective actions should results fall short of targets.

4.3.4 Contingency Measures

The following potential risks to the successful implementation of the V-Dec Management Plan have been identified:

- Failure of successful regeneration of juvenile / planted specimens
- Failure of weed management

Should the initial weed removal and revegetation works fail to achieve the objectives for the V-Dec area, monitoring and reporting procedures will facilitate the identification of the cause of failure, whether that be due to flooding, drought, poor soil quality, inadequacy of weed removal techniques, impacts from human disturbance or other causative events. Once the causative event of failure is identified, corrective actions can be imposed to implement new procedures, techniques or management measures.

Potential contingency measures include:

- Use of different plant species or using higher ratios of successful species;
- Implementation of more aggressive weed removal and management techniques;
- Utilising a variety of water sources during drought;
- Replanting where damage has occurred as a result of unexpected events such as flooding and fire;



- Erection of fences or signs where failure has occurred as a result of human disturbance; and
- Maximising surface roughness to slow runoff, which reduces erosion and provides more time for plants to absorb water.

As noted previously, **Lendlease** has provided a commitment to the ongoing funding of rehabilitation works until management handover to Council. In addition, rehabilitation works must be established to an acceptable standard before Council will take on management of V-Dec area. The process of accepting the completed works requires regular monitoring and acceptance by Council that objectives have been achieved. The onus to manage and maintain the V-Dec area lies on the proponent and must be achieved in order to comply with Commonwealth Government approval conditions.



4.4. Consent Agreement

Department of Natural Resources and Mines

Signature: _____

Name:

Position: Natural Resource Management Officer

Date: / / 2016

Owner: Ipswich City Council

Signature: _____

Name:

Date: / / 2016

Easement Owner: Powerlink

Signature: _____

Name:

Date: / / 2016

Easement Owner: Seqwater

Signature: _____

Name:

Date: / / 2016



Appendices

Appendix A

V-Dec Supporting Information Details

Appendix B

EPBC Approval and Conditions

Appendix C

Declared Area Plan

Appendix D

Property Map of Assessable Vegetation

Appendix E

V-Dec Weed Management Plan



Appendix A

V-Dec Supporting Information Details



Section 1 Case details

Name of applicant	Ian Murray
Company (if applicable)	Lendlease Communities Australia Pty Ltd
Lot/plan associated with development	Lot 22 on SP234042 Lot 33 on SP269190
DLGIP case number (e.g. SDA-0815-123456)	N/A

Section 3 Contact details for offset delivery

Name	John Kibble
Company (if applicable)	Lendlease Communities Pty Ltd
Postal Address	GPO Box 2777 Brisbane QLD 4001
Phone	0408 558 808
Fax	
Email address	john.kibble@lendlease.com



Section 4 Environmental offset site particulars

4.1 Offset site property and ownership details

If the offset will be delivered on more than one lot, please duplicate the table below.

Lot on plan details (property description)	Lot 11 on S31533, Lot 705 on SP151175, Lot 740 on SP179412, Lot 745 on SP242282, Lot 747 on SP189043, Lot 751 on SP189053, Lot 752 on SP189053, Lot 753 on SP189054 and Lot 748 on SP189044
Street address	Sinnathamby Boulevard, Springfield 4300
Name of Registered Owner(s)/ Licensee/s or Trustee/s	Ipswich City Council
Tenure Type*	<input checked="" type="checkbox"/> Estate in Fee Simple (freehold) <input type="checkbox"/> Leasehold (agriculture and grazing) <input type="checkbox"/> Other: _____
Property Name (if applicable)	Part of ICC's Springfield Wildlife Corridor
Area of Property (ha)	396ha
Local Government Area	Ipswich City Council
Sub-region/Bioregion	Bioregion 12 – South East Queensland

* For requests on State land (or non-freehold) tenures, the views of the State Land Asset Management unit of DNRM may be sought to ensure the proposal is consistent with the purpose of the tenure. For example, on agricultural and grazing leases the proposal would need to allow a level of agriculture or grazing to occur over the area to be consistent with the tenure, in accordance with the *Land Act 1994*. Please contact DNRM for further information.

4.2 Registered Interests*

Parcel (lot and plan)	Are there any Registered Interests on the lot?	Type of Registered Interest	Registered interest holder's name and contact details
751 SP189053; 748 SP189044; 745 SP242282; 747 SP189043	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Easement	Powerlink 33 Harold St Virginia QLD 4014
745 SP242282	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Easement	Seqwater PO Box 16146, City East QLD 4002

*Registered interests are mortgages, leases, subleases, covenants, profit á prendes, easements and building management statements, that have been registered on title under the *Land Act 1994* or the *Land Title Act 1994*. Please contact DNRM if you are unsure if there are any registered interests on your property.



Section 5 Legal security

<p>How will the offset area be legally secured?</p>	<p><input checked="" type="checkbox"/> Voluntary Declaration for an area of high nature conservation value under the <i>Vegetation Management Act 1999</i></p> <p>*Note that if a Voluntary Declaration is proposed for securing the offset, this offset delivery plan meets the requirements and will be accepted as a declared area management plan.</p> <p><input type="checkbox"/> Environmental offset protection area under the <i>Environmental Offsets Act 2014</i></p> <p><input type="checkbox"/> Under the <i>Nature Conservation Act 1992</i></p> <p><input type="checkbox"/> Other: _____</p>
<p>Why is it considered the best method for securing the offset area?</p>	<p>Provides for management and protection in accordance with Commonwealth approval conditions for Spring Mountain Estate (EPBC Ref: 2013/7057) and allows for registered easement holder's rights and interests to be maintained.</p>
<p>When will the offset area be legally secured?</p> <p>What is the timeframe for securing the offset area? Note that the offset must be legally secured for the duration of the impact.</p>	<p>As per EPBC approval conditions, the currency period for management of the declaration is 20 years from the date of commencement of Spring Mountain Estate. Management obligations have a term of 10 years as per the V-Dec Management Plan.</p>
<p>Why is this timeframe for securing the offset area considered reasonable?</p> <p>Are there any registered interests or other parties that need to be in agreement? Are there any other approvals that need to be given? (e.g. if the application is for a reconfiguration then securing the area may need to wait until an approval is given by the assessment manager)</p>	<p>A high level of tenure security exists on the allotment though mapped remnant, partial exclusion of the land from the regional plan urban footprint and Council zoning of Conservation. The 20 year timeframe of the V-Dec enables the proponent to invest in significant weed management and conservation improvement works over first 10 years in accordance with the V-Dec Management Plan. Further, the V-Dec provides the legal certainty to support this investment and conservation use through the complete removal of urban footprint designations and transitioning of protection in perpetuity.</p>
<p>What is the expected timeframe for the management outcomes of the offset delivery plan to be achieved?</p>	<p>Management will include primary, secondary and maintenance stages which will be completed over 10 years until handover to Council, under which ongoing maintenance will continue as part of the broader conservation estate.</p>



Section 6 Offset site delivery information

Describe the existing land use of the land on which the environmental offset will be undertaken.	Conservation / nature based recreation. The land adjoins a water tower, maintenance tracks and is traversed by easements registered by Seqwater and Powerlink. A number of lawful uses and access occurs in parts of the land.
Describe any impacts that land use (existing use and as a result of any development approval) may have on the delivery of the offset.	Nil. Easement holder rights and access tracks will be maintained. As part of broader agreement between Lendlease and ICC, low scale nature based recreation will be better managed and unlawful access and uses will be controlled.
Is the environmental offset staged?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If yes, please complete offset delivery form EOD6 (Staged Offset Details). This form can be found at http://www.qld.gov.au/environment/pollution/management/offsets/

Section 7 Description of the offset site

The description of the environmental offset site should include, but is not limited to, the following information. This information is required to meet the offsets policy and to secure the offset area through a voluntary declaration under the *Vegetation Management Act 1999*. Please contact DNRM if you require assistance providing this information.

Area (hectares) of environmental offset site
396ha
Brief description of the landscape features e.g. topography, geology, soils, landzone
<p>The Queensland Government's Regional Ecosystem map shows the site contains Endangered, Of Concern and Least Concern regional ecosystems. Specifically, RE12.8.24 (Endangered), RE12.9-10.7a (Of Concern), RE12.9-10.2 (Least Concern), RE12.9-10.17 (Least Concern) and RE12.9-10.19 (Least Concern).</p> <p>The V-Dec area contains steep slopes with elevations of 120m along ridgelines to 80m in gullies. Soils consists of 'sublabile to quartozose sandstone, siltstone, shale, thin coal seams'. The land zone is described as 9 and 10. A number of first order drainage features commence within or traverse the offset area.</p>
Pre-clearing regional ecosystem (if known) for offset sites containing non-remnant vegetation



Pre-clear mapping identifies the V-Dec area as containing composite Endangered RE12.9-10.12/12.9-10.15, Of Concern RE12.9-10.2/12.9-10.7/12.9-10.19 and Least Concern RE12.9-10.19a
Brief description of any existing vegetation – e.g. species, densities, and heights (including pest plants)
<p>Flora field surveys showed that canopy trees in areas within close proximity to the gully lines (waterways and drainage lines) are regularly composed of <i>Eucalyptus tereticornis</i> (Forest Red Gum) and/or <i>Eucalyptus microcorys</i> (Tallowwood), with <i>Eucalyptus siderophloia</i> (Grey Ironbark), <i>Eucalyptus crebra</i> (Narrow leaved Ironbark), <i>Eucalyptus moluccana</i> (Gum-topped Box), <i>Eucalyptus seeana</i> (Narrow leaved Red Gum) and <i>Lophostemon suaveolens</i> (Swamp Box).</p> <p>Overall, the ridgelines and mid to upper slope areas showed greater percentages of non-eucalypt species, such as <i>Corymbia citriodora</i> (Spotted Gum), <i>Corymbia intermedia</i> (Pink Bloodwood) and <i>Angophora leiocarpa</i> (Smooth-bark Apple). Across the site, a number of weed species were identified. Gully lines in particular were areas observed to have a denser shrub layer of <i>Lantana camara</i> (Lantana).</p>
Threatened species - if an environmental offset is required for a threatened species, does it already use/inhabit the offset area?
The V-Dec area is required to compensate for clearing of Koala and Grey-headed Flying-fox habitat as per EPBC approval conditions. Both of these species are considered to utilise the offset area.
Explain why the offset is of sufficient size and scale proportionate to the area that will be cleared
<p><i>It is a requirement that the offset provide a conservation outcome for the prescribed matter that achieves at least an equivalent environmental outcome. This can be achieved by comparing the habitat quality of the offset site with that of the impact site by using the Guide to determining terrestrial habitat quality and the Land-based offset multiplier calculator, both found at http://www.qld.gov.au/environment/pollution/management/offsets/</i></p> <p>The V-Dec area is of sufficient size and scale to meet the EPBC Environmental Offset Policy and required as per EPBC conditions.</p>
Describe the measures that will be taken to minimise any time-lag between the impact and delivery of the offset site?
<p><i>e.g. does your offset site contain regrowth vegetation? Does the threatened species already use, or exist in, the area?</i></p> <p>The V-Dec area will remain as Conservation land and continue to provide habitat for threatened species, in particular Koala and Grey-headed Flying-fox. Significant management works by the proponent will occur over a 10 year term in accordance with the V-Dec Management Plan. No major long term impacts are predicted as the land already provides a base level of habitat. The purpose of this offset is to improve this habitat quality over the development area. Any primary works in the offset area are programmed to be achieved in the first 10 years. The impact of the development</p>



occurs over a 20 year period. As a result, the full benefit of the offset should be realised at the halfway mark of the impact.



Section 8 Offset site management plan

Describe how the environmental offset site will be managed to achieve a conservation outcome/s. To ensure the environmental offset site is capable of delivering a conservation outcome for the impacted prescribed environmental matter, ensure that the offset site contains the relevant characteristics listed in section 2.3.1.6 of the Queensland Environmental Offset Policy.

What is the specific purpose and desired outcomes of the offset site and its management?

- The Category X/C/R areas that form part of the offset area will be managed so that within X years they will have the height, density and species expected of the regional ecosystem and meets remnant status and will be shown as Category B on the Regulated Vegetation Management Map.
- The Category B areas that form part of the offset area will be managed to achieve a conservation outcome in accordance with the management activities of this plan.
- Offset area will be mapped as Category A on the Regulated Vegetation Management Map to ensure visibility of offset area and associated management plan to future property owners.
- The management activities associated with the offset area will continue until all the vegetation reaches remnant status and can be mapped as essential habitat for the Koala and Grey-headed Flying-fox.
- Other: _____

List the benefits the offset delivery plan will have on the prescribed environmental matter e.g. if an environmental offset is required for a fauna species, describe how the environmental offset site will benefit the species. This ensures that a conservation outcome/s for each prescribed environmental matter will be achieved.

The benefits of this V-Dec area to the Koala and Grey-headed Flying-fox will be:

- *Creating and protecting a habitat corridor for these species in the Flinders-Karawatha Bioregional Corridor*
- *Increase in quality of vegetation through removal and control of weeds, rehabilitation of drainage lines and enhancement of regrowth areas*
- *Adaptive management during monitoring and maintenance period*



Describe the land management practices that will be used to achieve the conservation outcome/s. Include details of the location and area of each management practice as necessary (i.e. property scale, paddock, part of watercourse). Ensure these locations are identified on an attached map.

The V-Dec Management Plan proposed activities that will support the natural regeneration and restoration of biodiversity values including weed management (particularly removal of dominate weed infestations and along drainage lines), erosion and sediment control, adaptive management and maintenance.

1. Management actions

Issue	Management action	How will it be carried out	Location	Timing	Who will be doing the activity	Comments
Primary Weed Removal	Initial weed removal / treatment of site weeds involving manual removal, stock piling and disposal, and initial usage of prescribed herbicides.	In accordance with methods detailed in the South East Queensland Ecological Restoration Guidelines	In accordance with Spring Mountain V-Dec Area Management Plan	At the commencement of Spring Mountain (Quarterly)	Contractor – appointed by Lendlease	Initial control of dominant weed infestations. Impacts on watercourses will be managed and mitigated.
Secondary (Follow Up) Weed Removal	Follow up weed removal involving quarterly inspection of areas having undergone Primary Weed Removal and treatment of infestations or outbreaks as required.	In accordance with methods detailed in the South East Queensland Ecological Restoration Guidelines	In accordance with Spring Mountain V-Dec Area Management Plan	Quarterly	Contractor – appointed by Lendlease	Follow up control of weeds. Impacts on watercourses will be managed and mitigated.



Maintenance Weeding	Final stage of weeding which occurs in areas where the majority of weeds have been removed and treated and continues to remove additional outbreaks while fostering for natural regeneration and regrowth seedlings.	In accordance with methods detailed in the South East Queensland Ecological Restoration Guidelines	In accordance with Spring Mountain V-Dec Area Management Plan	Annually	Contractor appointed by Lendlease	–	At completion of site weeding works and agreed maintenance timeframe of 10 years.
2. Restrictions							
Restriction	Details					Comments	
Vegetation Clearing	<p><i>Vegetation clearing on the V-Dec area is restricted to:</i></p> <ul style="list-style-type: none"> • With the exception of registered easements, clearing of native vegetation may only occur in accordance with an exemption defined by Schedule 24 of the <i>Sustainable Planning Regulation 2009</i> or a development approval under the <i>Sustainable Planning Act 2009</i> including maintenance of access tracks and public access for nature based recreation • All reasonable measures must be taken to minimise the introduction, establishment and spread of non-native plants. Where non-native plants already occur in the area, all reasonable measures must be taken to control the non-native plant. • All reasonable measures must be taken to weeds of national environmental significance as declared by the Commonwealth. 						



	<ul style="list-style-type: none"> • All reasonable measures must be taken towards natural and assisted regeneration. • All reasonable measure must be taken towards erosion and sediment control. • Ensure public safety 		
Fauna	<ul style="list-style-type: none"> ▪ Activities in the V-Dec area will not damage, destroy, mark, move, dig up or otherwise interfere with active nests, burrows, roots, caves or other structures used by native animals. 		
Fire	<ul style="list-style-type: none"> ▪ Fire is managed in accordance with the Council's bushfire management plan 		
Waterways	<ul style="list-style-type: none"> ▪ The bed and banks of waterways are not modified unless associated with the requirements of a permit and an approved management plan (refer to Spring Mountain V-Dec Area Management Plan) 		
What are the risks of the offset failing to achieve the conservation outcome and how will these be managed?			
Risk	Level of risk (<i>Extreme, High, Moderate or Low</i>)	Proposed actions to minimise risk	Proposed remedial actions if risk occurs
<p>Failure of successful regeneration of juvenile / planted specimens</p> <p>Failure of weed management</p>	Low.	Should the initial weed removal and revegetation works fail to achieve the objectives for the offset area, monitoring and reporting procedures will facilitate the identification of the cause of failure, whether that be due to flooding, drought, poor soil quality, inadequacy of weed removal techniques, impacts from human disturbance or other causative events.	Once the causative event of failure is identified, corrective actions can be imposed to implement new procedures, techniques or management measures



Describe how will the conservation outcome/s will be measured and monitored? i.e. how will you know when you have achieved the desired outcomes.

Insert general description of monitoring and reporting activities e.g. regular reporting, photo monitoring, surveying, field measurements, recording management activities etc. This can include periodic assessment in accordance with the Guide to determining terrestrial habitat quality to determine gains in quality.

Management will occur over 10 years. Secondary weed management will be undertaken quarterly and adaptive management and monitoring will occur in conjunction with Council until works are completed to the required level of Council handover. Reporting will include a short memo style report responding to agreed criteria including:

- Date, time and weather conditions at the time of inspection
- Changes in weed extent populations (spreading/contracting)
- Changes in weed densities
- Health of existing weed vegetation protected by NRM provisions
- Rate and success of revegetation plantings
- Growths of PFC rates of assisted regeneration areas
- Occurrences of new weed infestations or species outbreaks
- Comments on any indirect changes to the area as a result of weed management (i.e. erosion/change in weed footprints/death to natives, and
- A visual diary of imagery from selected locations at each inspection (including the pre-state and quarterly inspections).
- A plan and descriptions of terrestrial habitat guideline monitoring

Reporting

The V-Dec Area monitoring report will include:

- Name and contact details of landholder/management body
- DLGIP and DNRM case numbers
- Lot/plan and address
- An overview of the progress of the management area in achieving the management outcomes
- Details of the management activities undertaken
- How any risk or threats have impacted the area and activities undertaken to manage these



- Photo monitoring details (photos from identified sites should be included in the report)
- Other monitoring outputs e.g., transect details, Biocondition results, survey details etc.
- If offset is for essential habitat for a species, species presence/absence should be noted
- Any amendments to the management activities/schedule, restrictions or monitoring and reporting requirements
- Other

Reports are due to DNRM and ICC by 30 June and will be provided annually or biannually

It is noted that in accordance with the EPBC development permit Lendlease are required to undertake and publish reports on the offset area.



Appendix B

Spring Mountain EPBC Act Approval (EPBC 2013/7057)



Approval

Spring Mountain Mixed Use Master Planned Community Development, Queensland (EPBC 2013/7057)

This decision is made under sections 130(1) and 133 of the *Environment Protection and Biodiversity Conservation Act 1999*.

Proposed action

Person to whom the approval is granted Lend Lease Communities (Springfield) Pty Limited

Proponent's ACN (if applicable) ACN 087 876 864

Proposed action To construct a mixed use development (including residential, commercial and community developments and associated infrastructure) on a 387ha site at Spring Mountain, Queensland [See EPBC Act referral 2013/7057].

Approval decision

Controlling Provision	Decision
Listed threatened species and communities (sections 18 & 18A)	

Conditions of approval

This approval is subject to the conditions specified below.

Expiry date of approval

This approval has effect until 31 December 2040.

Decision-maker

Name and position Deb Callister
Acting First Assistant Secretary
Environment Standards Division

Signature

Date of decision 23 December 2015

CONDITIONS

1. The approval holder must not clear more than 255 hectares of **MNES habitat**.
2. To minimise adverse impacts to **koalas** from **vegetation clearing and construction activities** there must be no **koala** injury or mortality as a result of **vegetation clearing and construction activities** at the **project site**.
3. To minimise adverse impacts to **koalas** from vehicle strike and in order to maintain safe **koala** movement opportunities through the **project site** the approval holder must:
 - a. implement the measures specified in Table 3-3 of the **Fauna Management Plan** prior to **operation**, and maintain these measures for the life of the approval;
 - b. ensure **koala road crossings** are placed in the locations specified at Figure 3-1 of the **Fauna Management Plan** prior to **operation**, and maintain these measures for the life of the approval;
 - c. implement measures sufficient to identify any **koala** injury and mortality at the **project site**; and
 - d. if **koala** injury or mortality occurs, then revise management measures in consultation with a **suitably qualified person** to reduce the likelihood of adverse impacts to **koalas**; and inform the **Department**, either as part of annual compliance reporting required under condition 13 or as a separate notification in writing.
4. To minimise adverse impacts to **koalas** from domestic dog attack and to exclude **koalas** from entering residential areas within the **project site**, the approval holder must:
 - a. implement measures to prevent domestic dog attacks on **koalas**, including limiting the movement of domestic dogs, creating dog exclusion zones and **signage** as specified at section 3.4 of the **Fauna Management Plan**; and
 - b. ensure **koala exclusion fencing** is constructed and located as specified at section 3.4 of the **Fauna Management Plan** prior to **operation**, and maintained for the life of the approval.
5. To minimise adverse impacts to **Plectranthus habrophyllus**, there must be no net loss of **P. habrophyllus** at the **project site** as a result of the proposed action, as defined by the following milestones:
 - a. by six months after the **commencement of the action** and annually for three years thereafter, there must be 0% cover of **weeds of national significance** in the **on-site conservation areas** and **buffer areas**;
 - b. by one year after the **commencement of construction** there must be 80% survival of planted **P. habrophyllus**;
 - c. by three years after the **commencement of construction**, there must be an increase in the number of mature **P. habrophyllus** in the **on-site conservation areas** that is greater than the number of **P. habrophyllus** removed during **construction**; and
 - d. by three years after the **commencement of construction**, there must be evidence of recruitment from planted **P. habrophyllus** individuals.

6. The approval holder must undertake a monitoring program. The monitoring program must be planned and undertaken so that the data gathered is adequate to: inform adaptive management; and demonstrate whether milestones and outcomes described in conditions 2, 5 and 8 have been met. The monitoring program must:
 - a. include daily surveys for injured or dead koalas during **vegetation clearing and construction activities**;
 - b. include pre-clearance surveys of all areas that will be cleared to establish the number of mature *P. habrophyllus* that will be lost as a result of the proposed action;
 - c. establish quadrats within each of the **on-site conservation areas** where *P. habrophyllus* has been planted and at **control sites** that contain remnant *P. habrophyllus* populations where supplemental planting has not occurred; and
 - d. be undertaken by a **suitably qualified person**.
7. To compensate for the loss of **koala habitat** and **grey-headed flying-fox foraging habitat** the approval holder must:
 - a. **secure**, prior to the **commencement of the action**, the **offset** containing 293 hectares of **MNES habitat** within the offset area at **Annex 1**;
 - b. provide the Department with the **offset attributes**, **shapefile** and map(s) clearly defining the location and boundaries of each offset, within 2 weeks of lodgement of the offset with the **Titles Office**; and
 - c. ensure the **Agreement** is registered on the title on which each offset is located, and provide the Department with evidence of lodgement with the **Titles Office**, within 2 weeks of lodgement. Provide a copy of the signed **agreement** within 2 weeks of receipt from the **Titles Office**.

The approval holder must ensure any proposal for alternative offsets is agreed to in writing with the **Department**.

Note: Offsets for different species may overlap where they share the same habitat requirements.

8. To compensate for impacts to **koala habitat** and **grey-headed flying-fox foraging habitat** the approval holder must achieve the following outcomes as compared to baseline **offset** habitat quality and extent, unless agreed in writing with the **Department**:
 - a. by 20 years after the **commencement of construction**, there must be a **gain in habitat quality** across 90% of the **offset**.
9. To mitigate impacts on **koala** and *P. habrophyllus*, the approval holder must develop a fire management strategy for the **project site** and the **offset**, incorporating advice from a **suitably qualified person** regarding the impacts of the fire management strategy on **koala** and *P. habrophyllus*.
10. The approval holder must adaptively manage **koala habitat**, **grey-headed flying-fox foraging habitat** and *P. habrophyllus* to achieve the outcomes described in conditions 1-9. This must include:

- a. developing and implementing a strategy (or strategies) to achieve the outcomes and milestones outlined in conditions 1-9, in consultation with a **suitably qualified person** (noting that the plan does not require approval by the **Minister** and is not an 'action management plan' under the **EPBC Act**);
- b. a documented process of adaptive management and continual improvement, including using data from monitoring and experimentation trials to inform adaptive management; and
- c. where there is a reasonable risk (or evidence) that outcomes or milestones are not likely to be achieved: revising management measures in consultation with a **suitably qualified person**; increasing the level of effort to achieve the outcomes; and informing the **Department**, either as part of annual compliance reporting required under condition 13 or as a separate notification in writing.

Administrative conditions

11. Within 7 days after the **commencement of the action**, the approval holder must advise the **Department** in writing of the actual date of **commencement of the action**.
12. The approval holder must maintain accurate records substantiating all activities associated with or relevant to the conditions of approval, including measures taken to implement the management plan, report or strategy 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 **Department's** website. The results of audits may also be publicised through the general media.
13. Within three months of every 12 month anniversary of the **commencement of the action**, the approval holder must publish a report on their website addressing compliance with each of the conditions of this approval, including implementation of any management plans as specified in the conditions. Documentary evidence providing proof of the date of publication and non-compliance with any of the conditions of this approval must be provided to the **Department** at the same time as the compliance report is published, until agreed in writing with the **Department**.
14. The approval holder must notify the **Department** in writing of any non - compliance with conditions as soon as practicable and within no more than 2 business days of becoming aware of the non - compliance.
15. Upon the direction of the **Minister**, the approval holder must ensure that an independent audit of compliance with the conditions of approval is conducted and a report submitted to the **Minister**. The independent auditor must be approved by the **Minister** prior to the commencement of the audit. Audit criteria must be agreed to by the **Minister** and the audit report must address the criteria to the satisfaction of the **Minister**.
16. The approval holder may choose to revise a management plan, program or strategy approved by the **Minister** under conditions 1 - 9 without submitting it for approval under section 143A of the EPBC Act, if the taking of the action in accordance with the revised plan, program or strategy would not be likely to have a **new or increased impact**. If the approval holder makes this choice they must:

- a. notify the **Department** in writing that the approved plan, program or strategy has been revised and provide the **Department** with an electronic copy of the revised plan, program or strategy;
 - b. implement the revised plan, program or strategy from the date that the plan, program or strategy is submitted to the **Department**; and
 - c. for the life of this approval, maintain a record of the reasons the approval holder considers that taking the action in accordance with the revised plan, program or strategy would not be likely to have a **new or increased impact**.
17. The approval holder may revoke their choice under condition 16 at any time by notice to the **Department**. If the approval holder revokes the choice to implement a revised plan, program or strategy, without approval under section 143A of the Act, the plan, program or strategy approved by the **Minister** must be implemented.
18. Condition 16 does not apply if the revisions to the approved plan, program or strategy include changes to environmental offsets provided under the plan, program or strategy in relation to a matter protected by a controlling provision for the action, unless otherwise agreed in writing by the **Minister**. This does not otherwise limit the circumstances in which the taking of the action in accordance with a revised plan, program or strategy would, or would not, be likely to have **new or increased impacts**.
19. If the **Minister** gives a notice to the approval holder that the **Minister** is satisfied that the taking of the action in accordance with the revised plan, program or strategy would be likely to have a **new or increased impact**, then:
- a. Condition 16 does not apply, or ceases to apply, in relation to the revised plan, program or strategy; and
 - b. The approval holder must implement the plan, program or strategy approved by the **Minister**.

To avoid any doubt, this condition does not affect any operation of conditions 16, 17 and 18 in the period before the day the notice is given.

At the time of giving the notice the **Minister** may also notify that for a specified period of time that condition 16 does not apply for one or more specified plans, programs or strategies required under the approval.

20. Conditions 16, 17, 18 and 19 are not intended to limit the operation of section 143A of the **EPBC Act** which allows the approval holder to submit a revised plan, program or strategy to the **Minister** for approval.
21. If, at any time after five years from the date of this approval, the approval holder has not **substantially commenced the action**, then the approval holder must not **substantially commence the action** without the written agreement of the **Minister**.
22. Unless otherwise agreed to in writing by the **Minister**, the approval holder must publish all management plans, reports or strategies referred to in these conditions of approval on their website. Each management plan, report or strategy must be published on the website within 1 month of being approved by the **Minister** or being submitted under condition 1 – 9.

DEFINITIONS

Agreement - the executed agreement between the approval holder and the relevant landowner, to secure the land for long-term protection.

Buffer areas means 20 metre buffers around areas containing remnant or planted *P. habrophyllus*.

Commencement of the action means the date **construction** is first undertaken, excluding fences and signage, associated with the proposed action.

Construction includes any preparatory works required to be undertaken including clearing vegetation, the erection of any onsite temporary structures and the use of heavy duty equipment for the purpose of breaking the ground for buildings or infrastructure including any works for the creation of vegetation buffers.

Control sites means sites to be monitored concurrently with a **project site** or **offset site**, to provide evidence of the relative impacts or improvements as a result of the proposed action.

Department means the Australian Government Department or any other agency administering the **EPBC Act** from time to time.

EPBC Act means the *Environment Protection and Biodiversity Conservation Act 1999* (Commonwealth).

EPBC Act Environment Offsets Policy (October 2012) is the Policy guiding the use of offsets under the *Environment Protection and Biodiversity Conservation Act 1999*, published by the then Department of Sustainability, Environment, Water, Population and Communities, October 2012.

Fauna Management Plan means the document titled *Saunders Havill Group's Spring Mountain Fauna Management Plan 17 July 2015* (FMP).

Gain in habitat quality means an improvement in the quality and extent of **koala habitat** and **grey-headed flying-fox foraging habitat** in comparison to baseline environmental conditions at the **offset** and compared with an unmanaged control site.

Grey-headed flying-fox means the native species *Pteropus poliocephalus*, protected under the **EPBC Act**.

Grey-headed flying-fox foraging habitat means the known native food trees, including eucalypts (genera *Eucalyptus*, *Corymbia* and *Angophora*), melaleucas and banksias that are the primary food for the species.

Koala means the native species *Phascolarctos cinereus* (combined populations of Qld, NSW and the ACT), protected under the **EPBC Act**.

Koala habitat means any forest or woodland containing species that are known **koala** food trees or shrubland with emergent food trees. This can include remnant and non – remnant vegetation in natural, agricultural, urban and peri-urban environments and is defined by the vegetation community present and the vegetation structure; **koalas** do not necessarily have to be present.

Koala exclusion fencing is fencing constructed and located to prevent access by **koalas** to residences within the **project site**.

Koala road crossings are road crossings, including underpasses, which are specifically designed to facilitate the movement of **koalas**.

Minister means the Minister administering the EPBC Act and includes a delegate of the Minister.

MNES means matters of national environmental significance.

MNES habitat means **koala habitat** and **grey-headed flying-fox foraging habitat**.

New or increased impact means a new or increased impact on any matter protected by the controlling provisions for the action, when compared to the plan, program or strategy that has been approved by the **Minister**.

Offset attributes means a '.xls' file capturing relevant attributes of the **offset** site, including the EPBC reference ID number, the physical address of the **offset** site, coordinates of the boundary points in decimal degrees, the **EPBC Act** protected matters that the **offset** compensates for, any additional **EPBC Act** protected matters that are benefiting from the **offset**, and the size of the **offset** in hectares.

On-site conservation areas means areas containing remnant or planted *P. habrophyllus* that are managed primarily for conservation.

Operation means the date of commencement of functioning as a residential development.

Plectranthus habrophyllus or *P. habrophyllus* means the native species protected under the EPBC Act.

Project site is the area defined as 'referral area' in the map at **Annex 2**.

Secure means long-term protection under a legal mechanism that is either establishing a covenant on the title as a voluntary declaration under the *Vegetation Management Act 1999* (Qld), or establishing a Nature Refuge under the *Nature Conservation Act 1992* (Qld).

Shapefile means an ESRI Shapefile containing '.shp', '.shx' and '.dbf' files and other files capturing attributes including at least the EPBC reference ID number and EPBC protected matters present at the relevant site. Attributes should also be captured in '.xls' format.

Signage is appropriately located signs designed to raise awareness of the presence of **Koalas** within the **project site** or mitigate against impacts to **Koalas**.

Substantially commence (d) the action means commencement of clearing the land and construction of infrastructure (i.e. sewerage, power, water, stormwater) associated with the action. This does not include preparatory works.

Suitably qualified person means a person with qualifications in environmental science, ecology or biology from a recognised institute and a minimum of 5 years field experience in flora and fauna management, or as agreed in writing by the **Department**.

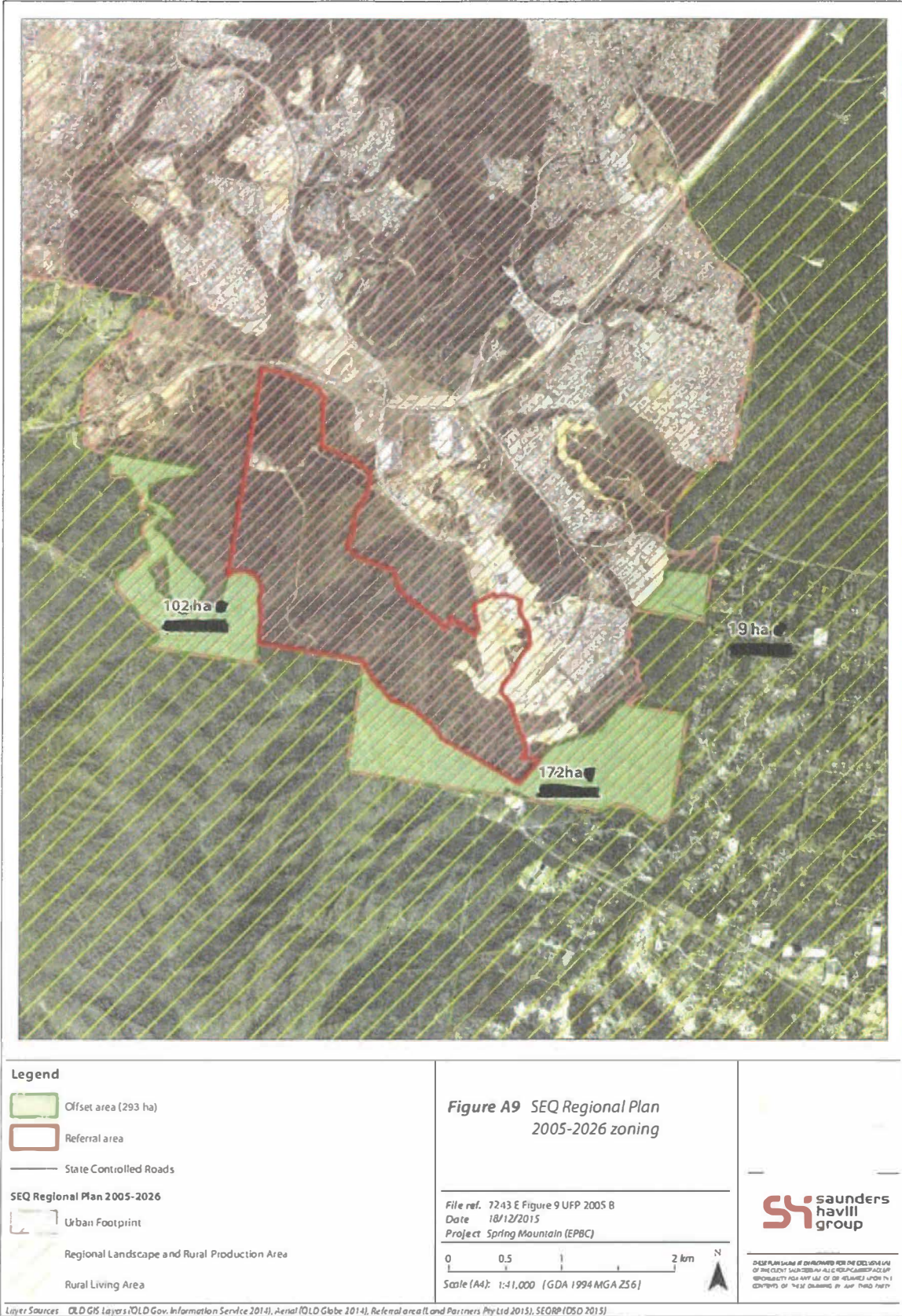
Titles Office means the relevant authority responsible for registering the land title transaction.

Vegetation clearing and construction activities means any activities that destroy, modify or remove vegetation within the **project site**, and those activities required during the construction of infrastructure for the duration of the approval.

Weeds of national significance means the thirty two weeds that have been agreed by Australian governments, based on an assessment process that prioritised these weeds based

on their invasiveness, potential for spread and environmental, social and economic impacts, available at: <http://www.weeds.org.au/docs/WoNS/>.

Annex 1



Annex 2

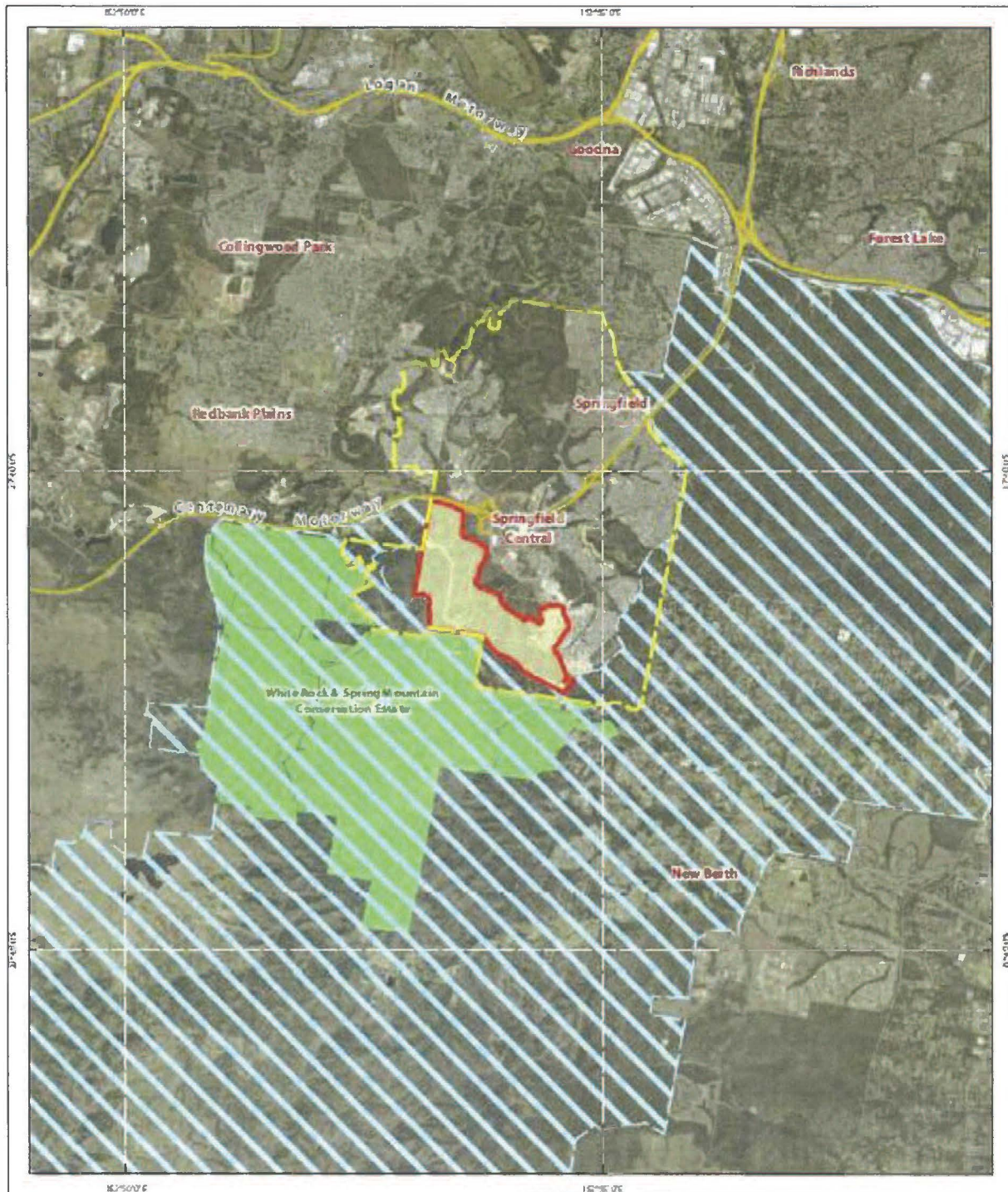


Figure A1 Site Context

-  White Rock & Spring Mountain Conservation Estate
-  White Rock & Spring Mountain Conservation Estate
-  E Indus River area

File ref: 7243 E 5/ques 1 Site Context A
 Date: 29/06/2015
 Project: Spring Mountain (EPBC)

0 0.5 1 2 3 4 km
 Scale (M): 1:100,000 (GDA 1954 MGA Z55)



SH saunders
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 group

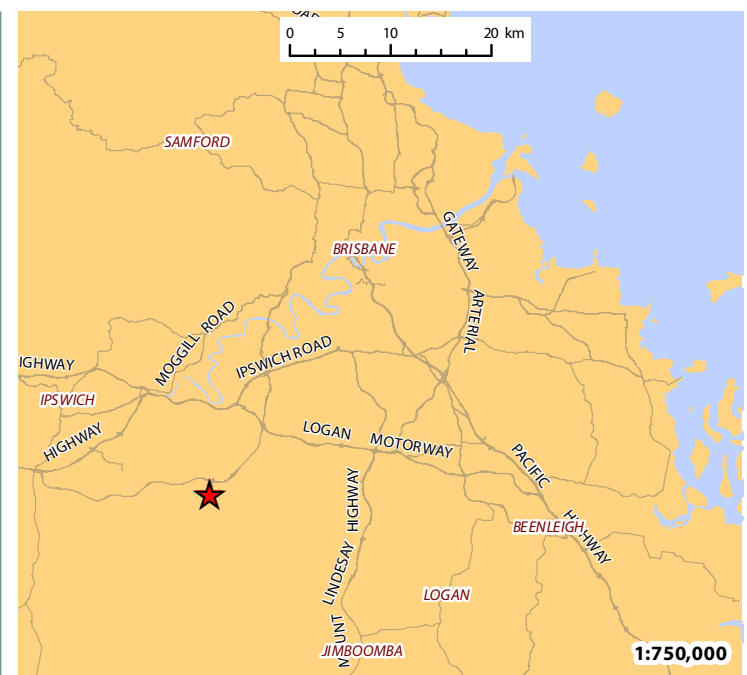
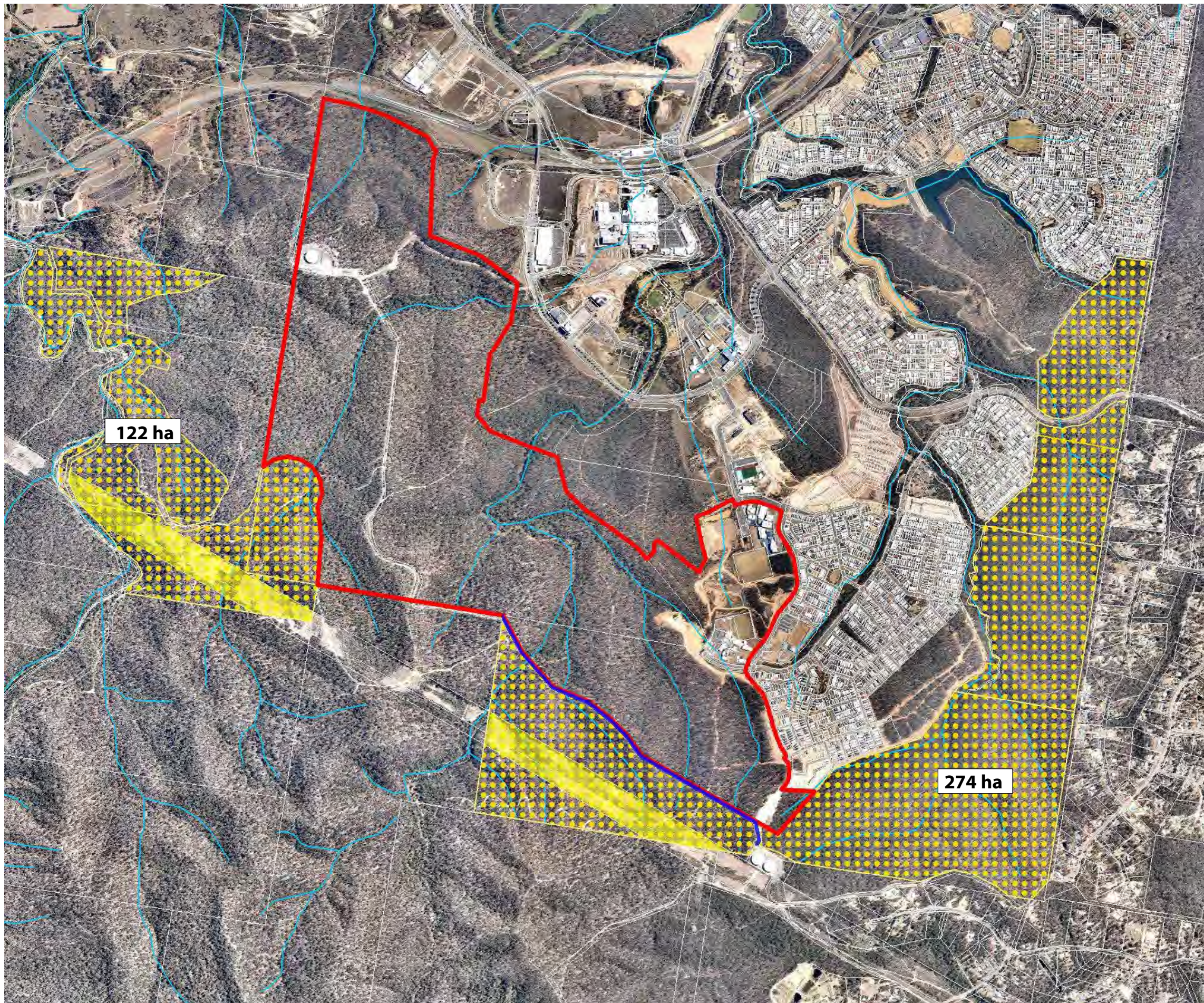
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Data Sources: DECCGIS (as per QLD Gov. Information Service 2016), Aerial (NOID Grade 2014), External aerial (Land Partners Pty Ltd 2015)



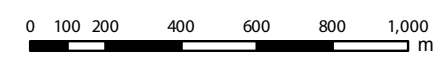
Appendix C

Declared Area Plan



Legend

- Spring Mountain project area
- Qld DCDB
- QLD watercourse mapping (VM)
- Declared Areas
- SEQ Water Easement
- Powerlink Easement



ISSUES:

Issue	Date	Description	Drawn	Checked
B	07/01/2016	Client Draft	AL	KG
C	19/02/2016	Easement Rev	AL	KG
D	30/05/2016	Declared area revision	TC	KG

Spring Mountain

Declared Area Plan

Date | 30/05/2016
 Scale | 1:20,000 @ A3
 Data Information:
 Universal Transverse Mercator
 GDA 1994 MGA Zone 56
 Client | Lend Lease
 Project | Spring Mountain EPBC
 Address/RPD | Springfield
 Source | DCBD (DNRM, 2013), Aerial (QLD Globe, 2013)

Plan A

SHG File
 7243 E 04 Offset areas D

THESE PLANS HAVE BEEN PREPARED FOR THE EXCLUSIVE USE OF THE CLIENT SAUNDERS HAVILL GROUP. SAUNDERS HAVILL GROUP CAN NOT ACCEPT RESPONSIBILITY FOR ANY USE OR RELIANCE UPON THE CONTENTS OF THESE DRAWINGS BY ANY THIRD PARTY.
 CONFIRM ALL DIMENSIONS ON SITE PRIOR TO CONSTRUCTION AND DO NOT SCALE FROM THE DRAWINGS. ALL DIMENSIONS ARE IN METRES. ANY DISCREPANCIES SHOULD BE CLARIFIED IN WRITING WITH SAUNDERS HAVILL GROUP PRIOR TO THE COMMENCEMENT OF WORK.
 PRIOR TO ANY DEMOLITION, EXCAVATION OR CONSTRUCTION ON SITE, THE RELEVANT AUTHORITY SHOULD BE CONTACTED FOR FURTHER UNDERGROUND SERVICES AND DETAIL LOCATIONS OF ALL SERVICES.



Appendix D





Property Map of Assessable Vegetation

Property Map of Assessable Vegetation

Lot on Plan
 748 on SP189044
 753 on SP189054
 752 on SP189053
 751 on SP189053
 747 on SP189043
 745 on SP242282
 740 on SP179412
 705 on SP151175
 11 on S31533

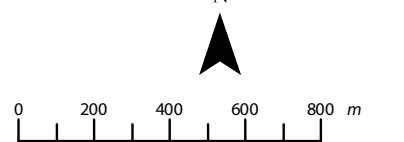
Notes: Property boundaries provided by Dept. of Natural Resources and Mines.

Legend

-  Subject Lot(s)
 -  Area to which the PMAV does not apply
- Vegetation Category Area**
-  Category A area
 -  Category X area

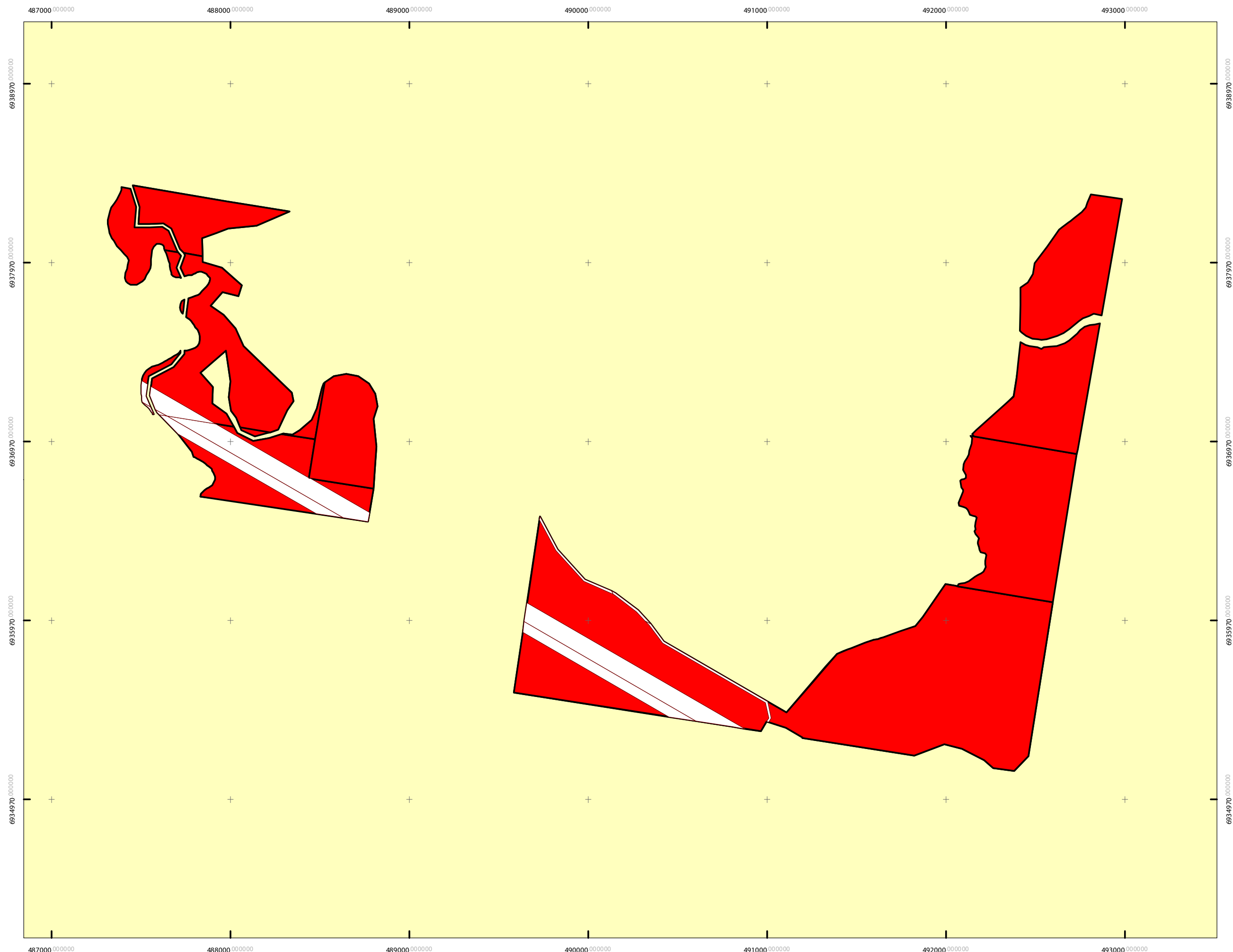


N



Scale (A4): 1:20,000 [GDA 1994 MGA Z56]

File ref. 7522 E 01 Offset Area PMAV A
Date 30/05/2016
Project Springfield (Spring Mountain)



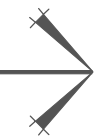


Appendix E

V-Dec Area Weed Management Plan

Spring Mountain Precinct

V-DEC MANAGEMENT PLAN - WEED MANAGEMENT



INTRODUCTION

This Voluntary Declaration (V-DEC) Management Plan has been prepared to outline specific weed management works to accompany an application for the registration of a Voluntary Declaration over Council owned conservation land at Spring Mountain. The land is located adjoining the Lend Lease Communities Pty Ltd Spring Mountain Precinct Development within Greater Springfield. The conservation land to which the V-Dec application applies was dedicated to Ipswich City Council (ICC) by Springfield Land Corporation (SLC) between 2006 and 2011. As part of the negotiation and approval of an *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) for the adjoining Lend Lease Spring Mountain Precinct project the proponent is required to undertake improvement works within the Council owned Conservation Land. The same approval also seeks the land is "legally secured" via the registration of a Voluntary Declaration on title.

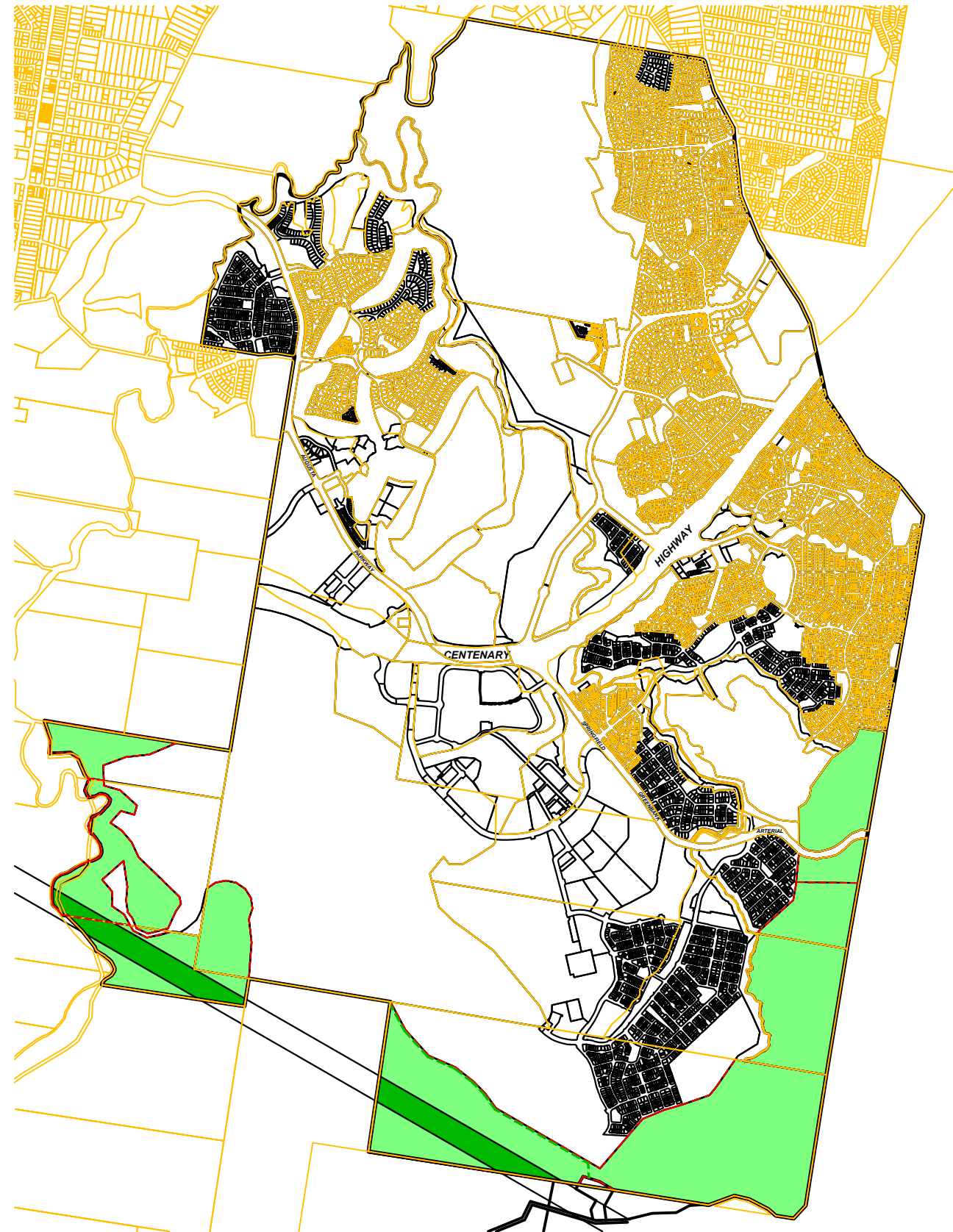
To complete this registration the V-Dec requires consent from the land owner (Ipswich City Council) and registered interests (Powerlink and SEQ Water). As part of the process a management plan which outlines the improvement works proposed must also be prepared and submitted. A number of rolling meetings have been held with ICC Parks and Environment Staff. ICC already retain a management plan for the conservation land which covers a range of improvement works and activities. As agreed with ICC the primary purpose of this V-Dec Management Plan is to bring forward weed management works within the designated area. This plan series provides details on proposed weed management.

ISSUE D 24.08.2016

EDITS TO DNRM SUBMISSION ISSUE

DRAWING SCHEDULE

Dwg No.	Drawing Title	Issue	Date
7243 E 01	Cover Sheet	D	24/08/2016
7243 L 02	Weed Management Plan - Notes	D	24/08/2016
7243 L 03	Weed Management Plan - Weed Techniques	D	24/08/2016
7243 L 04	Weed Management Plan - Weed Techniques	D	24/08/2016
7243 L 05	Weed Management Plan - Weed Techniques	D	24/08/2016
7243 L 06	Weed Management Plan - Sheet 1	D	24/08/2016
7243 L 07	Weed Management Plan - Sheet 2	D	24/08/2016
7243 L 08	Weed Management Plan - Sheet 3	D	24/08/2016
7243 L 09	Weed Management Plan - Sheet 4	D	24/08/2016
7243 L 10	Weed Management Plan - Sheet 5	D	24/08/2016
7243 L 11	Weed Management Plan - Sheet 6	D	24/08/2016
7243 L 12	Weed Management Plan - Sheet 7	D	24/08/2016
7243 L 13	Weed Management Plan - Sheet 8	D	24/08/2016



Spring Mountain Precinct

V-DEC MANAGEMENT PLAN - WEED TREATMENT & REHABILITATION

NOTES

page 5
This Voluntary Declaration (V-DEC) Management Plan links specific weed removal and management measures with spatial areas within the declared area included with the voluntary declaration application. This V-DEC management plan covers the 396ha of land previously dedicated by Springfield Land Corporation (SLC) to Ipswich City Council (ICC). This is inclusive of the 293ha area forming the basis of an environmental offset for Lendlease.

WEED CONTROL PROGRAM TIMING

The primary stage of manual weed removal, treatment and disposal for the V-DEC area is to commence upon the registering of the V-DEC document. Weed removal and maintenance is to occur in 4 staged areas and continue over a 10 year period.

Primary Weed Removal Stage - Consists of the initial weed removal / treatment of site weeds via the methods detailed within the South East Queensland Ecological Restoration Guidelines. Essentially involves the manual removal, stock piling and disposal and initial usage of prescribed herbicides. Additional notes below include:

- Implemented weed control method according to this plan.
- Weed trees located within 20M zone of the existing trail network are to be removed where trunk is cut down to ground level and vegetative matter removed.
- Program timing: primary weed removal phase is considered to be completed when all existing weeds within the stage for the declared area have been removed or treated. Both the secondary phase and the primary phase of weed removal can occur concurrently in different stage areas over time.
- A key map is to be provided logging the progress of areas from primary to secondary phases of weed removal and areas of rehabilitation as part of the reporting progress.

Secondary or Follow-up Weeding - for all areas will involve the quarterly inspection of areas having undergone Primary Weed Removal and treatment of infestations or outbreak as required. Additional notes below include:

- Implemented weed control method according to this plan.
- Weed trees located within 20M zone of the existing trail network are to be removed where trunk is cut down to ground level and vegetative matter removed.
- Program timing: primary weed removal phase is considered to be completed when all existing weeds within the declared area have been removed initially. Both the secondary phase and the primary phase of weed removal can occur concurrently in different work areas over time.
- A key map is to be provided logging the progress of areas from primary to secondary phases of weed removal and areas of rehabilitation as part of the reporting progress.

Maintenance Weeding Phase - final stage of weeding which occurs in areas where the majority of weeds have been removed and treated. Maintenance weeding continues to remove additional outbreaks but also allows for the fostering of natural regeneration and regrowth seedlings. Additional notes below include:

- Implemented weed control method according to this plan.
- Weed trees located within 20M zone of the existing trail network are to be removed where trunk is cut down to ground level and vegetative matter removed.
- Program timing: primary weed removal phase is considered to be completed when all existing weeds within the designated Park have been removed initially. Both the secondary phase and the primary phase of weed removal can occur concurrently in different work areas over time.
- A key map is to be provided logging the progress of areas from primary to secondary phases of weed removal and areas of rehabilitation as part of the reporting progress.

Revegetation occurs in two (2) distinct zones throughout the management area. Refer to Drawing sheets for a full description of proposed plant species, sizes, densities and numbers.

NATURAL REGENERATION

- Applies:
- To relatively large, intact and weed-free areas of native vegetation.
 - Where the native plants are healthy and capable of regenerating without human intervention.
 - When native plant seed is stored in the soil or will be able to reach the site from nearby natural areas, by birds or other animals, wind or water.
 - Where the plant community has a high potential for recovery after any short-lived disturbance, such as a fire or cyclonic winds.
 - When preventative action is all that is required to avert on-going disturbance, e.g. erection of fencing to prevent intrusion from cattle.

Planting in such sites can work against the aims of restoration by interfering with natural regeneration.

The re-establishing plant community will be similar in structure, composition and diversity to the original vegetation.

ASSISTED NATURAL REGENERATION

- Applies:
- To natural areas where the native plant community is largely healthy and functioning.
 - When native plant seed is still stored in the soil or will be able to reach the site from nearby natural areas, by birds or other animals, wind or water.
 - Where the natural regeneration processes (seedling germination, root suckering etc.) are being inhibited by external factors, such as weed invasion, soil compaction, cattle grazing, mechanical slashing etc.
 - When limited human intervention, such as weed removal, minor amelioration of soil conditions, erection of fencing, cessation of slashing, etc. will be enough to trigger the recovery processes through natural regeneration.
 - When major component is weed control.

Planting in such sites can work against the aims of restoration by interfering with natural regeneration.

The re-establishing plant community will be similar in structure, composition and diversity to the original vegetation.

NOTES

MONITORING AND REPORTING PROCEDURES

Monitoring of the parkland weed management and revegetation works allows for:

- A review of the pre-established performance indicators for measuring the success of the weed removal and control;
- Ensure the level of protection for existing identified native vegetation inclusive of that which has naturally regenerated;
- Review the rate of spread or contraction of weed infestation within the control program;
- Monitor the rate of assisted regeneration and revegetation of desirable native species promoted in areas where weeds have been removed; and
- Identification of new weed threats or other factors which may be effecting areas designated for ecological rehabilitation.

Monitoring is required for weed eradication, revegetation and assisted regeneration.

MONITORING TIME FRAMES

For weed removal and revegetation three (3) Council determined timeframes form the anchor of the monitoring process. These include:

Council Pre-Start - On-site meeting prior to the initial commencement of work within each stage of weed management. Will involve Consultant, Contractor and Council to work through weed treatment areas and clarify works approved and appointed.

On-Maintenance - At the completion of the Primary Weed Removal Stage and Secondary weeding an On-Maintenance meeting will be held with Council to inspect the works on-site in relation to the approved plans and previously agreed on-maintenance criteria.

Off-Maintenance - At the completion of all site weeding works and the agreed maintenance timeframe a final inspection will be held by Council to determine if works have been completed to the required level for Council hand over.

REPORTING

Reporting to Ipswich City Council will occur on a six (6) month interval during the total period. Council will physically attend the Pre-Start, On-maintenance and Off-maintenance meetings. For this project it is recommended reporting include a short memo styled report responding to agreed criteria. As part of the monitoring a number of pre-determined transect and quadrant sampling sites have been allocated. At these locations a number of baseline studies have been completed and will be repeated post weed removal and maintenance to measure the success of the programmed works. It is also recommended this include a visual diary of imagery from selected locations at each inspection (including the pre-start and monthly inspections). The imagery for the six (6) month period will be included with the report to Council.

In addition to the photo monitoring the biannual report to Council should include sufficient information on:

- Date, time and whether conditions at time of inspection
- Changes in weed extent populations (spreading / contracting)
- Changes in weed densities
- Health of existing vegetation protected by NRM provisions
- Rate of success for revegetation plantings
- Growth and PFC rate of assisted regeneration areas
- Occurrences of new weed infestations or species outbreaks
- Comments on any indirect changes to the area as a result of weed management (ie erosion / change in weed footprints / death to natives)
- Annual reporting is required to be sent to the Department of the Environment (DOE).

RESOURCES / ROLES & RESPONSIBILITIES

All resources required to implement this plan will be provided by the proponent (Lendlease). The following roles are applicable:

PROponent

- Ensure all consultants, contractors, sub contractors or others utilizing the area are aware of the V-DEC Management Plan.
- Appoint appropriate consultants and contractors to undertake works as prescribed on the drawings and conditioned by Ipswich City Council.
- Cover the costs of all necessary resources to ensure works are completed as per the approved documents.

CONSULTANTS

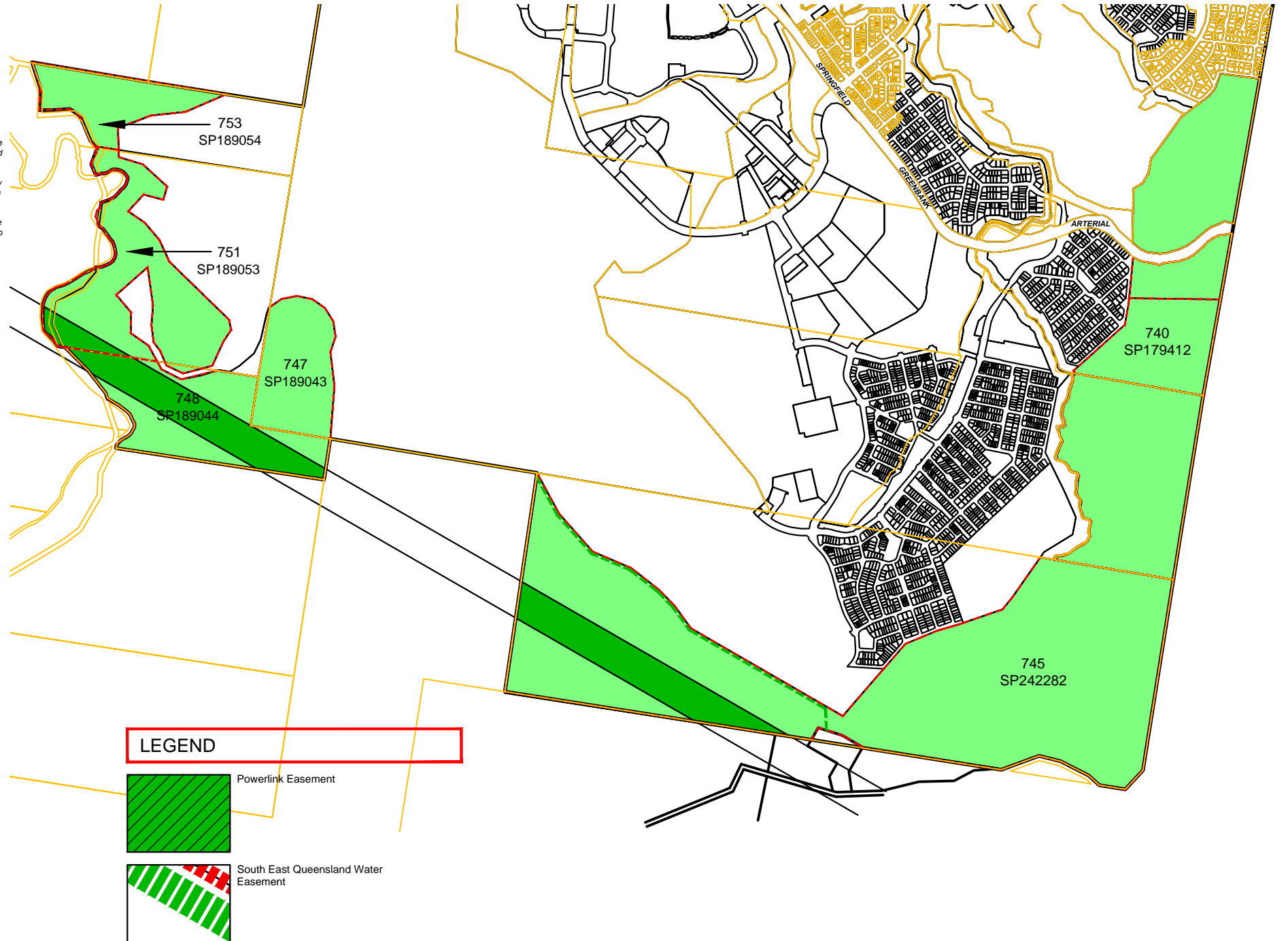
- Brief the proponent on their requirements in implementing and maintaining works as per the V-DEC Management Plan.
- Attend pre start, on maintenance and off maintenance meetings.
- Undertake monitoring and reporting to Ipswich City Council as set up by this document.
- Be available to respond to technical queries or departures to the approved documentation when on-site conditions require changes.
- Liaise with Council throughout all stages of approval, initial works and maintenance of works.

COUNCIL

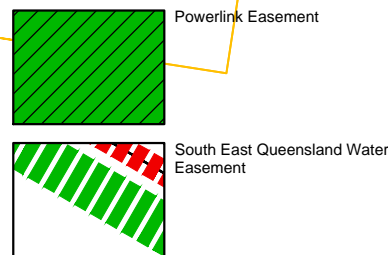
- Provide technical expertise via commentary on the approval of documentation.
- Attend pre-start, on and off maintenance inspections.
- Undertake random inspections through the Secondary weed management and Maintenance weed management phases.
- Accept and review biannual reports as dictated in this document.

CONTRACTOR

- Complete works in strict accordance with the documentation.
- Recommend changes to the documentation when specific experience or on-site conditions require so.
- Attend pre-start, on and off maintenance inspections.



LEGEND



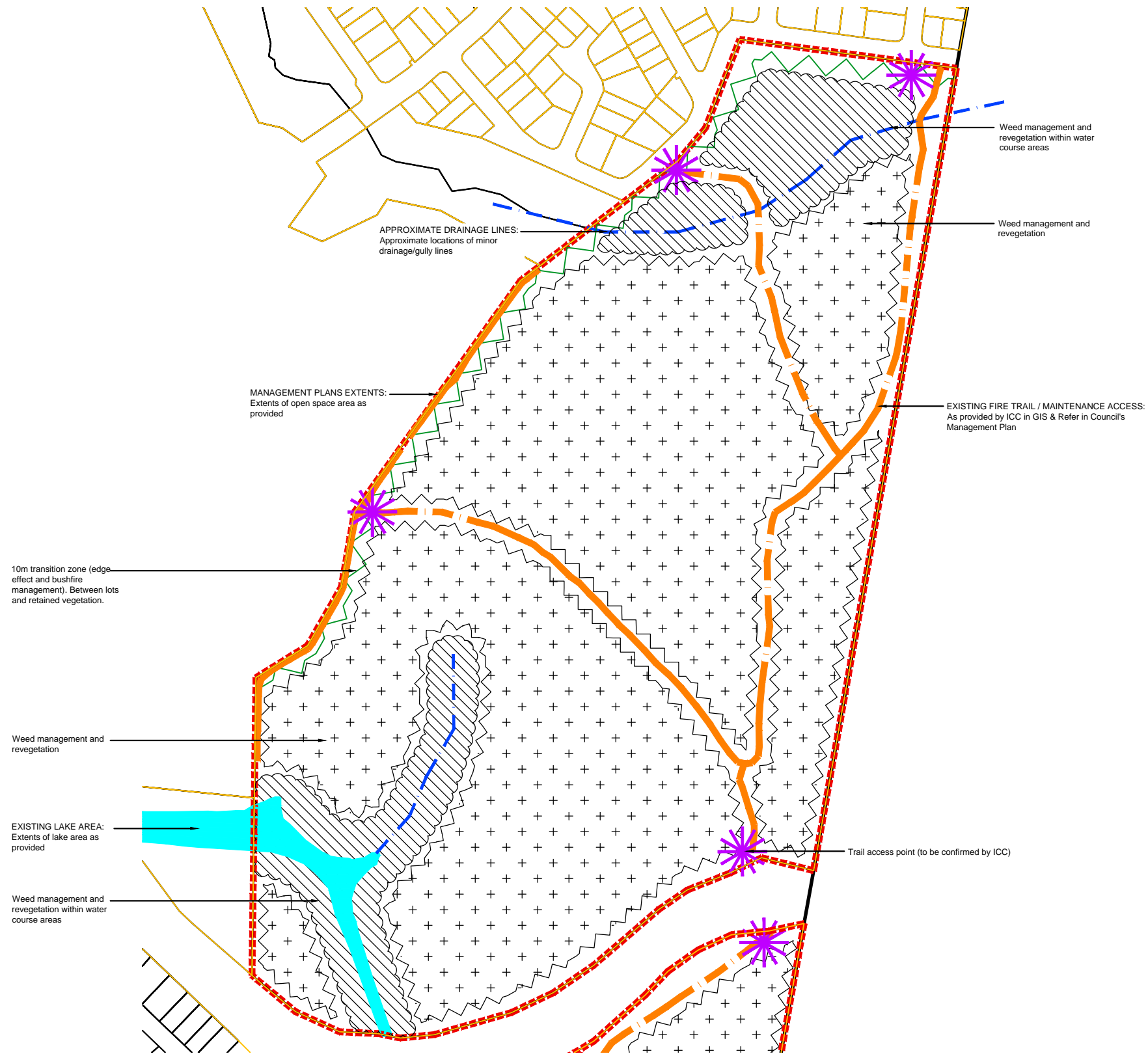
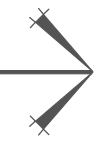
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Issue	Date	Description	Checked
A	28/04/2015	Preliminary Issue	MS
B	22/02/2016	Submission Issue	MS
C	25/05/2016	DNRM Submission Issue	MS
D	24/08/2016	Edits to DNRM Submission Issue	MS

CLIENT:	
PROJECT:	Spring Mountain Precinct
SCALE:	AS NOTED

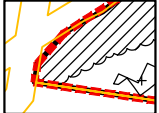
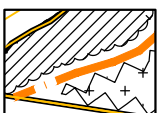

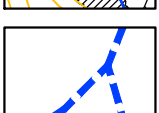

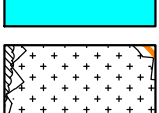
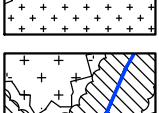


landscape architecture	
DRAWING: V-DEC Management Plan Weed Management Notes	
DATE: August 16	CHECKED: MS
CLIENT REF.: 7243	DRAWN: TL
DRAWING No.: 7243 L 02 RP D	

Spring Mountain Precinct

V-DEC MANAGEMENT PLAN - LOT 705 on SP151175



LEGEND

-  Extent of management plan area
-  Existing fire trail / maintenance access. As provided by ICC in GIS & Refer to Council's Management Plan
-  Approximate minor drainage lines. Minor drainage / gully lines
-  Approximate mapped major drainage lines
-  Extent of existing lake area
-  Weed management and revegetation
-  Weed management and revegetation within water course areas
-  10m transition zone (Edge effect & bushfire management). Between lots and retained vegetation
-  Trail access point (To be confirmed by ICC)

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 Saunders Havill Group Pty Ltd ABN 24 144 972 949
 Brisbane • Emerald • Gladstone
 head office 9 Thompson St Bowen Hills Q 4006
 phone 1300 123 SHG web www.saundershavill.com

■ surveying ■ town planning ■ urban design ■ environmental management ■ landscape architecture

40 YEARS
 1975 - 2015

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APPROVED COMPANY
 ISO 9001 Quality Management System

APPROVED COMPANY
 ISO 14001 Environmental Management System

QMS

AMENDMENTS:			
Issue	Date	Description	Checked
A	28/04/2015	Preliminary Issue	MS
B	22/02/2016	Submission Issue	MS
C	25/05/2016	DNR Submission Issue	MS
D	24/08/2016	Edits to DNR Submission Issue	MS

CLIENT:
 PROJECT: Spring Mountain Precinct
 SCALE: AS NOTED

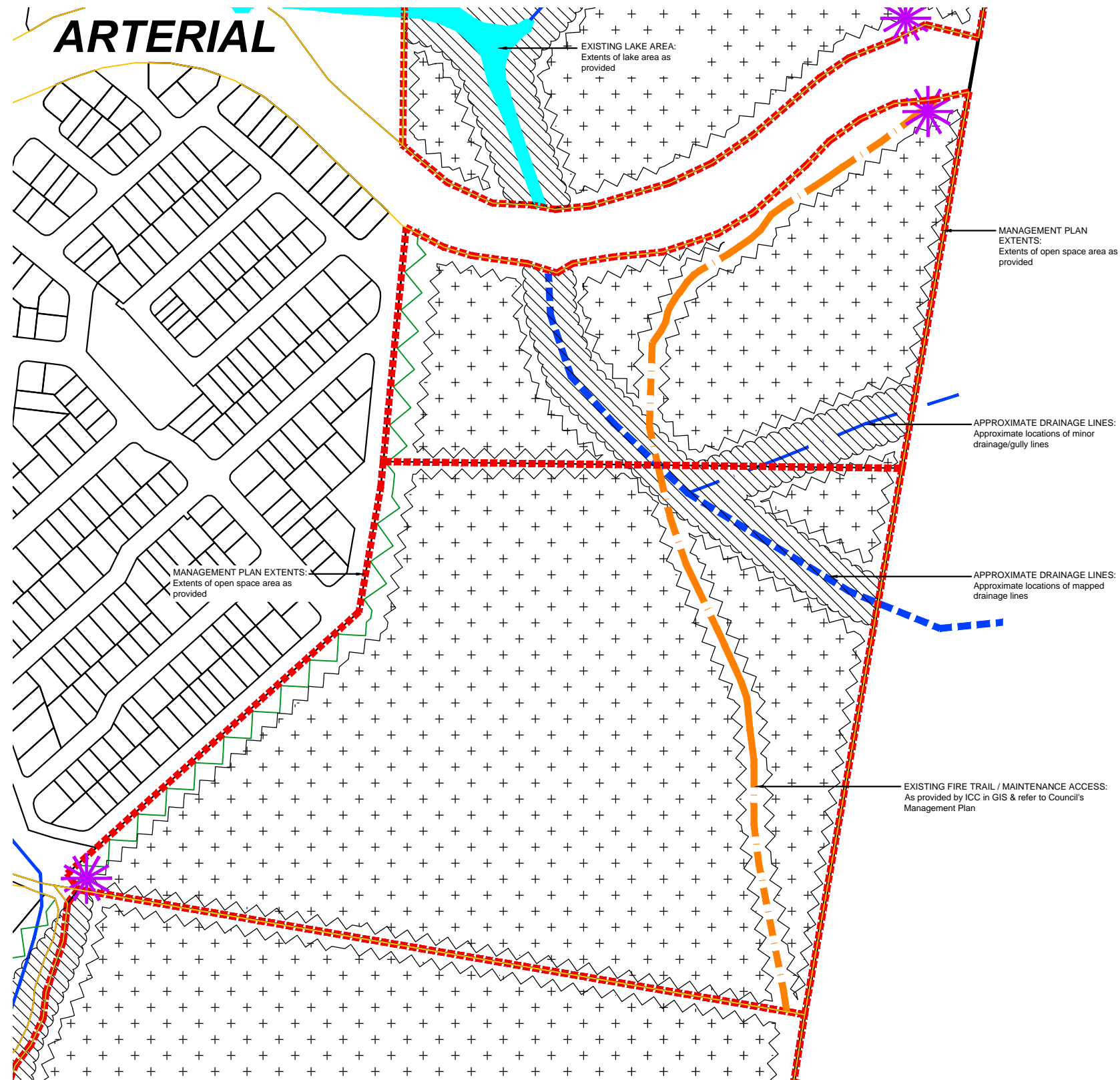
landscape architecture

DRAWING: V-DEC Management Plan
 Lot 75 on SP151175

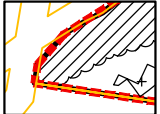
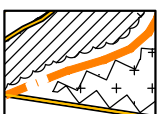

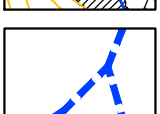



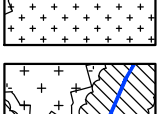

DATE: August 16 CHECKED: MS
 CLIENT REF.: 7243 DRAWN: TL
 DRAWING No.: 7243 L 06 RP D

Spring Mountain Precinct

V-DEC MANAGEMENT PLAN - LOT 740 on SPI79412



LEGEND

-  Extent of management plan area
-  Existing fire trail / maintenance access. As provided by ICC in GIS & Refer to Council's Management Plan
-  Approximate minor drainage lines. Minor drainage / gully lines
-  Approximate mapped major drainage lines
-  Extent of existing lake area
-  Trail access point (To be advised/confirmed by ICC)
-  Weed management and revegetation
-  Weed management zone (edge of vegetation in water management). Between lots and retained vegetation
-  Trail access point (To be confirmed by ICC)

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 phone 1300 123 SHG web www.saundershavill.com

■ surveying ■ town planning ■ urban design ■ environmental management ■ landscape architecture

40 YEARS
 1975-2015

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APPROVED COMPANY
 ISO9001 Quality Management System
 QMS

APPROVED COMPANY
 ISO14001 Environmental Management System
 QMS

AMENDMENTS:		
Issue	Date	Description
A	28/04/2015	Preliminary Issue
B	22/02/2016	Submission Issue
C	25/05/2016	DNR Submission Issue
D	24/08/2016	Edits to DNR Submission Issue

CLIENT:
 PROJECT: Spring Mountain Precinct

SCALE: 1:2000@A1
 1:4000@A3

landscape architecture

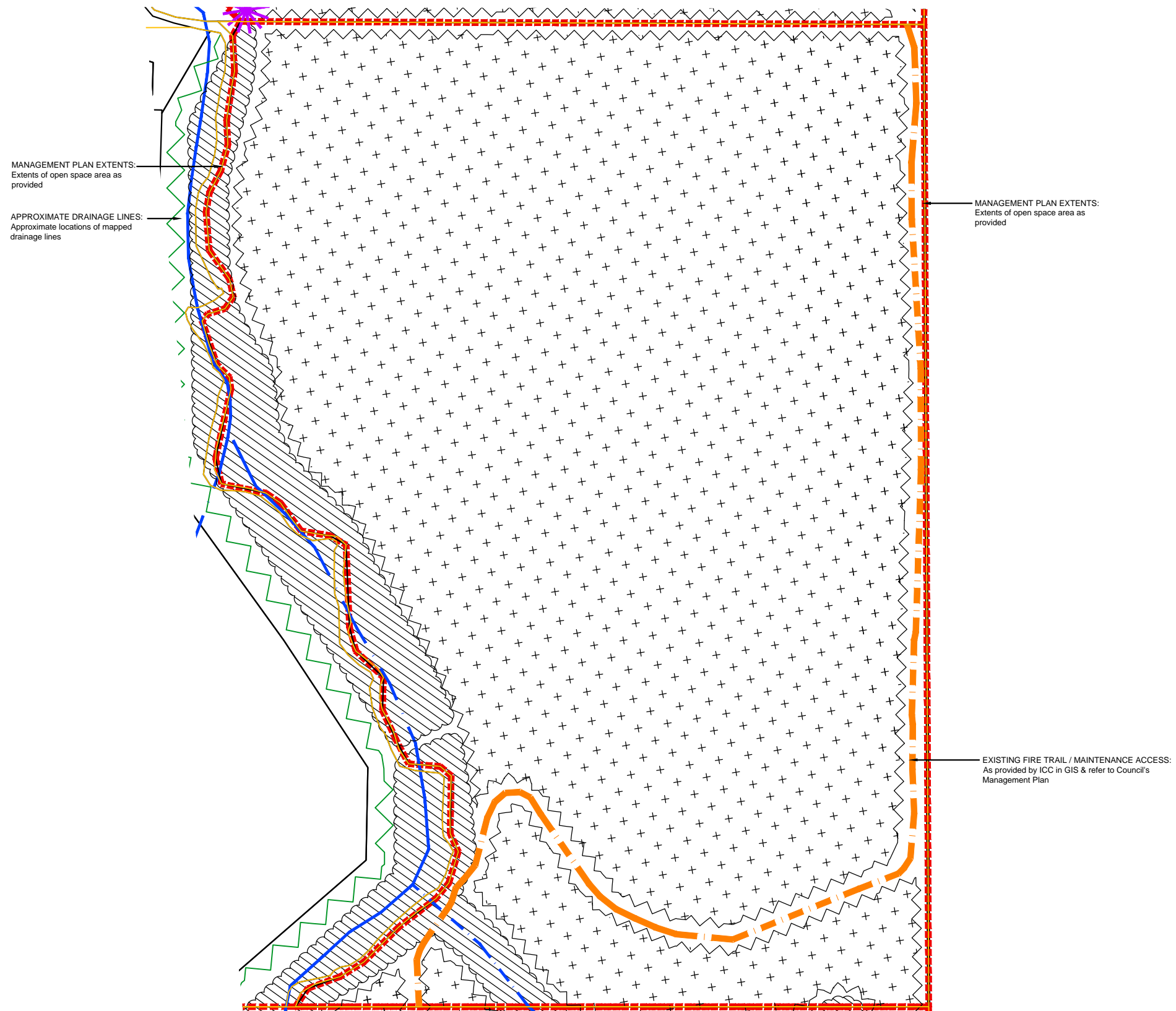
DRAWING: V-DEC Management Plan
 Lot 740 on SP179412

DATE: August 16
 CLIENT REF.: 7243
 DRAWING No.: 7243 L 07 RP D

CHECKED: MS
 DRAWN: TL

Spring Mountain Precinct

V-DEC MANAGEMENT PLAN - LOT II on S31533



LEGEND

- Extent of management plan area
- Existing fire trail / maintenance access. As provided by ICC in GIS & Refer to Council's Management Plan
- Approximate minor drainage lines. Minor drainage / gully lines
- Approximate mapped major drainage lines
- Extent of existing lake area
- New maintenance tracks throughout revegetation areas. Not part of this management plan. Refer ICC requirements
- Trail access point (To be confirmed by ICC)

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40 YEARS
 1975 - 2015

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APPROVED COMPANY
 ISO9001 Quality Management System
APPROVED COMPANY
 ISO14001 Environmental Management System

QMS

AMENDMENTS:

Issue	Date	Description	Checked
A	28/04/2015	Preliminary Issue	MS
B	22/02/2016	Submission Issue	MS
C	25/05/2016	DNRM Submission Issue	MS
D	24/08/2016	Edits to DNRM Submission Issue	MS

CLIENT:

PROJECT: Spring Mountain Precinct

SCALE: 1:2000@A1 0 20 100m
 1:4000@A3

landscape architecture

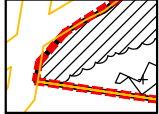
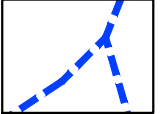
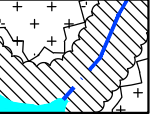
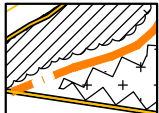



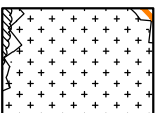


DRAWING: V-DEC Management Plan
 Lot 11 on S31533

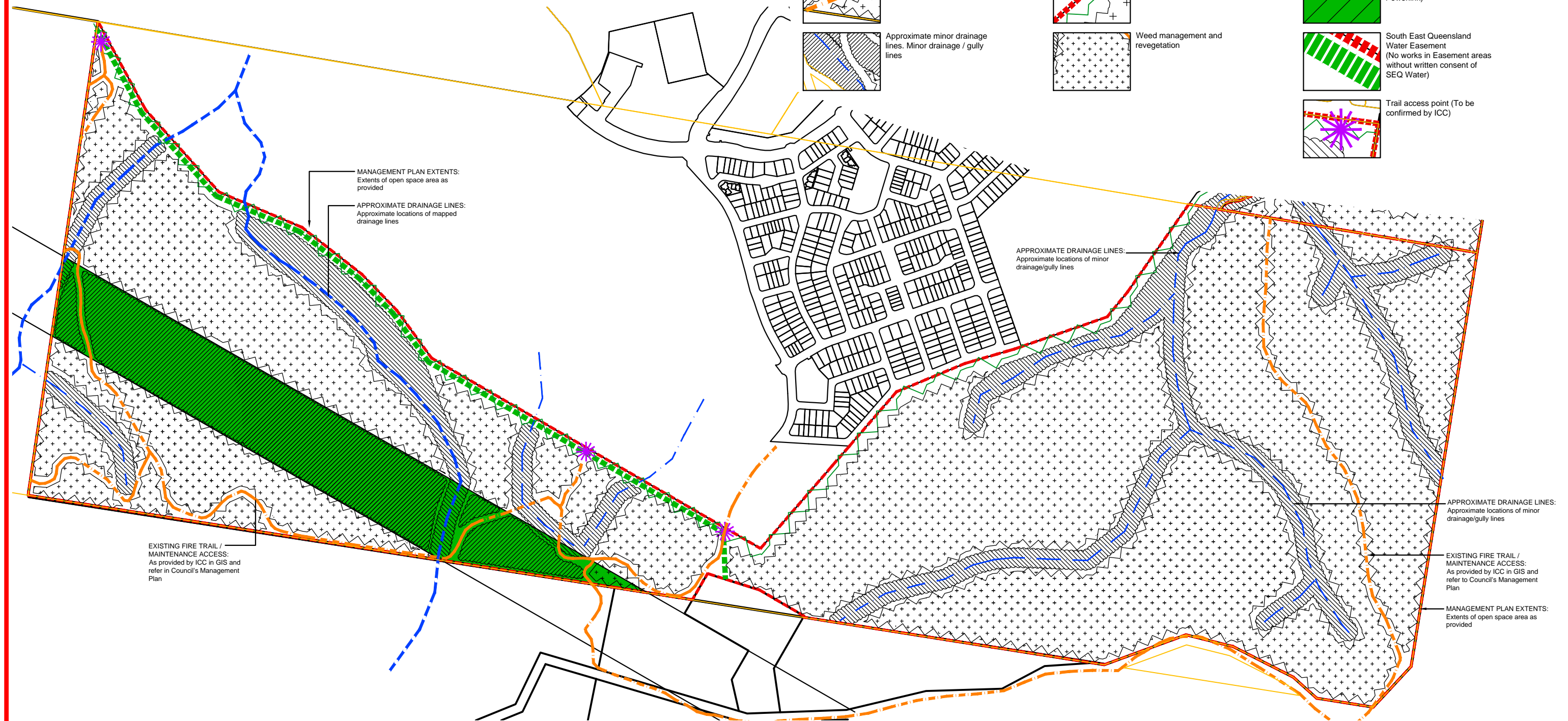
DATE: August 16 **CHECKED:** MS
CLIENT REF.: 7243 **DRAWN:** TL
DRAWING No.: 7243 L 08 RP D

Spring Mountain Precinct

V-DEC MANAGEMENT PLAN - LOT 745 on SP242282

LEGEND

	Extent of management plan area		Approximate mapped major drainage lines		Weed management and revegetation within water course areas
	Existing fire trail / maintenance access. As provided by ICC in GIS & Refer to Council's Management Plan		Trail access point (To be advised/confirmed by ICC)		Powerlink Easement (No works in Easement areas without written consent of Powerlink)
	Approximate minor drainage lines. Minor drainage / gully lines		Weed management and revegetation		South East Queensland Water Easement (No works in Easement areas without written consent of SEQ Water)
					Trail access point (To be confirmed by ICC)



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40 YEARS
 1975-2015

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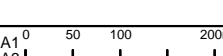
APPROVED COMPANY
 ISO9001 Quality Management System
 QMS

APPROVED COMPANY
 ISO14001 Environmental Management System
 QMS

AMENDMENTS:		
Issue	Date	Description
A	28/04/2015	Preliminary Issue
B	22/02/2016	Submission Issue
C	25/05/2016	DNRM Submission Issue
D	24/08/2016	Edits to DNRM Submission Issue

CLIENT:
 PROJECT: Spring Mountain Precinct

SCALE: 1:4000@A1
 1:8000@A3



landscape architecture

DRAWING: V-DEC Management Plan
 Lot 745 on SP242282


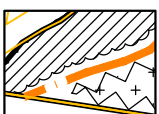

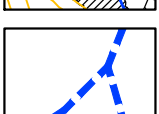



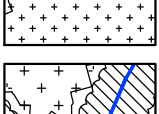

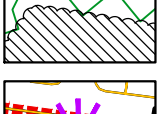
DATE: August 16 CHECKED: MS
 CLIENT REF.: 7243 DRAWN: TL
 DRAWING No.: 7243 L 09 RP D

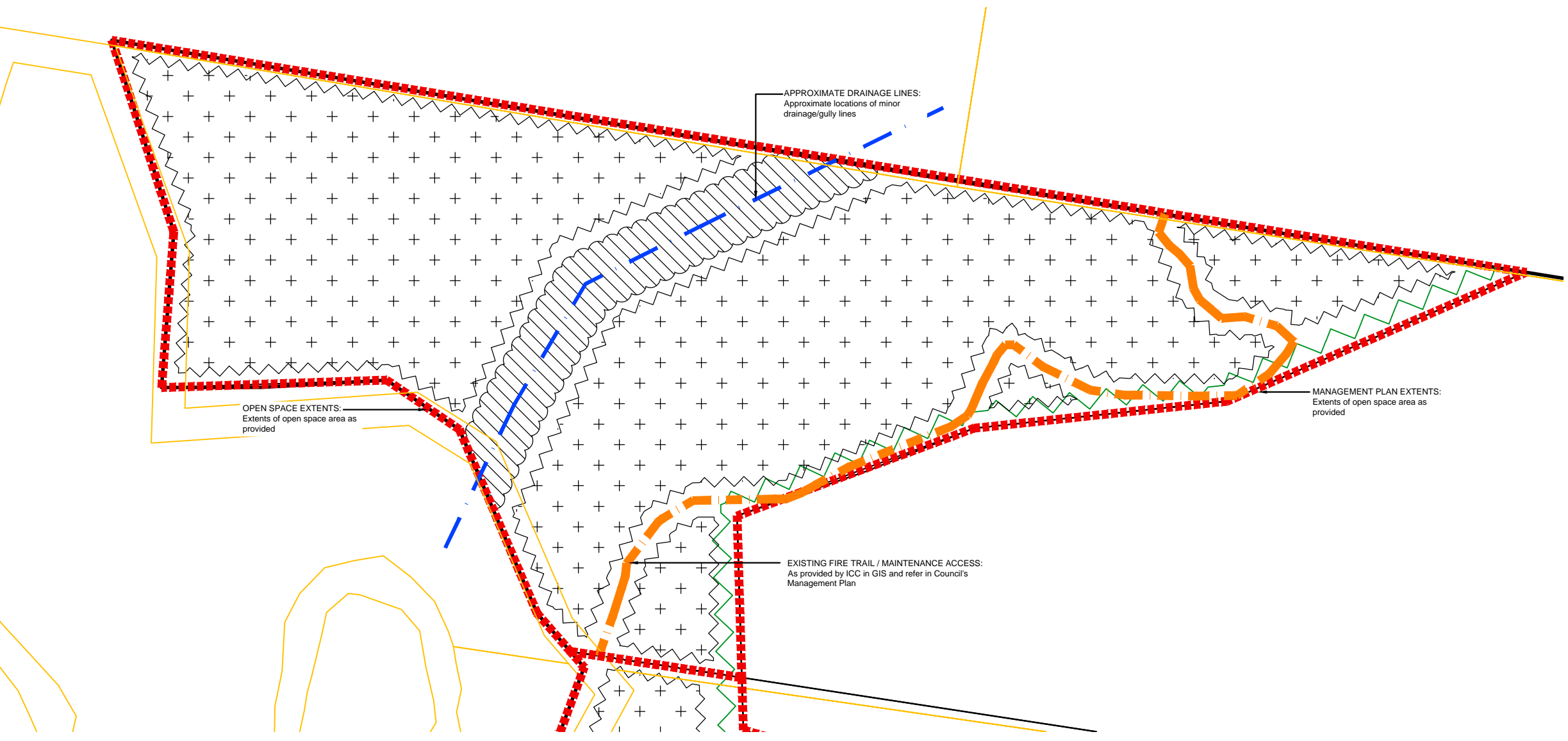
Spring Mountain Precinct

V-DEC MANAGEMENT PLAN - LOT 753 on SPI89054



LEGEND

-  Extent of management plan area
-  Existing fire trail / maintenance access. As provided by ICC in GIS & Refer to Council's Management Plan
-  Approximate minor drainage lines. Minor drainage / gully lines
-  Approximate mapped major drainage lines
-  Extent of existing lake area
-  Future fauna management road solution
-  Weed management and revegetation
-  Weed management and revegetation within water course areas
-  10m transition zone (Edge effect & bushfire management). Between lots and retained vegetation
-  Trail access point (To be confirmed by ICC)



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AMENDMENTS:		
Issue	Date	Description
A	28/04/2015	Preliminary Issue
B	22/02/2016	Submission Issue
C	25/05/2016	DNRM Submission Issue
D	24/08/2016	Edits to DNRM Submission Issue

CLIENT:
 PROJECT: Spring Mountain Precinct
 SCALE: 1:1500@A1, 1:3000@A3

landscape architecture
 DRAWING: V-DEC Management Plan Lot 753 on SP189054
 DATE: August 16
 CLIENT REF.: 7243
 DRAWING No.: 7243 L 10 RP D

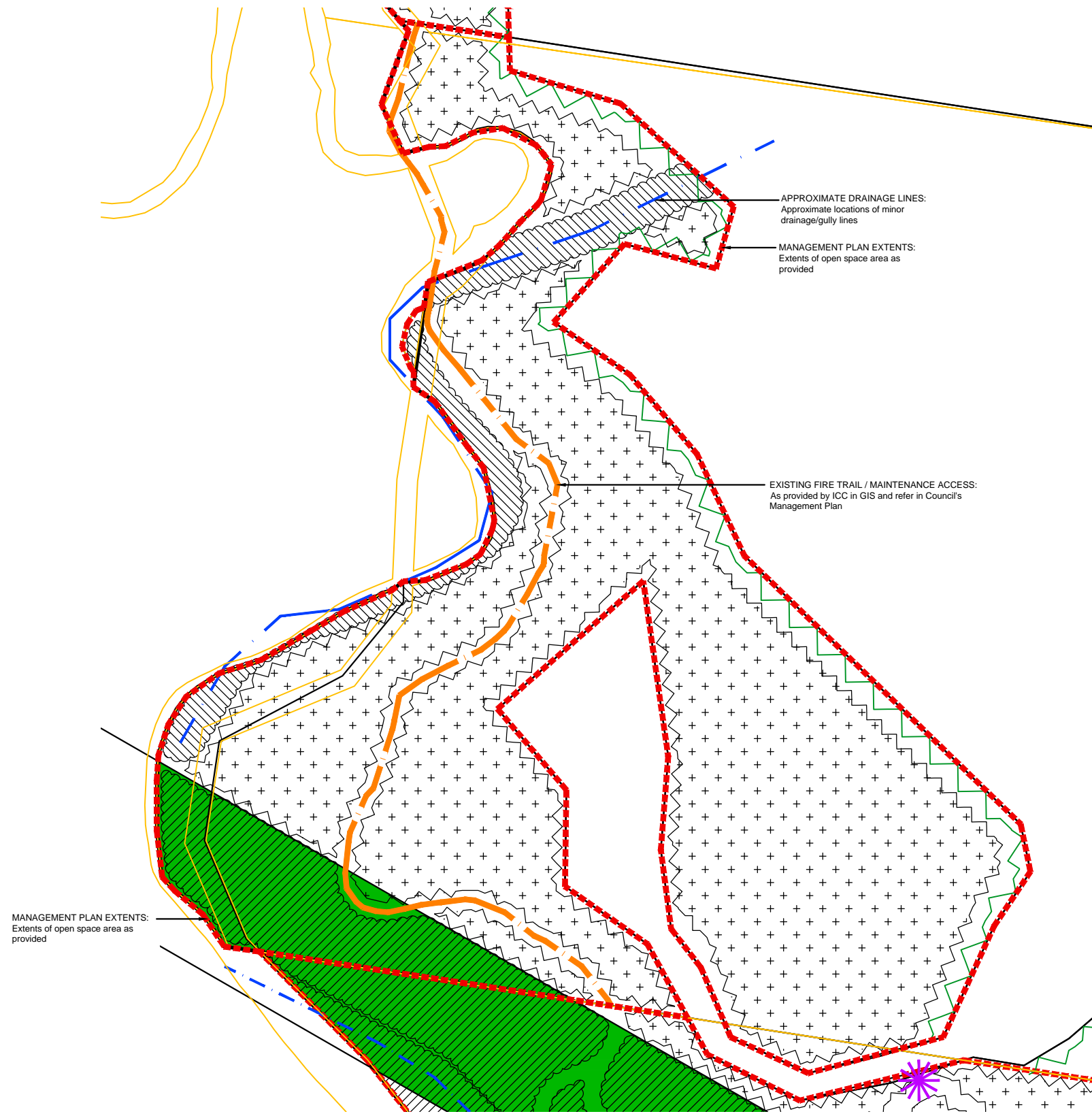
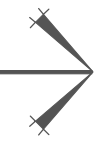
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1975-2015

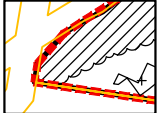
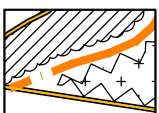

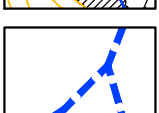

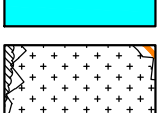
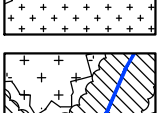



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Spring Mountain Precinct

V-DEC MANAGEMENT PLAN - LOT 751 on SPI89053



LEGEND

-  Extent of management plan area
-  Existing fire trail / maintenance access. As provided by ICC in GIS & Refer to Council's Management Plan
-  Approximate minor drainage lines. Minor drainage / gully lines
-  Approximate mapped major drainage lines
-  Extent of existing lake area
-  Weed management and revegetation
-  Weed management and revegetation within water course areas
-  10m transition zone (Edge effect & bushfire management). Between lots and retained vegetation
-  Powerlink Easement (No works in Easement areas without written consent of Powerlink)
-  Trail access point (To be confirmed by ICC)

MANAGEMENT PLAN EXTENTS:
Extents of open space area as provided

APPROXIMATE DRAINAGE LINES:
Approximate locations of minor drainage/gully lines

MANAGEMENT PLAN EXTENTS:
Extents of open space area as provided

EXISTING FIRE TRAIL / MAINTENANCE ACCESS:
As provided by ICC in GIS and refer in Council's Management Plan

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40 YEARS
1975-2015

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APPROVED COMPANY
ISO 9001 Quality Management System
QMS

APPROVED COMPANY
ISO 14001 Environmental Management System
QMS

AMENDMENTS:		
Issue	Date	Description
A	28/04/2015	Preliminary Issue
B	22/02/2016	Submission Issue
C	25/05/2016	DNRM Submission Issue
D	24/08/2016	Edits to DNRM Submission Issue

CLIENT:
PROJECT: Spring Mountain Precinct

SCALE: 1:2500@A1 0 20 40 120m
1:5000@A3

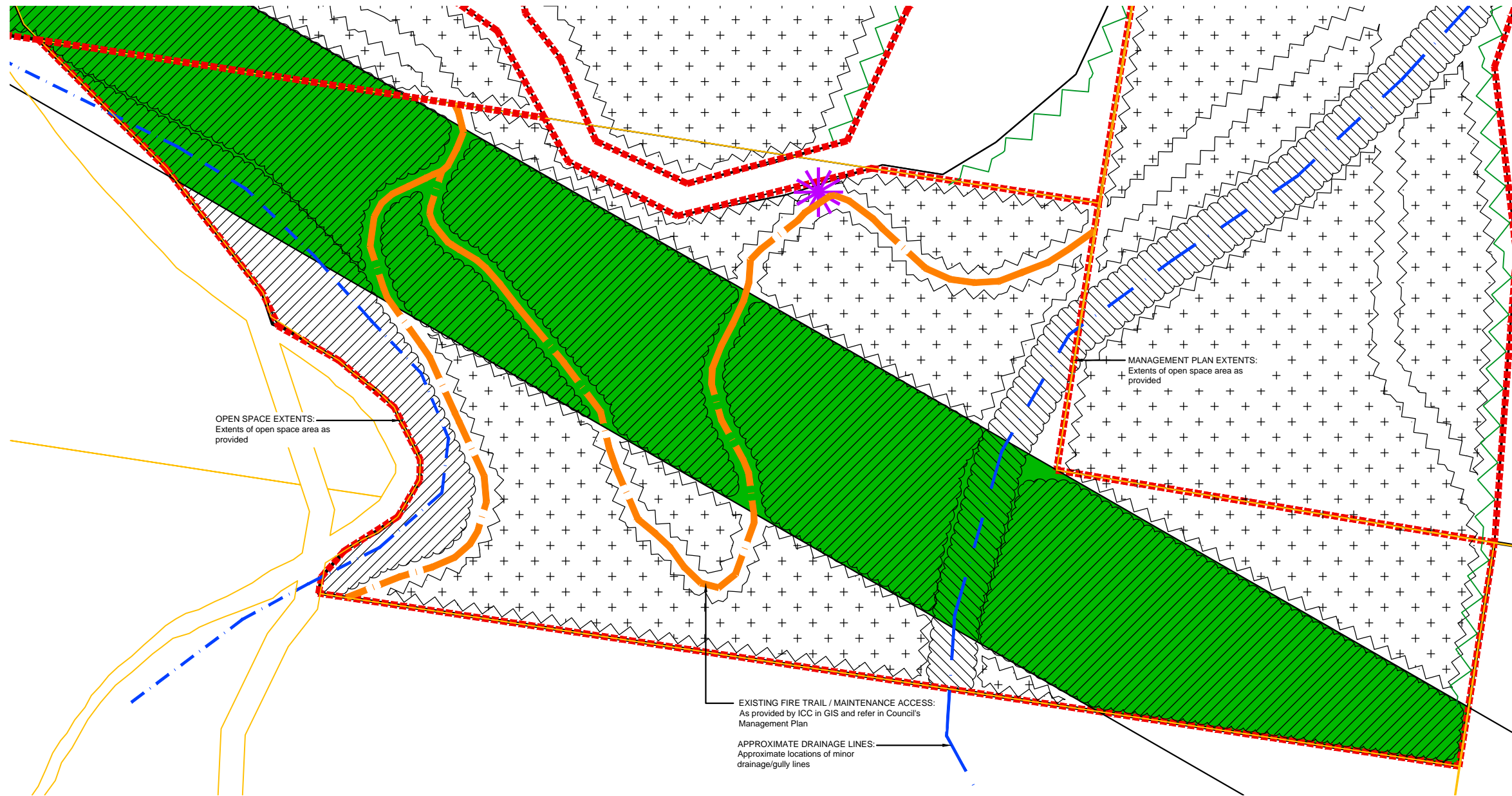
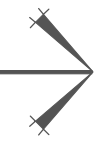
landscape architecture

DRAWING: V-DEC Management Plan
Lot 751 on SP189053

DATE: August 16 CHECKED: MS
CLIENT REF.: 7243 DRAWN: TL
DRAWING No.: 7243 L 11 RP D

Spring Mountain Precinct

V-DEC MANAGEMENT PLAN - LOT 748 on SPI89044



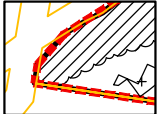
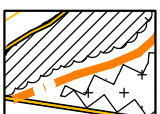

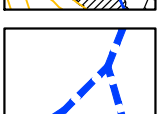

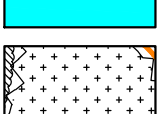
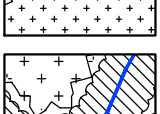

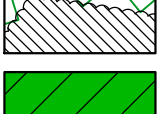

OPEN SPACE EXTENTS:
Extents of open space area as provided

MANAGEMENT PLAN EXTENTS:
Extents of open space area as provided

EXISTING FIRE TRAIL / MAINTENANCE ACCESS:
As provided by ICC in GIS and refer in Council's Management Plan

APPROXIMATE DRAINAGE LINES:
Approximate locations of minor drainage/gully lines

LEGEND

-  Extent of management plan area
-  Existing fire trail / maintenance access. As provided by ICC in GIS & Refer to Council's Management Plan
-  Approximate minor drainage lines. Minor drainage / gully lines
-  Approximate mapped major drainage lines
-  Extent of existing lake area
-  Weed management and revegetation
-  Weed management and revegetation within water course areas
-  10m transition zone (Edge effect & bushfire management). Between lots and retained vegetation
-  Powerlink Easement (No works in Easement areas without written consent of Powerlink)
-  Trail access point (To be confirmed by ICC)

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40 YEARS
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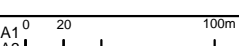
APPROVED COMPANY
 ISO14001 Environmental Management System
 QMS



AMENDMENTS:		
Issue	Date	Description
A	28/04/2015	Preliminary Issue
B	22/02/2016	Submission Issue
C	25/05/2016	DNR Submission Issue
D	24/08/2016	Edits to DNR Submission Issue

CLIENT:
 PROJECT: Spring Mountain Precinct

SCALE: 1:2000 @ A1
 1:4000 @ A3



landscape architecture

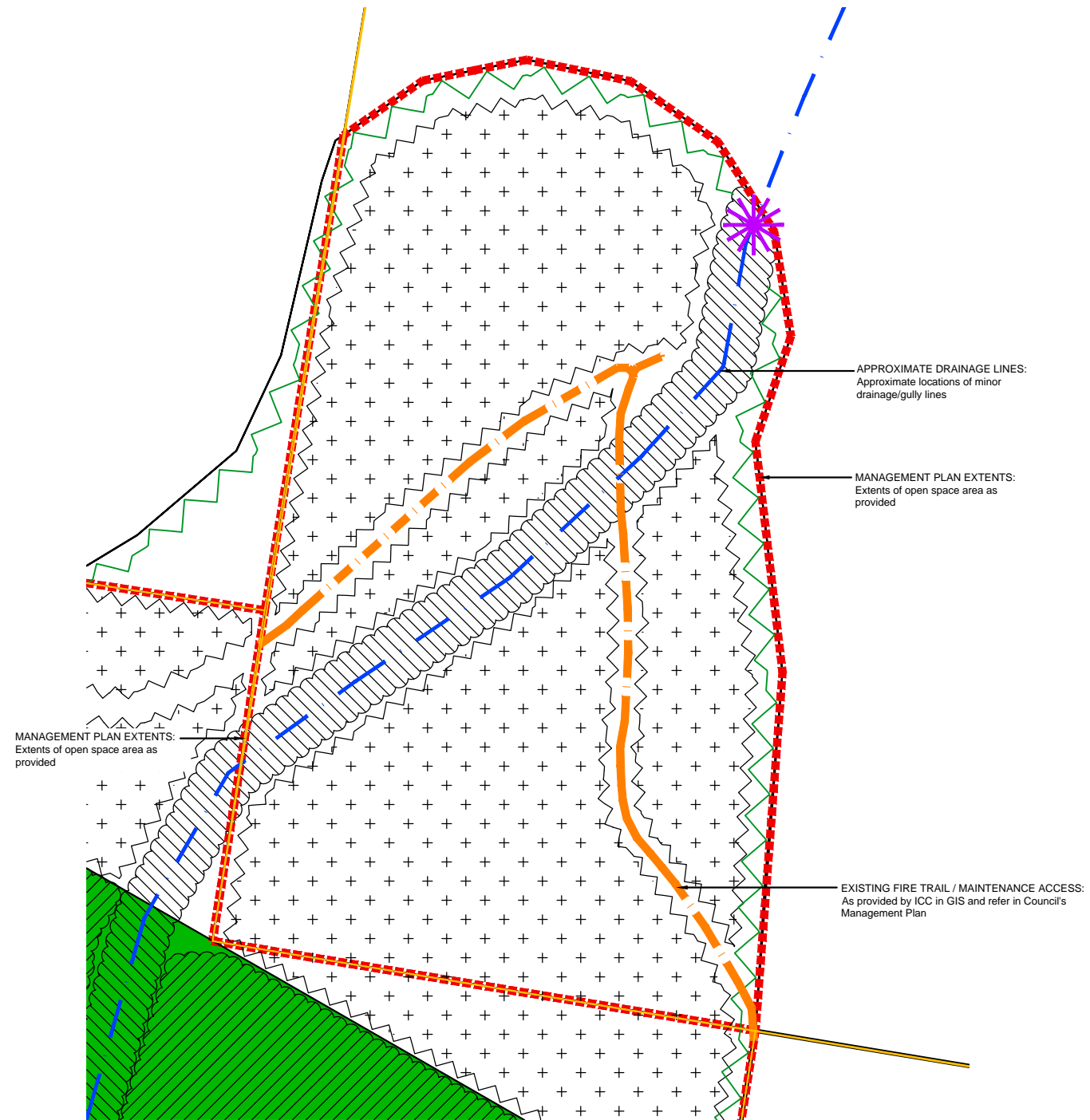
DRAWING: V-DEC Management Plan
 Lot 748 on SP189044

DATE: August 16
 CLIENT REF.: 7243
 DRAWING No.: 7243 L 12 RP D


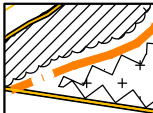

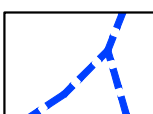

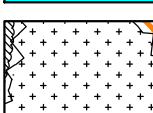
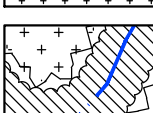



CHECKED: MS
 DRAWN: TL

Spring Mountain Precinct

V-DEC MANAGEMENT PLAN - LOT 747 on SPI89043



LEGEND

-  Extent of management plan area
-  Existing fire trail / maintenance access. As provided by ICC in GIS & Refer to Council's Management Plan
-  Approximate minor drainage lines. Minor drainage / gully lines
-  Approximate mapped major drainage lines
-  Extent of existing lake area
-  Weed management and revegetation
-  Weed management and revegetation within water course areas
-  10m transition zone (Edge effect & bushfire management). Between lots and retained vegetation
-  Powerlink Easement (No works in Easement areas without written consent of Powerlink)
-  Trail access point (To be confirmed by ICC)

AMENDMENTS:		
Issue	Date	Description
A	28/04/2015	Preliminary Issue
B	22/02/2016	Submission Issue
C	25/05/2016	DNRM Submission Issue
D	24/08/2016	Edits to DNRM Submission Issue

CLIENT:	
PROJECT:	Spring Mountain Precinct
SCALE:	1:2000@A1 1:4000@A3

Appendix G

Copy of land titles for EPBC Act Offset
Area

CURRENT TITLE SEARCH

DEPT OF NATURAL RESOURCES AND MINES, QUEENSLAND

Request No: 27537978

Search Date: 11/12/2017 09:31

Title Reference: 50614776

Date Created: 30/06/2006

Previous Title: 10385041

REGISTERED OWNER

Dealing No: 709715866 27/06/2006

IPSWICH CITY COUNCIL

ESTATE AND LAND

Estate in Fee Simple

LOT 753 SURVEY PLAN 189054
Local Government: IPSWICH

EASEMENTS, ENCUMBRANCES AND INTERESTS

1. Rights and interests reserved to the Crown by
Deed of Grant No. 10385041 (POR 19)

ADMINISTRATIVE ADVICES

Dealing	Type	Lodgement Date	Status
717568283	VEG NOTICE VEGETATION MANAGEMENT ACT 1999	11/10/2016 12:06	CURRENT

UNREGISTERED DEALINGS - NIL

CERTIFICATE OF TITLE ISSUED - No

** End of Current Title Search **

COPYRIGHT THE STATE OF QUEENSLAND (DEPT OF NATURAL RESOURCES AND MINES) [2017]
Requested By: D-ENQ URBIS PRO

CURRENT TITLE SEARCH

DEPT OF NATURAL RESOURCES AND MINES, QUEENSLAND

Request No: 27538003

Search Date: 11/12/2017 09:32

Title Reference: 50846699

Date Created: 25/05/2011

Previous Title: 50812373

50827021

REGISTERED OWNER

Dealing No: 713779352 28/03/2011

IPSWICH CITY COUNCIL

ESTATE AND LAND

Estate in Fee Simple

LOT 745 SURVEY PLAN 242282
Local Government: IPSWICH

EASEMENTS, ENCUMBRANCES AND INTERESTS

1. Rights and interests reserved to the Crown by
Deed of Grant No. 10821215 (POR 19A)
2. EASEMENT IN GROSS No 601668680 (D972706) 22/12/1970
BURDENING THE LAND
TO QUEENSLAND ELECTRICITY COMMISSION
OVER EASEMENT D ON RP124920
3. TRANSFER No 703439374 07/07/1999 at 14:47
EASEMENT IN GROSS: 601668680 (D972706)
QUEENSLAND ELECTRICITY TRANSMISSION CORPORATION LIMITED
A.C.N. 078 849 233
4. EASEMENT IN GROSS No 601668682 (L886473X) 18/03/1994
BURDENING THE LAND
TO QUEENSLAND ELECTRICITY COMMISSION
OVER EASEMENT A ON RP818451
5. TRANSFER No 703443113 08/07/1999 at 16:00
EASEMENT IN GROSS: 601668682 (L886473X)
QUEENSLAND ELECTRICITY TRANSMISSION CORPORATION LIMITED
A.C.N. 078 849 233
6. EASEMENT IN GROSS No 711922895 15/09/2008 at 15:53
burdening the land
SOUTHERN REGIONAL WATER PIPELINE COMPANY PTY LTD A.C.N. 117
898 174
over
EASEMENTS C AND E ON SP216426

CURRENT TITLE SEARCH

DEPT OF NATURAL RESOURCES AND MINES, QUEENSLAND

Request No: 27538003

Search Date: 11/12/2017 09:32

Title Reference: 50846699

Date Created: 25/05/2011

EASEMENTS, ENCUMBRANCES AND INTERESTS

7. VESTING No 715263602 19/08/2013 at 12:09
EASEMENT IN GROSS: 711922895
QUEENSLAND BULK WATER SUPPLY AUTHORITY

8. EASEMENT IN GROSS No 712158705 13/01/2009 at 15:57
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SOUTHERN REGIONAL WATER PIPELINE COMPANY PTY LTD A.C.N. 117
898 174
over
EASEMENT D ON SP211634

9. VESTING No 715263535 19/08/2013 at 11:56
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QUEENSLAND BULK WATER SUPPLY AUTHORITY

ADMINISTRATIVE ADVICES

Dealing	Type	Lodgement Date	Status
717568283	VEG NOTICE	11/10/2016 12:06	CURRENT
	VEGETATION MANAGEMENT ACT 1999		

UNREGISTERED DEALINGS - NIL

CERTIFICATE OF TITLE ISSUED - No

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Request No: 27537839

Search Date: 11/12/2017 09:24

Title Reference: 50614649

Date Created: 29/06/2006

Previous Title: 50418614

REGISTERED OWNER

Dealing No: 709715819 27/06/2006

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ESTATE AND LAND

Estate in Fee Simple

LOT 740 SURVEY PLAN 179412
Local Government: IPSWICH

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Dealing	Type	Lodgement Date	Status
717568283	VEG NOTICE VEGETATION MANAGEMENT ACT 1999	11/10/2016 12:06	CURRENT

UNREGISTERED DEALINGS - NIL

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Search Date: 11/12/2017 09:26

Title Reference: 50614631

Date Created: 29/06/2006

Previous Title: 50613985

REGISTERED OWNER

Dealing No: 709715678 27/06/2006

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LOT 747 SURVEY PLAN 189043
Local Government: IPSWICH

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Deed of Grant No. 10312012 (POR 4)
2. EASEMENT IN GROSS No 601668679 (D972702) 22/12/1970
BURDENING THE LAND
TO QUEENSLAND ELECTRICITY COMMISSION
OVER EASEMENT C ON RP125090
3. TRANSFER No 703439374 07/07/1999 at 14:47
EASEMENT IN GROSS: 601668679 (D972702)
QUEENSLAND ELECTRICITY TRANSMISSION CORPORATION LIMITED
A.C.N. 078 849 233

ADMINISTRATIVE ADVICES

Dealing	Type	Lodgement Date	Status
717568283	VEG NOTICE VEGETATION MANAGEMENT ACT 1999	11/10/2016 12:06	CURRENT

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Title Reference: 50614613

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2. EASEMENT IN GROSS No 602038460 (D972700) 22/12/1970
BURDENING THE LAND
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OVER EASEMENT B ON RP125089
3. TRANSFER No 703439374 07/07/1999 at 14:47
EASEMENT IN GROSS: 602038460 (D972700)
QUEENSLAND ELECTRICITY TRANSMISSION CORPORATION LIMITED
A.C.N. 078 849 233
4. EASEMENT IN GROSS No 703230867 17/03/1999 at 14:06
burdening the land
QUEENSLAND ELECTRICITY TRANSMISSION CORPORATION LIMITED
A.C.N. 078 849 233
over
EASEMENT JJ ON SP117001

ADMINISTRATIVE ADVICES

Dealing	Type	Lodgement Date	Status
717568283	VEG NOTICE VEGETATION MANAGEMENT ACT 1999	11/10/2016 12:06	CURRENT

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Dealing No: 709715763 27/06/2006

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Estate in Fee Simple

LOT 751 SURVEY PLAN 189053
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TO QUEENSLAND ELECTRICITY COMMISSION
OVER EASEMENTS D & E ON RP125091
3. TRANSFER No 703439374 07/07/1999 at 14:47
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QUEENSLAND ELECTRICITY TRANSMISSION CORPORATION LIMITED
A.C.N. 078 849 233
4. EASEMENT IN GROSS No 703230867 17/03/1999 at 14:06
burdening the land
QUEENSLAND ELECTRICITY TRANSMISSION CORPORATION LIMITED
A.C.N. 078 849 233
over
EASEMENTS FF AND GG ON SP117000

ADMINISTRATIVE ADVICES

Dealing	Type	Lodgement Date	Status
717568283	VEG NOTICE VEGETATION MANAGEMENT ACT 1999	11/10/2016 12:06	CURRENT

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UNREGISTERED DEALINGS - NIL

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Appendix H

Village 8 Bushfire Management Report

Spring Mountain Village 8 Area Development Plan

Bushfire Assessment Report

510247-044



Prepared for
Lend Lease Communities

30 May 2017

Document Information

Prepared for Lend Lease Communities
Project Name Bushfire Assessment Report
File Reference I:\5102-47-044 SM V8\wp\Village 8 BFA V3 30052017.docx
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Contact Information

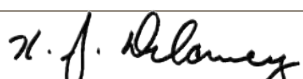
Cardno (Qld) Pty Ltd
ABN 57 051 074 992

Level 11 Green Square North Tower
515 St Paul's Terrace
Locked Bag 4006
Fortitude Valley Qld 4006

Telephone: 07 3369 9822
Facsimile: 07 3369 9722
International: +61 7 3369 9822

www.cardno.com.au

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Version	Reason for Issue / Stage of Deliverable	Approver Initials	Approved Signature	Approved Release Date
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1	Client use	JD		24 October 2016
2	Information Request Amended - Client Use	JD		20 January 2017
3	To reflect Landscaping Plans and updated State Guidelines	JD		30 May 2017

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Glossary of Terms and Abbreviations

APZ	Asset Protection Zone (APZ) - A fuel reduced area surrounding a built asset or structure.
AHD	Australian Height Datum (AHD) - A common national plane of level corresponding approximately to mean sea level.
AEP	Annual Exceedance Probability (AEP) - the measure of the likelihood (expressed as a probability) of an event equalling or exceeding a given magnitude in any given year.
AS3959	Australian Standard 3959 – Construction of buildings in bushfire prone areas
BAL	Bushfire Attack Level (BAL) as defined in AS3959
FFDI	Forest Fire Danger Index - is related to the chances of a fire starting, its rate of spread, its intensity, and its difficulty of suppression, according to various combinations of air temperature, relative humidity, wind speed and both the long and short-term drought effects. An index of 1 means that a fire will not burn, or will burn so slowly that control presents little difficulty. An index of 100 means that fires will burn so fast and hot that control is virtually impossible.
PFLI	Potential Fire-line Intensity (PFLI) – a measure of the intensity of heat energy generated by a fire under a particular combination of weather conditions (e.g. temperature, wind speed, relative humidity) and taking into account the influences of vegetation type and slope.
QFES	Queensland Fire and Emergency Service
QRFS	Queensland Rural Fire Service
VHC	Vegetation Hazard Class (VHC) - based on the available bushfire fuel load typically associated with a particular vegetation type.

Executive Summary

This Bushfire Assessment Report (BAR) has been prepared on behalf of Lend Lease Communities (Springfield) Pty Ltd in respect of the Spring Mountain Village 8 Area Development Plan (ADP). This BAR includes updates to the approved Spring Mountain Village 8 Area Development Plan – Bushfire Assessment Report (Ref: 510247-004, dated 20 January 2017) to reflect:

- > the fact that some of the Active Open Space areas classified in the approved Bushfire Assessment Report as being areas “*within which low bushfire fuel loads will be established and maintained as part of the Village 8 ADP.*” cannot be maintained in that condition due to Council’s refusal to accept the establishment and maintenance of turf treatments on land with slope gradients greater than 1:6;
- > the effect of Condition 27 of the Village 8 ADP approval (Ref: 6115/2016/ADP) which requires the rehabilitation of disturbed areas of the Linear Creepline Open Space reserve;
- > alternative landscaping treatments that have been developed to ensure that there is a reduced bushfire fuel load adjacent along the bushland-urban interface so that adjacent residential properties are not exposed to an unacceptable risk of harm in the event of a bushfire;
- > Queensland based fuel load estimates associated with different vegetation types as detailed in Part B of State Planning Policy (SPP) – Natural Hazards, Risk and Resilience -Technical Manual - A ‘fit for purpose’ approach in undertaking natural hazard studies and risk assessments (DILGP,2016); and
- > use of Method 2 of *AS3959 (2009) Construction of buildings in bushfire prone areas* to determine building setbacks required to achieve particular Bushfire Attack Levels (BAL).

The Village 8 locality supports extensive areas of bushfire prone vegetation, some of which will persist in the landscape following completion of the Village 8 development. Whilst the overall level of risk of harm to human health and property from bushfire in southeast Queensland is relatively low it is not zero. As such it is necessary to ensure that appropriate bushfire hazard and risk management measures are incorporated into the design of urban developments located within or adjacent to areas of bushfire prone vegetation.

As detailed in Section 3.6, some of the Village 8 residential lots will be within a designated bushfire prone area. This is due to the fact that they will be located within 100m of areas of bushfire prone vegetation of sufficient size to sustain a Medium to Very High intensity bushfire that are located within internal Open Space reserves or the adjoining Conservation Estate to the south. To ensure that an acceptable level of risk of harm to human health and property is maintained a range of bushfire hazard and risk management measures, as detailed in Section 4, have been incorporated into the design of the Village 8 development, with additional management measures being required during the construction and occupational phases of the development.

If the recommendations provided in Sections 4.1 to 4.4 are implemented then the highest level of building design and construction that would be required on most residential lots would be to a BAL29 standard pursuant to *Australian Standard (AS) 3959(2009) Construction of buildings in bushfire prone areas*.

It is noted that the proposed Townhouse lot located to the north of Grande Avenue will be exposed to bushfire hazards associated with the presence of bushfire prone vegetation located on adjacent land to the north that is intended to be developed for urban purposes. Once that adjacent land to the north is developed for urban purposes, or alternative formal arrangements are put in place to remove or manage the vegetation to reduce its potential to sustain a Medium to Very High intensity bushfire, then the Townhouse lot would not be exposed to a bushfire hazard along its northern or eastern flank. However if development of the Townhouse lot precedes management of vegetation in adjacent urban development areas it will be necessary to undertake a more detailed analysis of hazards and required design responses.

As detailed in Section 5, the bushfire hazard and risk management measures that have been incorporated into the design of the Village 8 ADP combined with implementation of additional recommended measures during the construction and occupational phases of the development will ensure compliance with the Ipswich Planning Scheme Bushfire Risk Areas Overlay Code and the interim development assessment requirements of Part E of the State Planning Policy.

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- Appendix B Spring Mountain Indicative Phasing Plan (Annotated)
- Appendix C Mountain Creek Open Space Concept Plan
- Appendix D Site Based Bushfire Fuel Hazard Assessment & Site Photographs
- Appendix E Spring Mountain Village 8 ADP – Bushfire Prone Area Plan
- Appendix F QFES Bushfire Survival Plan Guideline

1 Introduction

This Bushfire Assessment Report (BAR) has been prepared on behalf of Lend Lease Communities (Springfield) Pty Ltd in respect of the Spring Mountain Village 8 Area Development Plan (ADP). The Spring Mountain development is a master planned community comprised of a range of land uses including residential, commercial, mixed use, educational, open space, community facilities, roads and associated infrastructure required to service the development. The total number of residential dwellings anticipated for the Spring Mountain master planned community is approximately 4,000, of which approximately 390 dwellings will be located within Village 8. It is anticipated that the Spring Mountain development would occur in a staged manner over a period of approximately 10 years.

This BAR provides:

- > in Section 2, a description of the Village 8 development;
- > in Section 3, an assessment of the bushfire hazards and risks that will be present within the Village 8 locality following completion of the Village 8 development;
- > in Section 4, details concerning the bushfire hazard and risk management measures that have been incorporated into the Village 8 ADP and additional measures that are recommended for implementation during the construction and occupational phases of the development; and
- > in Section 5, assessments of the levels of compliance that the Village 8 ADP achieves with the requirements of:
 - the Ipswich Planning Scheme's Development Constraints (Bushfire Risk Area) Overlay Code; and
 - part E of the State Planning Policy relating to the management of Natural Hazards.

It is noted that the Ipswich City Planning Scheme Part 14 - Springfield Structure Plan applies to the Spring Mountain development but does not have any specific provisions relating to bushfire hazard assessments and mitigation.

2 Description of the Village 8 Development

The Spring Mountain Village 8 Area Development Plan (ADP) encompasses an area of approximately 40 hectares and forms part of the greater Springfield development located within the boundaries of Ipswich City in south-east Queensland. The Spring Mountain Village 8 ADP has been prepared in general accord with the provisions of the Spring Mountain Precinct Plan which was approved by Ipswich City Council on 22 December 2015. A copy of the Spring Mountain Village 8 ADP, which received formal approval from Ipswich City Council on 10 February 2017, is presented in Appendix A.

The Spring Mountain Village 8 development will occur as part of the staged sequencing of the broader Spring Mountain development, with the general sequencing of the broader Spring Mountain development illustrated in the annotated Indicative Development Phasing Plan presented in Appendix B.

The Spring Mountain Village 8 site is located to the:

- > west of the Spring Mountain Village 6 estate which is currently being developed with residential lots scheduled to go on-sale in 2017;
- > south-west of the Spring Mountain Village 7 estate which is scheduled to be developed over the period from 2016 to 2019;
- > to the south of the Spring Mountain Village 9 estate which is not scheduled to be developed until 2025;
- > to the east of the Spring Mountain Village 10 estate which is scheduled to be developed over the period from 2019 to 2020; and
- > north of the White Rock – Spring Mountain Conservation Estate which encompasses an area of approximately 2,500 hectares.

The western boundary of the Village 8 estate is formed by Mountain Creek which will be contained within a Linear Creekline Open Space reserve that:

- > ranges in width from approximately 90m adjacent to the Grande Avenue crossing of Mountain Creek to approximately 300m adjacent to the southern boundary of Village 8;
- > will encompass managed vegetation areas which will accommodate an range of active and passive recreational opportunities for residents and visitors, linking to the Conservation Estate to the south;
- > will encompass retained native forest vegetation, typically extending at least 40m either side of the creek centreline, that will primarily be managed for conservation purposes; and
- > areas that will be disturbed by earthworks that will be subject to rehabilitation and landscaping works.

A perimeter roadway is located between residential lots and this western Open Space reserve.

A second Linear Creekline Open Space reserve centred on a tributary of Mountain Creek forms the northern and eastern boundary of the Village 8 estate. This Open Space reserve is less than 100m in width except for a localised widening at the confluence of the tributary and the main Mountain Creek channel. This Open Space reserve will support some areas of managed vegetation associated with the provision of recreational facilities (e.g. playgrounds, dog off-leash areas, pathways and fitness equipment, seating) with the balance supporting retained areas of native vegetation. Urban development (i.e. Spring Mountain Village 6, 7 and 9) will occur on the opposite side of the Open Space reserve. A perimeter roadway separates all Village 8 residential lots from this Open Space reserve, except for a proposed Townhouse lot located in the very north of the Village 8 precinct.

A Local Recreation Park will be established in the south-western corner of Village 8 within the Mountain Creek Linear Creekline Open Space reserve. The nature and form of this Local Recreation Park are detailed in the Mountain Creek Open Space Concept Plan, prepared by Landpartners Pty Ltd (Plan Ref: WC006626.OV8-001 Rev: C), presented in Appendix C. Importantly from a bushfire perspective the Local Recreation Park will provide a mixture of managed low threat vegetation and bushfire prone vegetation, traversed by a network of

trails and serviced by a reticulated water supply that will impede the northward and generally downslope movement of any bushfires that may occur within the Conservation Estate to the south.

Village 8 is located to the north and generally downslope of the adjacent the White Rock – Spring Mountain Conservation Estate. To the immediate south of Village 8 there is a 12m wide easement that extends over a trunk water supply main and an associated maintenance track. Approximately 200m further to the south of the Village 8 boundary, the Conservation Estate is traversed by a 150m wide predominately cleared high voltage electricity transmission easement and associated infrastructure. The Conservation Estate supports various forms of eucalypt dominated open forest growing on the slopes and gullies of the foothills of Spring Mountain (350 mAHD) situated approximately 3 km to the south west.

The primary road access to Village 8 from existing urban areas to the east and the currently being developed Village 6 will be via an extension of Grande Avenue which is a designated Major Collector Road. A secondary road connection between Village 6 and Village 8 being established in the central east of Village 8. The Grande Avenue road reserve is 20 m in width and the extension of Grande Avenue for Village 8 will involve construction of a crossing of the eastern tributary of Mountain Creek and also a crossing of the main Mountain Creek channel. Ultimately Grande Avenue will traverse Village 10, 11, 12 and 13 before connecting with Sinnathamby Boulevard.

An internal road network will service individual lots within Village 8, with a perimeter roadway providing physical separation of most residential lots from internal Open Space reserves and the Conservation Estate located to the south. Road access and associated parking facilities will be provided to connect the Local Recreation Park situated within the Mountain Creek Open Space reserve in the south-western sector of Village 8 with the local road network

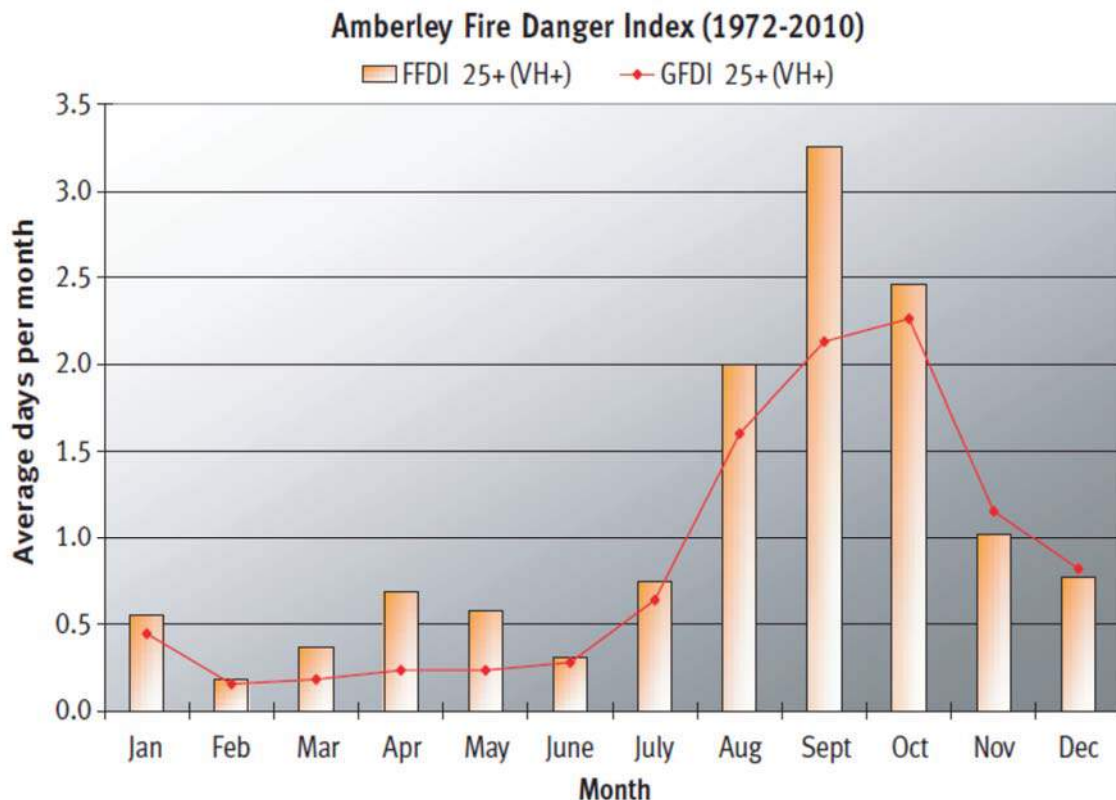
Village 8 will be serviced by a reticulated water supply and underground power.

3 Bushfire Hazard and Risk Assessment

3.1 Overview

The broader Spring Mountain locality supports a mosaic of urban, rural residential, retail, commercial, agricultural/pastoral and forested landscapes dissected by roadways and waterways. The Spring Mountain area is situated in south-eastern Queensland and is characterised by a mild sub-tropical coastal climate which does not currently experience extended periods of severe fire weather (i.e. extremely hot and dry periods with strong winds emanating from the continental interior) that are frequently experienced in Victoria, South Australia and less frequently New South Wales and Tasmania.

The number of days each year that are characterised by weather conditions conducive to the ignition and rapid spread of a high intensity bushfire are limited. In this respect the graphic below illustrates the average number of days each month that were characterised by a Forest Fire Danger Index (FFDI) of 25¹ or greater using data from the Amberley weather station over the period from 1972 to 2010². This analysis indicates that on average there are less than 14 days each year when an FFDI of 25 or greater can be expected and for the rest of the year the prevailing meteorological conditions mean that if a bushfire starts, it can most likely be contained without any significant risk to human health of property.



Consistent with the relatively low frequency of high risk fire weather in Queensland compared to that which occurs in southern states, the number of lives and houses that have been lost as a result of bushfire is also relatively low. This fact is illustrated in the graphic presented below which provides a comparison of the total number of lives and houses lost to bushfire within the various Australian states and territories over the period from 1926 to 2013.

¹ An FFDI of 25 is the base FFDI value for the Very High Fire Danger Rating used in Qld. The QFES advise that during such days fires can be difficult to control with flames that may burn into treetops. Loss of life and damage to property is still a threat. Staying and defending your property is an option if your home is well-prepared, and you are capable of actively defending it.

² Source: Planned Burn Guidelines – Southeast Queensland Bioregion of Queensland. Prepared by: Queensland Parks and Wildlife Service (QPWS) Enhanced Fire Management Team, Queensland Department of National Parks, Recreation, Sport and Racing (NPRSR).



(Source: Presentation given by QFES personnel at the Bushfire2016 Conference held at University of Queensland over the period from 28th to 30th of September 2016)

Notwithstanding the relatively low historical levels of loss of life and property to bushfires in Queensland, bushfires do frequently occur in south-eastern Queensland and present a material hazard to human health and property which needs to be appropriately considered as part of a comprehensive approach to land use planning and development. Analysis of climate data and modelling also indicates that the frequency of severe daily fire weather has increased throughout Australia, including south-east Queensland, over the period from 1973–2010 and is anticipated to increase further in line with future climate change projections (BoM and CSIRO, 2015).

3.2 Broadscale Pre-Development Bushfire Hazard Assessments

The Spring Mountain Village 8 development site is classified as a Transitional Bushfire Risk Area, being an area where there may be a risk for bushfire that is likely to diminish as development occurs, on the Ipswich Planning Scheme Map OV1. Relevant extracts from Ipswich Planning Scheme Map OV1 are presented in Table 3-1.

Adjacent vegetated lands to the south are classified as Bushfire Risk Areas on Map OV1 but the Planning Scheme does not classify the level of bushfire risk into severity categories. The adjacent Bushfire Risk Areas are associated with the extensive White Rock – Spring Mountain Conservation Estate which will represent a permanent bushfire hazard to the future residents of the Spring Mountain Village 8 estate, particularly those lots situated along the southern perimeters of the estate.

Pursuant to the State Planning Policy interactive Natural Hazard (Bushfire) mapping, both the Spring Mountain Village 8 development site and adjacent areas of vegetated land are currently classified as High to Very High Potential Intensity Bushfire areas. Extracts from the SPP mapping are presented in Table 3-2. This mapping does not account for the reduction in the extent of bushfire prone land that has and will continue to occur as existing bushland is cleared to facilitate development of the Spring Mountain estate and adjacent sectors of the Greater Springfield development.

Table 3-1 Ipswich Planning Scheme Bushfire Risk Areas Map OV1 Extract

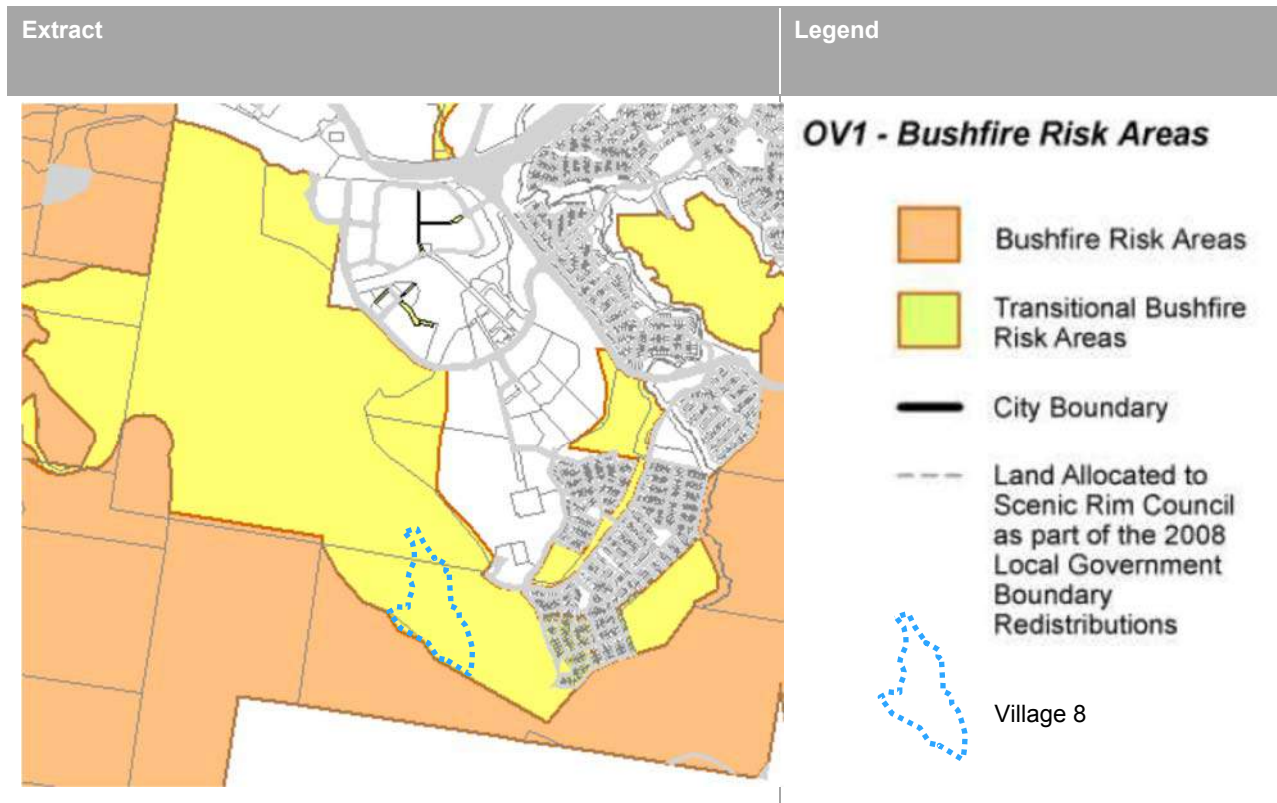
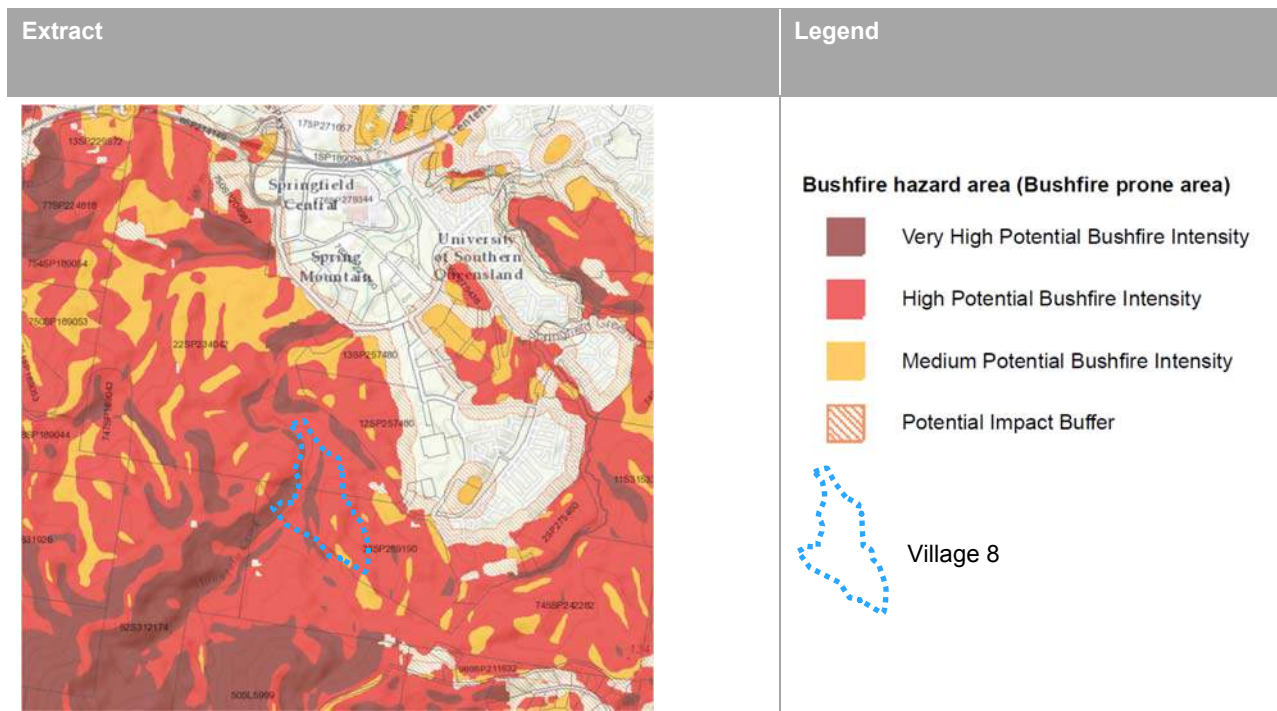


Table 3-2 SPP Natural Hazard (Bushfire) Mapping Extract



It is noted that neither of the above bushfire hazard maps are informed by field based surveys and assessment. Furthermore the associated regulations and policies recommend that the accuracy or otherwise of the mapping be confirmed by undertaking appropriate site specific investigations involving field based surveys.

3.3 Site Based Post-Development Bushfire Hazard Assessment

3.3.1 Overview

A site specific assessment of the bushfire hazard classifications for the Village 8 estate and immediate locality (i.e. land within 100m) has been completed based on review of aerial photography, topographic data, available vegetation mapping and a physical inspection completed on the 23rd of August 2016. This assessment takes into account changes that will occur to the extent and nature of vegetation types in the Village 8 locality as a consequence of the development of Village 8 and other sectors of the Spring Mountain estate.

This site specific assessment is based on the methodology for State-wide mapping of bushfire prone areas in Queensland (Leonard et al, 2014), which:

- > scales bushfire hazard based on the Potential Fire-line Intensity (PFLI) of a severe bushfire and can be used to predict the radiation profile of areas adjacent to potentially hazardous vegetation and an associated Potential Impact Buffer; and
- > classifies land that may be subject to significant bushfire attack as areas of Medium, High or Very high Potential Bushfire Intensity.

Those parts of Village 8 that could be subject to significant bushfire attack from embers, flames or radiant heat are included in a Potential Impact Buffer with a default width of 100m from all areas of vegetated land that are classified as having a Medium, High or Very High Potential Bushfire Intensity.

The classification of an area's Potential Bushfire Intensity takes into account three key variables being:

- > **total fuel load (W)**, which is primarily a function of the vegetation type(s) in the subject area;
- > the McArthur **Forest Fire Danger Index (FFDI)**, which is an index that considers variability in fire intensity associated with a range of weather variables including recent precipitation, current wind speed, relative humidity and temperature; and
- > **slope (Θ)**, which is an important variable controlling the rate of fire spread and fuel consumption.

The following sections provide a brief verification analysis of the High to Very High Potential Intensity Bushfire classifications that have been derived for the Spring Mountain site and adjacent lands.

3.3.2 Potential Fuel Loads

In accordance with the methodology for State-wide mapping of bushfire prone areas in Queensland (Leonard et al, 2014), Potential Fuel Loads are assigned to vegetation categories (Vegetation Hazard Classes) formed by amalgamating land use and vegetation types with a moderately consistent fuel load and structure. Whilst the Village 8 development will involve the retention of some areas of native vegetation within the Linear Creekline Open Space reserves, the clearance of adjoining land and its development for urban purposes will reduce the overall hazard potential of the retained areas of vegetation.

In accordance with DILGP (2016), for the purpose of bushfire hazard assessments and mapping:

Patches of a single VHC with an area of less than 0.5 hectares are merged with the surrounding VHC that is most common to the boundary of the vegetation patch; and

small patches or corridors of higher fuel load VHCs (8 tonnes / ha or more) less than 100m wide are merged with surrounding lower fuel load VHC classes where they are isolated from other patches of high fuel load VHCs by more than 100m.

- > small patches of a single Vegetation Hazard Class (VHC) less than 1 hectare are assigned the same VHC as that which dominates the surrounding landscape; and
- > narrow corridors of potentially hazardous vegetation less than 100m wide, that are isolated from other patches of high fuel load VHCs, are assigned the same VHC as that which dominates the surrounding landscape.

The Vegetation Hazard Classes (VHCs) and their associated Potential Fuel Loads, after DILGP (2016), that will be present once the civil works and subsequent rehabilitation and landscaping works required to establish the Village 8 estate have been completed are described in Table 3-3.

Table 3-3 Post Development Vegetation Hazard Classes (VHCs) and associated Potential Fuel Loads

VHC	VHC description	Potential Fuel Load (t / Ha)	Site Specific Assessment of Presence ³
9.1	Moist to dry eucalypt open forests on coastal lowlands and ranges	24.1	<p>Present – the existing landscape surrounding the Village 8 estate and the internal Linear Creekline Open Space reserve to the west of support the following open forest types:</p> <ul style="list-style-type: none"> > RE12.9-10.17 Open forest to woodland complex generally with a variety of stringybarks, grey gums, ironbarks and in some areas spotted gum. > RE12.9-10.19 <i>Eucalyptus fibrosa subsp. fibrosa</i> woodland +/- <i>Corymbia citriodora subsp. variegata</i>, <i>E. acmenoides</i> or <i>E. portuensis</i>, <i>Angophora leiocarpa</i>, <i>E. major</i>. Understorey often sparse. <p>Includes areas that will be subject to rehabilitation works in accordance with Condition 27 of the Village 8 ADP approval (Ref: 6115/2016/ADP).</p> <p>[Note: Does not include the eastern Linear Creekline Open Space reserve which is less than 100m in width and separated from adjacent, upslope areas of open forest by fire-trails and roadways.]</p>
9.3	Shrubland within moist to dry eucalypt on coastal lowlands and ranges	12.7	<p>Present – An equivalent to this vegetation type will be established as part of the landscaping of areas originally nominated in the approved Spring Mountain Village 8 Area Development Plan – Bushfire Assessment Report (Ref: 510247-004, dated 20 January 2017) as being “Active Open Space areas within which low bushfire fuel loads will be established and maintained as part of the Village 8 ADP and Village 6 ADP”.</p> <p>Given the constraints associated with Council’s restrictions on the use of turf landscaping treatments of land with slope gradients in excess of 16%, a native shrubland is to be established in some areas to achieve an acceptable balance between landscaping and bushfire hazard mitigation requirements. This landscape treatment will be comprised of:</p> <ul style="list-style-type: none"> > a 100mm deep mulch layer to assist with erosion and sedimentation control and plant establishment; > a dense (4/m²) planting of native ground covers and low growing shrubs (< 1.5m in height at maturity); and > no tall shrub or tree species. <p>This landscaping treatment will provide a reduced fuel load transition between the forested Linear Creekline Open Space reserve, to the west and south of the Village 8 residential estate, and adjoining urban development.</p>
40.4	Low grass or tree cover in rural areas	5.0	<p>Present – the modified vegetation within the high voltage powerline transmission easement to the south of Village 8 is analogous to this VHC.</p>
42.6	Nil to very low vegetation cover	2.0	<p>Present – the following areas belong to this VHC: Village 6 and Village 8 residential lots and roadways; active recreation areas within the Linear Creekline Open Space reserves; and a 6m wide managed part of the trunk water main easement that extends along the southern boundary of Village 8.</p>

Bushfire Prone Vegetation Class	Grassfire Prone Vegetation Classes	Low Fuel Load Classes
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³ Based on RE types listed in each VHC in Appendix A of Leonard et al, 2014.

Based on the above, the Potential Fuel Loads available within and adjacent to the Spring Mountain Village 8 site range from:

- > a minimum of 2.0 t/ha associated with existing urban development primarily located to the east and north; to
- > a maximum of 24.7 t/ha associated with areas of open forest vegetation located within the western Linear Creekline Open Space reserve and Conservation Estate to the south.

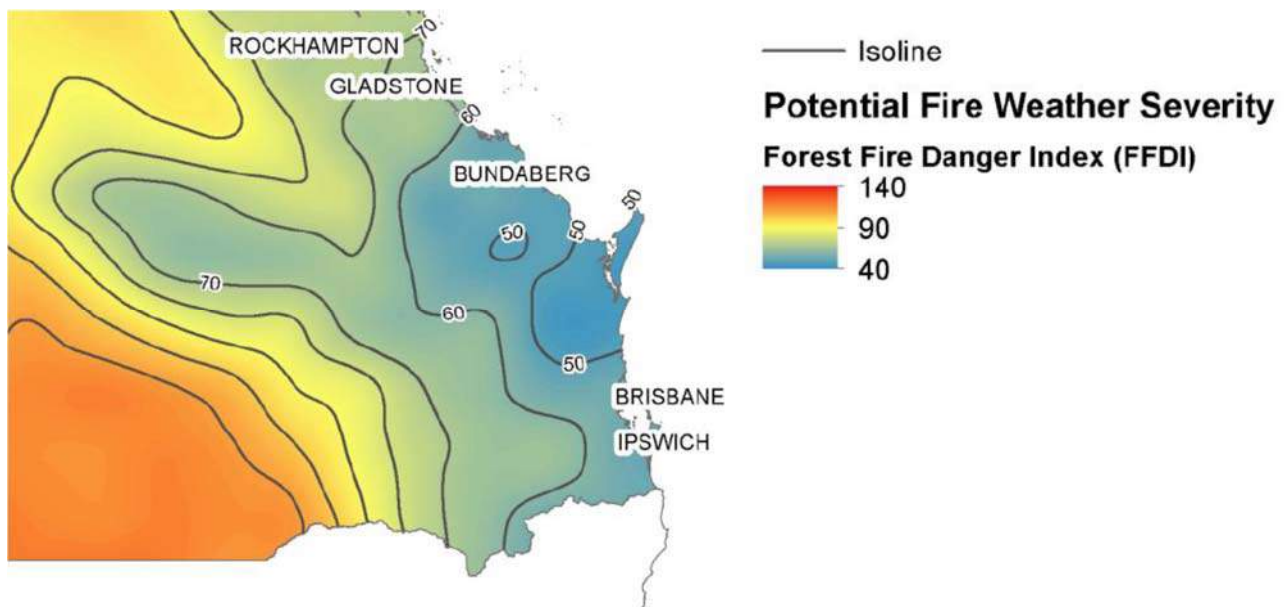
It is noted that the assumed Potential Fuel Loads associated with bushfire prone areas of Open Forest (VHC-9.1) and Shrubland (VHC-9.3) that will be present in the vicinity of Village 8 residential dwellings are equivalent to the existing available fuel loads. In this respect, estimates of the actual available fuel loads taken at a total of 11 locations within the open forest communities within and adjacent to Village 8, made on 23 August 2016, ranged from 8 to 22 tonnes/ha. Variation in available fuel loads adjacent to Village 8 reflect differences in fire history and other factors that influence the structure and species composition of the vegetation communities (e.g. grazing pressure, disturbance history, aspect, underlying geology etc). Another notable feature of the vegetation within the Village 8 Linear Creekline Open Space reserves and immediately upslope areas is the extensive infestations of Lantana (*Lantana camara*) which dominate the forest understorey. Representative photographs of the existing vegetation at 23 locations within and adjacent to Village 8 and associated fuel load estimates at 11 of those locations are presented in Appendix D.

3.4 Forest Fire Danger Index

Fire Weather Severity Mapping for Queensland shows that extreme Forest Fire Danger Index weather events occur more frequently in western Queensland than coastal and northern parts of the state. Zones with a less severe Forest Fire Danger Index (i.e. a FFDI < 50) occur in Cape York, the Wet Tropics and in parts of coastal South East Queensland.

As shown in the extract from the Fire Weather Severity Mapping presented in Table 3-4, the Spring Mountain development site and surrounding locality is located inside of the FFDI of 60.

Table 3-4 Fire Weather Severity Mapping Extract (Source: Leonard et al, 2014)



Notwithstanding the above and to avoid any inconsistency with *Australian Standard (AS) 3959 (2009) – Construction of buildings in bushfire prone areas*, an FFDI value of 40 has been adopted for the purpose of this bushfire hazard assessment.

3.5 Slope Assessment

The Spring Mountain Village 8 development site:

- > ranges in altitude from approximately 120 mAHD in the central south to 60 mAHD in the north;
- > is bounded by the primary Mountain Creek channel in the west and a tributary in east, with the confluence located to the immediate north; and
- > has a gently sloping ridge extending in a south-north direction with western facing slope characterised by slopes averaging 20% (11°) and eastern facing slopes characterised by slopes averaging 12% (7°).

Localised short run (< 50m) slopes with gradients of up to 33% (18°) do occur within and immediately adjacent to the Village 8 development site, but for the purpose of assessing likely fire intensities the predominant slope characteristics are used.

The immediately adjacent Conservation Estate land to the south is generally located upslope of the Spring Mountain Village 8 development site and is characterised by slopes typically less than 20% (or 11°). There is a small area of the Conservation Estate located downslope of the central south of the Village 8 development site that has steep gradients of approximately 33% (18°) over a run of approximately 100m. Spring Mountain, which has an elevation of 350 mAHD, is located approximately 3km to the south-west of the Spring Mountain Village 8 development site.

From a bushfire hazard perspective it is the slope of the vegetated land relative to the asset(s) that is potentially under threat that is of interest, referred to as the effective slope. If the potentially hazardous vegetation is located upslope of the asset(s) the contribution that slope makes towards the intensity and rate of spread of the bushfire is negligible. However if the potentially hazardous vegetation is located downslope of the asset(s) then the slope gradient of the vegetated land will have a significant influence on bushfire intensity and rate of spread. Typically, for each 18-20% (or 10°) degrees increase in slope gradient the rate of forward spread of a bushfire will double for a fire moving up the slope towards an asset. Similarly, if the fire is moving down the slope, the rate of spread will decrease by approximately 50% for each 18-20% (or 10°) increase in slope gradient. In general, as the rate of spread of a fire increases so does its intensity.

3.6 Post-Development Potential Bushfire (Fire-line) Intensity

Potential Bushfire Fire-line Intensity for the Spring Mountain Village 8 development site and adjacent land can be determined based on the Vegetation Hazard Class (VHC), Forest Fire Danger Index (FFDI) and Slope (θ) characteristics detailed above and using the following formulae as per Leonard et al, 2014.

$$FI = 0.62 W^2 FFDI \exp(0.069 \theta)$$

For the purposes of this assessment, the Village 8 development locality has been separated into a total of nine (9) discrete Bushfire Assessment Units (BAUs) for which bushfire hazard ratings have been derived in accordance with the State-wide mapping of bushfire prone areas in Queensland (Leonard et al., 2014). The delineation of BAUs takes into account existing development and future land use intents for the Site and adjacent lands as well as variations in Vegetation Hazard Class and Slope characteristics. All BAUs have been assigned a Forest Fire Danger Index (FFDI) of 40 for the purpose of this assessment.

Table 3-5 Site Specific Post-Development Potential Bushfire Intensity Classes

BAU	Land Use and Vegetation Description	Predominant Vegetation Hazard Class (VHC) ⁴	Potential Fuel Load (PFL) t / ha	Effective Slope Gradient ⁵ (Θ)	Potential Bushfire Fire-line Intensity ⁶ (FI) - kW/m	Potential Bushfire Intensity Class ⁷	Site Specific Adjusted Bushfire Intensity Class ⁸
V8R	Village 8 Residential lots and associated road reserves. Extent: ~ 26 hectares. Slope position of vegetation relative to residential lots: na Minimum distance of vegetation to Village 8 residential lots: na	41.4 Low grass or tree cover in built-up areas	2	3° (5%)	122	Low	Low
THS	Townhouse lot located to the north of Grande Avenue and south of Mountain Creek tributary. Extent: ~ 0.5 hectares. Slope position of vegetation relative to residential lots s: na Minimum distance of vegetation to Village 8 residential lots: na	41.4 Low grass or tree cover in built-up areas	2	3° (5%)	122	Low	Low
OSEa	The eastern Linear Creepline Open Space – Managed Vegetation Zone Parts of the open space reserve to the east of Village 8 that will accommodate a range of active and passive recreational uses and within which understorey and ground layer vegetation will be managed to facilitate those uses and maintain a low fuel environment. Extent: ~ 1.7 hectares. Slope position of vegetation relative to residential lots: Downslope Minimum distance of vegetation to Village 8 residential lots: 0 metres	41.4 Low grass or tree cover in built-up areas	2	11° (20%)	212	Low	Low

⁴ Area assigned to Vegetation Class most likely to influence fire intensity and risk.

⁵ BUAs located upslope of development assets are assigned a slope weighting of 0°.

⁶ FI calculation based on predominate slope value.

⁷ Potential Bushfire Intensity Class: Very high (potential intensity) > 40,000+kW/m; High (potential intensity) 20,000 – 40,000kW/m; Medium (potential intensity) 4,000 – 20,000kW/m; Low (Potential Intensity) < 4,000+kW/m

⁸ Adjusted Bushfire Intensity Class to account for narrow and or limited extent of potentially hazardous vegetation, which would effectively prevent a bushfire from reaching its full intensity potential, after Leonard et al., 2014.

BAU	Land Use and Vegetation Description	Predominant Vegetation Hazard Class (VHC) ⁴	Potential Fuel Load (PFL) t / ha	Effective Slope Gradient ⁵ (θ)	Potential Bushfire Fire-line Intensity ⁶ (FI) - kW/m	Potential Bushfire Intensity Class ⁷	Site Specific Adjusted Bushfire Intensity Class ⁸
OSEs	The eastern Linear Creekline Open Space reserve – South Areas of retained open forest located with the Open Space Reserve, generally extending at least 40m either side of the centreline of Mountain Creek tributary that extends along the eastern boundary of Village 8 and to the south of Grande Avenue. Total width of OSE does not exceed 80m. Extent: ~ 7.2 hectares. Slope position of vegetation relative to residential lots: Downslope Minimum distance of vegetation to Village 8 residential lots: 2 metres	9.1 Moist to dry eucalypt open forests on coastal lowlands and ranges	24.1	11° (20%)	30,769	High	Low [grouped with adjoining BAU: V8R and V6R]
OSEn	The eastern Linear Creekline Open Space reserve – North Areas of retained open forest located with the Open Space Reserve, generally extending at least 40m either side of the centreline of Mountain Creek tributary that extends along the eastern and northern boundary of Village 8 and to the north of Grande Avenue. This BAU is primarily located within the Spring Mountain Village 7 open space precinct. Total width of OSE does not exceed 80m. Extent: ~ 4.3 hectares. Slope position of vegetation relative to residential lots: Downslope Minimum distance of vegetation to Village 8 residential lots: 0 metres	9.1 Moist to dry eucalypt open forests on coastal lowlands and ranges	24.1	11° (20%)	30,769	High	Low [grouped with adjoining BAU: V8R and V7Ra]
OSN	The Linear Creekline Open Space reserve – North Areas of retained open forest located with the Open Space Reserve, generally extending at least 40m either side of the centreline of Mountain Creek tributary that is located to the south of BAU-V9R and BAU-TC19. The areas of bushfire prone vegetation are contiguous with similar vegetation located in those adjacent development precincts to the north. Extent: ~ 2.5 hectares. Slope position of vegetation relative to residential lots: Downslope Minimum distance of vegetation to Village 8 residential lots: 0 metres	9.1 Moist to dry eucalypt open forests on coastal lowlands and ranges	24.1	11° (20%)	30,769	High	High [Low - once adjacent BAU-V9R and BAU-TC are developed]

BAU	Land Use and Vegetation Description	Predominant Vegetation Hazard Class (VHC) ⁴	Potential Fuel Load (PFL) t / ha	Effective Slope Gradient ⁵ (Θ)	Potential Bushfire Fire-line Intensity ⁶ (FI) - kW/m	Potential Bushfire Intensity Class ⁷	Site Specific Adjusted Bushfire Intensity Class ⁸
OSWs	<p>The western Linear Creekline Open Space reserve - Balance Area to South of Grande Avenue</p> <p>Parts of the open space reserve that will accommodate a range of active and passive recreational uses within a predominately forested setting and adjacent areas where existing forest vegetation will be retained or rehabilitated. Whilst this zone will contain areas within which understorey and ground layer vegetation will be managed to facilitate those active public uses, the majority of the area will not be maintained in a low fuel condition.</p> <p>The areas of retained open forest located with the Open Space Reserve, generally extending at least 40m either side of the centreline of Mountain Creek. Total width of OSWs to the south of Grande Avenue is generally greater than 100m, ranging from up to 150m in the south to 80m in the north. OSWs is located to the east of Spring Mountain Village 10 precinct. Extent: 12.0 hectares.</p> <p>Slope position of vegetation relative to residential lots: Downslope Minimum distance of vegetation to Village 8 residential lots: 17 metres</p>	9.1 Moist to dry eucalypt open forests on coastal lowlands and ranges	24.1	11° (20%)	30,769	High	High

BAU	Land Use and Vegetation Description	Predominant Vegetation Hazard Class (VHC) ⁴	Potential Fuel Load (PFL) t / ha	Effective Slope Gradient ⁵ (Θ)	Potential Bushfire Fire-line Intensity ⁶ (FI) - kW/m	Potential Bushfire Intensity Class ⁷	Site Specific Adjusted Bushfire Intensity Class ⁸
OSF	<p>The western Linear Creekline Open Space reserve – Landscaped Reduced Fuel Fringe Zone</p> <p>Parts of the open space reserve extending along the western and southern fringe of Village 8 that will be disturbed during the bulk-earthworks phase of development, subsequently landscaped. This zone encompasses areas that were classified in the approved Spring Mountain Village 8 Area Development Plan – Bushfire Assessment Report (Ref: 510247-004, dated 20 January 2017) as being “Active Open Space areas within which low bushfire fuel loads will be established and maintained as part of the Village 8 ADP and Village 6 ADP”. However the capacity to establish and maintain these areas as low fuel environments is in conflict with Council’s requirement that “turf” landscape treatments be limited to land with gradients less than 1:6.</p> <p>This landscaping treatment will provide a reduced fuel load transition between the forested Linear Creekline Open Space reserve, to the west and south of the Village 8 residential estate, and adjoining urban development. This landscape treatment will be comprised of:</p> <ul style="list-style-type: none"> > a 100mm deep mulch layer to assist with erosion and sedimentation control and plant establishment; > a dense (4 plants per m²) planting of native ground covers and low growing shrubs (< 1.5m in height at maturity); and > no tall shrub or tree species. <p>Extent: ~ 2 hectares.</p> <p>Slope position of vegetation relative to residential lots: Downslope</p> <p>Minimum distance of vegetation to Village 8 residential lots: 16 metres</p>	9.3 Shrubland within moist to dry eucalypt on coastal lowlands and ranges	12.7	11° (20%)	8,545	Medium	Medium

BAU	Land Use and Vegetation Description	Predominant Vegetation Hazard Class (VHC) ⁴	Potential Fuel Load (PFL) t / ha	Effective Slope Gradient ⁵ (θ)	Potential Bushfire Fire-line Intensity ⁶ (FI) - kW/m	Potential Bushfire Intensity Class ⁷	Site Specific Adjusted Bushfire Intensity Class ⁸
OSWn	<p>The western Linear Creepline Open Space reserve – Balance Area to the North of Grande Avenue</p> <p>Areas of retained open forest located with the Mountain Creek Open Space Reserve to the north of Grande Avenue. The open forest in this BAU is generally less than 100m in width, but currently is contiguous with open forest vegetation contained within BAU-V9R and BAU-TC19. This area forms part of the Spring Mountain Village 9 open space precinct.</p> <p>Extent: ~ 6.8 hectares.</p> <p>Slope position of vegetation relative to residential lots: Downslope</p> <p>Minimum distance of vegetation to Village 8 residential lots: 25 metres</p>	9.1 Moist to dry eucalypt open forests on coastal lowlands and ranges	24.1	11° (20%)	30,769	High	High [Low - once adjacent BAU-V9R and BAU-TC are developed]
V6R	<p>Village 6 Residential estate</p> <p>Encompasses the approved and currently being constructed Village 6 residential estate, including lots, roadways and those parts of the recreational reserves within with vegetation will be actively managed to facilitate open space uses.</p> <p>Extent: ~ 35.1 hectares.</p> <p>Slope position of vegetation relative to residential lots: Downslope</p> <p>Minimum distance of vegetation to Village 8 residential lots: 110 metres</p>	41.4 Low grass or tree cover in built-up areas	2.0	3° (5%)	122	Low	Low
V7Ra	<p>Village 7 Residential Estate – Interim Vegetation Management Zone</p> <p>A 30m to 80m wide band of land extending along the boundary of the Village 7 precinct and the Linear Creepline Open Space reserve to the south within which vegetation management will be undertaken as part of the Village 8 development for bushfire hazard mitigation purposes. This interim Vegetation Management Zone will become redundant once the Village 7 residential estate is developed.</p> <p>Extent: ~ 3.1 hectares.</p> <p>Slope position of vegetation relative to residential lots: Downslope</p> <p>Minimum distance of vegetation to Village 8 residential lots: 80 metres</p>	41.4 Low grass or tree cover in built-up areas	2.0	3° (5%)	122	Low	Low

BAU	Land Use and Vegetation Description	Predominant Vegetation Hazard Class (VHC) ⁴	Potential Fuel Load (PFL) t / ha	Effective Slope Gradient ⁵ (θ)	Potential Bushfire Fire-line Intensity ⁶ (FI) - kW/m	Potential Bushfire Intensity Class ⁷	Site Specific Adjusted Bushfire Intensity Class ⁸
V7Rb	<p>Village 7 Residential Estate- Balance</p> <p>The balance of the Village 7 residential estate which currently supports areas of eucalypt open forest. Until this area is developed and open forest vegetation is cleared it will present a potential bushfire hazard to surrounding residential estates. Development of Village 7 is scheduled to occur over the 2016-2019 period.</p> <p>Extent: ~ 6.8 hectares.</p> <p>Slope position of vegetation relative to residential lots: Downslope</p> <p>Minimum distance of vegetation to Village 8 residential lots: > 100 metres</p>	9.1 Moist to dry eucalypt open forests on coastal lowlands and ranges	24.1	3 ⁰ (5%)	17,717	Medium	Medium [Low - once BAU-V7R is developed]
V9R	<p>Village 9 Residential Estate</p> <p>The Village 9 residential estate is located to the north of Village 8 and has frontage to the Mountain Creek Linear Creepline Open Space corridor. This area supports areas of eucalypt open forest that are contiguous with open forest vegetation within the adjoining Open Space corridor and yet to be developed Springfield Town Centre precincts to the east. Development of Village 9 is not scheduled to commence until 2025.</p> <p>Extent: ~ 5.25 hectares.</p> <p>Slope position of vegetation relative to residential lots: Downslope</p> <p>Minimum distance of vegetation to Village 8 residential lots: > 150 metres</p>	9.1 Moist to dry eucalypt open forests on coastal lowlands and ranges	24.1	14 ⁰ (25%)	37,845	High	High [Low - once BAU-V9R is developed]
V10R	<p>Village 10 Residential Estate</p> <p>The Village 10 residential estate is located to the west of Village 8 and has frontage to the Mountain Creek Linear Creepline Open Space corridor. This area supports areas of eucalypt open forest that are contiguous with open forest vegetation within the adjoining Open Space corridor and the Conservation Estate to the south. Development of Village 10 is scheduled to occur over the 2019-2020 period.</p> <p>Extent: ~ 15.3 hectares.</p> <p>Slope position of vegetation relative to residential lots: Upslope</p> <p>Minimum distance of vegetation to Village 8 residential lots: ~ 120 metres</p>	9.1 Moist to dry eucalypt open forests on coastal lowlands and ranges	24.1	0 ⁰ (0%)	14,404	Medium	Medium [Low - once BAU-V9R is developed]

BAU	Land Use and Vegetation Description	Predominant Vegetation Hazard Class (VHC) ⁴	Potential Fuel Load (PFL) t / ha	Effective Slope Gradient ⁵ (θ)	Potential Bushfire Fire-line Intensity ⁶ (FI) - kW/m	Potential Bushfire Intensity Class ⁷	Site Specific Adjusted Bushfire Intensity Class ⁸
TC19	<p>Town Centre – Precinct 19</p> <p>The Springfield Town Centre Precinct 19 is located to the north of Village 8 and is contiguous with the Mountain Creek Linear Creekline Open Space corridor; BAU-V9R, BAU-V7Ra and BAU-V7Rb. This area supports areas of eucalypt open forest that are contiguous with open forest vegetation within the adjoining BAUs. The timing for development of BAU-TC19 is not known, but is anticipated to commence by 2020.</p> <p>Extent: > 20 hectares.</p> <p>Slope position of vegetation relative to residential lots: Downslope</p> <p>Minimum distance of vegetation to Village 8 residential lots: 100 metres</p>	9.1 Moist to dry eucalypt open forests on coastal lowlands and ranges	24.1	9° (15%)	26,803	High	High [Low - once BAU-TC19 is developed]
WME	<p>Water Main Easement</p> <p>A trunk water main easement, in favour of SEQ Water, extends along the southern boundary of Village 8. This easement averages 12m in width and supports a 4WD maintenance trail. A written agreement has been reached between Lend Lease and SEQ Water for Lend Lease to undertake regular maintenance of this easement to ensure a low fuel load environment is maintained. As part of this agreement Lend Lease will also maintain the 4WD track in a serviceable condition to meet QFES rural firetrail standards. The maintain Water Main Easement also forms part of the approved Open Space network linking internal open space reserves and trail networks with active recreation opportunities within the Conservation Estate (refer Appendix C for further details). It is assumed the following the initial 10 years of maintenance by Lend Lease, Council and/or SEQ Water would assume responsibility for the ongoing maintenance of the vegetation and access infrastructure within the easement.</p> <p>Extent: ~ 1.10 hectares.</p> <p>Slope position of vegetation relative to residential lots: Upslope</p> <p>Minimum distance of vegetation to Village 8 residential lots: 20 metres</p>	41.4 Low grass or tree cover in built-up areas	2.0	0° (0%)	223	Low	Low

BAU	Land Use and Vegetation Description	Predominant Vegetation Hazard Class (VHC) ⁴	Potential Fuel Load (PFL) t / ha	Effective Slope Gradient ⁵ (Θ)	Potential Bushfire Fire-line Intensity ⁶ (FI) - kW/m	Potential Bushfire Intensity Class ⁷	Site Specific Adjusted Bushfire Intensity Class ⁸
CEDS	<p>Conservation Estate – Down Slope</p> <p>Encompasses an area of remnant eucalypt dominated vegetation located within the Council managed Conservation Estate. This area has a south-westerly aspect.</p> <p>Extent: ~ 8.0 hectares.</p> <p>Slope position of vegetation relative to residential lots: Downslope</p> <p>Minimum distance of vegetation to Village 8 residential lots: 32 metres</p>	9.1 Moist to dry eucalypt open forests on coastal lowlands and ranges	24.1	19° (35%)	53,437	Very High	Very High
CEUS	<p>Conservation Estate – Up Slope</p> <p>Encompasses the balance of the adjoining Council managed Conservation Estate located to the south of Village 8.</p> <p>Extent: > 50 hectares.</p> <p>Slope position of vegetation relative to residential lots: Downslope</p> <p>Minimum distance of vegetation to Village 8 residential lots: 68 metres</p>	9.1 Moist to dry eucalypt open forests on coastal lowlands and ranges	24.1	0° (0%)	14,404	Medium	Medium
CEPE	<p>Conservation Estate – Power Easement</p> <p>Encompasses a 150m wide high voltage power transmission line easement that traverses the Conservation Estate approximately 200 m to the south of, and parallel to, the Village 8 southern boundary. The vegetation in this BAU has been substantially cleared and modified to facilitate establishment of the infrastructure and to reduce the risk of damage to this infrastructure in the event of a bushfire. .</p> <p>Extent: >20 hectares.</p> <p>Slope position of vegetation relative to residential lots: Upslope</p> <p>Minimum distance of vegetation to Village 8 residential lots: > 200 metres</p>	40.4 Low grass or tree cover in rural areas	5.0	0° (0%)	620	Low	Low

The distribution of BAUs detailed in Table 3-5 are presented in the Bushfire Hazard Assessment and Management Plan (Drawing Ref: 510247-044-BAR001) presented in Appendix E.

Based on the above analysis it is possible to define the location and extent of bushfire prone areas, including a 100m wide safety buffer, comprised of vegetated land areas that have been assessed as having a medium or higher bushfire intensity potential. The location of land currently identified as being bushfire prone areas, including a 100m buffer to same, within the Village 8 locality are also shown in Bushfire Hazard Assessment and Management Plan (Drawing Ref: 510247-044-BAR001) presented in Appendix E.

It is recognised that some of these bushfire prone areas to the north and west will disappear as the planned urban development of adjacent forested land occurs. Whilst the removal of that vegetation will have some implications for the development of the Townhouse lot it will not result in the removal of any lots from the designed bushfire prone area which extends 100m from the adjacent forested areas that are of sufficient size to sustain a Medium to Very High intensity bushfire.

4 Bushfire Hazard and Risk Management

The appropriate mitigation and management of bushfire hazards involves the integration of a combination of bushfire hazard mitigation measures during the design, construction and operational phases of any urban development, including:

1. ensuring development design, including the layout of roads and driveways, and the location, size and orientation of residential lots and buildings, is responsive to bushfire hazards;
2. appropriate fire-fighting and management infrastructure is provided, including an adequate and accessible water supply, fire breaks and maintenance/access trails;
3. specifications and materials for building design and construction are in accordance with *AS3959 (2009) – Construction of Buildings in Bushfire Prone Areas* and the Building Code of Australia;
4. management of potentially hazardous vegetation taking into account the conservation values of that vegetation and the important role that fire plays in the functioning of many Australian ecosystems;
5. landscape design and maintenance requirements;
6. community awareness, education and training; and
7. identification of parties to be responsible for specific bushfire management tasks and actions.

The design of the Village 8 layout and the nature of the Open Space reserves have been informed by consideration of the above.

The following sections provide detail concerning some of the key design elements that have been incorporated into the design of the Village 8 estate to ensure that an acceptable level of risk to human health and property is maintained in the event of a bushfire occurring in the general locality. Where appropriate details concerning measures that need to be taken during the construction and occupational phases of the Village 8 estate development are also provided below.

4.1 Lot Layout and Access

The nature of the interface between urban development and bushfire hazard areas has a critical influence on the likelihood of harm occurring to people and property in the event of a bushfire. The provision of appropriate building setbacks and a defendable space between areas of potentially hazardous vegetation and adjacent dwellings is essential to ensuring that the level of risk of harm to people and property associated with exposure to flame, radiant heat, embers and smoke is maintained at an acceptable level. In addition to building setbacks, the provision of a lot layout and associated road network that facilitates safe access routes for bushfire response personnel and safe evacuation routes for residents, is essential.

In respect of the above, the Village 8 development layout as illustrated in Appendix A and described in Section 2, makes provision for the following.

- 1) A perimeter roadway system that separates most of the residential lots from the Conservation Estate to the south and internal Linear Creekline Open Space reserves. The development's road network:
 - a. provides for efficient and safe emergency access to buildings for the deployment of fire-fighting appliances and evacuation of residents if required;
 - b. would comply with local government standards and the Queensland Road Planning and Design Manual (DTMR, 2013);
 - c. provides multiple entry/exit routes from areas adjacent to vegetated land that has a Medium to Very High bushfire intensity potential; and
 - d. involves constriction of the Grande Avenue Mountain Creek crossing which will provide access to land to the west to facilitate deployment of fire response units if required.
- 2) Residential lots that are, with the exception of the proposed Townhouse lot to the north of Grande Avenue, located more than 16 metres from adjacent areas of bushfire prone vegetation that will be present in the landscape following completion of the Village 8 civil and landscaping works. The

setback is comprised of road reserve and/or manage vegetation areas which will be accessible by fire response units and where there will be access to a reticulated water supply for fire suppression purposes if required. These areas will provide a defensible space within which property protection actions can be safely undertaken by QFES personnel in the event that a bushfire occurs within the surrounding landscape.

- 3) In respect of the Townhouse lot, the requirement for and nature of any building setbacks from adjacent areas of vegetation that may be required for bushfire hazard management purposes will depend on the timing of development of the Townhouse lot. If development of the Townhouse lot is deferred until adjacent land to the north that is planned to be developed for urban purposes (i.e. BAUs V9R and TCP19) are developed and associated bushfire prone vegetation is removed then there would be no specific requirements along the northern and eastern flanks of the Townhouse lot from a bushfire hazard management perspective. This is because the remaining narrow (i.e. ~ 80m) band of open forest vegetation within the adjoining Liner Creepline Open Space reserve would have a Low bushfire hazard rating. However if development of the Townhouse lot precedes the development of BAUs V9R and TCP19, then it would be necessary to undertake a detailed hazard assessment and design a townhouse layout that provided appropriate separation between buildings and adjoin areas of bushfire prone vegetation. Regardless of the timing of development, the Townhouse lot will still be subject to some design constraints due to the presence of areas of bushfire prone vegetation within the Linear Creepline Open Space reserve to the south of Grande Avenue (i.e. BAU-OSWs).

Provision has also be made for a formed connection between the perimeter roadway extending along the southern boundary of Village 8 and the existing fire/maintenance trail network located within the trunk water main easement and Conservation Estate to the south.

In summary, the approved Village 8 layout and access arrangements are appropriate from a bushfire hazard management perspective.

4.2 Water Supplies

The Spring Mountain Village 8 development will be serviced by a reticulated water supply.

The water supply network should make provision for:

- > placement of fire hydrants/outlets along the interface between urban development and areas of potentially hazardous vegetation located within or adjacent to the Spring Mountain Village 8 development site at intervals not greater than 120m in accordance with QFES (2014);
- > placement of fire hydrants/outlets within the Local Recreation Park situated within the Mountain Creek Open Space reserve in the south-western sector of Village 8; and
- > flow and pressure characteristics that are suitable for fire-fighting purposes, with a minimum pressure and flow of 10 litres a second at 200 kPa).

4.3 Building Design

Buildings within those parts of the Village 8 estate situated within 100m of areas of potentially hazardous vegetation will need to be designed and constructed in accordance with *Australian Standard AS3959 (2009) – Construction of Buildings in Bushfire Prone Areas*. In general the standards for new homes construction in bushfire prone areas includes:

- > a concrete slab;
- > exterior walls, roof, veranda or deck constructed from non-combustible materials;
- > sealed wall and roof joints to guard against ember attacks;
- > shutters made from aluminium (or other non-combustible material);
- > toughened glass windows;
- > fire-resistant-timber door frames, with a weather strip at the base; and
- > metal (rather than plastic) external trimmings such as vents, guttering and downpipes.

The individual lots within Village 8 that will be subject to AS3959 requirements are identified in Bushfire Hazard Assessment and Management Plan (Drawing Ref: 510247-044-BAR001) presented in Appendix E.

All of the standard Village 8 residential lots are setback at least 16m from adjacent areas of bushfire prone vegetation that will persist within the landscape following completion of the Village 8 civil works program and the completion of planned urban development of surrounding land. Each of the lots with direct frontage to areas of bushfire prone vegetation extending along the western and southern perimeter of Village 8 also have internal building setbacks of 3m.

Table 4-1 provides a summary of the building setbacks to bushfire prone vegetation that are provided along the southern and western boundaries of Village 8 and the associated maximum AS3959(2009) Bushfire Attack Level (BAL) that would be required..

Table 4-1 Bushfire Prone Vegetation Setbacks and Corresponding Maximum BAL Ratings

Area	Nature and Width of Minimum Building Setback	Maximum Bushfire Attack Level (BAL) Rating ⁹ Associated Each VHC
<p>Southern Boundary - Lots situated along the southern boundary of Village 8 which have frontage to adjacent areas of bushfire prone vegetation contained within the Conservation Estate to the south (i.e. BAU – CEDS and OSF). Bushfire Prone Vegetation along the southern boundary occurs on slopes up to 19°.</p>	<p>Minimum building setback comprised of road reserve, areas of maintained low fuel environment parkland, and internal lot building setbacks of:</p> <ul style="list-style-type: none"> ▪ 20 m from areas of VHC9.3- Shrubland within moist to dry eucalypt on coastal lowlands and ranges; and ▪ 30m from areas of VHC9.1 - Moist to dry eucalypt open forests on coastal lowlands and ranges 	<p>BAL-29</p> <p>BAL-29</p>
<p>Western Boundary - Lots situated along the western boundary of Village 8 which have frontage to adjacent areas of bushfire prone vegetation contained within the Conservation Estate to the south (i.e. BAU – OSWs and OSF). Bushfire Prone Vegetation along the western boundary occurs on slopes up to 11°.</p>	<p>Minimum building setback comprised of road reserve, areas of maintained low fuel environment parkland, and internal lot building setbacks of:</p> <ul style="list-style-type: none"> ▪ 19 m from areas of VHC9.3- Shrubland within moist to dry eucalypt on coastal lowlands and ranges; and ▪ 25 m from areas of VHC9.1 - Moist to dry eucalypt open forests on coastal lowlands and ranges 	<p>BAL-19</p> <p>BAL-40</p>

In respect of the maximum BAL-40 indicated along the western boundary it is relevant to note the following:

- > a BAL-40 requirement applies to only one lot, all other lots meeting BAL-29 setback requirements; and
- > the requirement to build to a BAL-40 standard could be avoided via a minor (i.e. 1 metre) increase in the internal lot building setback on the affected lot.

As detailed in Table 3-5, the above BAL assessments assume that forested land within the adjacent Conservation Estate and Linear Open Space corridors **are not** actively managed¹⁰ to reduce bushfire fuel loads apart from BAU-OSEa, and BAU-WME as defined on Drawing Ref: 510247-044-BAR001 presented in Appendix E. The specific vegetation management (fuel reduction) works required within BAU-OSEa and BAU-WME are detailed in Table 4-2.

⁹ Maximum BAL requirement determined using AS3959(2009) Method 2, FDI 40 and the slope and fuel loads detailed in Table 3-5.

¹⁰ Actively managed either by way of hazard reduction burns or via the mechanical removal of vegetation.

In the interim period between the completion of the Village 8 civil works program and the completion of the planned urban development of adjacent land, the only Village 8 lot that will be exposed to a higher bushfire hazard level is the proposed Townhouse lot (BAU-THS). Until Village 9 (BAU-V9R) and Springfield Town Centre Precinct 19 (BAU-TC19) are developed and existing areas of bushfire prone vegetation are removed, the narrow (< 100m) Linear Creekline Open Space reserve to the north of the Townhouse lot will be classified as a bushfire prone area as it is of sufficient size to sustain a Medium to Very High intensity bushfire. The western and southern boundaries of the proposed Townhouse lot will be separated from adjacent areas of bushfire prone vegetation by a managed vegetation zone at least 25m in width that will accommodate Grande Avenue, a stormwater detention basin and associated embellishments. However the north-eastern boundary of the Townhouse lot directly fronts onto areas of retained open forest within the adjoining Linear Creekline Open Space reserve which would place substantive constraints on the design of development. However once planned urban development to the north is completed, the narrow (i.e. < 100m) width of retained areas of open forest vegetation within the adjoining Linear Creekline Open Space reserve will enable this area to be reclassified to a Low Bushfire Intensity Potential. If development of the Townhouse lot is proposed prior to the development of adjacent land to the north, and associated reductions in bushfire hazard levels are achieved, then a more detailed analysis of bushfire hazard levels and required building standards for the Townhouse development should be completed.

The specific requirements to achieve compliance with AS3959 at each lot will then need to be confirmed and the dwelling designed and constructed in accordance with that standard.

4.4 Vegetation Management

The bushfire severity potential of an area can be substantially reduced by managing vegetation in a manner that reduces or removes potential bushfire fuel loads. This includes management of areas that are intended to provide a conservation function. The failure to manage vegetative fuel loads in conservation reserves can result in high intensity wildfires that have adverse ecological impacts for the reserve as well as creating an unnecessary hazard for adjacent urban areas.

To ensure that future residents of Village 8 are not exposed to an unacceptable level of risk of harm due to bushfire (i.e. a BAL29 is achievable at all residential lots) active management of vegetation is required within some of the previously defined Village 8 Bushfire Assessment Units (BAUs). In this respect Table 4-2 specifies:

- > the specific BAUs where vegetation management works are required;
- > the general nature and timing of vegetation management works that are required; and
- > the entities responsible for implementing the management works.

Table 4-2 Vegetation Management Specifications

BAU	General Description of Vegetation Management Works	Responsible Entities
<p>OSEa</p>	<p>The eastern Linear Creekline Open Space – Managed Vegetation Zone</p> <p><u>Works:</u></p> <p>Clearance of under storey vegetation and maintenance of a low ground cover vegetation generally less than 300mm in height.</p> <p>Clearance of existing canopy trees, particularly Stringybark species, with an overall canopy cover of < 20% and gaps of at least 10m between the canopies of retained individual or small clumps of trees and native understorey (i.e. < 300m²).</p> <p>Construction of Open Space embellishments in accordance with the landscape master plan.</p> <p><u>Timing:</u></p> <p>Initial works to be completed prior to construction of any dwellings within the bushfire prone areas of Village 8.</p> <p>Active maintenance of initial works required at least once a year in July – August prior to the commencement of the high risk bushfire period.</p> <p>A second treatment may be required in November – January in some years depending on the amount of regrowth that occurs.</p>	<p>Lend Lease responsible for:</p> <ul style="list-style-type: none"> > initial works; > maintenance works for a period of 18 months following completion of Village 8 civil and landscaping works. <p>Council responsible for:</p> <ul style="list-style-type: none"> > maintenance works in perpetuity.
<p>V7Ra</p>	<p>Village 7 Residential Estate – Interim Vegetation Management Zone</p> <p>A 30m to 80m wide band of land extending along the boundary of the Village 7 precinct and the Linear Creekline Open Space reserve to the south within which vegetation management will be undertaken as part of the Village 8 development for bushfire hazard mitigation purposes. This interim Vegetation Management Zone will become redundant once the Village 7 residential estate is developed.</p> <p>Extent: ~ 2.81 hectares.</p> <p>Slope position of vegetation relative to residential lots: Downslope</p> <p>Minimum distance of vegetation to Village 8 residential lots: 80 metres</p>	<p>Lend Lease responsible for:</p> <ul style="list-style-type: none"> > initial works; > maintenance works until Village 7 is developed for urban purposes.
<p>WME</p>	<p>Water Main Easement</p> <p><u>Works:</u></p> <p>Clearance of under storey vegetation and maintenance of a low ground cover vegetation generally less than 300mm in height.</p> <p>Clearance of existing canopy trees, particularly Stringybark species with an overall canopy cover of < 20% and gaps of at least 10m between the canopies of retained individual or small clumps of trees (i.e. < 300m²).</p> <p><u>Timing:</u></p> <p>Initial works to be completed prior to construction of any dwellings within the bushfire prone area in the south of Village 8.</p> <p>Active maintenance of initial works required at least once a year in July – August prior to the commencement of the high risk bushfire period.</p> <p>A second treatment may be required in November – January in some years depending on the amount of regrowth that occurs.</p>	<p>Lend Lease responsible for:</p> <ul style="list-style-type: none"> > initial works; > maintenance works for a period of 10 years following completion of Village 8 civil and landscaping works. <p>Council / SEQ Water responsible for:</p> <ul style="list-style-type: none"> > maintenance works in perpetuity.

4.5 Landscape Design

Inappropriate landscape design in bushfire prone areas (i.e. any land within 100m of bushfire prone vegetation with a Medium to Very High hazard rating) may expose a dwelling to increased levels of ember attack, radiant heat and flame contact.

Home owners that have well designed and maintained landscaping with appropriate plant species can actually help protect their houses by:

- > reducing the amount of radiant heat received by a house;

- > reducing the chance of direct flame contact on a house;
- > reducing wind speed around a house;
- > deflecting and filtering embers; and
- > reducing flammable landscaping materials within the defensible space.

All vegetative material can burn under the influence of a bushfire, as such landscape designs in bushfire prone areas should give careful consideration to:

- > species selection;
- > species planting proximity to assets and access paths relative to their flammability; and
- > avoidance of both horizontal and vertical continuity of vegetation.

In general “mesic” plant species that have a higher leaf moisture content, less bark and a lower rate of leaf drop will assist with reducing available bushfire fuel loads thereby assisting in reducing the likelihood and severity of bushfire attack. The use of mesic plant species in combination with the following guidelines form the basis for a low risk landscape design in bushfire prone areas.

- > Establish and maintain lawn or paved areas such as paths and/or a pebble garden with herbs near to the house.
- > Maintain cleared areas around all driveways, pathways, fire-trails and roadways that may need to be used as an access/egress route in the event of a bushfire.
- > Plant trees at least 5 m from any dwelling house to allow clear access and minimise canopy overhang of roofs and associated accumulation of leaf litter.
- > Space trees and shrubs to avoid the creation of a continuous canopy that may carry fire.
- > Prune lower limbs of trees to a height of 2m above ground level.
- > Avoid using conifers, paperbarks (i.e. *Melaleuca* species), stringy-bark and ribbon-bark eucalypts in landscape plantings.
- > Avoid using organic mulch with preference given to non-flammable mulches such as scoria (light weight volcanic stone), pebbles, recycled crushed bricks.
- > Regularly water landscape plantings to maintain plant health and moisture levels.
- > Utilise non-combustible materials for fencing and retaining walls.

4.6 Property Maintenance

The owners and residents of dwellings and managers of public land in bushfire prone areas need to maintain their properties to minimise risks associated with bushfires. In this respect it is noted that most cases of bushfire damage to property are caused by radiated heat from the bushfire or most commonly by burning embers landing in, on, or around buildings and starting small spot fires which may damage the property long after a fire front has passed.

The following property maintenance works should be carried out within all properties (i.e. residential lots, parkland reserves, road reserves) located within 100m of bushfire prone vegetation prior to the commencement of the bush fire season¹¹:

- > mow grassy areas and maintain at a height < 300mm;
- > remove excess ground fuels and combustible material including long dry grass, dead leaves and branches;
- > remove leaf litter and any other combustible materials from the roof and gutters;

¹¹ In south-east Queensland the bushfire season typically extends from spring (August-September) to mid-summer (January). The greatest danger occurs after the dry winter/spring period, before the onset of the rainy weather common in summer. The worst conditions occur when deep low-pressure systems near Tasmania bring strong, dry, westerly winds to the coast, as occurred in the major New South Wales fires in January 1994. (Source: Bureau of Meteorology)

- > keeping areas under decks, fences, fence posts, gates and trees raked and cleared of potential fuels (i.e. dry grass, leaves, litter etc);
- > ensure all roof tiles, roof sheeting, screens and glass on windows and doors, and painted surfaces are in good condition giving particular attention to ensuring entry of embers through gaps;
- > ensure doors are fitted with draught seals and well maintained;
- > ensure any LPG cylinders are located to minimise exposure to direct flame and radiant heat and have their relief valves pointing away from buildings;
- > ensure that door mats are of non-combustible material;
- > check water supplies, hydrants, taps and hoses are accessible and in good working order; and
- > check that vegetation is not interfering with safe access and use of driveways, pathways and roadways.

4.7 Community Awareness

All prospective purchasers of land within the Village 8 estate should be provided with clear advice, by the Developer, concerning the following.

- a) The location of any lots that are located within 100m of areas of bushfire prone vegetation and therefore subject to the requirements of AS3959.
- b) For those lots that are subject to AS3959, the requirement for a lot specific Bushfire Attack Level (BAL) assessment to be carried out to confirm the particular BAL standards that would apply to each façade of a dwelling on the affected lot.

All residents of bushfire prone areas should maintain an appropriate level of bushfire awareness and preparation. Relevant information concerning such issues is readily available from Queensland Rural Fire Service at <https://ruralfire.qld.gov.au/Pages/Home.aspx>.

4.8 Koala Management

This section contains advice concerning management of bushfire for Koala conservation purposes and is provided for advice purposes only.

The eucalypt dominated open forests of the Spring Mountain locality support a population of Koala. Whilst the long-term viability of the local Koala population will primarily depend on the appropriate management of habitat contained within the Conservation Estate to the south, the Linear Creekline Open Space corridors within and adjacent to the Village 8 development are likely to be utilised by Koala.

Inappropriate bushfire regimes can present a threat to the long-term survival of local Koala populations. In that respect high-intensity and high-frequency fires can result in the removal of a proportion of the Koala breeding population at a rate faster than it is able to be replaced by successive Koala generations. This type of impact is amplified as high intensity fires:

- > temporarily reduces the quality and availability of the food resource that is required to sustain Koala that survive the fire event; and
- > make Koala more prone to predation and injury from car strikes as they spend more time on the ground moving through fire affected areas where food resources may be sparse.

It is important therefore that appropriate management strategies are implemented to:

- > reduce the frequency and extent of high intensity fire events in areas of Koala habitat; and
- > promote the recruitment of preferred Koala food trees.

To effectively manage bushfire to achieve Koala conservation outcomes a coordinated approach to bushfire management should be taken. In this respect the management of the extensive Conservation Estate to the south should be coordinated with the management of the Linear Creekline Open Space corridors and the balance areas of the Spring Mountain estate that have not yet been developed for urban purposes. However, given the linear and riparian nature of the Creekline Open Space corridors and the presence of adjoining urban

land uses, the conduct of hazard reduction and ecological burns within the Creepline Open Space corridors is not recommended.

In respect of the Conservation Estate to the south (Council's responsibility) and as yet undeveloped sectors of the Spring Mountain estate (Lend Lease's responsibility) that support areas of Koala habitat, it is recommended that following measures be implemented to inform the development and maintenance of a fire regime that will promote Koala conservation outcomes.

- 1) A register be established and maintained of all bushfire events within retained areas of Koala habitat, including known details of past fire events. The register should enable the mapping of areas affected by different fire events.
- 2) Establish and maintenance of a fire trail system in and around retained areas of Koala habitat that will assist with the implementation of measures designed to establish and maintain an appropriate fire regime.
- 3) Hazard reduction and ecological burns should be undertaken in general accord with the following guidelines:
 - SEASON: Summer to winter.
 - INTENSITY: Low to moderate.
 - INTERVAL: 4-25 years.
 - STRATEGY: Aim for 40-60% mosaic burn. Burn with soil moisture and with a spot ignition strategy so that a patchwork of burnt/unburnt country is achieved.
 - ISSUES: The fire regime should maintain a mosaic of grassy and shrubby understoreys. Control of weeds is a major focus of planned burning in most areas. Careful thought should be given to maintaining ground litter and fallen timber habitats by burning only with sufficient soil moisture. Burning should aim to produce fine scale mosaics of unburnt areas. Variability in season and fire intensity is important, as well as spot ignition in cooler or moister periods to encourage mosaics.
- 4) Koala spotters should be employed during the planning and conduct of hazard reduction / ecological burns to:
 - carry-out a pre-burn survey to identify the distribution and abundance of Koala within the planned burn block, along with baseline details concerning vegetation structure and floristics of relevance from a Koala habitat assessment perspective, so that appropriate measures can be taken to minimise the risk of harm to resident Koala;
 - respond in the event of any Koala being harmed by the fire; and
 - conduct post burn surveys at 6 monthly intervals of to assess the impact of the fire events on the distribution and abundance of Koala within the burnt area.

In respect of any wildfires that enter the Linear Open Space Corridors, the fact that resources would be directed towards protecting residential areas such as Village 8 will also ensure that adjacent areas of retained Koala habitat within the Linear Creepline Open Space corridors are likely to be protected from high intensity bushfire events. The Village 8 road network and pedestrian/cycle paths within the open space corridors will also facilitate bushfire management responses (i.e. access to suppress spot fires; control lines from which back-burns can be initiated).

4.9 Responsibilities

The Developer of the Village 8 estate (i.e. Lend Lease) is responsible for:

- > design and construction of a development layout consistent with the specifications of Section 4.1;
- > establishment of a reticulated water supply as per specifications of Section 4.2;
- > implementation of vegetation management works as per the specifications of Section 4.4; and
- > providing relevant community bushfire awareness information as per specifications of Section 4.7.

The Ipswich City Council is responsible for:

- > the maintenance of public parklands, water supply infrastructure and road reserves following completion of any required maintenance period during which the Developer (i.e. Lend Lease) is responsible; and
- > the management of the Conservation Estate located to the south of the Village 8 estate.

The Ipswich City Council / SEQWater is responsible for maintenance of the water main easement extending along the southern perimeter of Village 8 as per the specifications of Section 4.4.

Property owners and occupiers of individual lots are responsible for:

- > the design, construction and maintenance of dwellings in accordance with AS3959 as per Section 4.3 recommendations;
- > the appropriate landscaping and maintenance of their properties in general accord with Sections 4.5 and 4.6; and
- > ensuring that they have an appropriate level of bushfire awareness and preparation in general accord with the Queensland Fire and Emergency Services guidelines such as the Bushfire Survival Plan Guideline presented in Appendix F.

5 Compliance Assessments

5.1 Ipswich Planning Scheme Bushfire Risk Areas Overlay Code

Based on the previously presented information, an assessment of the levels of compliance that the Spring Mountain Village 8 development achieves with the requirements of the Ipswich Planning Scheme Bushfire Risk Areas Overlay Code is presented in Table 5-1.

Table 5-1 Ipswich Planning Scheme Bushfire Risk Areas Overlay Code compliance assessment

Specific Outcomes	Probable Solutions	Comments
Design, Siting and Construction		
<p>(1) Uses and works in bushfire risk areas are designed, sited, and constructed to—</p> <ul style="list-style-type: none"> (a) minimise the number of people and properties subject to bushfire risk; (b) improve the survivability of buildings and the protection of life during the passage of a firefront; (c) minimise costs and threats to emergency services; and (d) facilitate evacuation in the event of a bushfire. 	<p>(1)(a) Uses and works are sited—</p> <ul style="list-style-type: none"> (i) in existing cleared areas able to accommodate the use within an adequate fire protection buffer as identified in (iii) below; and (ii) where possible, on land and parts of a site which are least prone to bushfire risk with regard to aspect, slope, elevation and vegetation type— <ul style="list-style-type: none"> (A) away from the tops of ridgelines and other than on a North to West facing slope, with the flatter portion of the lot being used as building sites (refer Figure 11.4.1); and (B) on land with a slope gradient less than 15%, and on level ground wherever possible; and (iii) with a minimum 20 metre wide area (measured from the horizontal from the building) serving as a fire protection buffer around the building of which at least the first 10 metres from the building is a cleared area (fuel free inner zone), while the outer 10 metres (fuel reduced outer zone) may be planted with fire retardant vegetation species or grassed (refer Figure 11.4.2) [No habitable or storage structures are located in this area.]; and (iv) to ensure that any outbuilding (such as garages and carports) is built as part of the main building or located at least 5 metres from the main building (refer Figure 11.4.3). 	<p>Complies with SO(1)</p> <p>As detailed in Section 4, the Spring Mountain Village 8 development is designed to comply with SO(1) and PS(1). Notwithstanding the above, development of the proposed Townhouse lot to the north of Grande Avenue should either be:</p> <ul style="list-style-type: none"> a) deferred until adjacent urban development areas to the north has been completed and the extent of bushfire prone vegetation is reduced to the point where the remaining 80m wide Linear Creekline Open Space corridor no longer poses any substantial bushfire hazard to the Townhouse development; or b) a detailed bushfire hazard assessment and management plan is prepared to support any proposed Townhouse development.
	<p>(b) If trees are planted they—</p> <ul style="list-style-type: none"> (i) are of a species that grow to over 2 metres in height to maintain separation between lower canopy and the ground; (ii) have vertical and horizontal separation between each plant to ensure the canopy is not continuous; and (iii) do not grow closer to the building than a distance equivalent to the tree's expected mature height so that branches do not overhang the eaves of the building (refer Figure 11.4.4). 	<p>As detailed in Section 4.4 and Section 4.5 appropriate provisions have been made for vegetation management and landscape design.</p>
	<p>(c) Buildings—</p>	<p>All buildings located within 100m of areas with a Medium – Very High Bushfire Intensity Potential will need to be designed and</p>

Specific Outcomes	Probable Solutions	Comments
	<ul style="list-style-type: none"> (i) have a continuous roof line avoiding roof valleys, multiple hips and a combination of pitched and flat roofs on the same building – as these provide catchment areas for debris (refer Figure 11.4.5); and (ii) have low pitched roofs between 12 and 21 degrees to reduce radiation pick up (refer Figure 11.4.6); and (iii) are of slab-on-ground construction where this is responsive to the site; or (iv) “pole homes” with floors elevated off the ground with all external openings (between the floor and the ground) sealed to prevent the entry of burning debris; and (v) minimise large expansive walls as these expose a greater surface area to a bushfire; and (vi) are constructed in accordance with the relevant Bushfire provisions of the Standard Building Regulation 1993. 	<p>constructed in accordance with AS3959 (2009) – <i>Construction of Buildings in Bushfire Prone Areas</i> and the Building Code of Australia.</p> <p>The actual Bushfire Attack Level (BAL) Construction Standard that will be required for individual lots needs to be determined at the time that building plans are being prepared for approval. Nevertheless, as detailed in Section 4.3, the nature of the building setbacks from identified bushfire prone areas that is provided within the Village 8 development layout should ensure that dwellings can be constructed to a BAL29 or lower standard.</p> <p>As detailed in Table 3-5, this BAL assessment assumes that forested land within the adjacent Conservation Estate and Linear Open Space corridors are not actively managed to reduce bushfire fuel loads apart from BAU-OSEa and BAU-WME.</p> <p>The construction requirements for the proposed Townhouse lot should be determined as part of a future development application.</p>
	<ul style="list-style-type: none"> (d) Masonry, stone, steel, colourbond or wire fencing is used and timber fencing is avoided. 	<p>As detailed in Section 4.5.</p>
<p>(2) Uses and works avoid a high concentration of people living or congregating in a high bushfire risk area.</p>	<p>(2) Uses where people are likely to congregate, including an educational establishment, community building, place of worship, hospital, retirement community, caravan park, camping ground, child care centre, correctional centre and tourist facility—</p> <ul style="list-style-type: none"> (a) are not located within a bushfire risk area; or (b) where this is not possible, are constructed in accordance with Probable Solution 1, above. 	<p>Complies with SO(2)</p> <p>The Village 8 development will not establish any of the following uses within 100m of identified areas of bushfire prone vegetation with a Medium to Very High hazard rating: schools, community buildings, place of worships, hospitals, retirement villages, aged care facilities or child care centres.</p>
<p>Water Storage and Supply</p>		
<p>(3) Uses and works provide sufficient and accessible water storage and supply for firefighting purposes by—</p> <ul style="list-style-type: none"> (a) connection to a reticulated water supply, if available to the site, having sufficient pressure and flow for firefighting purposes; or 	<p>(3) Where reticulated water supply is not available—</p> <ul style="list-style-type: none"> (a) the site has a minimum water supply of 5,000 litres (per dwelling) available for firefighting purposes as either— <ul style="list-style-type: none"> (i) a separate on-site water tank; or (ii) a reserve section in the bottom part of the main water supply tank; or (iii) a swimming pool installed immediately upon construction of the dwelling; or 	<p>Complies with SO(3)</p> <p>As detailed in Section 4.2.</p>

Specific Outcomes	Probable Solutions	Comments
<p>(b) where reticulated water supply is not available to the site, a dam, lake, water tank or swimming pool are provided with sufficient capacity for water pumping in times of bushfire.</p>	<p>(iv) a dam or lake; and</p> <p>(b) where on-site water supply tanks are provided they are—</p> <p>(i) above ground and located adjacent to the building;</p> <p>(ii) fitted with a 50mm outlet pipe and a 50mm male camlock coupling (standard rural fire brigade fitting) to allow fire hose connection;</p> <p>(iii) of precast concrete construction and supported by a fireproof structure; and</p> <p>(iv) supported by a stand-by diesel or petrol powered pump should electricity be cut off during a bushfire.</p> <hr/> <p>(4) Where reticulated water supply is available—</p> <p>(a) if reconfiguring a lot, water supply outlet pipes are located—</p> <p>(i) within 40 metres of the building envelope on each lot; or</p> <p>(ii) where no building envelope is indicated on a lot, within 40 metres of the centre of the lot; or</p> <p>(b) if for the erection of a building, the water supply outlet pipe is located within 40 metres of the building.</p>	
<p>Vehicular Access and Fire Trails</p>		
<p>(4) Fire trails or perimeter roads are provided to mitigate against bushfire risk by—</p> <p>(a) separating uses and works from surrounding vegetated areas; and</p> <p>(b) being of sufficient width to serve as an effective fire trail which allows continuous access for firefighting vehicles; and</p> <p>(c) being in secure tenure and maintained.</p>	<p>(5) Uses and works (including where reconfiguring a lot) incorporate—</p> <p>(a) a perimeter road—</p> <p>(i) located between the boundary of the lot(s) and adjacent vegetated lands; and</p> <p>(ii) with a minimum cleared width of 20 metres; and</p> <p>(iii) with a constructed road width of 6 metres; and</p> <p>(iv) constructed to an all weather standard; or</p> <hr/> <p>(b) a fire trail—</p> <p>(i) having a minimum cleared width of 6 metres; and</p> <p>(ii) having a minimum formed width of 4 metres; and</p> <p>(iii) having a maximum gradient of 15%; and</p> <p>(iv) that is constructed and maintained to prevent erosion and provide continuous access for firefighting vehicles; and</p> <p>(v) allowing vehicular access at least every 200 metres; and</p>	<p>Complies with SO(4) As detailed in Section 4.1.</p>

Specific Outcomes	Probable Solutions	Comments
	<p>(vi) that has vehicular access at each end and links to either existing fire trails or roads, or has a turning circle, or turnaround area at the end of the trail for the turning of firefighting vehicles; or</p> <p>(vii) which has passing or turning areas with a maximum gradient of 5% (1 in 20) at intervals of at least every 400 metres; and</p> <p>(viii) are situated on public land which may also be used for pedestrian or cycling access; or</p> <p>(ix) on private land by way of an access easement granted in favour of the local government and Queensland Fire Services, where the fire trail is unfenced and maintained by the private owner to enable access at all times by firefighting vehicles; or</p> <p>(c) a combination of perimeter roads and fire trails as per (a) and (b) above; and</p> <p>(d) vehicular access points to properties are a minimum of 3 metres in width and 4.5m in height in order to permit ready access by fire and rescue vehicles; and</p> <p>(e) access driveways maintain a minimum horizontal clearance of 5m from all powerlines.</p>	
<p>(5) Residential uses and works (including reconfiguring a lot) are designed to mitigate potential bushfire risk and provide safe sites for dwellings.</p>		<p>Complies with SO(5)</p> <p>As detailed in Section 4 herein, an integrated approach to bushfire hazard and risk mitigation has been taken to ensure future residents and their dwellings are not exposed to an unacceptable level of risk of harm due to the occurrence of bushfire.</p>
<p>(6) Where the use involves reconfiguring a lot and the opening of a new road, the road layout provides vehicular access which is designed to—</p> <p>(a) mitigate against bushfire risk by ensuring adequate access for firefighting and other emergency vehicles; and</p> <p>(b) allow for evacuation in the event of a bushfire; and</p>	<p>(6) Wherever possible the road layout provides through roads and avoids the use of cul-de-sac and dead end roads (refer Figure 11.4.7).</p>	<p>Complies with SO(6)</p> <p>As detailed in Section 4.1 herein.</p>

Specific Outcomes	Probable Solutions	Comments
(c) provide for the safe and effective operation of water supply and equipment for fire fighting vehicles.		
(7) Wherever possible the road layout provides through roads and avoids the use of culs- de-sac and dead end roads (refer Figure 11.4.7).	(7) Road gradients are generally no more than 12.5%, or are from 12.5% to not more than 20% over a maximum distance of 50 metres.	Complies with SO(7) As detailed in Section 4.1 herein.
(8) New residents are informed about the nature of the bushfire hazard and mitigation measures.	(8) The developer provides potential purchasers of lots and the local government with detailed information including— (a) the nature of the bushfire hazard present on the lot; (b) responsibilities for fire management (including fuel in vegetated areas, maintenance of open areas and buildings, separation of assets); (c) measures available for ongoing fire hazard mitigation (including planting of fire resistant species, use of non-flammable fencing and screens, separation of assets from hazards); and (d) the intended management of retained internal vegetated strips and public areas.	Complies with SO(8) As detailed in Section 4.7 herein.

5.2 State Planning Policy (SPP)

The Spring Mountain Village 8 development site contains and adjoins bushfire hazard areas and as such the development requires assessment against the interim development assessment requirements of Part E of the SPP.

Based on the previously presented information, an assessment of the levels of compliance that the Spring Mountain Village 8 development achieves with the interim development assessment requirements of Part E of the SPP is presented in Table 5-2.

Table 5-2 SPP Part E Interim Development Assessment Requirements compliance assessment

Requirement	Response
Development:	
(1) avoids natural hazard areas or mitigates the risks of the natural hazard to an acceptable or tolerable level	As detailed in Section 4 herein, an integrated approach to bushfire hazard and risk mitigation has been taken to ensure future residents and their dwellings are not exposed to an unacceptable level of risk of harm due to the occurrence of bushfire.
(2) supports, and does not unduly burden, disaster management response or recovery capacity and capabilities	The Village 8 development forms part of a master planned development, makes appropriate provision for bushfire hazard mitigation and would not place an undue burden on bushfire management response or recovery capacity and capabilities.
(3) directly, indirectly and cumulatively avoids an increase in the severity of the natural hazard and the potential for damage on the site or to other properties	The Village 8 development is consistent with this requirement in that it would: <ul style="list-style-type: none"> > reduce the extent of potentially hazardous vegetation in the vicinity of the existing urban development and the associated severity of local bushfires; and > improve the capacity of bushfire management personnel to respond to a bushfire in the general locality via the extension of the formed road and reticulated water network.
(4) avoids risks to public safety and the environment from the location of hazardous materials and the release of these materials as a result of a natural hazard	The Village 8 development would not involve the manufacture or bulk storage of hazardous materials.
(5) maintains or enhances natural processes and the protective function of landforms and vegetation that can mitigate risks associated with the natural hazard.	The Village 8 development would allow for the maintenance of natural processes and vegetation within designated conservation reserves.

6 References

Australian Standard AS3959-2009 Construction of buildings in bushfire prone areas.

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DSDIP (2014). State Planning Policy (SPP) – Natural Hazards, Risk and Resilience -Technical Manual - A 'fit for purpose' approach in undertaking natural hazard studies and risk assessments. Prepared by the Department of State Development Infrastructure and Planning, August, 2014.

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Draft State Planning Policy Guideline - State Interest - Guidance on flood, bushfire and landslide hazards (December 2013).

DTMR (2013). Road Planning and Design Manual (2nd Edition) - Queensland Practice. Prepared by the Queensland Department of Main Roads and Transport.

QFES (2014). Fire Hydrant and Vehicle Access Guidelines for Residential, Commercial and Industrial Lots. Development design guidelines prepared by the Queensland Fire and Emergency (Rescue) Service.

Leonard, J., Newnham, G., Opie, K., and Bianchi, R. (2014). A new methodology for state-wide mapping of bushfire prone areas in Queensland. CSIRO, Australia.

NSW Rural Fire Service (2006). Planning for Bushfire Protection – A Guide for Councils, Planners, Fire Authorities and Developers. NSW Rural Fire Service.

State Planning Policy 1/03 Guideline – Mitigating the Adverse Impacts of Flood, Bushfire and Landslide (SPP 1/03 Guideline).

DNPRSR (2012). Planned Burn Guidelines – Southeast Queensland Bioregion of Queensland. Prepared by: Queensland Parks and Wildlife Service (QPWS) Enhanced Fire Management Team, Queensland Department of National Parks, Recreation, Sport and Racing.

Bushfire Assessment Report

APPENDIX A
SPRING MOUNTAIN VILLAGE 8 ADP
LAYOUT

VILLAGE 8 - SPRINGFIELD RISE FUNCTIONAL LAYOUT PLAN

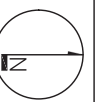


- LEGEND**
- Major Collector Street - Grande Avenue
(Varies in width due to intersection design)
 - Collector Street (17m Wide)
 - Access Street (16m Wide)
 - Access Place (16m Wide)
 - Driveway (12m Wide)
 - Driveway Access to Local Park
 - Potential Future Bus Route
 - Potential Future Bus Stop
 - 2.2m Path (Indicative Location Within Park & Subject to Detailed Design)
 - 2m Path (Indicative Subject to Detailed Design)
 - 1.5m Path (Indicative Subject to Detailed Design)
 - Local Recreation Park
 - Linear Creeklake Open Space
 - Landscaped Road Reserve
 - Landscaped Area within Lot
 - Stormwater Quality
 - Entry Wall (Indicative Location)
 - Vehicle Entry (Specific driveway location to be determined at detailed design)
 - Stage Boundaries
 - 200m Radius Catchment to Local Park
 - 500m Catchment to possible Local Centre
 - Creek Invert (As Per Woller Consulting Survey)
 - Q100 Floodline (Provided by Arcadis Engineers)
 - 40m Offset to Creek Invert
 - 80m Offset from Village 6 extent of Development
 - Mandatory 2 Storey Dwelling
(Must have a second storey balcony or deck with a minimum dimension of 2m)
 - Dual Occupancy Lot
 - Potential Bin Pads (Lots 5757-5765, 5749 and 5750)

NOTE: Indicative access and pathway subject to detailed operational work design

PLAN NUMBER WC000626:0\8-010 G

SHEET 1 OF 6



PLAN DESCRIPTION:
VILLAGE 8 SPRINGFIELD RISE
SPRING MOUNTAIN

Client Name: LEND LEASE
Project Name: SPRINGFIELD RISE
Scale: 1:4000 (A3)

File: 6626V8G4.
Drawn: DAVIDM
Date: 17/10/2016

Bushfire Assessment Report

APPENDIX B
SPRING MOUNTAIN INDICATIVE
PHASING PLAN (ANNOTATED)



LEGEND

- | | | | |
|--|---|--|--|
| | INDICATIVE DEVELOPMENT PHASING | | LOCAL RECREATION PARK |
| | RESIDENTIAL DEVELOPMENT AREA | | CONSERVATION (INDICATIVE - REFER s5.1) |
| | OPTIONAL USE AREA | | BUSHFIRE RISK AREA - LAND USE (OPEN SPACE OR POSSIBLE RESIDENTIAL) TO BE DETERMINED AT ADP STAGE |
| | EXISTING SCHOOL | | CENTENARY HIGHWAY |
| | PROPOSED SCHOOL | | SINNATHAMBY BOULEVARD |
| | PROPOSED NEIGHBOURHOOD CENTRE | | TOWN CENTRE ROAD TYPE 2C |
| | LOCAL CENTRE | | TOWN CENTRE ROAD MAJOR COLLECTOR (ACCESS) |
| | CHILD CARE CENTRE (& POSSIBLE LOCAL CENTRE) | | MAJOR COLLECTOR STREET (NO ACCESS) |
| | COMMUNITY CENTRE | | MAJOR COLLECTOR STREET (ACCESS) |
| | INFRASTRUCTURE (EXISTING) | | VILLAGE BOUNDARY |
| | INFRASTRUCTURE OBLIGATION ITEM | | COLLECTOR STREET (INDICATIVE) |
| | DISTRICT 2 PARK (D2P1) | | VILLAGE BOUNDARY |
| | MAJOR DISTRICT PARK NORTH (FP1) | | SPRING MOUNTAIN PRECINCT BOUNDARY |
| | FORMAL PARK WEST (FP2) | | INDICATIVE TOWN CENTRE DEVELOPMENT AREAS (SUBJECT TO TOWN CENTRE CONCEPT PLAN) |
| | LINEAR CREEKLINE OPEN SPACE | | |

NOTE: ALL DIMENSIONS AND AREAS ON THIS PLAN ARE SUBJECT TO SURVEY AND REQUIREMENTS FOR LOGGEMENT OF SURVEY PLANS IN THE DEPARTMENT OF NATURAL RESOURCES AND MINES.

Bushfire Assessment Report

APPENDIX C
MOUNTAIN CREEK OPEN SPACE
CONCEPT PLAN

A MOUNTAIN CREEK OPEN SPACE CONCEPT

GENERAL DESIGN CONCEPTS

Active Recreation Areas
May include Themed Playgrounds, Kick-about areas, Fitness equipment and Dog off-leash areas. Active Recreation Areas may be incorporated along the length of the Mountain Creek Linear Open Space Corridor.

Passive Recreation Areas
These spaces may be designed as Parkland Settings or Natural Settings and

incorporated throughout the site. Picnic Shelters may be provided with some having BBQ facilities subject to Bushfire risk assessment.

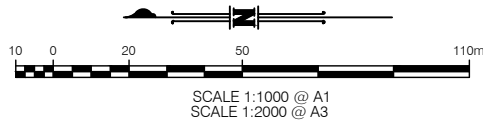
Mountain Creek Corridor
Provides a natural backdrop to development which retains native vegetation while preserving fauna connections.

Lookout Points
May be located at interest nodes to take advantage of existing landscape features and view corridors.

Pedestrian Trail Network
May include a hierarchy of pathway networks such as passive walking/ cycle paths and steeper hike and bike/ fitness trails providing varying trail types for a

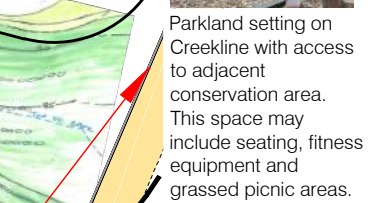
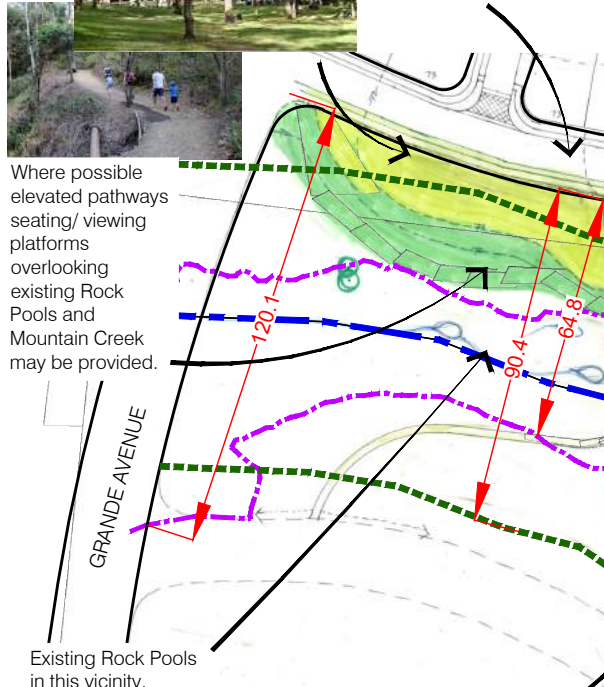
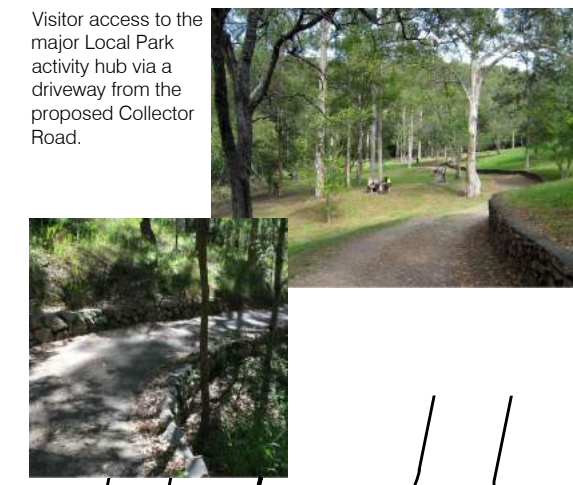
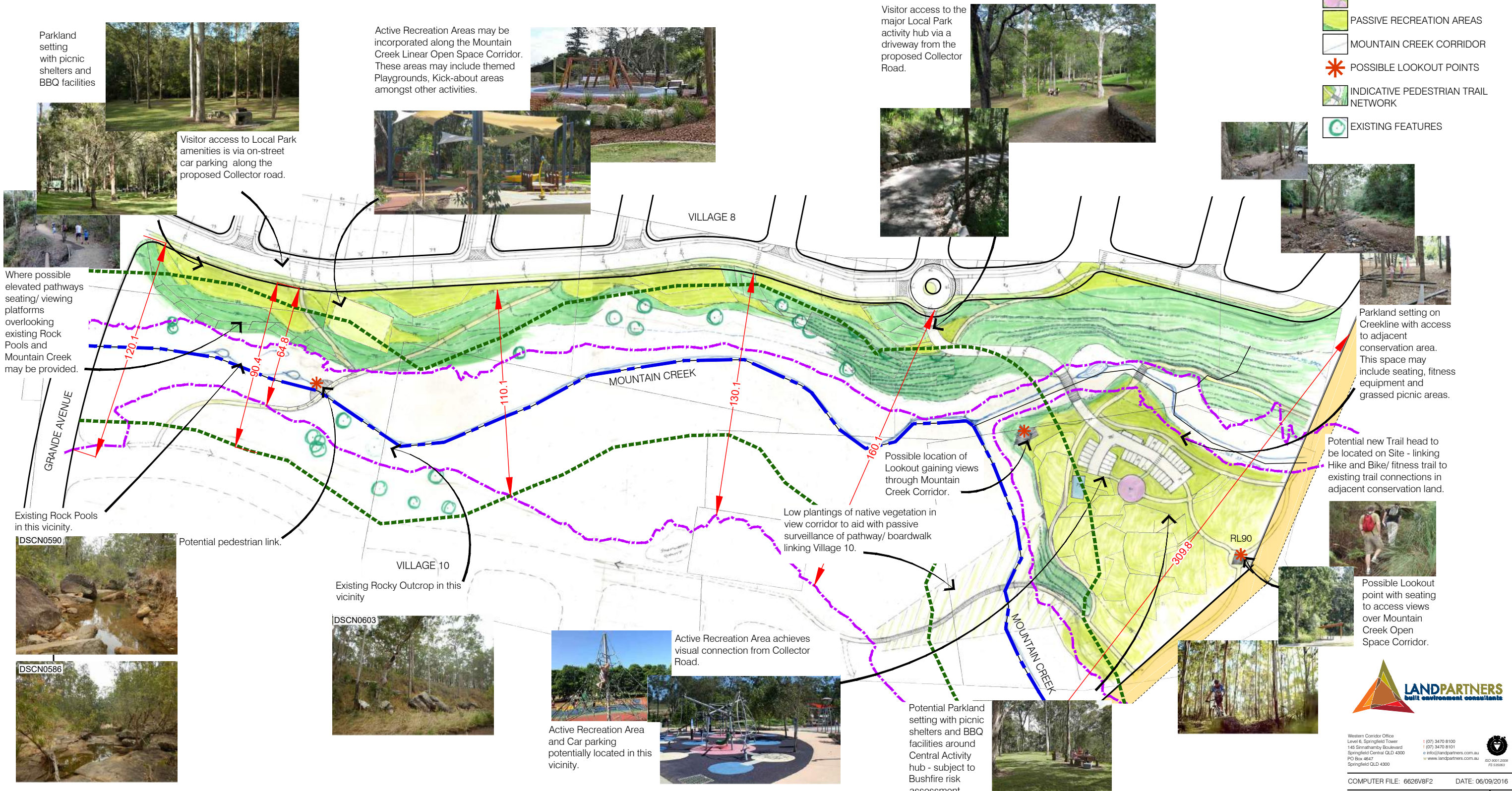
diverse range of users. Some pathways may be wider in order to provide access for maintenance/ emergency vehicles.

Existing Natural Features
These features have been located on site for potential retention for the enjoyment of residents and visitors to the area.



LEGEND

- 40m CREEKLINE OFFSET
- Q100 FLOODLINE
- MOUNTAIN CREEK INVERT
- ACTIVE RECREATION AREA
- PASSIVE RECREATION AREAS
- MOUNTAIN CREEK CORRIDOR
- POSSIBLE LOOKOUT POINTS
- INDICATIVE PEDESTRIAN TRAIL NETWORK
- EXISTING FEATURES



Western Corridor Office
Level 6, Springfield Tower
145 Springfield Boulevard
Springfield Central QLD 4300
PO Box 4647
Springfield QLD 4300

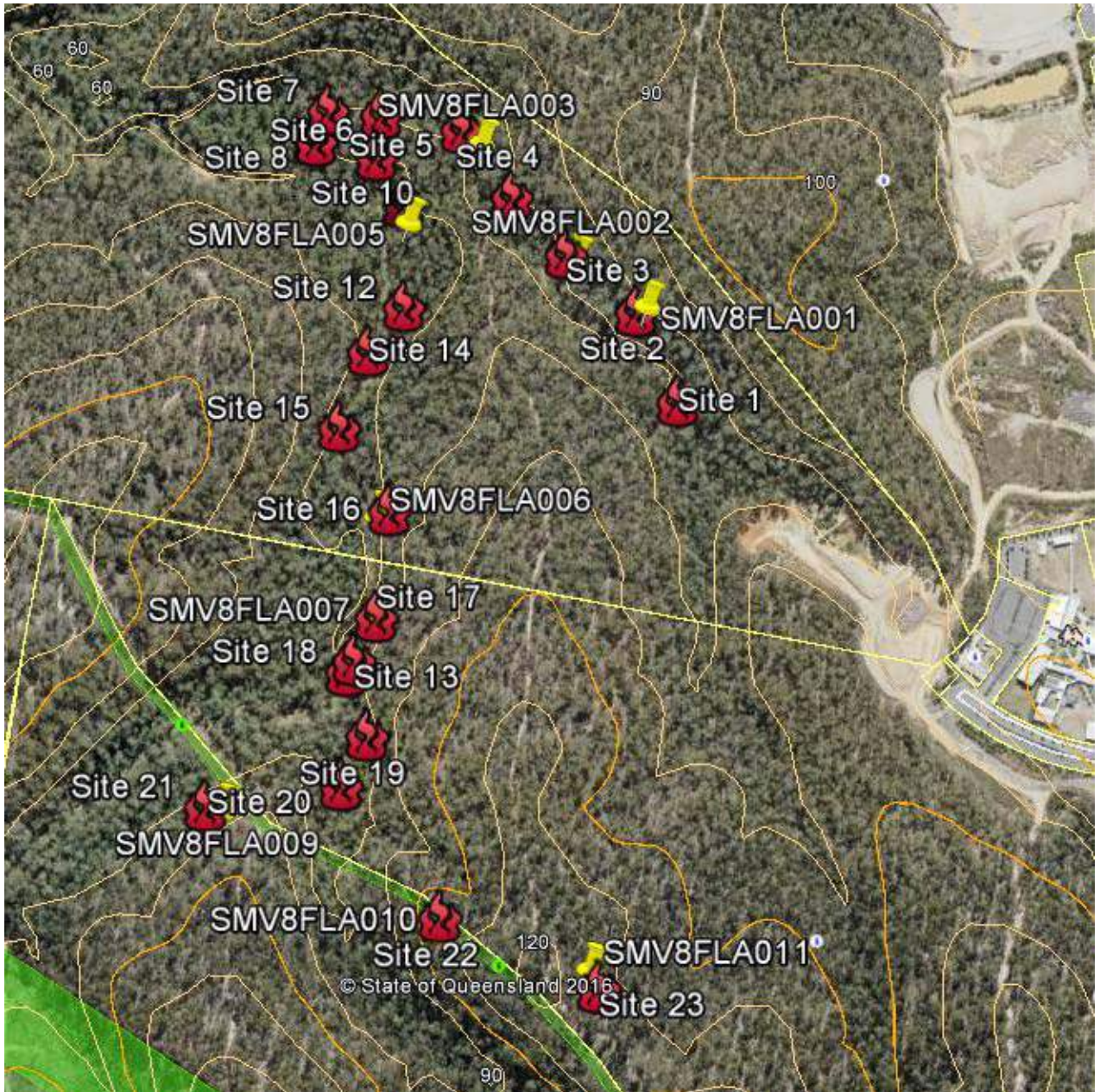
(07) 3470 8100
(07) 3470 8101
info@landpartners.com.au
www.landpartners.com.au
820 9001 2008
PIC 030093

COMPUTER FILE: 6626V8F2 DATE: 06/09/2016
PLAN NUMBER: WC006626.0V8-001 REV: C

NOTE: ALL DIMENSIONS AND AREAS ON THIS PLAN ARE SUBJECT TO SURVEY AND REQUIREMENTS FOR LODGEMENT OF SURVEY PLANS IN THE DEPARTMENT OF NATURAL RESOURCES AND MINES.

Bushfire Assessment Report

APPENDIX D
SITE BASED BUSHFIRE FUEL HAZARD
ASSESSMENT & SITE PHOTOGRAPHS



Site Locations

Site 1



Vegetation Type: Remnant RE12.9-10.17 - *Eucalyptus crebra* +/- *E. tereticornis*, *Corymbia tessellaris*, *Angophora* spp., *E. melanophloia* woodland on sedimentary rocks

Slope: < 5% (3 degrees)

Aspect: North-west

Fuel Hazard Assessment (Hines et al, 2010) – Not assessed

Bark Fuel:

Elevated Fuel:

Near Surface Fuel:

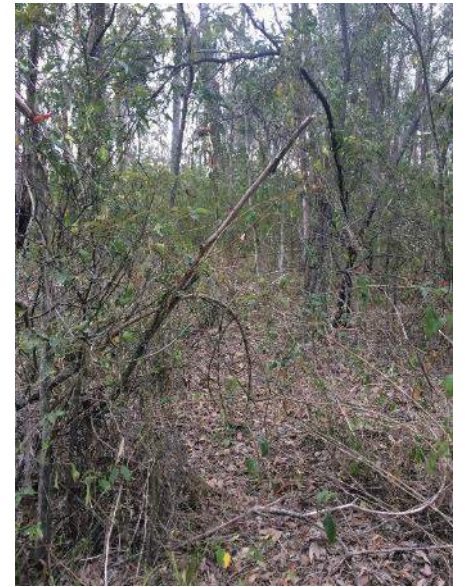
Surface Fuel:

Overall Fuel Hazard:

Indicative Fuel Load (t/Ha):

Notes: Mt Creek tributary ephemeral, Lantana infestation on both sides of creek line

Site 2 / FLA001



Vegetation Type: Remnant RE12.9-10.17 - *Eucalyptus crebra* +/- *E. tereticornis*, *Corymbia tessellaris*, *Angophora* spp., *E. melanophloia* woodland on sedimentary rocks

Slope: 22% (12 degrees)

Aspect: South-west

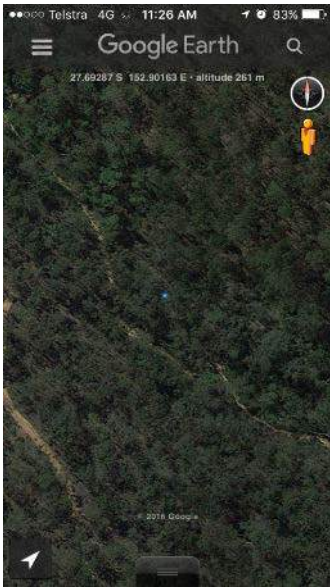
Fuel Hazard Assessment (Hines et al, 2010)

Bark Fuel: M
Elevated Fuel: M
Near Surface Fuel: M
Surface Fuel: M

Overall Fuel Hazard: Moderate

Indicative Fuel Load (t/ha): 8-16

Notes:



Vegetation Type: Remnant RE12.9-10.17 - *Eucalyptus crebra* +/- *E. tereticornis*, *Corymbia tessellaris*, *Angophora* spp., *E. melanophloia* woodland on sedimentary rocks

Slope: 17% (10 degrees)

Aspect: South-west

Fuel Hazard Assessment (Hines et al, 2010)

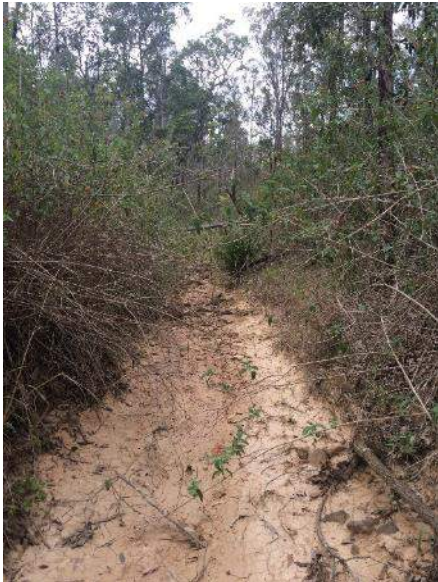
Bark Fuel: H
Elevated Fuel: L
Near Surface Fuel: E
Surface Fuel: M

Overall Fuel Hazard: High

Indicative Fuel Load (t/Ha): 12-21

Notes: *Lophostemon suaveolens* main contributor to bark hazard

Site 4



Vegetation Type: Remnant RE12.9-10.17 - *Eucalyptus crebra* +/- *E. tereticornis*, *Corymbia tessellaris*, *Angophora* spp., *E. melanophloia* woodland on sedimentary rocks

Slope: < 5% (3 degrees)

Aspect: North-west

Fuel Hazard Assessment (Hines et al, 2010) – At assessed

Bark Fuel:

Elevated Fuel:

Near Surface Fuel:

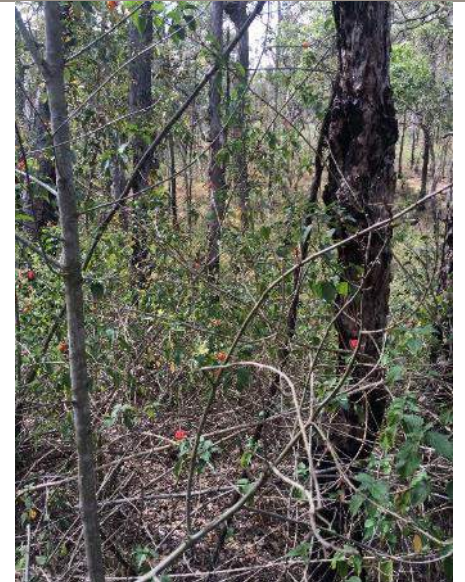
Surface Fuel:

Overall Fuel Hazard:

Indicative Fuel Load (t/Ha):

Notes: Dense thickets of Lantana either side of ephemeral creek channel.

Site 5 / FLA003



Vegetation Type: Remnant RE12.9-10.17 - *Eucalyptus crebra* +/- *E. tereticornis*, *Corymbia tessellaris*, *Angophora* spp., *E. melanophloia* woodland on sedimentary rocks

Slope: 20% (11 degrees)

Aspect: North-east

Fuel Hazard Assessment (Hines et al, 2010)

Bark Fuel: H
Elevated Fuel: M
Near Surface Fuel: H
Surface Fuel: M

Overall Fuel Hazard: High

Indicative Fuel Load (t/Ha): 10-18

Notes: Extensive Lantana infestation occupies downslope creek flats.



Vegetation Type: Remnant RE12.9-10.17 - *Eucalyptus crebra* +/- *E. tereticornis*, *Corymbia tessellaris*, *Angophora* spp., *E. melanophloia* woodland on sedimentary rocks

Slope: 20% (11 degrees)

Aspect: North-east

Fuel Hazard Assessment (Hines et al, 2010)

Bark Fuel:	M
Elevated Fuel:	H
Near Surface Fuel:	E
Surface Fuel:	M

Overall Fuel Hazard: Very High

Indicative Fuel Load (t/Ha): 13-22

Notes: Extensive Lantana infestation occupies downslope creek flats.



Vegetation Type: Remnant RE12.9-10.17 - *Eucalyptus crebra* +/- *E. tereticornis*, *Corymbia tessellaris*, *Angophora* spp., *E. melanophloia* woodland on sedimentary rocks

Slope: 15% (9 degrees)

Aspect: North-west

Fuel Hazard Assessment (Hines et al, 2010) – Not assessed

- Bark Fuel:
- Elevated Fuel:
- Near Surface Fuel:
- Surface Fuel:

Overall Fuel Hazard:

Indicative Fuel Load (t/Ha):

Notes:



Vegetation Type: Remnant RE12.9-10.17 - *Eucalyptus crebra* +/- *E. tereticornis*, *Corymbia tessellaris*, *Angophora* spp., *E. melanophloia* woodland on sedimentary rocks

Slope: 20% (11 degrees)

Aspect: South-west

Fuel Hazard Assessment (Hines et al, 2010) – Not assessed

Bark Fuel:

Elevated Fuel:

Near Surface Fuel:

Surface Fuel:

Overall Fuel Hazard:

Indicative Fuel Load (t/Ha):

Notes: Upslope of main channel of Mt Creek. Ephemeral waterway. Extensive Lantana infestation on western bank of Mountain Creek.



Vegetation Type: Remnant RE12.9-10.17 - *Eucalyptus crebra* +/- *E. tereticornis*, *Corymbia tessellaris*, *Angophora* spp., *E. melanophloia* woodland on sedimentary rocks

Slope: < 5% (3 degrees)

Aspect: North

Fuel Hazard Assessment (Hines et al, 2010) – Not assessed

Bark Fuel:

Elevated Fuel:

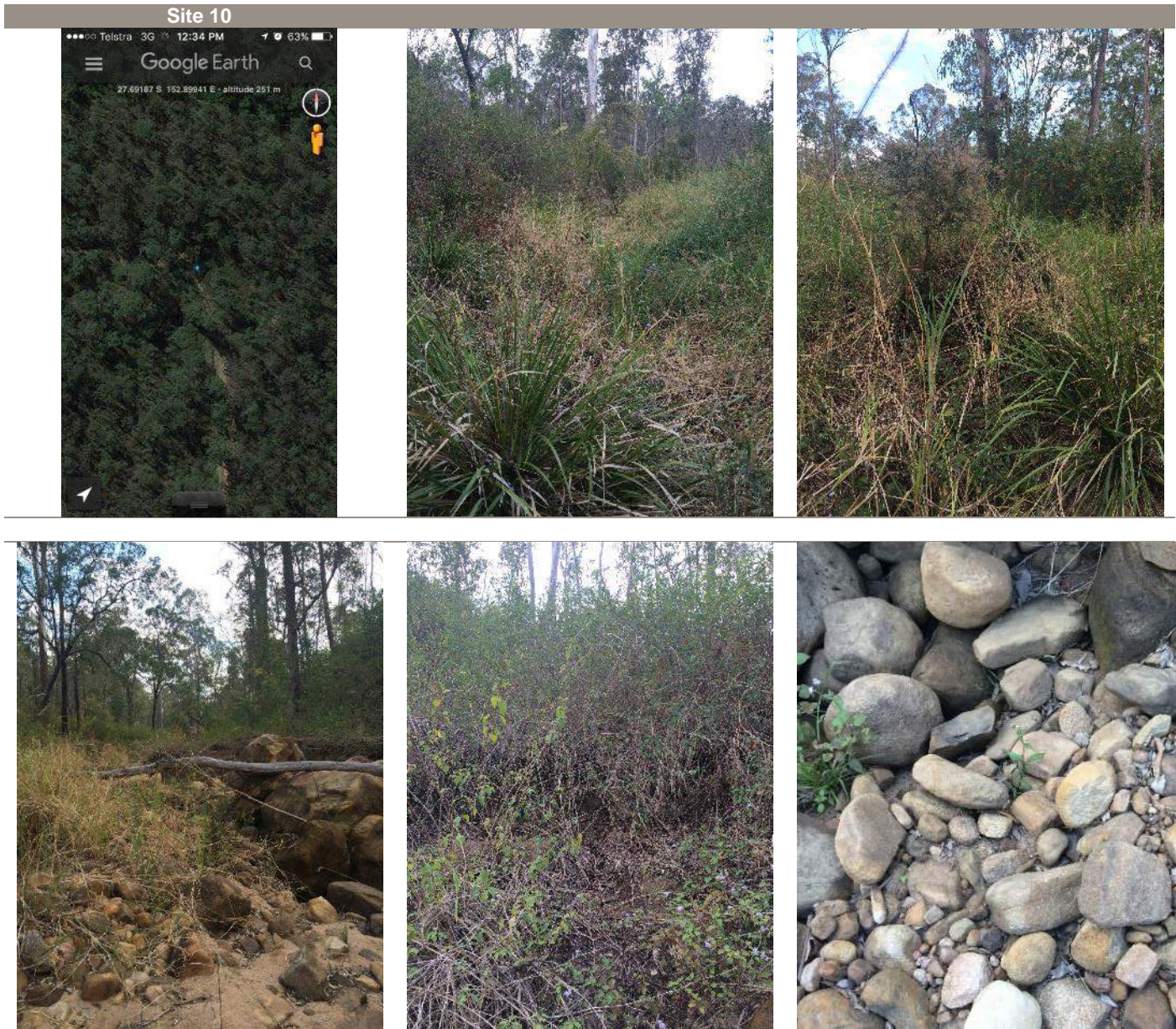
Near Surface Fuel:

Surface Fuel:

Overall Fuel Hazard:

Indicative Fuel Load (t/Ha):

Notes: Main channel of Mt Creek. Ephemeral waterway, some shallow pools. Extensive Lantana infestation on western bank of Mountain Creek.



Vegetation Type: Remnant RE12.9-10.17 - *Eucalyptus crebra* +/- *E. tereticornis*, *Corymbia tessellaris*, *Angophora* spp., *E. melanophloia* woodland on sedimentary rocks

Slope: < 5% (3 degrees)

Aspect: North

Fuel Hazard Assessment (Hines et al, 2010) – Not assessed

Bark Fuel:

Elevated Fuel:

Near Surface Fuel:

Surface Fuel:

Overall Fuel Hazard:

Indicative Fuel Load (t/Ha):

Notes: Main channel of Mt Creek. Ephemeral waterway, some shallow pools. Extensive Lantana infestation on western bank of Mountain Creek. Present but less extensive on eastern bank.

Site 11 / FLA005



Vegetation Type: Remnant RE12.9-10.17 - *Eucalyptus crebra* +/- *E. tereticornis*, *Corymbia tessellaris*, *Angophora* spp., *E. melanophloia* woodland on sedimentary rocks

Slope: 15% (9 degrees)

Aspect: West

Fuel Hazard Assessment (Hines et al, 2010)

Bark Fuel: M
Elevated Fuel: M
Near Surface Fuel: E
Surface Fuel: L

Overall Fuel Hazard: High

Indicative Fuel Load (t/Ha): 10-15

Notes: Extensive Lantana infestation occupies downslope creek flats.



Vegetation Type: Remnant RE12.9-10.17 - *Eucalyptus crebra* +/- *E. tereticornis*, *Corymbia tessellaris*, *Angophora* spp., *E. melanophloia* woodland on sedimentary rocks

Slope: 20% (11 degrees)

Aspect: West

Fuel Hazard Assessment (Hines et al, 2010) – Not assessed

Bark Fuel:

Elevated Fuel:

Near Surface Fuel:

Surface Fuel:

Overall Fuel Hazard:

Indicative Fuel Load (t/Ha):

Notes:

Site 13



Vegetation Type: Remnant RE12.9-10.17 - *Eucalyptus crebra* +/- *E. tereticornis*, *Corymbia tessellaris*, *Angophora* spp., *E. melanophloia* woodland on sedimentary rocks

Slope: 20% (11 degrees)

Aspect: West

Fuel Hazard Assessment (Hines et al, 2010) – Not assessed

Bark Fuel:

Elevated Fuel:

Near Surface Fuel:

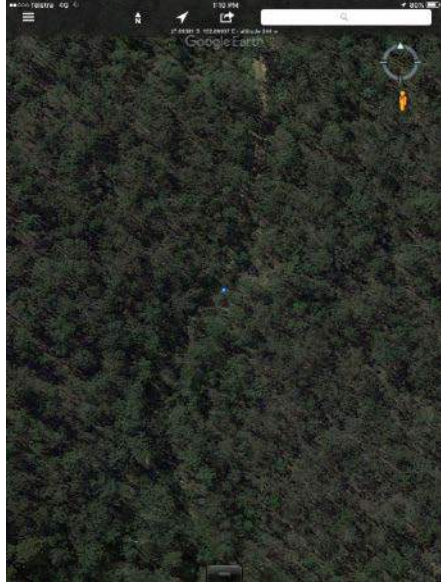
Surface Fuel:

Overall Fuel Hazard:

Indicative Fuel Load (t/Ha):

Notes: Adjacent to confluence of main channel and smaller tributary which creates the Open Space wedge in the south-west of Village 8. Extensive Lantana infestations on western creek bank.

Site 14



Vegetation Type: Remnant RE12.9-10.17 - *Eucalyptus crebra* +/- *E. tereticornis*, *Corymbia tessellaris*, *Angophora* spp., *E. melanophloia* woodland on sedimentary rocks

Slope: < 5% (3 degrees)

Aspect: North

Fuel Hazard Assessment (Hines et al, 2010) – Not assessed

Bark Fuel:

Elevated Fuel:

Near Surface Fuel:

Surface Fuel:

Overall Fuel Hazard:

Indicative Fuel Load (t/Ha):

Notes: Main channel of Mt Creek. Ephemeral waterway, some shallow pools. Extensive Lantana infestation on western bank of Mountain Creek. Present but less extensive on eastern bank.



Vegetation Type: Remnant RE12.9-10.17 - *Eucalyptus crebra* +/- *E. tereticornis*, *Corymbia tessellaris*, *Angophora* spp., *E. melanophloia* woodland on sedimentary rocks

Slope: < 5% (3 degrees)

Aspect: North

Fuel Hazard Assessment (Hines et al, 2010) – Not assessed

Bark Fuel:
 Elevated Fuel:
 Near Surface Fuel:
 Surface Fuel:

Overall Fuel Hazard:

Indicative Fuel Load (t/Ha):

Notes: Main channel of Mt Creek. Ephemeral waterway, some shallow pools. Extensive Lantana infestation on western bank of Mountain Creek. Present but less extensive on eastern bank.

Site 16 / FLA006



Vegetation Type: Remnant RE12.9-10.17 - *Eucalyptus crebra* +/- *E. tereticornis*, *Corymbia tessellaris*, *Angophora* spp., *E. melanophloia* woodland on sedimentary rocks

Slope: 32% (18 degrees)

Aspect: West

Fuel Hazard Assessment (Hines et al, 2010)

Bark Fuel: M
Elevated Fuel: L
Near Surface Fuel: E
Surface Fuel: L

Overall Fuel Hazard: High

Indicative Fuel Load (t/Ha): 9-14

Notes:

Site 17 / FLA007



Vegetation Type: Remnant RE12.9-10.17 - *Eucalyptus crebra* +/- *E. tereticornis*, *Corymbia tessellaris*, *Angophora* spp., *E. melanophloia* woodland on sedimentary rocks

Slope: 23% (13 degrees)

Aspect: West

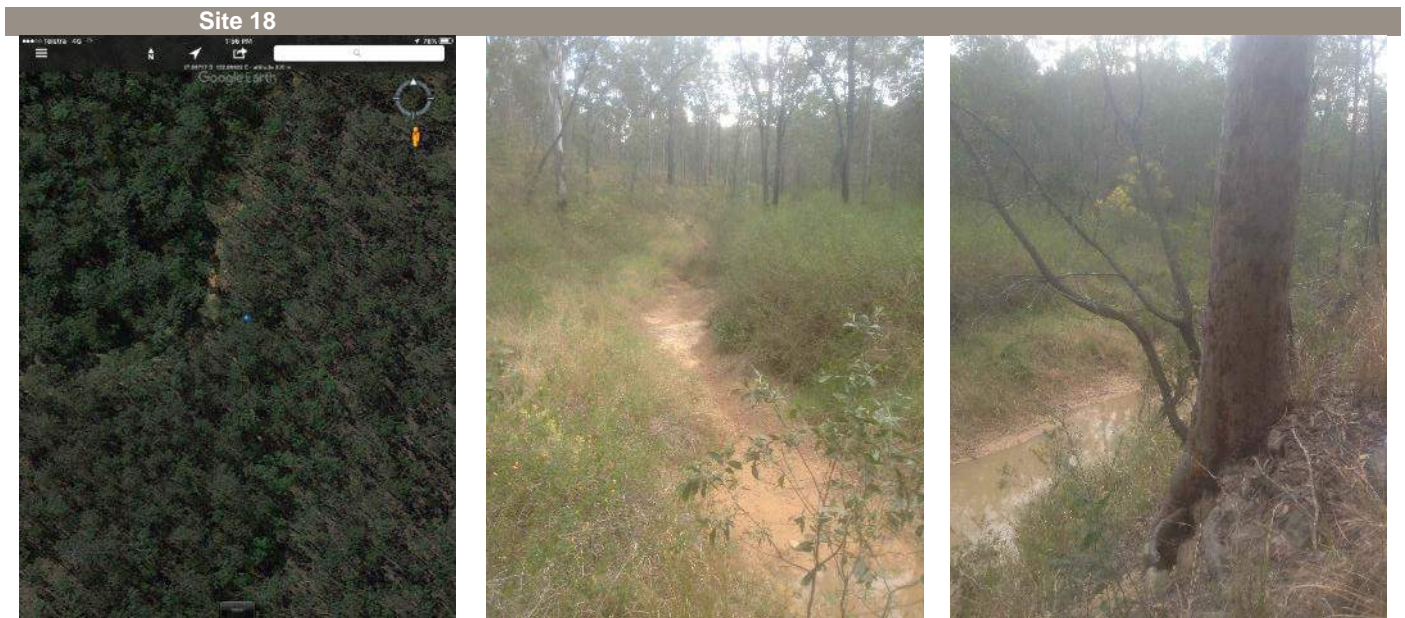
Fuel Hazard Assessment (Hines et al, 2010)

Bark Fuel: M
Elevated Fuel: L
Near Surface Fuel: E
Surface Fuel: L

Overall Fuel Hazard: High

Indicative Fuel Load (t/Ha): 9-14

Notes: Lantana infestation in downslope creek channel



Vegetation Type: Remnant RE12.9-10.17 - *Eucalyptus crebra* +/- *E. tereticornis*, *Corymbia tessellaris*, *Angophora* spp., *E. melanophloia* woodland on sedimentary rocks

Slope: 33% (18 degrees)

Aspect: West

Fuel Hazard Assessment (Hines et al, 2010) – Not assessed

Bark Fuel:

Elevated Fuel:

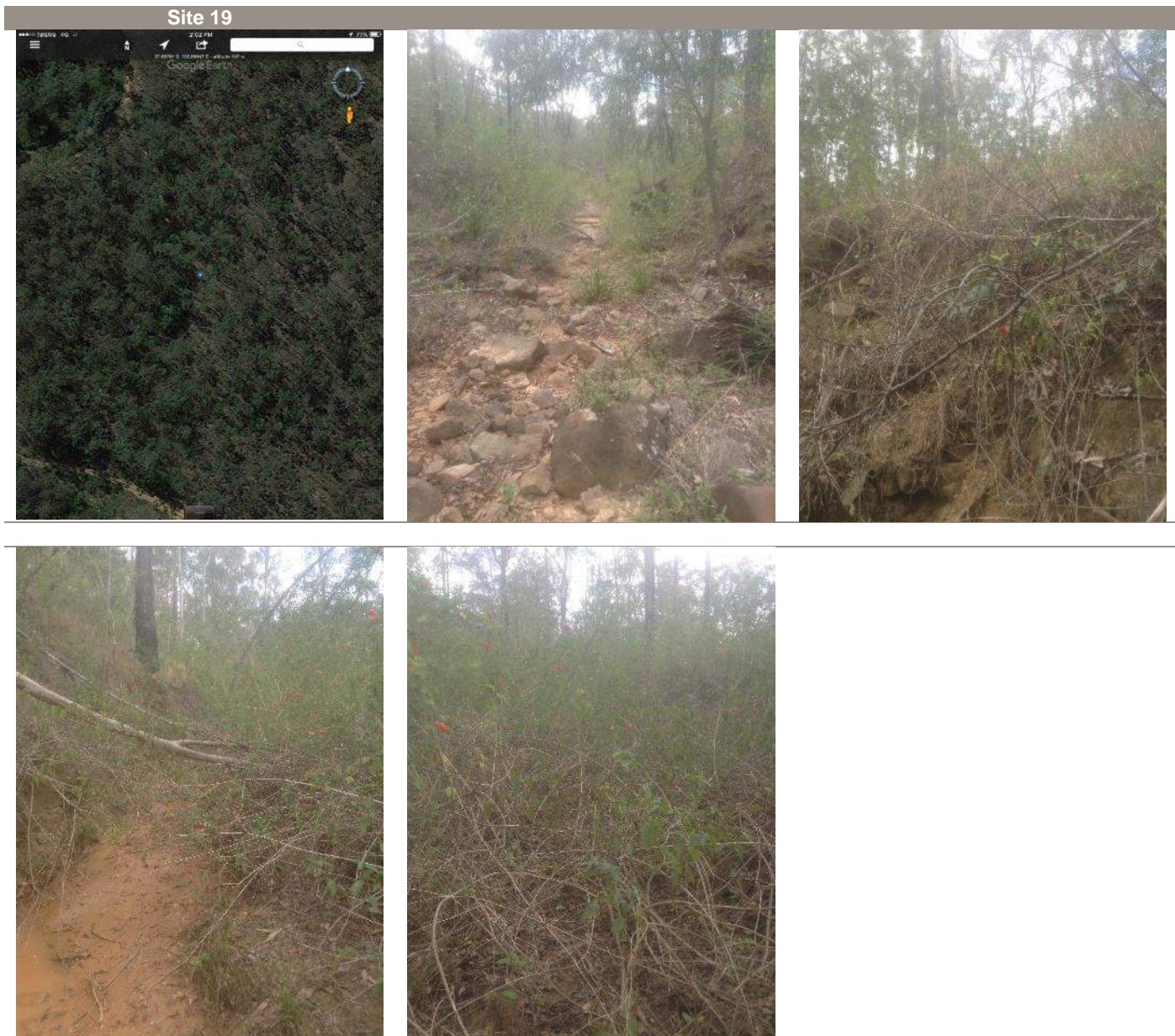
Near Surface Fuel:

Surface Fuel:

Overall Fuel Hazard:

Indicative Fuel Load (t/Ha):

Notes: Adjacent to confluence of main channel and smaller tributary which creates the Open Space wedge in the south-west of Village 8. Extensive Lantana infestations on western creek bank.



Vegetation Type: Remnant RE12.9-10.17 - *Eucalyptus crebra* +/- *E. tereticornis*, *Corymbia tessellaris*, *Angophora* spp., *E. melanophloia* woodland on sedimentary rocks

Slope: < 5% (3 degrees)

Aspect: West

Fuel Hazard Assessment (Hines et al, 2010) – Not assessed

Bark Fuel:

Elevated Fuel:

Near Surface Fuel:

Surface Fuel:

Overall Fuel Hazard:

Indicative Fuel Load (t/Ha):

Notes: Within the small tributary channel to the east of the Open Space wedge in the south-west of Village 8. Extensive *Lantana* infestations on both creek banks extending across the channel.



Vegetation Type: Remnant RE12.9-10.17 - *Eucalyptus crebra* +/- *E. tereticornis*, *Corymbia tessellaris*, *Angophora* spp., *E. melanophloia* woodland on sedimentary rocks

Slope: < 5% (3 degrees)

Aspect: -

Fuel Hazard Assessment (Hines et al, 2010)

Bark Fuel:	M
Elevated Fuel:	H
Near Surface Fuel:	VH
Surface Fuel:	M

Overall Fuel Hazard: Very High

Indicative Fuel Load (t/Ha): 11-20

Notes: Located on creek terrace. 50m north of southern site boundary. Adjacent Conservation Area located upslope.

Site 21 / FLA009



Vegetation Type: Remnant RE12.9-10.19a: *Corymbia henryi* +/- *Eucalyptus fibrosa* subsp. *fibrosa*, *Corymbia citriodora* subsp. *variegata*, *E. siderophloia*, *E. crebra* open forest. Occurs in coastal areas on Cainozoic and Mesozoic sediments.

Slope: 16% (9 degrees)

Aspect: North-west

Fuel Hazard Assessment (Hines et al, 2010)

Bark Fuel:	H
Elevated Fuel:	L
Near Surface Fuel:	H
Surface Fuel:	L

Overall Fuel Hazard: Moderate

Indicative Fuel Load (t/Ha): 7-11

Notes: Located in adjacent upslope Conservation Area.



Vegetation Type: Remnant RE12.9-10.19a: *Corymbia henryi* +/- *Eucalyptus fibrosa* subsp. *fibrosa*, *Corymbia citriodora* subsp. *variegata*, *E. siderophloia*, *E. crebra* open forest. Occurs in coastal areas on Cainozoic and Mesozoic sediments.

Slope: 32% (18 degrees)

Aspect: South-west

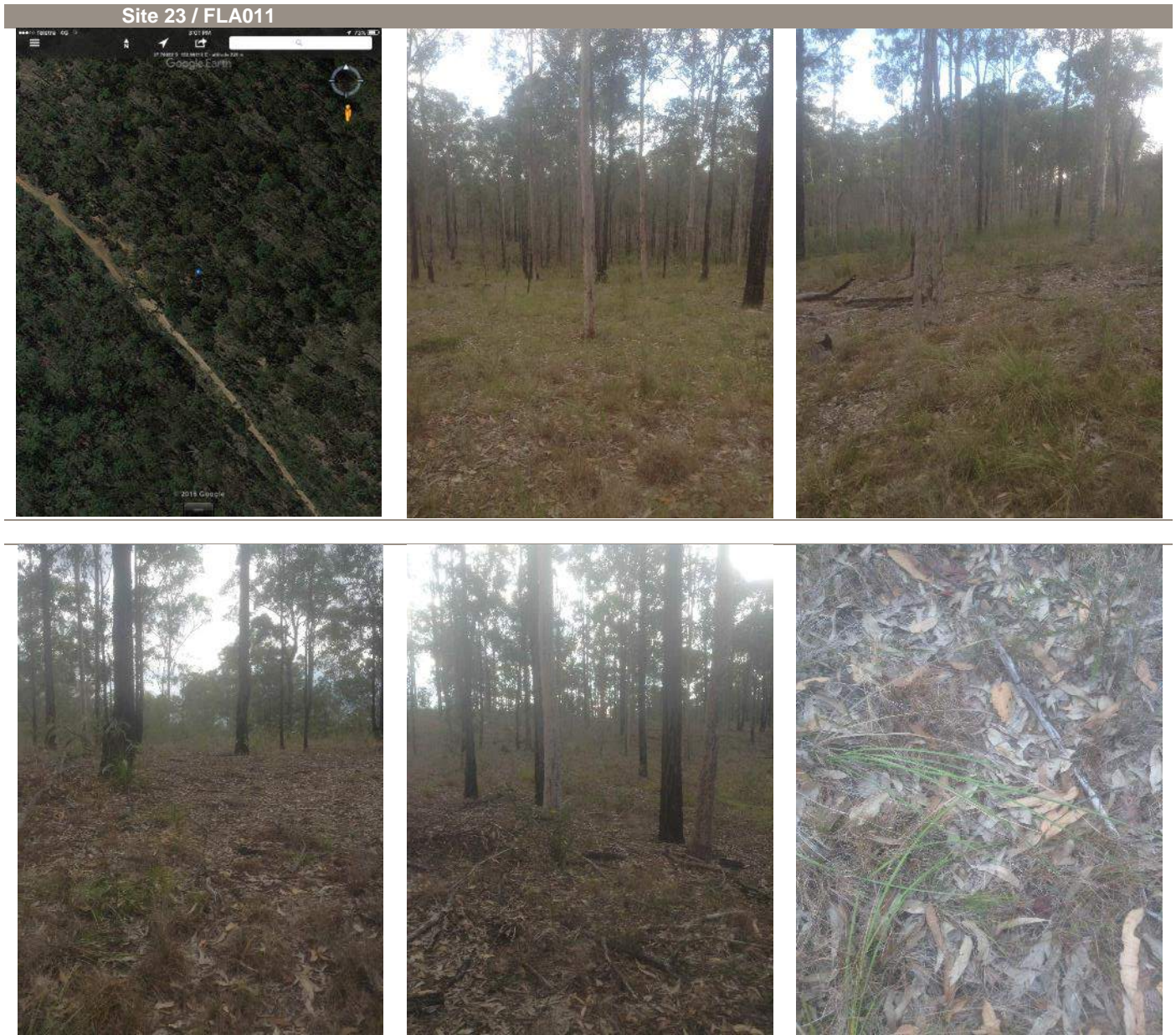
Fuel Hazard Assessment (Hines et al, 2010)

Bark Fuel:	M
Elevated Fuel:	L
Near Surface Fuel:	VH
Surface Fuel:	M

Overall Fuel Hazard: High

Indicative Fuel Load (t/Ha): 9-18

Notes: Located in adjacent upslope Conservation Area.



Vegetation Type: Remnant RE12.9-10.19a: *Corymbia henryi* +/- *Eucalyptus fibrosa* subsp. *fibrosa*, *Corymbia citriodora* subsp. *variegata*, *E. siderophloia*, *E. crebra* open forest. Occurs in coastal areas on Cainozoic and Mesozoic sediments.

Slope: 13% (8 degrees)

Aspect: North-east

Fuel Hazard Assessment (Hines et al, 2010)

Bark Fuel:	M
Elevated Fuel:	L
Near Surface Fuel:	VH
Surface Fuel:	M

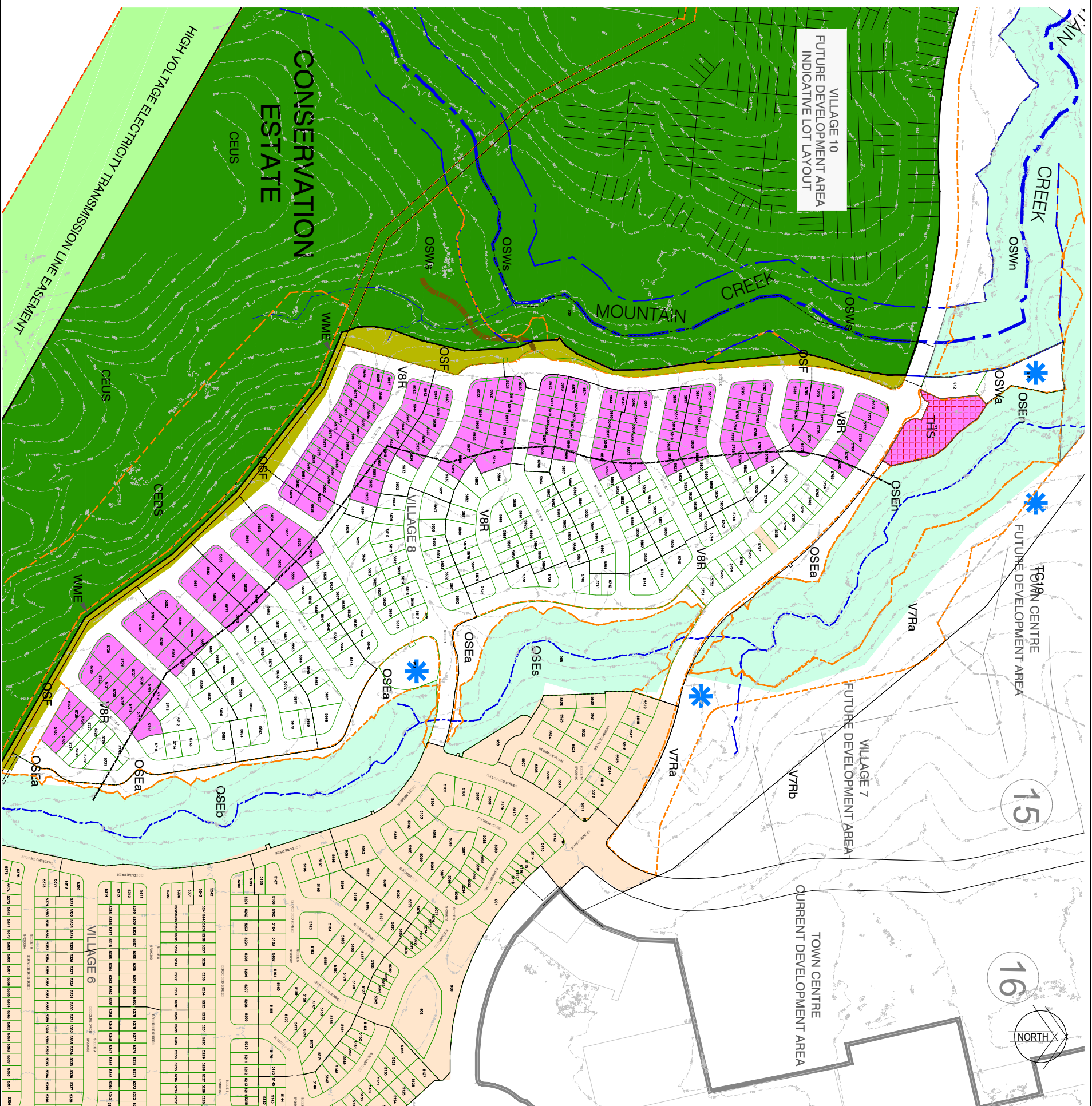
Overall Fuel Hazard: High

Indicative Fuel Load (t/Ha): 9-18

Notes: Located within Village 8 development urban lot area. Open nature of vegetation suggestive of relatively high fire frequency.

Bushfire Assessment Report

APPENDIX E
SPRING MOUNTAIN VILLAGE 8 ADP –
BUSHFIRE PRONE AREA PLAN



LEGEND

- Lots located within 100m of bushfire prone vegetation and subject to AS9399 (2009)
- BUSHFIRE PRONE VEGETATION**
- Vegetation Hazard Classes (VHC) adopted from Table 1 of the Natural Hazards, Risk and Resilience - Technical Manual - A 'fit for purpose' approach in undertaking natural hazard studies and risk assessments (DLGP, April 2016).**
- VHC - 9.1 : Moist to dry eucalypt open forest on coastal plains and lowlands - Fuel Load 24.1 tonnes per hectare. Encompasses areas of existing open forest to be retained, cleared areas where open forest rehabilitation works is to occur, and landscaped open space areas comprised of mulched beds, ground covers, shrubs and trees.
- VHC - 9.3 : Shrubland within moist to dry eucalypt open forest on coastal plains and lowlands - Fuel Load 12.7 tonnes per hectare. Encompasses areas that will be cleared during the bulk-earthenworks program and which are to be landscaped using a mixture of native prostrated ground covers and low growing shrubs less than 0.5m in height.
- Low hazard - managed open space, roadways and residential lots
- Low hazard - narrow (< 100m) creekline open space corridor
- Low hazard - areas cleared to facilitate approved urban development
- 5925 Lot number
- Internal lot front boundary 3m building setback
- Town House (Lot 911) - detailed bushfire hazard assessment required
- Creek Centreline
- Creek Centreline 40m setback
- Contour 5 m intervals
- OSEb Bushfire Assessment Units (BAU) - refer to Table 3-5 of the Bushfire Assessment Report for further details concerning assessed bushfire intensity potential in each BAU.



Rev.	Date	Description	Des.	Verif.	Appr.

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Cardno
Shaping the Future
Cardno (Qld) Pty Ltd ABN 57 051 074 992
Level 11, 515 St Pauls Terrace
Ferntree Gully, QLD 4005
Tel: 07 3389 9922 Fax: 07 3389 9722
Web: www.cardno.com.au

Date	30/05/2017	Client	Lend Lease Communities Pty Ltd	Status	PRELIMINARY
Drawn		Project	Spring Mountain Village 8 ADP	NOT TO BE USED FOR CONSTRUCTION PURPOSES	
Checked		Date		Scale	1:2,500
Date		Date		Size	A1
Verified		Date		Revision	1
Approved		Title	Bushfire Prone Area Plan	Drawing Number	510247-044-BAR001

Bushfire Assessment Report

APPENDIX F
QFES BUSHFIRE SURVIVAL PLAN
GUIDELINE

Bushfire Survival Plan

PREPARE. ACT. SURVIVE.





You must **PREPARE** . **ACT** . **SURVIVE** .

Your main priority is to ensure that you and your family are safe. During a bushfire, you and your family's survival and safety depend on your preparations, and the decisions you make.

The lives of you and your family are more important than any building.

Whether your plan is to leave early or stay, you must prepare your home and property to increase their levels of resilience and your chances of survival.

Bushfires in Queensland

The fire season in Queensland normally commences in the far north of the state in July and progresses through to southern areas as spring approaches. The fire season can extend through to February in southern and far south-western Queensland. These time frames can vary significantly from year to year, depending on the fuel loads, long-term climate, and short-term weather conditions in each area.

There are four key considerations for dealing with bushfire:

- The safety of you and your family.
- The resilience of your property.
- The protection of irreplaceable valuables and important documents.
- The maintenance of adequate levels of insurance.

This document will provide you with information about the things you need to consider to prepare yourself and your home for the bushfire season, and how to make your own personal Bushfire Survival Plan.

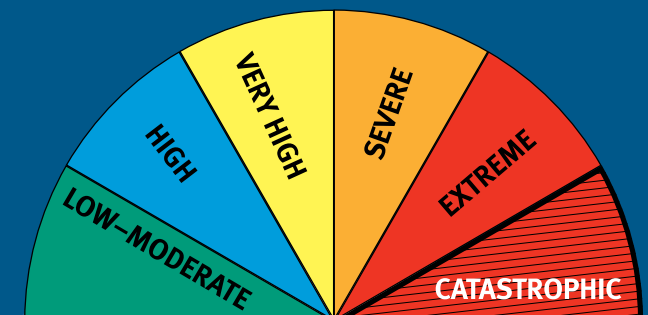
It is your responsibility to prepare yourself, your family and your home for the threat of bushfire.

Understand your risk

The first step in planning to survive a bushfire is to understand your own level of risk. By understanding your own level of risk, you will be able to make informed decisions that are right for you and your family. Included with this Bushfire Survival Plan is a self-assessment tool that will enable you to gauge the risk level associated with your property. If you are still unsure of your level of risk or require assistance, contact your local fire station for more information. To book a Bushfire Safety presentation, call 13 QGOV (13 74 68).

Fire danger ratings

The increased frequency of extreme bushfires in Australia in the last 10 years and the recent experience of the Black Saturday fires in Victoria have encouraged fire services throughout Australia to introduce new levels of Fire Danger Rating (FDR). A lift-out chart of the FDR system is contained within this document. Display it in a prominent place in your home, or keep it with your Bushfire Survival Plan.



Catastrophic fire danger rating

The highest level is catastrophic. On a day of catastrophic FDR, leaving early is the only option to ensure your survival. You must relocate early to a safer location hours before a fire approaches, or even the day before. Under no circumstances will it be safe to stay with your property.

Extreme fire danger rating

The second highest level is extreme. Should a fire occur in your area on a day of extreme FDR, leaving early will always be the only option. Staying can only be considered for homes that:

- Have been designed and constructed specifically to address the threat of bushfire.
- Have been maintained to those levels and are currently well prepared.
- Can be actively defended by people with the skills, knowledge and confidence to implement a well-rehearsed Bushfire Survival Plan.

On days of catastrophic or extreme FDR:

- Fires are likely to be uncontrollable, unpredictable and very fast moving, with highly aggressive flames extending high above tree tops and buildings.
- Thousands of embers may be violently blown into and around homes causing other fires to start rapidly and spread quickly up to 20 kilometres ahead of the main fire.
- Fire can threaten suddenly, without warning, and the heat and wind will make it difficult to see, hear and breathe as the fire approaches.
- People in the path of such fires will almost certainly be injured or die, and a significant number of homes and businesses will be destroyed or damaged.
- Even well-prepared and constructed homes will not be safe.
- Expect power, water and phone networks to fail as severe winds well ahead of the fire will bring down trees and power lines, and blow roofs off buildings.

It is vital that you understand that, on these days, your survival will depend solely on how well you have prepared and how decisively you act.

**Leaving late can be
a deadly option.
If you are in any doubt,
make the decision to
LEAVE EARLY.**

What will you do?

At all times you need to **PREPARE.ACT.SURVIVE.**

When the fire danger rating is 'catastrophic', leaving early is the safest option.

When the fire danger rating is lower than 'catastrophic', one of the most important decisions you need to make is whether you will leave early or stay with a well-prepared property. This decision is the basis of your Bushfire Survival Plan.

The following questions may help you make the right decision about whether you leave early or stay:

- Do you need to consider family members who are young, elderly or infirm?
- Are you physically and emotionally prepared to stay with your property?
- Do you have the knowledge, skills, and confidence to stay with your property?
- Is your home adequately constructed, maintained, and prepared to withstand the impact of a fire? In other words, is your home prepared to withstand the impact of a bushfire?
- Do you have well-maintained resources and equipment to fight fire, and do you know how to use them?
- Do you have appropriate protective clothing to fight a fire?
- What will you do if a rapid onset fire gives you no time to leave? Where will you shelter?
-



Leave early

If you plan to leave early, then you must leave your home well before a bushfire threatens and travelling by road becomes hazardous. Your leave-early preparations include:

Step 1: Preparation – your property should be well prepared for bushfire, even if you intend to leave early.

Step 2: What you will do? Make your Bushfire Survival Plan in accordance with your decision to leave early.

Step 3: Make a contingency plan – the FDR, the preparedness of your home, a change in household circumstances, a change in your physical preparedness or unexpected visitors are some things that may require you to reconsider your Bushfire Survival Plan.

Planning to stay

Planning is critical to successfully staying with your home, as it may involve the risk of psychological trauma, injury or death.

Step 1: Preparation – your property must be able to withstand the impact of bushfire and be prepared well enough to shelter you and your family.

Step 2: What you will do? Make your Bushfire Survival Plan in accordance with your decision to stay.

Step 3: Make a contingency plan – the FDR, the preparedness of your home, a change in household circumstances, a change in your physical preparedness or unexpected visitors are some things that may require you to reconsider your Bushfire Survival Plan.

In making your decision to stay, there are a few things you need to consider:

- Is your property able to withstand the impact of a bushfire?
- Are you physically and emotionally prepared to stay with your property?
- Do you have well-maintained resources and equipment, and do you know how to use them?
- Do you have appropriate protective clothing?
- Will your bushfire survival plan need to be different for weekdays, weekends or if someone is sick at home?
- Do you have a contingency plan?

Preparing your Bushfire Survival Plan

Preparation is the key to survival. Being involved in a fire will be one of the most traumatic experiences of your life.

- Prepare yourself – you need to be both mentally and physically prepared to carry out your Bushfire Survival Plan.
- Prepare your Bushfire Survival Plan.
- Prepare your Bushfire Emergency Kit.
- Prepare your Bushfire Evacuation Kit.
- Prepare your property.

When writing your plan, you need to consider:

- Have you made the right choice – to leave early or stay?
- Have you discussed your choice with your family, friends and neighbours?
- Who will take charge and lead other family members by carefully communicating the various tasks set out in the plan?
- If you have chosen to stay, what will you do to protect your property when the fire arrives?
- What will you put in your Bushfire Emergency Kit and where will you store it?
- Do your friends, family and neighbours know the details of your plan?

- What will you do if your Bushfire Survival Plan fails?
- Do you have an alternative option or contingency plan if your plan fails?
- Do you have a Neighbourhood Safer Place (NSP) you can go to as a last resort? For more information on NSPs, see www.ruralfire.qld.gov.au.
- Is it safe to travel there?

If your decision is to leave early, you must include the following information or action items in your Bushfire Survival Plan:

- Monitor media outlets – radio, TV, mobile phone and internet for bushfire alerts.
- When will you leave?
- What will be your trigger for action?
- Will your plan be different for weekdays, weekends, or if someone is at home sick or injured?
- What will you take with you (Evacuation Kit)?
- Where will you and your family go when you leave early?
- What route will you take to get there?
- What will you do with your pets?
- What will you do if there are consecutive or multiple ‘catastrophic’ or extreme fire danger days?
- Will you go to work on days when the FDR is in the upper levels?
- Will you send your children to school when the FDR is in the upper levels?
- Will all members of your household leave early?
- What will you do to prepare your property?
- What is your contingency plan in the event that it is unsafe to leave?

If your decision is to stay, you must include the following information or actions items in your Bushfire Survival Plan:

- Monitor media outlets – radio, TV, mobile phone and internet.
- Locate your Bushfire Emergency Kit.
- Put on protective clothing.
- Remain hydrated by drinking lots of water.

- Move any stock to fully grazed paddocks.
- Move cars to a safe location.
- Remove garden furniture, doormats, and other items.
- Close windows and doors and shut blinds.
- Take down curtains and move furniture away from windows.
- Seal gaps under doors and window screens with wet towels.
- Place pets inside, restrain them, and provide water.
- Block downpipes and fill gutters with water.
- Wet down the sides of buildings facing the approaching fire front.
- Wet down decks and verandas.
- Wet down fine fuels close to buildings.
- Turn on garden sprinklers before the bushfire arrives.
- Fill containers with water – bath, sinks, buckets, wheelie bins, etc.
- Have ladders ready to access inside roof spaces, and against the roof on the outside.
- Have a generator or petrol pump ready.
- Start patrolling outside to check for embers.

When the fire front arrives:

- Take all fire-fighting equipment, such as hoses and pumps, inside – these may melt during the fire.
- Go inside and shelter away from the fire front.
- Patrol the inside of your home, including the ceiling space, for embers or small fires that may start.
- Drink lots of water.
- Check family and pets.

After the fire front has passed:

- Wear protective equipment.
- Go outside once it is safe.
- Check for small spot fires and burning embers:
 - inside roof space
 - under floor boards
 - under house space

- on veranda and decks
 - on window ledges and door sills
 - in roof lines and gutters
 - garden beds and mulch
 - wood heaps
 - outdoor furniture
 - sheds and carports.
- Continue to drink lots of water.
 - Stay at your property until the surrounding area is clear of fire.
 - Monitor media outlets – radio, TV, mobile phone and internet.

You need to be both mentally and physically prepared to carry out your Bushfire Survival Plan.

There may be other actions to include, depending on your individual property and the level of bushfire risk you are exposed to.

Include the whole family in creating your Bushfire Survival Plan. You and your family should be aware of the actions you will take at the various FDR levels. and it is important to ensure this is incorporated into your Bushfire Survival Plan. The FDR for your area can be found on roadside signs and by visiting www.ruralfire.qld.gov.au and following the FDR link.

It is important that your Bushfire Survival Plan does not rely solely on receiving an alert.

Once you have completed your Bushfire Survival Plan, practise it regularly to ensure everyone involved knows exactly what to do in the event of a fire.

Preparing your Bushfire Emergency Kit

It is essential that you have a Bushfire Emergency Kit if your choice is to stay with your property. This kit will ensure you and your family have the important equipment you need to stay. For a comprehensive list of equipment needed in a Bushfire Emergency Kit see page 14.

Preparing your Bushfire Evacuation Kit

It is equally important to have a Evacuation Kit if your choice is to leave early. This kit will ensure you and your family have important items and equipment required to relocate for the time needed. For a comprehensive list of items and equipment needed in a Bushfire Evacuation Kit see page 15.

Making a contingency plan

No matter whether your decision is to leave early, well before a bush fire threatens, or to stay, you should still have a contingency plan as part of your Bushfire Survival Plan. There are many scenarios to consider, such as: what you will do if a rapid onset fire starts in your local area, making roads impassable or travel particularly dangerous? You should have other options if road travel is not safe.

- Is your house well prepared?
- Can it provide you with protection from radiant heat?
- Have you identified a safer location, such as an NSP?

Sheltering in a well-prepared property is far safer than being out in the open or in a vehicle.

Preparing your property

An unprepared property is not only at risk itself, but may also present an increased danger for your neighbours and their homes.

Planning is absolutely critical to safely staying with your home. Staying home involves the risk of psychological trauma, injury and death.

There are a number of measures you can take to prepare your home and property for bushfire. These include annual preparations you must take before the bushfire season.

Your pre-season property preparations should include:

- Displaying a prominent house number.
- Ensuring there is adequate access to your property for fire trucks – 4 metres wide by 4 metres high with a turn-around area. Reduce vegetation loads along the access path.
- Mowing your grass regularly.
- Removing excess ground fuels and combustible material (long dry grass, dead leaves and branches).
- Clearing leaves, twigs, bark and other debris from the roof and gutters.
- Purchasing and testing the effectiveness of gutter plugs.
- Trimming low-lying branches 2 metres from the ground surrounding your home.
- Enclosing open areas under your decks and floors.
- Installing fine steel wire mesh screens on all windows, doors, vents and weep holes.
- Pointing LPG cylinder relief valves away from the house.
- Conducting maintenance checks on pumps, generators and water systems.
- Checking that you have sufficient personal protective clothing and equipment.
- Relocating flammable items away from your home, including woodpiles, paper, boxes, crates, hanging baskets and garden furniture.
- Sealing all gaps in external roof and wall cladding.
- Checking that the first-aid kit is fully stocked.

Bushfire Alerts

If you receive an emergency warning about a bushfire or other emergency, take notice – it could save your life.

There are three types of alert messages to help you make the right safety choices:

Bushfire Advice Message – a fire has started – general information to keep you up to date.

Bushfire Watch and Act Message – represents a heightened level of threat. Conditions are changing, a fire is approaching; lives may come under threat. Take appropriate action.

Bushfire Emergency Warning – is the highest level message advising of impending danger. It may be preceded with the Standard Emergency Warning Signal (SEWS).

An Emergency Warning means there is a threat to lives, and protective action is required immediately.

When a bushfire strikes

You have made your decision to **PREPARE.ACT.SURVIVE**. You have prepared your property before the fire season. You have made your Bushfire Survival Plan. You have practised your Bushfire Survival Plan.

A bushfire is threatening. What do you do?

- Know the FDR for any given day.
- Regularly check the FDR on the Rural Fire Services website at www.ruralfire.qld.gov.au.
- Monitor your media outlets for warnings on bushfire activity.
- Seek out information if you have to, and do not assume that you will receive a warning.
- Leave early or stay according to your Bushfire Survival Plan.
- Act decisively in accordance with your Bushfire Survival Plan.
- Do not adopt the 'wait-and-see' option.

Travelling in your vehicle near a bushfire

Sheltering inside a vehicle is a high-risk strategy that can result in death. While sheltering inside a vehicle offers you a slightly higher chance of survival than being caught in the open, having a leave-early or stay strategy is a much safer option.

You should never take a journey into areas where the fire danger is catastrophic or extreme. You should consider postponing or finding alternative routes if necessary. If you can smell or see smoke in the distance, it is best to U-turn and drive away from the danger.

If you are caught in smoke or flames while on the road:

- Turn on the vehicle's headlights and hazard warning lights.
- If you need to shelter in your vehicle, drive your car into a bare, clear area well away from surrounding trees, leaving lights on. Position the vehicle to prevent a side impact from an advancing fire front.
- Close all windows and vents.
- Leave the engine running and turn off the air conditioning system.

- Cover your entire body with woollen or cotton blankets to protect you from radiant heat.
- Take shelter below the window level.
- Drink water frequently, and stay in the vehicle until the fire front has passed.
- Once the fire front has passed, exit the vehicle to inspect the damage and ensure other passengers are safe.

Neighbourhood Safer Places

A Neighbourhood Safer Place (NSP) is a place of last resort for people during a bushfire. An NSP may form part of a back-up plan when:

- Your Bushfire Survival Plan has failed.
- Your plan was to stay, but the extent of the fire means that your home cannot withstand the impact of the fire and, therefore, your home is not a safe place to shelter.
- The fire has escalated to an extreme or catastrophic level and relocation is the safest option.

An NSP is an identified building or open space within the community that can provide a level of protection from the immediate life-threatening effects of a bushfire. NSPs still entail some risk, both in moving to them and while sheltering in them; they cannot be considered completely safe.

They are a place of *last resort* in bushfire emergencies only. The following limitations of NSPs need to be considered within your Bushfire Survival Plan:

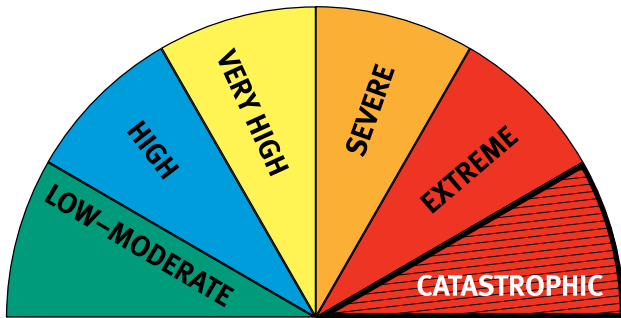
- NSPs do not cater for pets.
- Firefighters may not be present, as they will be elsewhere fighting the main fire front.
- NSPs do not provide meals or amenities.
- They may not provide shelter from the elements, particularly flying embers.

If you are a person with special needs, you should consider what assistance you may require at an NSP.

Although QFES cannot guarantee an immediate presence during a bushfire, every effort will be made to provide support as soon as resources are available.

If an NSP is part of your contingency plan, it should not require extended travel through fire-affected areas to get there.

FIRE DANGER RATING



The Fire Danger Rating (FDR) is an early indicator of potential danger, and should act as your first trigger for action. The higher the rating, the greater the need for you to act.

The FDR is an assessment of the potential fire behaviour, the difficulty of suppressing a fire, and the potential impact on the community should a bushfire occur on a given day.

A Fire Danger Index (FDI) of 'low-moderate' means that the fire will burn slowly and that it will be easily controlled, whereas a FDI in excess of 'catastrophic 100+' means that the fire will burn so fast and hot, it will be uncontrollable.

CATASTROPHIC

A fire with a rating of 'catastrophic' may be uncontrollable, unpredictable and fast-moving. The flames will be higher than roof tops. Many people may be injured, and many homes and businesses may be destroyed.

During a 'catastrophic' fire, well-prepared and constructed homes will not be safe. Leaving is the only option for your survival.

EXTREME

A fire with an 'extreme' rating may be uncontrollable, unpredictable and fast-moving. The flames may be higher than roof tops. During an 'extreme' fire, people will be injured, and homes and businesses may be destroyed.

During an 'extreme' fire, well-prepared and well-constructed homes may not be safe. Leaving is the only option for your survival.

SEVERE

A fire with a 'severe' rating may be uncontrollable and move quickly, with flames that may be higher than roof tops. A 'severe' fire may cause injuries, and some homes or businesses will be destroyed.

During a fire with a 'severe' rating, leaving is the safest option for your survival. Use your home as a place of safety only if it is well-prepared and well-constructed.

VERY HIGH

A fire with a 'very high' danger rating is one that can be difficult to control with flames that may burn into the tree tops. During a fire of this type, some homes and businesses may be damaged or destroyed.

During a fire with a 'very high' danger rating, you should use your home as a place of safety only if it is well-prepared and well-constructed.

HIGH

A fire with a 'high' danger rating is one that can be controlled, where loss of life is unlikely, and damage to property will be limited.

During a fire with a 'high' danger rating, you should know where to get more information and monitor the situation for any changes.

LOW-MODERATE

A fire with a 'low to moderate' rating can be easily controlled and poses little or no risk to life or property.

During a fire with a 'low to moderate' rating, you should know where to get more information and monitor the situation for any changes.

BUSHFIRE SURVIVAL PLAN

Complete your personalised Bushfire Survival Plan lift-out.

Personal details:

Important phone numbers: **000 (Triple Zero)** (Fire, Police and Ambulance)

Family:	Family:	Family:
Work:	Friends:	Friends:
School:		

Important contact details – name and phone number:

Insurer:	Policy Number:	Phone:
Electricity:		Phone:
Water:		Phone:
Gas:		Phone:
Phone Company:		Phone:
Council:	Phone:	

Leave early:

List all names and contact phone numbers of household members who have decided to leave early – then complete Section 1.

Names:
Phone:

Stay:

List all names and contact phone numbers of household members who have decided to stay – then complete Section 2.

Names:
Phone:

Leave early – Section 1

Pull this Bushfire Survival Plan lift-out from this document and keep in a safe place.

Leaving early will always be the safest option for you and your family. It is extremely important for you to prepare a detailed leave-early plan to ensure everyone understands what to do and when. Use the boxes below to list tasks to do.

When to go – Think of different triggers that will cause you and your family to leave early. Think about what you will do if you have sent the children to school that day. Think about whether or not you will have to travel from work into the fire zone.

Where to go – Identify one or more safer locations. Consider putting on personal protective clothing before you leave home.

How to get there – What roads will you take to your destination? Have an alternative route if your first choice is impassable.

What to take – Make a list of your most valuable items (e.g. insurance papers, electronic records, photo albums, passports, birth certificates and other important information).

Stay – Section 2

Anyone who is not going to leave early must be involved in completing this stay-and-defend plan to ensure they know what to do. Every stay plan will be different depending on your circumstances. Use the boxes below to list tasks to do.

Before the fire approaches – Start getting yourself and your property ready for a bushfire.

As the fire approaches – Prepare for ember attack on or near your home.
Remember to put on personal protective clothing.

As the fire front arrives – Stay safe by monitoring the fire from inside your home.

After the fire passed – Patrol your property and extinguish any spot fires or burning embers.
You may need to keep this up for several hours.

Everyone must have a contingency plan

Have a contingency plan – what will you do if you can't activate your Bushfire Survival Plan? Remember that leaving late can lead to loss of life.

Know where your nearest NSP is and how to get there.

ACTIVATING YOUR BUSHFIRE SURVIVAL PLAN

Once you have prepared your Bushfire Survival Plan and completed your preparations, it is absolutely essential that you regularly practise and review your plan. This will make sure you and your family are well organised in the event of a bushfire. If a bushfire threatens the health and safety of you, your family, home or property, you should follow these steps:

Step 1 – Activate your Bushfire Survival Plan

Someone must take charge and lead other family members through this emotional experience by carefully communicating the various tasks set out in the plan. Know who is going to leave early and who is going to stay.

Step 2 – Put on your personal protective clothing

Every member of the family must change into their personal protective clothing, including long pants, long-sleeve-shirt and closed-in shoes.

Step 3A – Pack your vehicle and leave early

If your plan is to leave early, pack all valuables in your vehicle (see Evacuation Kit) and relocate to your designated safer location. Give yourself enough time to get you and your family to safety. Don't return home until it is safe to do so.

OR

Step 3B – Implement your strategy to stay and defend

If your plan is to stay, ensure you have all the items in the Bushfire Emergency Kit ready to go. This can be a dangerous option, and you should be physically and mentally prepared.

Step 4 – Keep informed of bushfire activity

Listen to the radio, television, internet, firefighters and/or police for information on the fire in your local area. Bushfire is dynamic and unpredictable, so you need to be prepared for the unexpected. Warnings are not guaranteed, so do whatever is necessary to ensure you remain safe.

BUSHFIRE EMERGENCY KIT

You need to have a Bushfire Emergency Kit stored in an area of the house that is safe and easy to access. It should contain:

- protective clothing
- mop
- gloves
- torch
- hoses
- shovel
- towels
- buckets
- safety goggles
- ladder
- medications
- bottled drinking water
- fire extinguishers
- battery-operated radio
- spare batteries
- smoke mask
- woollen blankets
- first-aid kit
- knapsack sprayer
- protective clothing for the whole family.



EVACUATION KIT

Write a list of all items your family will need before, during, and after your relocation. The list below shows items that you might like to put in your evacuation kit:

- protective clothing for the whole family
- battery-operated radio and spare batteries
- safety goggles
- mobile phone and battery charger
- medications
- wallet or purse and money
- clothing (two sets of clothes for each family member)
- identity information (passports, birth certificates)
- bottled water (enough for each relocated family member)
- family and friends' phone numbers
- items of high importance (e.g. family photos, valuables, important documents)
- blankets (natural fibres)
- children's toys.



BUSHFIRE RISK SELF-ASSESSMENT CHECKLIST



This basic self-assessment checklist is designed to give you a greater understanding of the bushfire risk level relevant to your property. Information provided in this assessment will assist you when completing your Bushfire Survival Plan.

Address:

Postcode:

Property Owner / Property Name:

ACCESS/EGRESS

Road/Street/Driveway

PLEASE ✓ APPROPRIATE BOX

Clear of overhanging vegetation

Yes

No

Unrestricted gate access

Yes

No

Clear of overhead power lines

Yes

No

Able to reverse in

Yes

No

Turning/passing areas

Yes

No

Heavy vehicle access on cattle grid/bridge

Yes

No

Alternative way out

Yes

No

Two-wheel drive access

Yes

No

STRUCTURE/S

Exterior walls – non-combustible

Yes

No

Roof ridge capping sealed

Yes

No

Eaves enclosed

Yes

No

Roofing gutters and valleys clear of leaf litter and fine fuels

Yes

No

Underfloor enclosed

Yes

No

Vents screened

Yes

No

Windows – non-combustible finishing

Yes

No

Deck/veranda non-combustible

Yes

No

WATER SUPPLY

Reticulated water supply

Yes

No

Tank supply with QFES access – 50 mm male camlock fitting so fire fighters can use water if needed

Yes

No

QFES accessible external open water supply (dam/pool)

Yes

No

Firefighting pump and hose connected to water supply

Yes

No

Other considerations

There are a range of other things to be considered regardless of your decision to leave early or stay:

- Firefighting equipment (such as pumps, hoses and sprinkler systems) should be tested regularly and maintained in maximum operational working condition.
- Firefighters may need access to your property during a bushfire. So, it is in your best interests to allow enough space for fire trucks (4 metres wide by 4 metres high).
- Your pets, livestock, and other animals require proper care and attention during fires. Consider food, medication, transportation and sleeping arrangements for your animals.

Will someone from an emergency service knock on my door when it is time to leave?

Emergency services personnel are not always available to alert the community of potential risks by door knocking and encouraging you to leave. Monitor local radio stations, television networks and emergency service websites for information updates. Remember, the safest option is to leave early. Leaving too late can be fatal.

Will there always be a fire truck available to fight a bushfire threatening my home?

No, not always. Fire trucks and firefighters are a limited resource, so it is important they are deployed in an appropriate manner to best manage the fire. The QFES cannot guarantee a fire truck will be available to defend every home during a large bushfire event.

Is my home at risk from burning if there is more than 50 metres between my home and nearby bushland?

Yes, most houses destroyed in bushfires are lost as a result of ember attack. Under certain conditions, embers can cause fires to ignite up to 20 kilometres in front of the main fire. A combination of your level of preparation and your home construction will determine the survivability of your home.

What does leaving early mean?

Leaving early means before a bushfire event has reached your neighbourhood. Leaving early could be the day before or morning of predicted extreme or catastrophic bushfire weather.

Can I be made to leave my home during a bushfire?

In Queensland, you can be ordered by the Police or Fire Service to evacuate if they believe it is necessary for your safety.

Is cleaning my gutters and mowing my lawns enough to prepare my property for bushfire?

No! Fire requires fuel, heat and oxygen to occur. The radiant heat and flying embers produced by bushfires mean that overhanging trees, shrubs and mulch against homes, woodpiles, old building materials, outdoor furniture or other objects stored under the deck or chemicals in the garden will quickly ignite. Do yourself and your neighbours a favour by taking the time to properly prepare your whole property, which includes yourself, your house and your land.

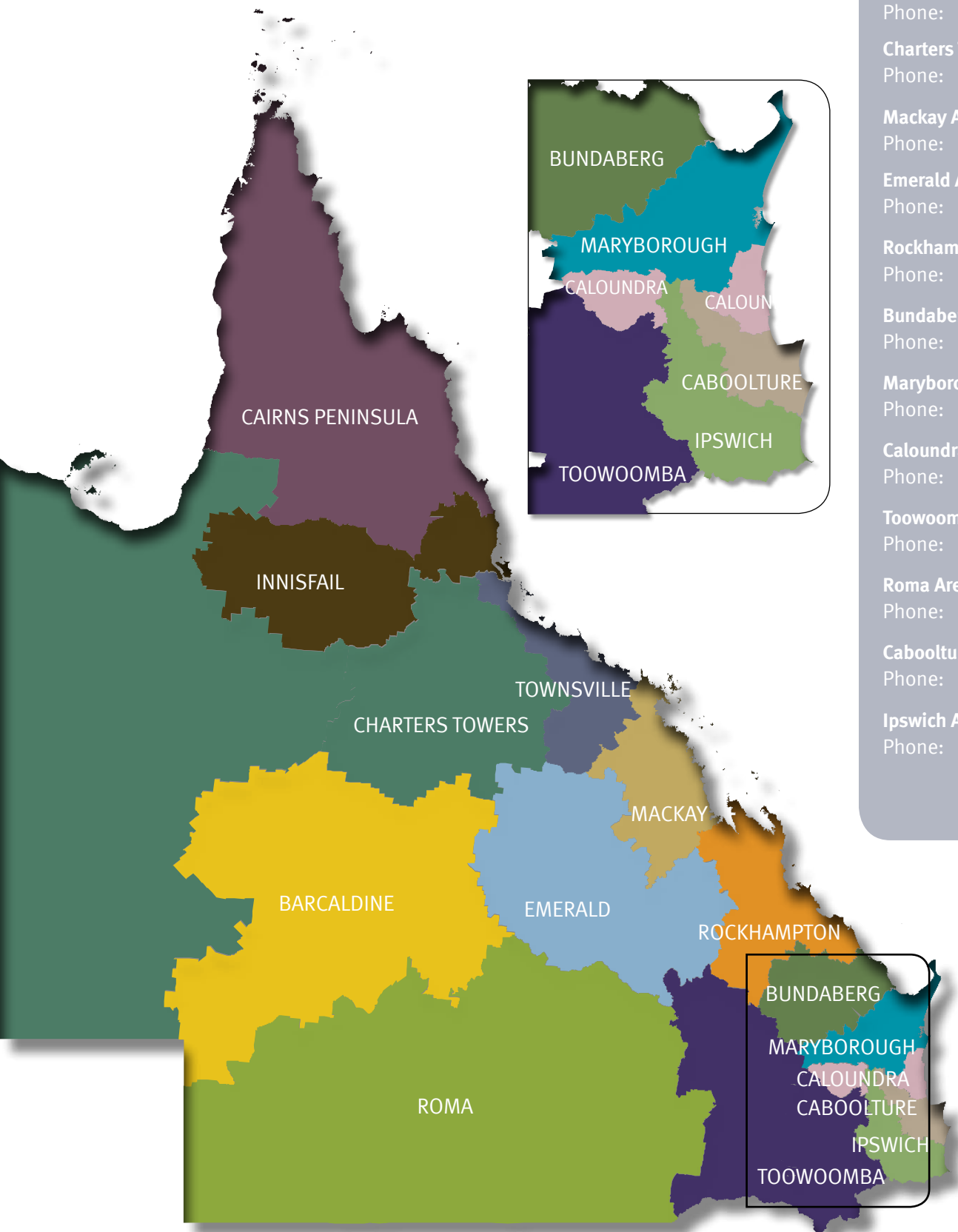
If I know the backstreets in my suburb or town very well, is it okay for me to leave at the last minute?

If your decision in your Bushfire Survival Plan is to leave early, then you should leave well before the fire front reaches your property. Irrespective of your local area knowledge, you must stick to your plan and leave early. Leaving late can be fatal.

FAQ'S

Rural Operations Areas

For further assistance contact your local Area Office



Cairns Area Office
Phone: (07) 4042 5468

Innisfail Area Office
Phone: (07) 4061 0650

Townsville Area Office
Phone: (07) 4796 9082

Charters Towers Area Office
Phone: (07) 4761 5130

Mackay Area Office
Phone: (07) 4965 6641

Emerald Area Office
Phone: (07) 4983 7580

Rockhampton Area Office
Phone: (07) 4938 4736

Bundaberg Area Office
Phone: (07) 4153 3244

Maryborough Area Office
Phone: (07) 4790 4839

Caloundra Area Office
Phone: (07) 5420 7517

Toowoomba Area Office
Phone: (07) 4616 1945

Roma Area Office
Phone: (07) 4622 2074

Caboolture Area Office
Phone: (07) 5420 1333

Ipswich Area Office
Phone: (07) 3294 4944

Bushfire is a very real risk to many of our suburbs, so make sure you are prepared now!

FOR FURTHER INFORMATION

GO TO www.ruralfire.qld.gov.au
www.qfes.qld.gov.au

OR book a free
“Are you Bushfire Prepared?”
presentation by calling

13 QGOV



facebook.com/QldFireandRescueService



twitter.com/QldFES or [@QldFES](https://twitter.com/QldFES)



youtube.com/FireRescueQld

Appendix I

White Rock – Spring Mountain Fire Management Strategic Plan and Risk Dashboard

Attachment 8: White Rock – Spring Mountain Fire Management Strategic Plan and Risk Dashboard

Ipswich Fire Management Strategic Plan 2017
Version Number: 1 | Created by: GHD | Version Date: APRIL 2017

Background

This risk dashboard identifies and ranks factors that might be influencing bushfire risk within and surrounding Ipswich City Council's Natural Area Estate (NAE). This map based plan is complimented by a Fire Management Strategic Plan (2017) report which provides greater detail of the range of factors which may contribute to risk at ICC NAE, in addition to the site specific factors identified here.

Protection Zones automatically apply around all *Fire Vulnerable Assets* located on ICC lands. A minimum of ten metres radius for unoccupied assets and twenty metres for occupied assets, or to the existing mown extent for picnic/facility areas.

Approach

Each ICC NAE has been considered using nine bushfire risk factors (Listed A to I in the risk matrix opposite) to generate a relative priority score between reserves.

Bushfire Vulnerability Factor	Column
Ecological Asset Bushfire Sensitivity Risk	A
Ecological Health Risk	B
Fire Severity Risk	C
Bushfire Attack Level Risk	D
Access Risk	E
Housing Stock Risk	F
Fire Vulnerable and Smoke Sensitive Asset Risk	G
Landscape Vegetation Cover Risk	H
Fire Suppression Risk	I

Risk Summary

A nature refuge lies south west of White Rock – Spring Mountain Reserve and transmission line runs south east through the reserve. Paperbark Flats Picnic Area is located in the north west corner near the Centenary Highway that runs north of the 2992 hectare reserve. The day use and mountain bike areas are in the northern section of the reserve. A number of *Very High* risk blocks (vulnerable to radiant heat, ember attack and smoke impact from bushfires) are adjacent to the new Springfield Lakes estate.

The reserve is mainly surrounded by unmanaged, *Very High* and *High* Potential Bushfire Intensity vegetation. Fires may start in the reserve or run into it from the surrounding area. The reserve is capable of supporting a large scale fire run.

The main factors driving bushfire risk at White Rock – Spring Mountain Reserve are:
 - Fire Severity and Surrounding Landscape Vegetation Cover risks (most blocks are rated as *High* or *Very High* fire severity and the surrounding area is unmanaged forest);
 - Fire vulnerable and Smoke Sensitive Asset risk (the Picnic and day-use areas, transmission line and highway all contribute to this risk); and
 - Fire Suppression Success risk (steep topography).

The following risk table contain mitigation actions. The acronyms used are explained in the two tables below.

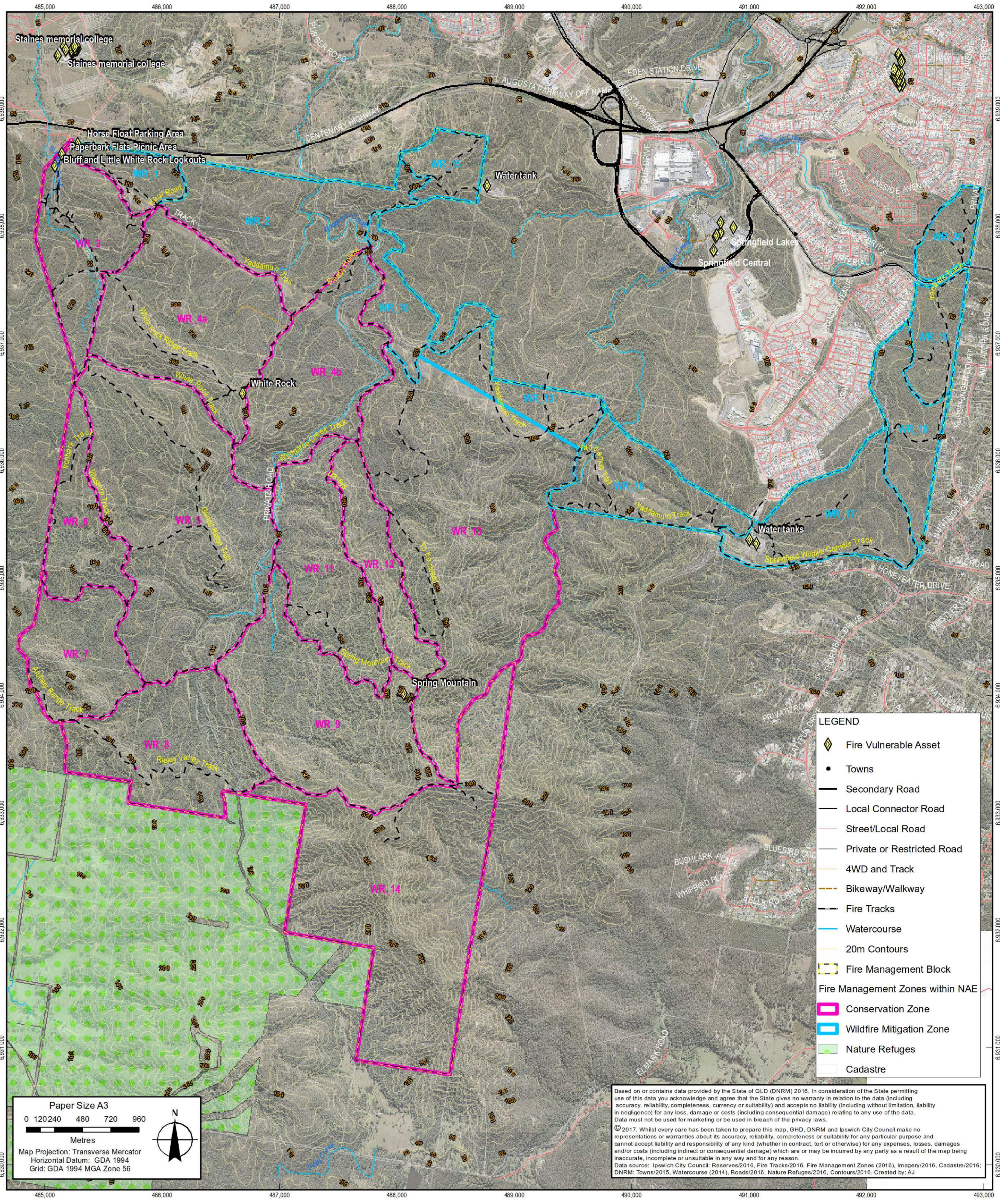
ICC MITIGATION

PZ	Maintain Protection Zone to required standard
FT	Maintain fire trails in accessible and stable condition, as per the NAE Standard (Service Tracks and Firebreaks)
PR	Maintain public roads in accessible and stable condition
PB	Maintain routine prescribed burning of blocks to maintain lower fuel levels, reduce fire intensity and rate of spread. The desired OFH should correspond to the block zoning class.
CR	Close reserve on total fire ban days and when fires are burning in the surrounding landscape
VR	Vegetation removal/ modification through activities such as slashing, manual removal, tree pruning (no fire)
EF	Exclude fire from vegetation communities which are fire-sensitive
CF	Exclude fire from the reserve to avoid coal fires starting

SHARED RESPONSIBILITY

RA	Residences adjoining the reserve may be vulnerable to bushfire impacts (direct flame, radiant heat and ember attack) due to the poor separation between residences and the adjoining hazard. Residents take action to reduce their vulnerability by actively modifying vegetation and /or maintaining structures to improve bushfire resistance
BSP	Prepare and implement QFES Bushfire Survival Plan
PZ	Prepare and maintain structures and protection zones around buildings
CE	QFES Community education
PO	Plantings Owner: Maintain internal slash break between plantings and reserve border, investigate possibility of thinning plantings around mature eucalypts.
TL	Transmission Line Owner: Maintain easement in accordance with industry standards
FO	Facilities owners to maintain protection zone around asset

Bushfire Asset Zone	Hectares	(A) Ecological Asset Bushfire Sensitivity Risk	(B) Ecological Health Risk	(C) Fire Severity Risk	(D) Bushfire Attack Level Risk	(E) Access Risk	(F) Housing Stock Risk	(G) Fire Vulnerable and Smoke Sensitive Asset Risk	(H) Surrounding Landscape Vegetation Cover Risk	(I) Fire Suppression Success Risk	Prioritisation Score	Summary notes	Unmitigated risk	ICC Mitigation Strategy	Residual Risk after ICC actions	Property owner and Fire Emergency Service Actions	Residual Risk after shared responsibility actions
WR_1	32.76	Low	Moderate	Moderate	Low	Low	N/A	Very High	High	Moderate	16	This block contains a picnic area. It is separated from Block 2 and 3 by fire trails. The reserve will support a fire run which may enter adjoining blocks within the reserve. Smoke may impact Centenary Highway and Transmission Line.	High [intolerable]	PZ, FT, PR, PB, CR, VR, EF	Medium [tolerable]	BSP, PZ, CE, TL	Low [acceptable]
WR_2	143.32	Low	High	Moderate	N/A	Low	N/A	Very High	Very High	Moderate	17	This block is utilised as a mountain bike area. The reserve will support a fire run which may enter adjoining blocks within the reserve. Smoke may impact Centenary Highway and Transmission Line.	High [intolerable]	FT, PR, PB, CR, VR, EF	Medium [tolerable]	BSP, PZ, CE, TL	Low [acceptable]
WR_3	95.51	Low	High	Moderate	N/A	Moderate	N/A	Very High	Very High	Moderate	18	This block a picnic area and is heavily used for day hiking. The reserve will support a fire run which may enter adjoining blocks within the reserve. Smoke may impact Centenary Highway and Transmission Line.	High [intolerable]	PZ, FT, PR, PB, CR, VR, EF	Medium [tolerable]	BSP, PZ, CE, TL	Low [acceptable]
WR_4a	183.96	Low	High	High	N/A	High	N/A	Very High	Very High	High	21	This block is used for day hiking. The reserve will support a fire run which may enter adjoining blocks within the reserve. Smoke may impact the Transmission Line.	High [intolerable]	FT, PB, CR, EF	Medium [tolerable]	BSP, PZ, CE, TL	Low [acceptable]
WR_4b	143.81	Low	High	High	N/A	High	N/A	Very High	Very High	High	21	This block is used for day hiking. The reserve will support a fire run which may enter adjoining blocks within the reserve. Smoke may impact the Transmission Line.	High [intolerable]	FT, PB, CR, EF	Medium [tolerable]	CE, TL	Low [acceptable]
WR_5	301.31	Low	High	High	N/A	N/A	N/A	Low	Very High	Very High	16	Fire trails bound the block with additional trails through the block. The reserve will support a fire run which may enter adjoining blocks within the reserve.	Medium [tolerable]	FT, PB, CR, EF	Low [acceptable]	CE	Low [acceptable]
WR_6	69.59	Low	High	High	N/A	N/A	N/A	Low	Very High	Very High	16	A rural residential block lies west of WR_6. Fire trails almost bound the block. The reserve will support a fire run, including external fire runs, which may move through adjoining blocks.	Medium [tolerable]	FT, PB, CR, EF	Low [acceptable]	BSP, PZ, CE	Low [acceptable]



Bushfire Asset Zone	Hectares	(A) Ecological Asset Bushfire Sensitivity Risk	(B) Ecological Health Risk	(C) Fire Severity Risk	(D) Bushfire Attack Level Risk	(E) Access Risk	(F) Housing Stock Risk	(G) Fire Vulnerable and Smoke Sensitive Asset Risk	(H) Surrounding Landscape Vegetation Cover Risk	(I) Fire Suppression Success Risk	Prioritisation Score	Summary notes	Unmitigated risk	ICC Mitigation Strategy	Residual Risk after ICC actions	Property owner and Fire Emergency Service Actions	Residual Risk after shared responsibility actions
WR_7	85.97	Low	High	High	N/A	N/A	N/A	Low	Very High	Very High	16	A rural residential block lies west of WR_7. The block is almost bounded by fire trails. The reserve will support a fire run which may enter adjoining blocks within the reserve.	Medium [tolerable]	FT, PB, CR, EF	Medium [tolerable]	BSP, PZ, CE	Low [acceptable]
WR_8	140.14	Low	High	High	N/A	High	N/A	Low	Very High	Very High	19	A rural residential block lies west of WR_8. The block is almost bounded by fire trails. A nature refuge adjoins the southern boundary of the block. The reserve will support a fire run which may enter adjoining blocks within the reserve.	Medium [tolerable]	FT, PB, CR, EF	Medium [tolerable]	BSP, PZ, CE	Low [acceptable]
WR_9	193.35	Low	High	Very High	N/A	N/A	N/A	Low	Very High	Very High	17	Fire trails bound the block. The reserve will support a fire run which may enter adjoining blocks within the reserve.	Medium [tolerable]	FT, PB, CR, EF	Low [acceptable]	CE	Low [acceptable]
WR_10	46.98	Low	High	High	N/A	N/A	N/A	Very High	Very High	Very High	19	Fire trails bound the western boundary. The reserve will support a fire run which may enter adjoining blocks within the reserve. Smoke may impact the Transmission Line.	High [intolerable]	FT, PB, CR, EF	Medium [tolerable]	CE, TL	Low [acceptable]
WR_11	117.75	Low	High	Very High	N/A	N/A	N/A	Low	Very High	Very High	17	Fire trails bound the block. The reserve will support a fire run which may enter adjoining blocks within the reserve.	Medium [tolerable]	FT, PB, CR, EF	Low [acceptable]	CE	Low [acceptable]
WR_12	65.46	Low	High	Very High	N/A	N/A	N/A	Low	Very High	Very High	17	Fire trails bound the block. The reserve will support a fire run which may enter adjoining blocks within the reserve.	Medium [tolerable]	FT, PB, CR, EF	Low [acceptable]	CE	Low [acceptable]
WR_13	368.22	Low	High	Very High	N/A	N/A	N/A	Very High	Very High	Very High	20	The reserve will support a fire run which may enter adjoining blocks within the reserve. Smoke may impact the Transmission Line.	High [intolerable]	FT, PB, CR, EF	Medium [tolerable]	CE, TL	Low [acceptable]
WR_14	327.66	Low	High	Very High	N/A	Very High	N/A	Very High	Very High	Very High	24	A fire trail bounds the northern boundary and the nature refuge bounds the western boundary. A rural residential building lies south of the block. The reserve will support a fire run which may enter adjoining blocks within the reserve. Smoke may impact the residence and Transmission Line.	High [intolerable]	FT, PB, CR, EF	Medium [tolerable]	CE, TL	Low [acceptable]
WR_15	32.06	Low	High	Very High	N/A	High	N/A	High	Very High	High	21	This block contains fire trails. A water storage tank lies east of the block. The reserve will support a fire run which may enter adjoining blocks within the reserve. Smoke may impact Centenary Highway and Transmission Line.	High [intolerable]	FT, PB, CR, EF	Medium [tolerable]	BSP, PZ, CE, FO	Low [acceptable]
WR_16	81.04	Low	High	High	Low	High	N/A	Very High	Very High	High	22	This block contains fire trails. A residential area lies to the north east of the block. The reserve will support a fire run which may enter adjoining blocks within the reserve. Smoke may impact residences and Transmission Line.	High [intolerable]	FT, PB, CR, EF	Medium [tolerable]	BSP, PZ, CE, TL	Low [acceptable]
WR_17	99.4	Low	High	High	Very High	High	Low	Very High	High	High	25	This block contains fire trails and water storage facilities. Residential areas lie north and south of the block. The reserve will support a fire run which may enter adjoining blocks within the reserve. Radiant heat and smoke may impact residences, water storage facilities and Transmission Line.	High [intolerable]	FT, PR, PB, CR, VR	High [Intolerable]	RA, BSP, PZ, CE, TL, FO	Medium [tolerable]
WR_18	60.86	Low	High	High	Very High	High	Low	Low	High	High	22	This block contains fire trails. Residential areas bound the northwest and eastern boundaries. The reserve will support a fire run which may enter adjoining blocks within the reserve. Radiant heat and smoke may impact residences.	High [intolerable]	FT, PR, PB, CR, VR	High [Intolerable]	RA, BSP, PZ, CE	Medium [tolerable]
WR_19	40.11	Low	High	High	Very High	High	Low	Low	High	High	22	This block contains fire trails. Residential areas bound the eastern and northwestern boundaries. The reserve will support a fire run which may enter adjoining blocks within the reserve. Radiant heat and smoke may impact residences.	High [intolerable]	FT, PR, PB, CR, VR	High [Intolerable]	RA, BSP, PZ, CE	Medium [tolerable]
WR_20	28.15	Low	High	High	Very High	High	Low	Low	High	High	22	This block contains fire trails. It is separated from WR_19 by a arterial road. Residential areas bound the northwestern boundary. The reserve will support a fire run which may enter adjoining blocks within the reserve. Radiant heat and smoke may impact residences.	High [intolerable]	FT, PR, PB, CR, VR	High [Intolerable]	RA, BSP, PZ, CE	Medium [tolerable]

Appendix J

Village 17 Site Based Management Plan



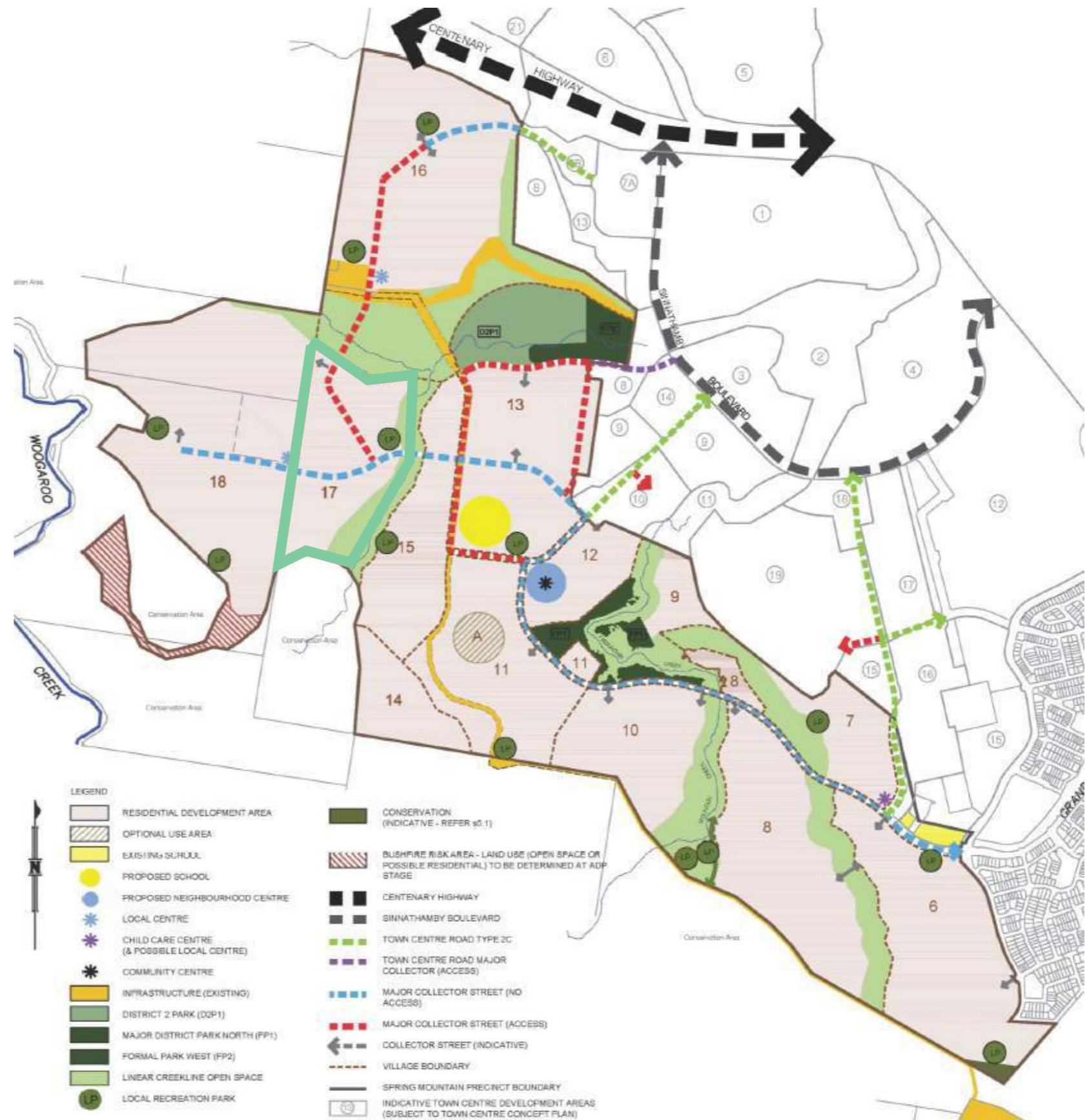
LENDLEASE COMMUNITIES

SPRINGFIELD RISE - VILLAGE 17

SITE BASED MANAGEMENT PLAN - GRANDE AVENUE

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02 INTRODUCTION

Introduction

This phase specific Site Based Management Plan (SBMP) has been prepared for works associated with the Village 17 (V17) precinct at Springfield Rise, Spring Mountain and incorporates the management intent, objectives and specifications detailed within the overarching environmental management plans prepared for the development.

The aim of this SBMP is to set out and guide the implementation of effective measures to ameliorate any impacts, and to ensure and manage the long term sustainability of the project and its natural environment, specifically for Matters of National Environmental Significance (MNES) listed species known to occur within the Spring Mountain project site namely:

- Phascolarctos cinereus (Koala)
- Pteropus poliocephalus (Grey-headed Flying-fox)
- Plectranthus habrophyllus

The document has been developed in accordance with the Spring Mountain SBMP, prepared by Yurrah, as an updated and re-issued phase specific management plan.

The purpose of this SBMP is to provide a single, consolidated management document which incorporates requirements of numerous ecological management plans prepared for Spring Mountain. From these documents, this SBMP extracts management objectives, implementation requirements, performance indicators and monitoring and auditing actions relevant to the specific the V17 works.

Environmental Pre-Start Checklist

This Site Based Management Plan has been prepared to create an on-site working document with easy to find references to management measures without the comprehensive details of the assessment and approval. Core to contractors working under this SBMP is completion of the Spring Mountain Pre-Start Environmental Checklist. Completion and sign off of this checklist, inclusive of attachments should will warrant compliance with this SBMP and broader approval parameters.

Details on this SBMP can be found within the following documents:

- Site Based Management Plan for Spring Mountain

- Community, prepared by Yurrah (July 2015)
- Threatened Flora Management Plan for Spring Mountain, prepared by Yurrah (July 2015)
- Fauna Management Plan for Spring Mountain, prepared by Saunders Havill Group (July 2015)
- Code of practice for Welfare of Animals effected by Land Clearing and Other Habitat Impacts, and Wildlife/ Spotter Catchers (Draft) prepared by Wildlife Warriors and Voiceless (2009)
- Offsets Management Plan prepared for Spring Mountain, prepared by Saunders Havill Group (July 2015)
- Bushfire Management Plan for Spring Mountain, prepared by Cardno (2016)

This SBMP should also be read in conjunction with all V17 approvals and conditions including approved civil, landscape, vegetation management and rehabilitation plans and specifications.

This SBMP has also been prepared to meet compliance and auditing requirements of the Spring Mountain Commonwealth Department of the Environment and Energy (DEE) approval under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC) (Ref: 2013/7057), specifically Conditions 3-6.

This SBMP outlines construction measures specific to the V17 works to manage of impacts to native flora and fauna.

Construction

- Vegetation Management (Clearing & Protection)
- Protection of MNES Fauna (Koala and Grey-headed Flying Fox) and Native Wildlife
- Maintenance of Safe Wildlife Movement Opportunities
- Fauna Habitat Rehabilitation
- Threatened Flora Management
- Pest Management
- Fire Management
- Education and Awareness



Image capture from Qld Globe (2019)

03 SITE DESCRIPTION

Site Description

Village 17 is located in the western portion of Springfield Rise and is encompassed by linear open space of Town Centre Gully West to the north-east, and the Conservation Land adjoining the southern boundary. Its western boundary adjoins Village 18. Village 17 has a development area of approximately 20.5 ha.

Natural Features

The village comprises undulating land typically falling towards the linear open space to the east with ridges from the west and south west into the site forming peaks in the adjoining Village 18 creating a central gully formation.

Layout

Village 17 will be developed for typical residential development, predominately comprising of a range of low rise (1-2 storey) detached dwelling forms. It is proposed that an overall density of 15-18 dw/ha will be achieved.

Village 17 is intended to be developed for residential development access via a grid based network of local access streets linking with the major collector networks that traverse the village to the west (to Village 18) and north (to Village 16). Access for detached dwellings is not available to the major collector into Village 18.

Village 17 accommodates for 1 Local Recreation Park in the eastern portion of the village adjoining the linear open space to be provided between Conservation Land and the linear open space provided as part of Village 16. The Local Recreation Park may be located proximate to the intersection of the major collector access into the village with the linear open space which will create an entre feature into the western portions of the precinct.

Interface with Linear Open Space

The interface with the Linear Open Space is to be provided as per the PSP3 unless otherwise approved. It is to take into regard potential bushfire mitigation strategies.

Interface with Conservation Land

The interface with the Conservation Land will require regard to potential bushfire mitigation strategies.



Photo: Grey-headed Flying-fox (listed as Vulnerable under EPBC Act (Cth))



Photo: Plectranthus habrophyllus (listed as Endangered under EPBC Act (Cth))



Photo: Koala (listed as Vulnerable under EPBC Act (Cth) and NCA (Qld))



Extract: Spring Mountain Estate Precinct Plan - V17 at Springfield Rise

04 ECOLOGICAL VALUES - SUMMARY

Ecological Values

Numerous ecological surveys were undertaken over the site as part broader concept planning for the Spring Mountain project. In addition, pre-clearance flora and fauna surveys for V17 were undertaken by Saunders Havill Group and Queensland Fauna Consultants, respectively. The following comments summarise the ecological values of the V17 site:

- The majority of the V17 site is mapped as containing vegetation comprised of composite Of Concern RE12.9-10.2/12.9-10.7/12.9-10.19. A small portion is mapped as Least Concern RE12.9-10.17a along the waterway.
- The V17 site adjoins the 293ha of Springfield Conservation Land to the west. This land has been legally secured on title under a Voluntary Decratisation for the purpose of Conservation. In collaboration with Lendlease Communities and Ipswich City Council, the Conservation Land is undergoing weed and pest management and assisted regeneration to improve the ecological value of the land which forms part of the Flinders - Karawatha Bioregional Corridor. The land will provide significant values for protected and local flora and fauna species.
- Vegetation throughout the V17 site is dominated by Eucalypt and Corymbia species with weeds largely confined to the shrub and ground layers.
- Gully lines were infested with weeds, particularly *Lantana camara* (Lantana) up to 2m in height. The V17 area ajoins Tully Gully to the east which is mapped as a green (low risk) waterway for waterway barrier works by Fisheries however is not a regulated watercourse for the purposes of the Water Act. Infestations of *Lantana* and evidence of scour and sedimentation were noted.
- The ridelines and slopes within the V17 works extent are contained to a mix of *Corymbia* and *Eucalypt* species with patches of dense understorey of *Acacia* species. Rock outcrops were observed along were targeted during the field survey due to these areas being preferred habitat for a number of the listed flora species including *Plectanthus habrophyllus* and *Masdenia coronata* (Slender Milkvine).
- No State or Commonwealth threatened flora or fauna species were identified within the V17 as part of and pre-clear surveys.

Regional Ecosystem Descriptions

Least Concern RE 12.9-10.2

Description *Corymbia citriodora* subsp. *variegata* open forest or woodland usually with *Eucalyptus crebra*. Other species such as *Eucalyptus tereticornis*, *Eucalyptus moluccana*, *Eucalyptus acmenoides* and *Eucalyptus siderophloia* may be present in scattered patches or in low densities. Understorey can be grassy or shrubby. Shrubby understorey of *Lophostemon confertus* (whipstick form) often present in northern parts of bioregion. Occurs on Cainozoic and Mesozoic sediments.

Of Concern RE 12.9-10.7

Description *Eucalyptus crebra* +/- *Eucalyptus tereticornis*, *Corymbia tessellaris*, *Angophora leiocarpa*, *Eucalyptus melanophloia* woodland. Occurs on Cainozoic and Mesozoic sediments.

Least Concern RE 12.9-10.19

Description *Eucalyptus fibrosa* subsp. *fibrosa* woodland +/- *Corymbia citriodora* subsp. *variegata*, *E. acmenoides* or *E. portuensis*, *Angophora leiocarpa*, *E. major*. Understorey often sparse.

Least Concern RE 12.9 -10.17a

Description *Lophostemon confertus* or *Lophostemon suaveolens* dominated open forest usually with emergent *Eucalyptus* and/or *Corymbia* species. Occurs in gullies and southern slopes on Cainozoic and Mesozoic sediments.



Photo: Image Capture Old Globe (2019) Regional ecosystems mapping.



Photo: Ridgelines containing large Corymbia and Eucalypt species



Photo: Gully infested with *Lantana camara*.



Photo: Tracks and disturbed areas.

05 ENVIRONMENTAL MANAGEMENT

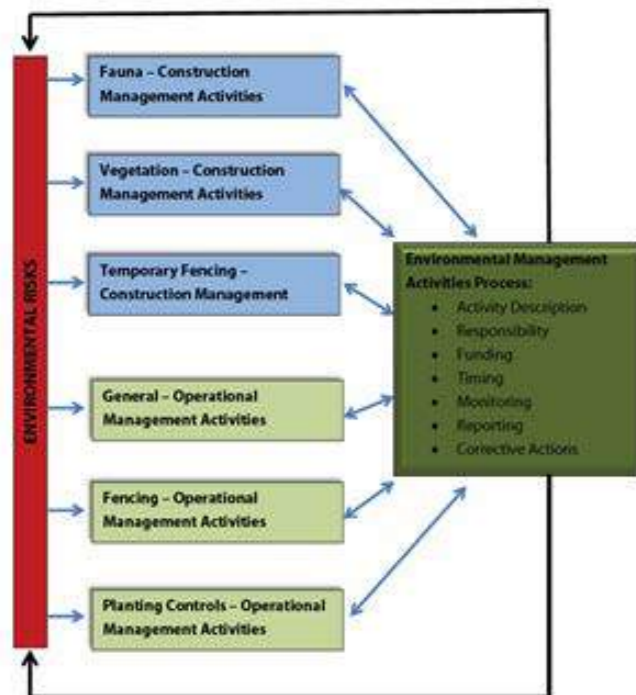
Management – General

This SBMP sequences through details on a number of site specific outcomes for fauna, vegetation management and operational controls associated with V17. Logically, the document works through construction processes and has been prepared as a sub-plan to the SBMP for Spring Mountain prepared by Yurrah.

Environmental Training

This SBMP is to be issued to all site contractors (and sub-contractors) and kept within site construction offices. Elements of compliance with the document will form part of the responsibility of the Principle Site Contractor. Training on the management measures outcomes in this SBMP will occur as part of the broader site environmental management and workplace health and safety procedures. This will include the following steps:

1. Copy of the SBMP made available to all site contractors (and sub-contractors)
2. Outline of the SBMP and its requirement relative to the site and / or particular scope of a contract forming part of the site induction requires contractors to read, acknowledge and sign the document prior to commencement of site works.
3. Requirements of the SBMP to be incorporated into workplace checklists, work method statements and toolbox talks.
4. Weekly review and report on compliance with the SBMP by the Principle Contractor.



Spring Mountain Risk Management Process

Adaptive Management

Adaptive management refers to a way of managing natural resources where management actions are regularly revised and, if necessary, modified based on monitored changes in environmental condition and/or changes in base knowledge which underpins the original management approach. This SBMP has been based on, as far as practical, the current state of knowledge of the species ecology and best practice habitat management approaches. When new facts emerge from future research, they should be immediately integrated into the plan so it remains consistent with the current state of knowledge (and best practice).

Statutory Requirements

Activities associated with this SBMP will comply with the relevant provisions of legislation and regulations and policies of the following:

- **Environment Protection and Biodiversity Conservation Act 1999 (Cth)** with regard to species listed under the provisions of this Act;
- **Nature Conservation Act 1992 (Qld)** with regard to species listed under the provisions of this Act;
- **Biosecurity Act 2014** with regard to weeds and pests; and
- The requirements of the Commonwealth, State and /or Local Government decision notices including any relevant “conditions of approval”.

Roles and Responsibilities

Proponent	Lendlease Communities Pty Ltd	Lendlease Communities Pty Ltd Contact: Graeme Knox
Contractor	Appointed party or company that performs the construction works on site and included all employees of the Contractor and sub-contractors.	Shadforth Civil Contact: Tony Hopper
Site Supervisor	Appointed party contracted by the Proponent to oversee daily site operations and site management.	Arcadias Contact: Christo Louw
Environmental Representative	Appointed party contracted by the Proponent to oversee environmental compliance.	Saunders Havill Group Contact: Murray Saunders
Fauna/Spotter Catcher	Appointed Contractor employed to implement fauna welfare responsibilities with vegetation clearing operations. The Fauna Spotter Catcher is a person who holds a rehabilitation permit with an extended authority issued by EHP specifying the gilder may take, keep or use an animal whose habitat is about to be destroyed by a human activity.	Queensland Fauna Consulting Contact: Bryan Robinson
Koala Spotter	Appointed Contractor employed to implement Koala welfare responsibilities associated with vegetation clearing operations. The Koala Spotter is a person who holds a tertiary qualification in Biology or Zoology, or who is demonstrably experienced in the identification and location of Koalas in their natural habitat and has an authorisation from EHP to conduct such activities. For example, demonstrably experienced may include a Koala keeper employed by a licensed wildlife exhibitor (i.e. zoo) may be capable of demonstrating competence in locating Koalas.	Queensland Fauna Consulting Contact: Bryan Robinson
Council	Ipswich City Council (ICC)	Ipswich City Council (ICC) Contact: Tim Foote

06 PRE-CLEARANCE - VEGETATION MANAGEMENT

P1– Vegetation Management (General)

Vegetation clearing must be undertaken in accordance with approved plans to ensure protection of areas of ecological significance and agreed retained linear open space corridors. Habitat trees where marked for retention must not be damaged as a result of tree clearing and or are to be removed at the specification and control of the appointed Fauna Spotter.

Table 1 describes the relevant management requirements to address this issue.

Objective

1. To identify clearing in the plans and specification, trees to be retained and trees to be cleared. Areas of retention should be clearly marked and fenced.
2. To ensure that all contractors understand the requirements of protection and retention and install protective devices to ensure no additional clearing occurs.
3. To ensure that the work program is such as to minimise the time between when clearing occurs and the cleared ground is stabilised.
4. To ensure that cleared material is mulches or wood-chipped as appropriate for recycling
5. To protect linear open space from construction damage and run-off.

Management Strategy

- Clearing to be undertaken in accordance with measures outlined in the EPBC Management Plans.
- Install stormwater management devices as per approved ESCP

Performance Indicators

- Integrity of protective devices.
- Existing vegetation and trees retained in good health, with no scars from earthworks machinery and no erosion and sediment deposited within linear open space/retention areas.

Clearing activities should be undertaken in accordance with the with all management plan requirements and associated approval conditions. This SMBP shows the clearing extent associated with V17 at Springfield Rise.



Photo: Control clearing of vegetation



Photo: Erosion control to cleared batter



Photo: Tree protection and erosion fence

Table 1: P1: Vegetation Management (Clearing and Protection)

Issue	Vegetation Management – Clearing and Protection	Responsible Person	Timing
Implementation Requirements	Ensure protective devices are installed and maintained in functional condition.	Contractor	During Clearing & Construction
	Monitor and report on the success, protection and retention, and integrity of protective devices such as fences and sediment fences through		
Monitoring	Weekly inspection and log.	Contractor	During Clearing & Construction
Reporting	Monthly (until operation).	Contractor	During Clearing & Construction
Corrective Action	Repair, replace or reinstate protective devices.	Contractor	During Clearing & Construction
	Appropriate treat any damage to trees or vegetation marked for retention as required.	Contractor	During Clearing & Construction

06 PRE-CLEARANCE - VEGETATION MANAGEMENT

07 PRE-CLEARANCE - FAUNA MANAGEMENT

P2 – Protection of MNES Fauna (Koala and Grey-headed Flying Fox) and Native Wildlife (Vegetation Clearing)

Clearing of native vegetation has the potential to result in direct injury or death to fauna. Clearing of vegetation for the purposes of preparing development areas also has the potential to result in incidental damage to adjacent habitats to be retained.

Development protocols to respond to injured wildlife must be prepared prior to vegetation clearing operations. It is expected that some of these protocols are likely to be applicable to responses required for all injured fauna (including Koala) and must be included within the Animal Welfare Plan (AWP) to be prepared by the appointed fauna spotter catcher.

Table 2 describes the relevant management requirements to address the protection of terrestrial fauna, specifically Koala, during vegetation clearing and

Objective

1. To minimise and mitigate adverse direct and indirect effects of vegetation clearing on terrestrial including Koala and Grey-headed Flying-fox, during clearing and construction.
2. Prevent mortality or injury to terrestrial wildlife, specifically Koala.

Management Strategy

- Prevent damage and/or disturbance to native vegetation and associated habitats outside clearing areas.
- Clearing and construction operations are employed to maximise animal welfare and reduce fauna mortality.
- Informal all personnel of site environmental responsibility.
- Reuse hollows and large rocks for habitat in retained habitat areas/linear open space.
- Safe fauna movement opportunities are provided within linear open space to prevent fauna moving through construction areas.
- Direct clearing activities from open area to less open areas allowing fauna to natural seek shelter in conservation land and linear open space/retained habitat
- Provision of permanent and temporary fencing in accordance with the V17 SBMP
- Undertake works in accordance with the V17 SBMP & direction of the appointed fauna spotter catcher.

Performance Indicators

- Prevent fauna mortality and disturbance to terrestrial fauna.
- No injury or death of Koala.
- No damage to linear open space/retained habitat.
- No disturbance to native vegetation outside permitted clearing footprints.

Fauna Management

Lendlease Communities Pty Ltd commits to the use of leading practice methods and processes for the role of Wildlife Spotter Catchers in the engagement of any contractors for native vegetation clearing works. The standards and requirements outlined in this Specification Note are acknowledged as above minimum requirements in most Local Government areas and are applicable despite lessor requirements listed within individual project approval packages.

As a minimum specification Wildlife Spotter Catchers will retain the following Queensland State Government Permits:

1. Animal Ethics
2. Scientific Purposes Permit
3. Scientific User Registration
4. Damage Mitigation Permit
5. Rehabilitation Permit

Wherever practical all clearing works will be coordinated in general accordance with applicable site based components of the DRAFT Code of Practice for the welfare of animals affected by land-clearing and other habitat impacts prepared by the Australia Zoo Wildlife Warriors and Voiceless (and or any contemporary Industry based final version of this Draft Code). This includes mandatory controls on the timing and sequencing of clearing works integrated with a regimented series of fauna management protocols implemented by registered Fauna Spotter / Catchers. The following procedural stages listed in the Draft Code are to be applied to clearing works on all Lendlease Communities Pty Ltd projects:

Action 1 – Engagement Wildlife Spotter Catcher

Action requires that the developer (and or the developer's representative through the principal contractor) engage a Wildlife Spotter Catcher with full registrations and licences provided in accordance with the Queensland Government's National Parks and Wildlife Services. A Registered Wildlife Spotter Catcher engaged shall have the minimum permits listed in this specification.

Action 2 – Wildlife Spotter Catcher to Prepare a Wildlife Protection and Management Plan (WPMP)

The WPMP should be submitted to the Queensland Department of Environment and Science (DES) or relevant authority and or stakeholder. The WPMP should include the following information:

- Description of the project with reference to impacts on wildlife or wildlife habitat;
- Pre development plan of the site showing habitat areas, features, corridors, riparian habitats and adjacent areas;
- Results of any fauna surveys including pre-clearance surveys; and
- A wildlife and habitat impact assessment based on the proposed development works.

Action 3 – Prepare a Wildlife and Habitat Impact Mitigation Plan

Following completion and endorsement of the WPMP the Wildlife Spotter Catcher should prepare a more specific Wildlife and Habitat Impact Mitigation Plan, which will include details on:

- Measures required to be completed to minimise wildlife and habitat impacts during operational works;
- Wildlife capture and removal plan;
- Contingency plan for wildlife requiring euthanasia, other veterinary procedures or captive care;
- Wildlife storage and housing plan;
- Wildlife release and disposal plan; and
- Post works measures to minimise impacts on wildlife.

Prior to the commencement of any construction works, a pre-start meeting is to be held between the project manager, site fore-person, plant operators and applicable Local and State Government representatives. At the pre-start meeting, the Wildlife Spotter Catcher is to outline the clearing process and the requirements of the WPMP.

Action 4 – Wildlife Spotter Catcher Role at Pre-Start Meeting

Prior to the commencement of any construction works, a pre-start meeting is to be held between the project manager, site fore-person, plant operators and applicable Local and State Government representatives. At the pre-start meeting, the Wildlife Spotter Catcher is to outline the clearing process and the requirements of the WPMP.

Action 5 – During Construction

The Wildlife Spotter Catcher is to be on-site during all phases of construction which involve potential impacts on wildlife or

habitat (unless otherwise specified by the appointed Wildlife Spotter Catcher. This will enable to the Wildlife Spotter Catcher to make any necessary adjustments to the approved Clearing Management Plans and WPMP to cater for any specific issues encountered during the clearing works.

Action 6 – Post Works Reporting

During the course of all site works, including the pre-clearance surveys, the Wildlife Spotter Catcher is to keep an accurate record of all animals encountered, captured, incidents and disposals for each stage of the project. The records should form part of the Wildlife Management Report to be issued under licence requirements to the State Government. The Wildlife Management Report should consist of the following 3 sections, where they are applicable to the project:

1. **Wildlife Habitat Management Plan** – Aspects of the planning, design, construction and ongoing operation of the project in which risks to wildlife have been identified. This plan should also include recommendations and outline the type, frequency and timeframes for monitoring
2. **Wildlife Capture and Disposal Plan** – Should contain the following details for each captured animals:
 - a. Species
 - b. Identification name or number
 - c. Sex (M, F or unknown)
 - d. Approximate Age or Age Class (neonate, juvenile, sub-adult, adult)
 - e. Time and date of capture
 - f. Method of capture
 - g. Exact point of capture (GPS coordinates)
 - h. State of health
 - i. Incidents associated with capture likely to affect health
 - j. Veterinary intervention or treatments
 - k. Time held in captivity
 - l. Disposal method (euthanasia, translocation, re-release)
 - m. Date and time of disposal
 - n. Detailed of disposal (GPS points of release)
 - o. For released animals, location relative to point of capture
3. **Animal Injury and Euthanasia Report** – similar details for the Wildlife Capture and Disposal Plan should be included in this report.

07 PRE-CLEARANCE - FAUNA MANAGEMENT

Koala Management & Welfare

While clearing activities aim to protect and minimise impacts to all terrestrial fauna, specific management measure for Koala are required as part of the EPBC approval and have been specified within the Fauna Management Plan, prepared by Saunders Havill Group which should be read in conjunction with the plan.

- Koalas on site are protected
- Koala habitats are protected, maintained and their integrity enhanced.
- The abilities for Koalas to move into, within and out of the site is maintained.
- All persons involved in construction and operation of the development are aware of the site values, their potential to impact on Koalas and their habitats, and their responsibilities in regard to procedures and strategies within approved management plans.



Koala Signage



Significant Tree Protection Fencing



Fauna Spotter During Tree Clearing



Fauna Spotters Retrieving Fauna



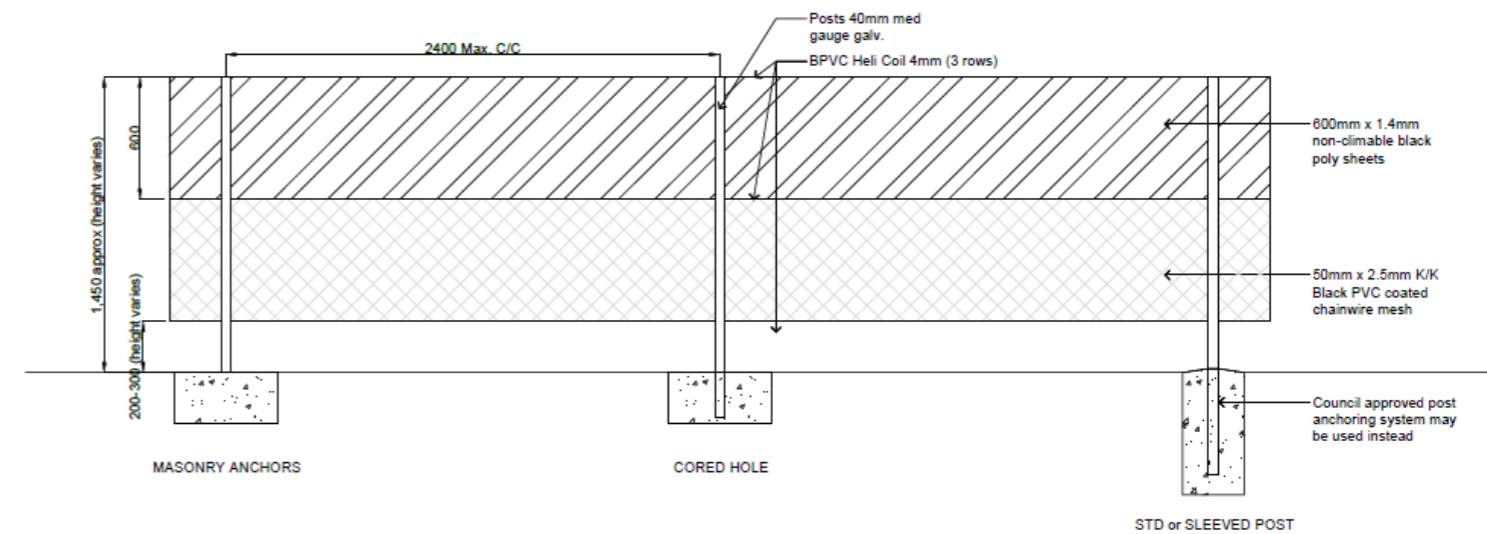
Fauna Exclusion Fencing



Fauna Signage



Fauna Exclusion Fencing



TYPE 1 FAUNA FENCE - TYPICAL DETAIL
SCALE 1:20 @ A1

Construction fencing detail

07 PRE-CLEARANCE - FAUNA MANAGEMENT

Table 2: P2 – Protection of MNES Fauna and Native Wildlife (Vegetation Clearing)

Table 2: P2 – Protection of MNES Fauna and Native Wildlife (Vegetation Clearing)

Issue	P2 - Protection of MNES Fauna and Native Wildlife	Responsible Person	Timing
Implementation Requirements	No vegetation removal shall occur until relevant approvals have been obtained All permit conditions will be followed	Proponent	Prior to Clearing
	To prevent damage and / or disturbance to native vegetation and associated habitats outside clearing areas: <ul style="list-style-type: none"> a. Clearing boundaries will be delineated on all drawings and in the field to define the authorised clearing extent. b. Installation of vegetation clearance markers (e.g. high visibility poly-web fencing) prior to the commencement of vegetation clearance to identify and protect remnant vegetation for retention. c. Along the interface between clearing precincts and open space / Environmental Corridors, trees are to be felled towards the clearing precinct to avoid damage to these areas. d. Clearing vegetation is to be stockpiled so as not to impede damage to drainage channels. 	Contractor	Prior to Clearing & During Clearing
	No clearing of vegetation is to commence without the presence of an EHP approved Fauna Spotter Catcher, or where clearing includes non-juvenile Koala habitat trees, a Koala Spotter. <ul style="list-style-type: none"> a. An appointed Site Superintendent will be responsible for ensuring that all trees scheduled for removal will be checked on the day of their removal for the presence of fauna by an EHP approved Fauna Spotter Catcher / Koala Spotter as vegetation characteristics dictate. b. The EHP approved Fauna Spotter will check and clear vegetation prior to its felling and, if required, will relocate native wildlife (other than Koala) into appropriate habitat areas within the site which are to be retained. In the case of a Koala being present, translocation of the individual/s must occur in accordance with requirements for Koala. c. Hollow-bearing (habitat) trees are to be identified in the field and by plan prior to commencement of clearing operations. These shall be marked and dismantled using a cherry picker and a suitably qualified arborist and Fauna Spotter Catcher. If fauna is present, the tree will either be left standing overnight to allow the animal to leave via their own volition, or will be encouraged from the tree by shaking or other methods deemed suitable by the fauna spotter. Where no signs of fauna are identified, machinery operators will be instructed to fell trees in a manner directed by the fauna spotter to minimise potential risk to fauna. 	Fauna Spotter Catcher	Prior to Clearing
	All construction personnel shall attend environmental training as part of the site induction process prior to entering the work site. As part of this training, all personnel will be instructed on their obligations in regard to vegetation clearing protocols and to protect native fauna. Areas identified for vegetation clearance are to be clearly defined and detailed in site inductions.	Contractor	Prior to Clearing
	Conduct vegetation clearing in sequential stages for sites with an area of more than 3 hectares. Vegetation clearing is to conform with the following: <ul style="list-style-type: none"> d. The direction of clearing should be away from threatening processes or hostile environments, and towards the clearing precinct to avoid damage to adjacent retained habitat links, ensuring that: <ul style="list-style-type: none"> i. Fauna are not required to cross roads or move through developed areas or disturbed areas. Such as residential areas or areas that require movement of greater than 100m over cleared ground to reach suitable habitat; ii. Fauna area not left occupying an "island" of habitat between hostile environments, such as a road and a cleared area, unless there are no other more suitable habitat areas in which to direct fauna, and iii. Fauna can safely leave the site of clearing and relocate to adjacent habitat. 	Contractor	During Clearing

* EHP is now the Department of Environment and Science (DES)

07 PRE-CLEARANCE - FAUNA MANAGEMENT

Table 2: P2 – Protection of MNES Fauna and Native Wildlife (Vegetation Clearing)

Issue	P2 - Protection of MNES Fauna and Native Wildlife	Responsible Person	Timing
	<ul style="list-style-type: none"> e. Cleared vegetation is to be stockpiled so as not to impede fauna movement. f. Where vegetation to be cleared includes non-juvenile Koala habitat trees, implement sequential clearing as per the requirements for Koala. 		
	Companion animals (e.g. dogs) are to be banned from all construction areas.	Contractor	At all times
	Vehicle access within retained habitat/linear open space will be limited and appropriately signed.	Contractor	Prior to Clearing & During Clearing
	<p>Conduct vegetation clearing in accordance with Section 4 of the Spring Mountain FMP (prepared by Saunders Havill Group dated July 2015) which outlines specific implementation requirements for <u>Koala</u> including clearing in sequential stages for sites. For a site more than 6ha vegetation clearing is to conform with the following:</p> <ul style="list-style-type: none"> a. Is carried out in a way the ensures Koalas on the area being cleared have enough time to move out of the clearing with without human intervention and involves <ul style="list-style-type: none"> i. Ensuring not more than 3ha or 3% of the sites area (whichever is greater) in any one stage ii. Ensuring that between each stage and the next there is at least one period of 12 hours at starts at 6pm on a day and ends at 6am on the following day, during which no trees are cleared on the site b. Is implanted in a way that ensures, while clearing is being carried out, appropriate habitat links are maintained within the clearing site and between the site and its adjacent areas allowing Koalas living on the site to move out of the site c. Ensures that no tree in which a Koala is present, or a tree with a crown overlapping a tree in which a Koala is present, is cleared until the tree is vacated by the Koala. d. Ensures that vegetation clearing is directed away from threatening processes, or hostile environments, and towards any retained vegetation or habitat links, ensuring that: <ul style="list-style-type: none"> i. Koalas are not pressured, through loss of habitat, to cross roads or move through developed or disturbed areas, such as residential areas or areas that require movement of greater than 100m over cleared ground to reach suitable habitat; ii. Koalas are not left occupying an "island" of habitat between hostile environments, such as road and cleared areas, unless there are no other more suitable habitat areas in which direct Koalas; and iii. Koalas can safely leave the site of clearing and relocate to adjacent habitat. e. The Koala spotter is responsible for ensuring, throughout the duration of clearing operations, that no tree in which a Koala is present, or a tree identified as being a risk to Koalas if felled, should not be felled, damaged or interfered with until the Koala has moved from the felling site of its own volitation. f. Where a Koala is present in a tree scheduled for removal, the tree will be marked with distinctive flagging tape (and other advisory means as required) and machinery operators will be briefed on the location of such trees and it will be clearly confirmed with operators that the subject tree(s) are to remain undisturbed until the Koala has moved of its own volition (where the strategy is to allow the Koala to move of its own accord, overnight). On the following day, such trees are to be checked again prior to their removal and, if necessary, the procedure is to be repeated until the Koala has moved g. A Koala spotter is not to be involved in the clearing of vegetation while they are responsible for identify Koalas on site. 	Contractor / Fauna Spotter Catcher/ Koala Spotter	During Clearing

*EHP is now the Department of Environment and Science (DES)

07 PRE-CLEARANCE - FAUNA MANAGEMENT

Table 2: P2 – Protection of MNES Fauna and Native Wildlife (Vegetation Clearing)

Issue	P2 - Protection of MNES Fauna and Native Wildlife	Responsible Person	Timing
	<p>A requirement that a permit to interfere with wildlife from EHP will be mandatory for the wildlife handling activities as will the appropriate Animal Ethics Permit from DAF. Construction personnel shall not attempt to handle any wildlife.</p> <ol style="list-style-type: none"> Fauna / Koala handling and relocation activities must only be undertaken by those identified on a current site-specific Damage Mitigation Permit (Removal and Relocation of Wildlife) from EHP. Koala Spotter/Fauna Spotter Catchers are required to relocate injured wildlife to the nearest designated veterinary clinic of wildlife hospital. Full contacts will be provided within the AWP. A register of fauna incidents / interactions is to be maintained daily during clearing operations. 	Fauna Spotter Catcher/Koala Spotter	During Clearing & Construction
	The timing of vegetation clearance should be selected in order to minimise impacts (direct and indirect) to affected fauna habitats during optimum breeding period.	Contractor	During Clearing
	Avoid clearing of vegetation between the hours of 6pm and 6am.	Contractor	During Clearing
Monitoring	For each day of native vegetation clearing operations, a daily audit log is to be completed by the Contractor either prior to, or on completion of daily operations. Audit of key requirements, e.g. clearing contained within designated limits, integrity of clearing boundary devices, no damage to vegetation outside clearing boundary, Fauna Spotter Catcher present.	Contractor	During Clearing
Reporting	Animal Welfare Plan is prepared prior to clearing operations by the appointed Fauna Spotter Catcher.	Proponent / Fauna Spotter	Prior to Clearing
	Weekly report by the Fauna Spotter Catcher/ Koala Spotter to the Contractor on the clearing of any native vegetation and any animals encountered, injured or relocated is to be submitted.	Contractor	During Clearing
	Monthly report by the Contractor the Site Superintendent on native vegetation operations, including compliance, non-compliance incidents (fauna injury and responses) and corrective actions, outcomes of Fauna Spotter Catcher activities.	Contractor	During Clearing & Construction
	Bi-annual report by the Site Superintendent to the Proponent. Report to consider incident patterns, if any, and provide recommended solutions and a description of the corrective actions taken.	Contractor	During Clearing & Construction
	Annual site audit by the Environmental Representative and report to the Proponent	Environmental Representative	During Clearing & Construction
Corrective Action	In the event that monitoring identifies practices inconsistent with the strategies developed for this FMP, the Contractor shall take the necessary corrective steps and note them in the monthly report to be reviewed by the Site Superintendent.	Contractor	During Clearing & Construction
	In the event that monitoring identifies practices inconsistent with the strategies developed for this SBMP, the Contractor shall take the necessary corrective steps and note them in the monthly report to be reviewed by the Site Superintendent	Contractor	During Clearing & Construction

* EHP is now the Department of Environment and Science (DES)

08 FAUNA MANAGEMENT - CONSTRUCTION

P3 – Maintenance of Safe Wildlife Movement Opportunities (Site Preparation Operations)

The following suite of best practice measures will be employed throughout the site to minimise fauna habitat fragmentation, facilitated fauna movement and reduce related injury and mortality. Management requirements are considered in the context of:

- Site preparation operations (i.e. during vegetation clearing and earthworks phases); and
- Design treatments and strategies for the built phase of the development

Table 3 describes the relevant management requirements in regard to site preparation operations. The following should be read in conjunction with the requirements for Koala design treatments and strategies for the built phase of the development.

Retention and rehabilitation of the 293ha of offset land for Conservation to the south, will occur as a result of the Spring Mountain development to maintain fauna movement and connectivity within and between the development site.

Objective

1. To avoid the impact of habitat fragmentation by roads and maintain safe movement opportunities for native wildlife (including Koala and Grey-headed Flying-fox) between linear open space.
2. To maintain fauna movement opportunities within retained habitat areas and minimise fauna movement opportunities through site preparations.

Management Strategy

- Develop a track plan for retained habitat areas/linear open space which allows fauna movement to be maintained
- Restrict access to retained habitat areas/linear open space for environmental management only.
- Reduce road speeds
- Increase driver awareness and education

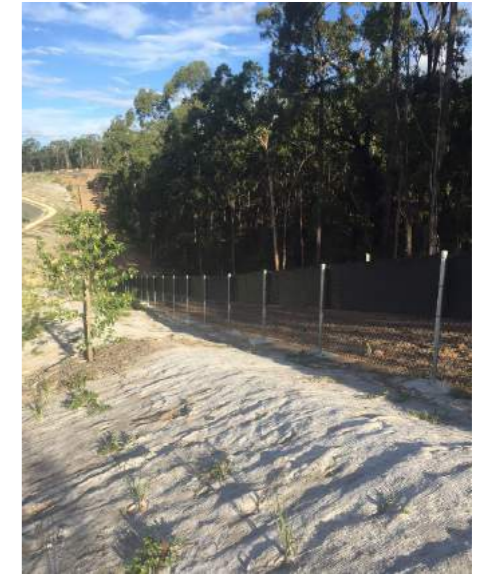
Performance Indicators

- Minimal fauna mortality.

Temporary Fencing

Prior to the commencement of vegetation clearing a temporary fauna exclusion fence will be erected around the area of clearing and works and be maintained until the completion of major civil works. The purpose of the fence is to minimise any native fauna (including koala) from entering into the clearing and or post clearing construction zone during a time when potential risks of impact are at their highest.

The fencing proposed is a “floppy-top” temporary fauna exclusion fencing as per the details and photos shown on this drawing sheet. This fencing type is preferred as it continues to allow any fauna within the impact zone to exit, however prevents new or re-entry once the fence is erected. The fencing type can also be erected along random alignments and relocated to new areas as the clearing areas expand in future clearing and development events. This fencing type has been successfully used as a temporary barrier on other koala related projects within the vicinity of major roads and housing areas.



Fauna exclusion fencing

Table 3: P3 – Maintenance of Safe Fauna Movement Opportunities – Site Preparation Operations

Table 3: P3 – Maintenance of Safe Fauna Movement Opportunities – Site Preparation Operations

Issue	P2 – Maintenance of Safe Fauna Movement Opportunities – Site Preparation Operations (Roads and Vehicle Interactions)	Responsible Person	Timing
Implementation Requirements	A site access plan is to be developed for the Environmental Corridors.	Proponent	Prior to Clearing
	Site protocols are to be established which restrict authorised area access to the approved track network identified with the plan.	Contractor	Prior to Clearing
	All construction personnel shall attend environmental training as part of the site induction process prior to entering the work site. As part of this training, all personnel will be instructed on their obligations in regard to vehicle movement restrictions and construction speed limits.	Contractor	Prior to Clearing
	Erect temporary exclusion fencing around the area of clearing and works and be maintained until the completion of major civil works.	Contractor	Prior to Clearing
	Vehicle movements outside designated operational areas (other than for land management purposes) will be prohibited.	Contractor	During Clearing & Construction
	Road speeds throughout construction areas and through retained habitat areas will be restricted to 50km/hr.	Contractor	During Clearing & Construction
	Strategic use of awareness signage is to be implemented along the interface between operational areas and Environmental Corridors and access restriction signage at all track entry points to Environmental Corridors during construction works.	Contractor	During Clearing & Construction
Reporting	Proposed construction access roads will be subject to design treatments to ensure safe fauna crossing opportunities. Construction of an elevated portion (or portions) in the form of bridging structures (culverts) in associated with guide fencing will be incorporated to ensure the provision of safe crossing opportunities.	Contractor	During Clearing & Construction
	Weekly inspection and log.	Contractor	During Clearing
	Monthly report by the Contractor to the Site Superintendent in regard to development / maintenance of structures implemented to facilitate fauna movement, review of fauna / vehicle incident patterns, if any, and provide recommended solutions, an a description of corrective actions taken.	Contractor	During Clearing & Construction
Monitoring	Bi-annual audit report by the Site Superintendent to the Proponent. Report to include compliance with site access restrictions, integrity of structure implemented to facilitate fauna movement, review of fauna/ vehicle incident patterns, if any, and provide recommended solutions, and a description of corrective actions taken.	Contractor	During Clearing
	Annual site audit by Environmental Representative and report to the Proponent.	Environmental Representative	During Clearing & Construction
Corrective Action	In the event that monitoring identifies practices inconsistent with the strategies developed for this SBMP, the contractor shall take the necessary corrective steps and note them in the monthly report to be reviewed by the Site Superintendent.	Contractor	During Clearing & Construction

09 THREATENED FLORA MANAGEMENT

P5 – Threatened Flora Management

Plectranthus habrophyllus, a herb listed as Endangered under the EPBC Act, has been recorded at several locations across the Spring Mountain project site. Core populations have been identified within Core Conservation areas by Yurrah. The majority of these locations are associated with waterways within linear open space and the habitat is to be protected.

Pre-clearance Survey

In accordance with the EPBC approved Threatened Flora Management Plan, prepared by Yurrah, pre-clearance surveys for each development precinct must occur by a suitable qualified person prior to the commencement of clearing. Any additional individuals must be recorded and translocated where necessary.

Translocation

Where plants are located within the development footprint of near the edge of the footprint, and are at risk of impact, these plants will be translocated to establish a new population in suitable habitat within the proposed Linear Open Space. The habitat for both translocated individuals and in situ individuals will be protected within a Core Conservation Area.

As an added habitat protection measures, Buffer Areas, with an offset width of 20m, will be established around Core Conservation Areas. No Go Zones must be marked out by the 20m buffer around known populations within Core Conservation areas. No work apart from conservation management activities is to be permitted within Core Conservation Areas.

Clearing and Construction

Plectranthus habrophyllus is to be protected from impacts of construction. Stormwater Management Plans, Bushfire Management Plans and Weed Management are to address threatened flora management.

Table 5 describes the relevant management requirements to address this issue.

Objective

1. To encourage the locally resident populations of threatened flora species to increase at a natural rate to a desired level on site.

Management Strategy

- Threatened flora habitat to be protected through the

- approved Threatened Flora Management Plan
- Recognise and protect all linear open space through management of interface between linear open space and development for bushfire, weeds and access issues.
- Establish Core Conservation Areas and Buffer Areas at threatened flora locations to target management activities.
- Design a network for fire-trails to defined spatial blocks to prevent damage caused by uncontrolled fire and allow access for maintenance.
- Awareness and education of threatened flora presence.
- Ensure all responsible persons are aware of the significance of this issue and are fully aware of any likely impacts of scheduled works.

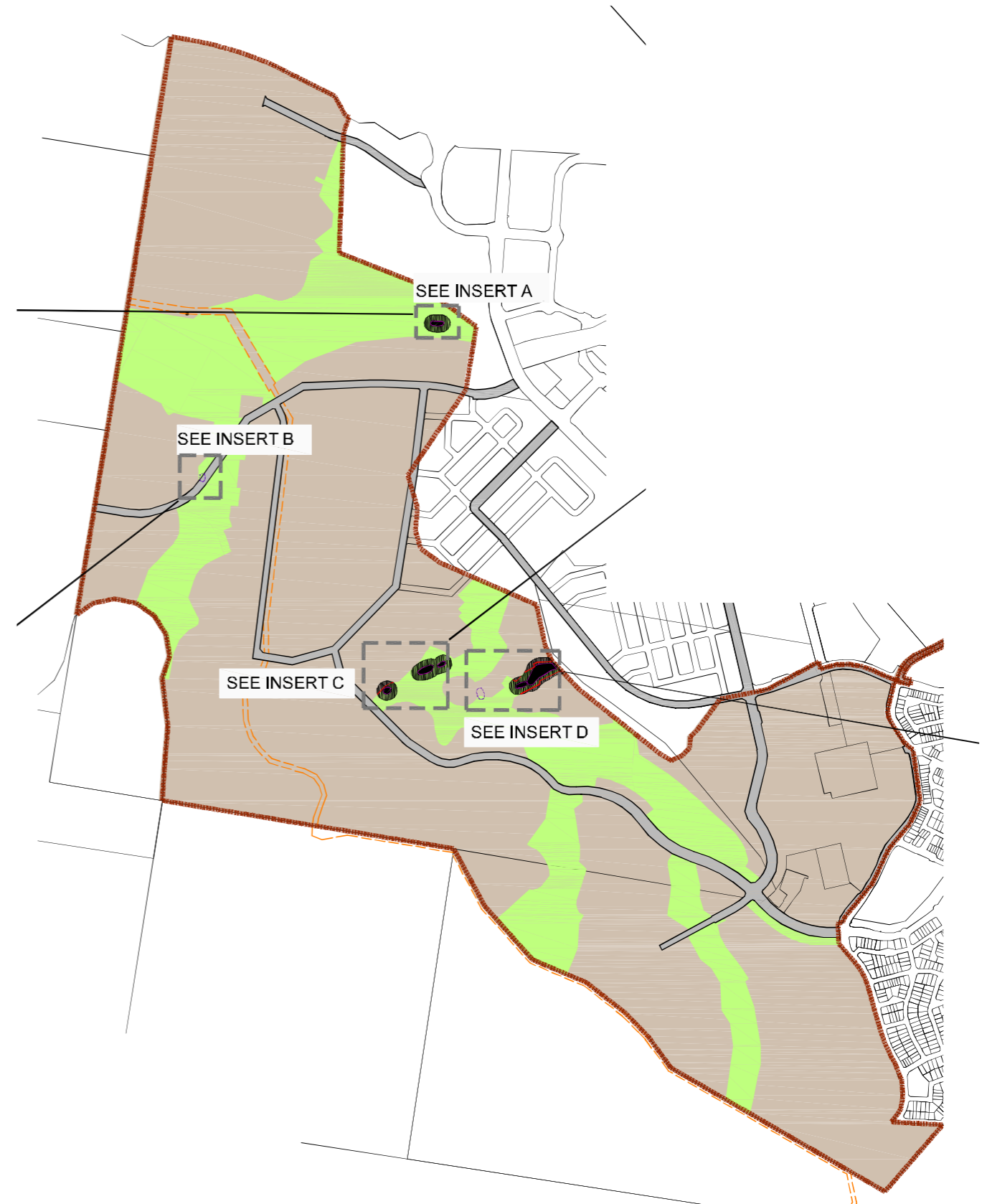
Performance Indicators

- 0% weed cover in Core Conservation Areas and Buffers
- No evidence of damage from stormwater run-off construction
- Recruitment of threatened flora seedlings in Core Conservation Area
- No damage from uncontrolled access
- Condition of protective fencing remains undamaged.

It is noted that no potential patches of *Plectranthus habrophyllus* were identified by Yurrah (2015) within or adjacent to the V17 clearing area. Pre-clearance surveys for *Plectranthus habrophyllus* were undertaken by Saunders Havill Group for the V17 clearing area and a 20m buffer. No *Plectranthus habrophyllus* was recorded as a part of pre-clearance surveys.



Photo: *Plectranthus habrophyllus* (listed as Endangered under the EPBC Act (Cth))



09 THREATENED FLORA MANAGEMENT

Table 5: P5 – Threatened Flora Management

Table 5: P5 – Threatened Flora Management

Issue	P4 Threatened Flora Management	Responsible Person	Timing
Implementation Requirements	<p>Core Conservation Areas located within 20m of land proposed for uses other than conservation, identified as areas for additional interface management including:</p> <ol style="list-style-type: none"> 1. A detailed survey of threatened plant locations by a registered surveyor. 2. Where interfacing with residential, a fence with a minimum 50% transparency to be erected along interface boundary. Signage to be erected identifying area as 'Significant Ecological Area' and 'Dumping of Rubbish Prohibited' and where further information can be obtained. 3. Where interfacing with road verge or park landscaping, design and plant selection considers and avoids any potential impact upon the threatened flora species. Landscape plant species selected will be non-invasive, existing trees to be retained where possible to maintain microclimate, and clear edge formed that discourages access. Mulch to be preferably sourced from the site and is to be weed free. 	Proponent	Design /Prior to Clearing &
	<p>Undertake pre- clearing surveys.</p> <ol style="list-style-type: none"> 1. Once the line of clearing (including construction of parks, pedestrian tracks and fire trails) is marked out by a registered surveyor, an additional survey for threatened species is to be undertaken within the clearing area, and Linear Open Space within 10m of the clearing line. 2. Additional individuals, or groups of individuals located to be recorded with a GPS, given a unique ID number, and flagged with marking tape. Where necessary individuals will be translocated in accordance with protocols in the Threatened Flora Management Plan. 3. The boundary of the Core Conservation Areas will be adjusted as necessary (if not within construction footprint), to include any additional individuals located during of the pre-clearing survey. 	Proponent	Prior to Clearing
	<p>Establish No Go Zones.</p> <ol style="list-style-type: none"> 1. Core Conservation Areas less than 20m from of the clearing and construction footprint will be identified on construction drawings and through signage on site as 'No Go Zones'. Their associated Buffer Areas will be identified as 'Proceed with Caution Zones'. 2. Work within the Buffer Area will require supervision by the Project Ecologist. 3. No work apart from conservation management activities is to be permitted within the Core Conservation Areas. 	Contractor	Prior to Clearing
	<p>Erect exclusion fencing and signage.</p> <ol style="list-style-type: none"> 1. Where Linear Open Space has not been fenced as part of general vegetation protection, temporary fencing must be installed around the Core Conservation Area, where practical, and necessary (i.e. steep terrain may form natural barrier). The temporary fence shall be a minimum of star pickets with 3 strand wire and high visibility mesh attached to the top wire (with minimum gap of 500mm along the bottom) and erected prior to clearing. 2. The required alignment and extent of the fencing is to be undertaken in consultation by the project ecologist and inspected before the start of clearing. 3. Signage is to be attached to fencing clearly identifying the site as a significant ecological area and a 'No Go Zone', and no entry permitted unless approval given by Proponent. Mapping will be produced identifying location of threatened flora and alignment of protective fencing during detailed design for each Phase of the Spring Mountain 	Contractor	Prior to Clearing

09 THREATENED FLORA MANAGEMENT

Table 5: P5 – Threatened Flora Management

Issue	P4 Threatened Flora Management	Responsible Person	Timing
	<p>Stormwater Management controls to be installed through implementation of an Approved Stormwater Management Plan for Spring Mountain.</p> <ol style="list-style-type: none"> The Stormwater Management Plan will outline management required to ensure water quality and quantity flowing into Core Conservation Areas and all areas of proposed conservation are at predevelopment levels. All stormwater management devices are to be installed and inspected prior to clearing and construction. Stormwater management devices to be regularly checked and maintained to ensure they perform their intended function. 	Contractor	Prior to Clearing
	<p>Induct all site workers and visitors in the presence and significance of threatened species on site, and on the management measures being implemented at the present time. All personal associated undertaking works within a Buffer Area are to be made aware of the presence of threatened plants, and are to be educated on protective measures in place, prior to entering area. No personnel to enter Core Conservation Area without approval.</p>	Contractor	Prior to Clearing
	<p>Fire trails will be installed in accordance with the Final Bushfire Management Plan with locked gates and structures to prevent access to vehicles, other than emergency and maintenance vehicles, into all Linear Open Space areas.</p>	Contractor	During Clearing
Monitoring	<p>Core Conservation Areas and Buffers will be monitored on a 3 monthly basis for the first year, and annual thereafter for 2 years subject to satisfactory performance including:</p> <ul style="list-style-type: none"> Provide general photographic descriptive record Establish permanent sample quadrats located in each management block, according to an agreed sample strategy Confirm the absence of environmental weeds Measure species richness of the ground layer. Measure abundance of flowing threatened species. Measure abundance of threatened species seedlings General observations. 	Contractor	During Construction / Operation
Reporting	<p>Every 3 months by the Environmental Representative to the Proponent for the first year, every 6 months in the second year and once in the third year/</p>	Environmental Representative	During Clearing & Construction
	<p>Annually by the Proponent to the DoE including non-conformances, corrective actions and assessment of monitoring results.</p>	Proponent	During Clearing
Corrective Action	<p>In the event that monitoring identifies practices inconsistent with the strategies developed for this SBMP, the contractor shall take the necessary corrective steps and note them in the monthly report to be reviewed by the Site Superintendent.</p>	Contractor	During Clearing & Construction

10 FLORA AND FAUNA CHECKLIST

Pre-Clearance Checklist:

This Site Based Management Plan (V17) contains only a small portion of information included within existing assessment management plans for Spring Mountain. Subsequently, the volume of requirements remains complex and overlapping. To ensure compliance with approval requirements and provide a record trail for reporting to the Commonwealth Department of the Environment and Energy the following pre-clearance checklist is to be completed with each phase of works.

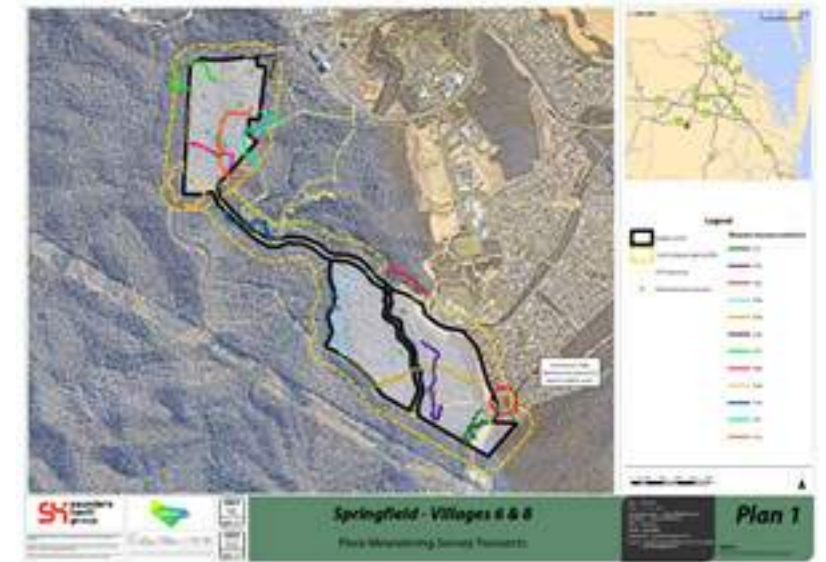
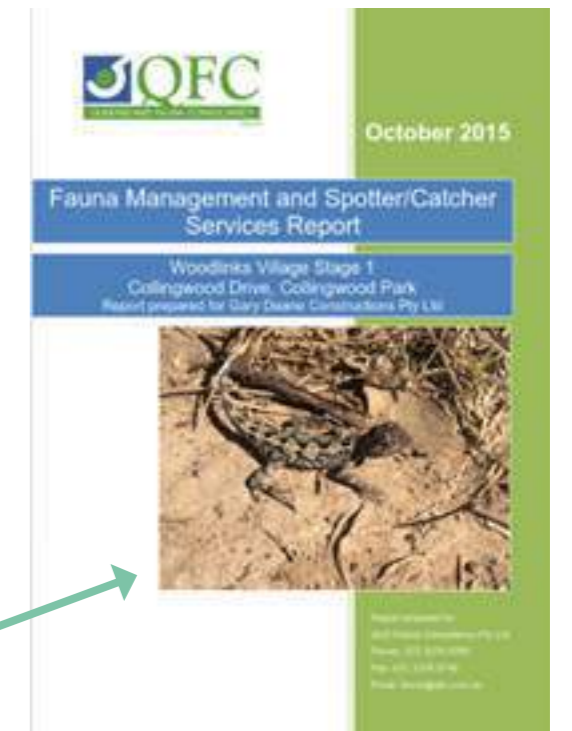
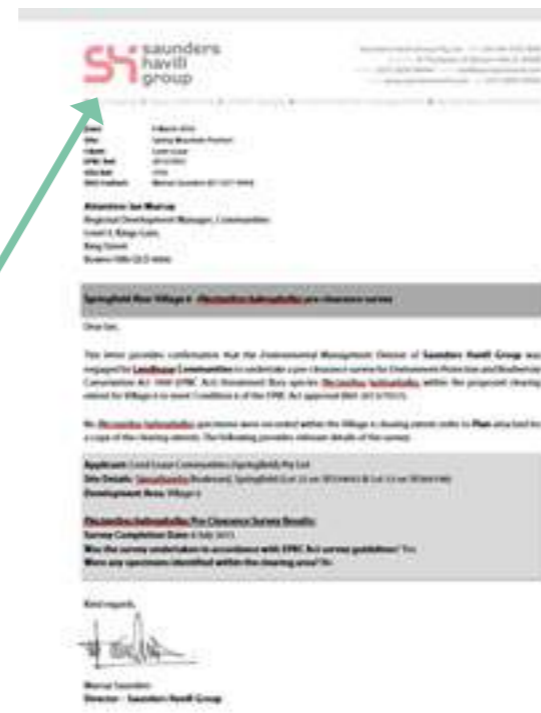
The checklist is to be completed by the principal contractor and requires sign off by the Environmental Coordinator and Fauna Spotter. To complete the checklist a number of items need to be issued from various parties to the principal contractor (eg confirmation of pre-clearance surveys).

The pre-clearance checklist is established in a format which enables direct annual reporting to the Department of the Environment and Energy and will include a number of attachments.



Springfield Rise - Environmental Pre-Start Checklist

Project Area: Village 6		Date:			
Contractor: Shadforth's		Construction Stage/ Activity:			
Date work is to start:		Early works bulk earthworks			
Date work is to cease:		Compliance			
#	Control Measure	Yes	No	N/A	Comments
1	Are clearing extents marked out and fenced? (N.B. Fencing is required as per ICC permits unless instructed otherwise by Council, Fauna Spotter or Environmental Coordinator)	✓			Completed by Wolter Consulting on DATE
2	Has the fencing of clearing extents demarcation been inspected by the Environmental Coordinator?	✓			Completed by SHG on DATE
3	Has sign off been provided by the Environmental Coordinator for demarcation areas?	✓			See Attachment 1
4	Has certification for pre-clearance flora been provided? (N.B. Exemptions/permits for protected plants under the NCA must be obtained by EHP where works occur in a High Risk Area). Please provide date and reference.	✓			See Attachment 2. EHP Reference: AR082999 22 January 2016
5	Have pre-clearance checks surveys for <i>Plectanthus habrophyllus</i> been completed over the clearing area?	✓			Completed by SHG on 8 July 2015. See Attachment 3.
6	Are there 'no-go' zones identified within the clearing area?		✓		
7	If yes, have 'no-go' zones been demarcated, fenced, signed and inspected by the Environmental Coordinator and Contractor?			✓	
8	Has the appointed Fauna Spotter completed pre-clearance surveys and reports?				
9	Has the appointed Fauna Spotter identified any				



Appendix K

Village 17 Environmental Pre-start Checklist

Springfield Rise

Environmental Pre-Start Checklist

Project Area: Village 17		Date: 22 July 2019			
Contractor: Shadforths Civil		Construction Stage/ Activity:			
Date work is to start: 23 July 2019		Vegetation clearing associated with the interim uses bulk earthworks and vegetation clearing ADP approval (4337/2018/IU) for V17. Refer to Attachment 1 for V17 vegetation clearing extent.			
Date work is to cease: 18 August 2019					
		Compliance			
#	Control Measure	Yes	No	N/A	Comments
1	Is the works extent within the EPBC 2013/7057 referral area?	✓			Refer Attachment 2 for V17 works extent in relation to EPBC referral area.
2	Are clearing extents marked out and fenced? (N.B. Fencing is required as per ICC permits unless instructed otherwise by Council, Fauna Spotter or Environmental Coordinator)	✓			Fencing extents have been set out by Shadforth and RPS on 4 th July 2019.
3	Has the fencing of clearing extents demarcation been inspected by the Environmental Coordinator?	✓			Fencing extents were checked by SHG on 5 th July 2019. Refer Attachment 3.
4	Has sign off been provided by the Environmental Coordinator for demarcation areas?	✓			Refer Attachment 3 for sign off by the Environmental Coordinator.
5	Has certification for pre-clearance flora been provided? (N.B. Exemptions/permits for protected plants under the NCA must be obtained by DES where works occur in a High Risk Area). Please provide date and reference.	✓			See Attachment 4. DES Reference: WA0016513 (issued 8 July 2019).
6	Have pre-clearance checks surveys for <i>Plectanthus habrophyllus</i> been completed over the clearing area?	✓			Completed by SHG on 5 th July 2019. See Attachment 5 for Sign off by the Environmental Coordinator.
7	If <i>Plectanthus habrophyllus</i> 'no-go' zones have been identified within the clearing area, have these been demarcated, fenced, signed and inspected by the Environmental Coordinator and Contractor?			✓	No <i>Plectanthus habrophyllus</i> was recorded within the works extent. See Attachment 5.
8	If works involve clearing within a Fisheries mapped waterway for waterway barrier works, are the works compliant with applicable accepted development codes and / or permits?			✓	DAF mapping shows Tully Gully as a green (low risk) waterway for waterway barrier works. Refer Attachment 6. The works extent is outside this waterway. However, if construction

Springfield Rise

Environmental Pre-Start Checklist

					access results in temporary waterway barrier works, a pre-works notification in accordance with Section 7.2 of the Accepted Development Requirements for constructing or raising waterway barrier works (Oct 2018) (ADR) is required to DAF prior to the commencement of works.
9	If works involve clearing within a watercourse defined under the Water Act 2000, are the works compliant with applicable exemptions and / or permits?			✓	A determination on all watercourses in the Springfield Rise development area was made by NRM. Tully Gully identified as being a 'drainage feature' for the purpose of the Water Act, and thus riverine protection requirements do not apply. See Attachment 6.
10	Has the appointed DES permitted Fauna Spotter completed pre-clearance surveys and reports within 2 weeks of clearing?	✓			A Fauna Spotter Catcher Pre-Clearance and Habitat Values Survey was completed by QFC on the 18 th July 2019. See Attachment 7 for a copy to the WPMP – Village 17 (July 2019).
11	If the appointed Fauna Spotter identified any sensitive areas for consideration in clearing methods, have these been addressed?	✓			See Attachment 8 for the Fauna Spotter Catcher WHIMP – Village 17 (July 2019), prepared by QFC.
12	If a sick or injured animal, specifically a koala, is identified during clearing, are appropriate controls in place to ensure the animal can seek medical attention if required?	✓			See Attachment 8 for the Fauna Spotter Catcher WHIMP – Village 17 (June 2019), prepared by QFC.
13	Have all contractors, subcontractors and associated personnel been instructed on environmental procedures and controls?	✓			Environmental Awareness Acknowledgement Notice, signed by Shadforth (July). See Attachment 9.
14	Has a Council pre-start been completed?	✓			A pre-start was undertaken with Council and relevant parties on 9 July 2019.

NOTE: if the answer to any question above is NO then the clearing activity will not proceed.

Springfield Rise

Environmental Pre-Start Checklist

Compliance Awareness

All works are to be undertaken in accordance with the V17 Environmental Pre-Start Package which includes the 'V17 Ultimate Site Based Management Plan, prepared by Saunders Havill Group, dated June 2019' and this V17 Environmental Pre-Start Checklist and attachments.

Signing below demonstrates acknowledgement of the environmental pre-start procedures and requirements listed in the checklist above and associated attachments.

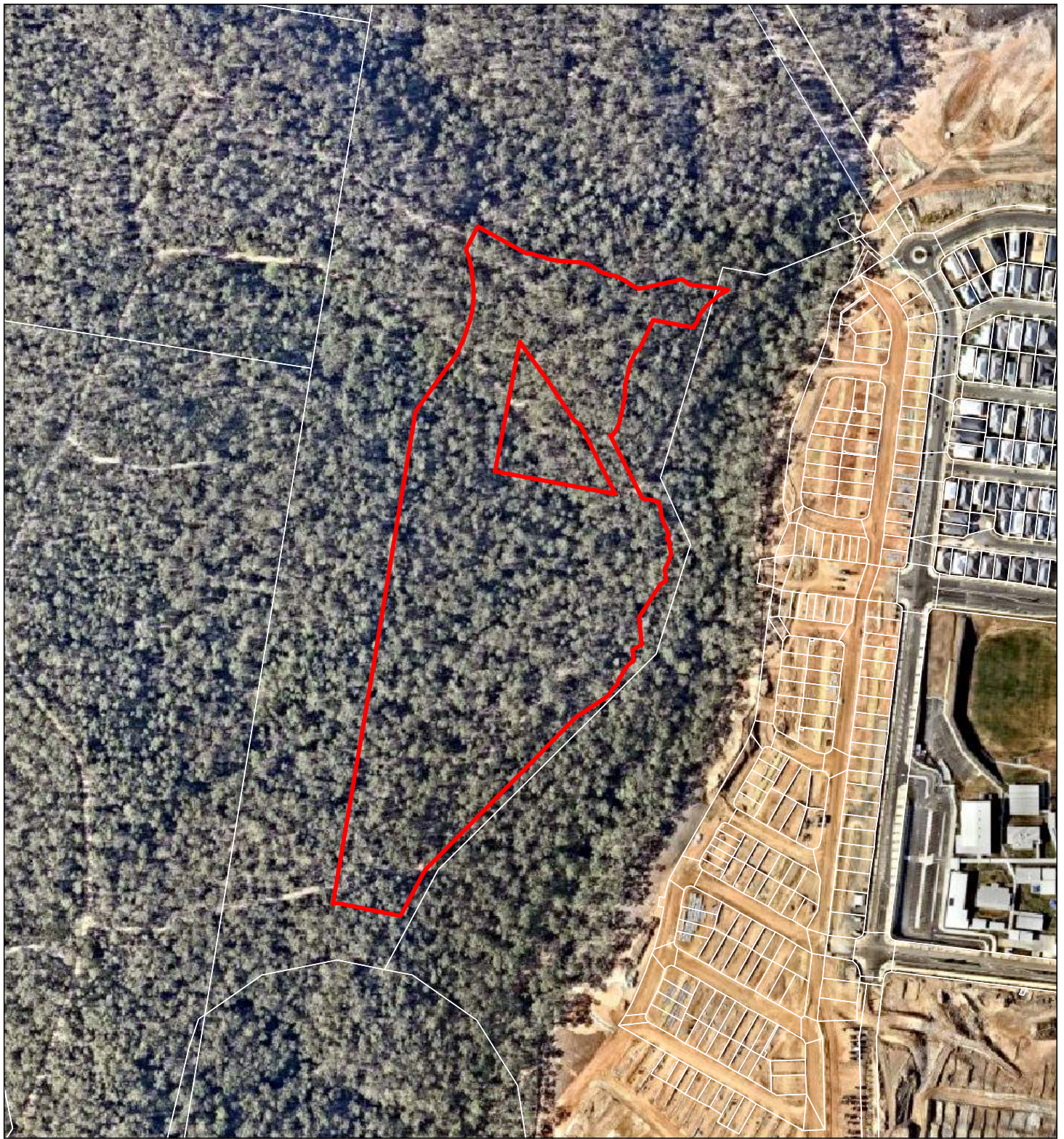
Name	Company	Position	Signature	Date
Daryl Langhorne	Lendlease Communities	Client Representative		22/07/19
Tony Hooper	Shadforths Civil	Site Contractor		22/7/19
Dustyn North	Wood Mulching Industries	Clearing Contractor		22/07/2019
BRYAN ROBINSON	Queensland Fauna Consultancy	Fauna Spotter Catcher		22/7/19
Nick Gill	Northrop	Superintendent (Project Engineer)		22/07/2019
Keira Grundy	Saunders Havill Group	Environmental Coordinator		22/07/19

Springfield Rise

Environmental Pre-Start Checklist

Attachment 1

Vegetation Clearing Area for V17



Legend

- Qld DCDB
- Proposed works extent

Figure 1
 Village 17
 Works Extent

File ref. 7522 Attachment 1 Works Extent A
Date 11/07/2019
Project Springfield Rise - Op-works

0 50 100 200 m
 Scale (A4): 1:5,000 [GDA 1994 MGA Z56]



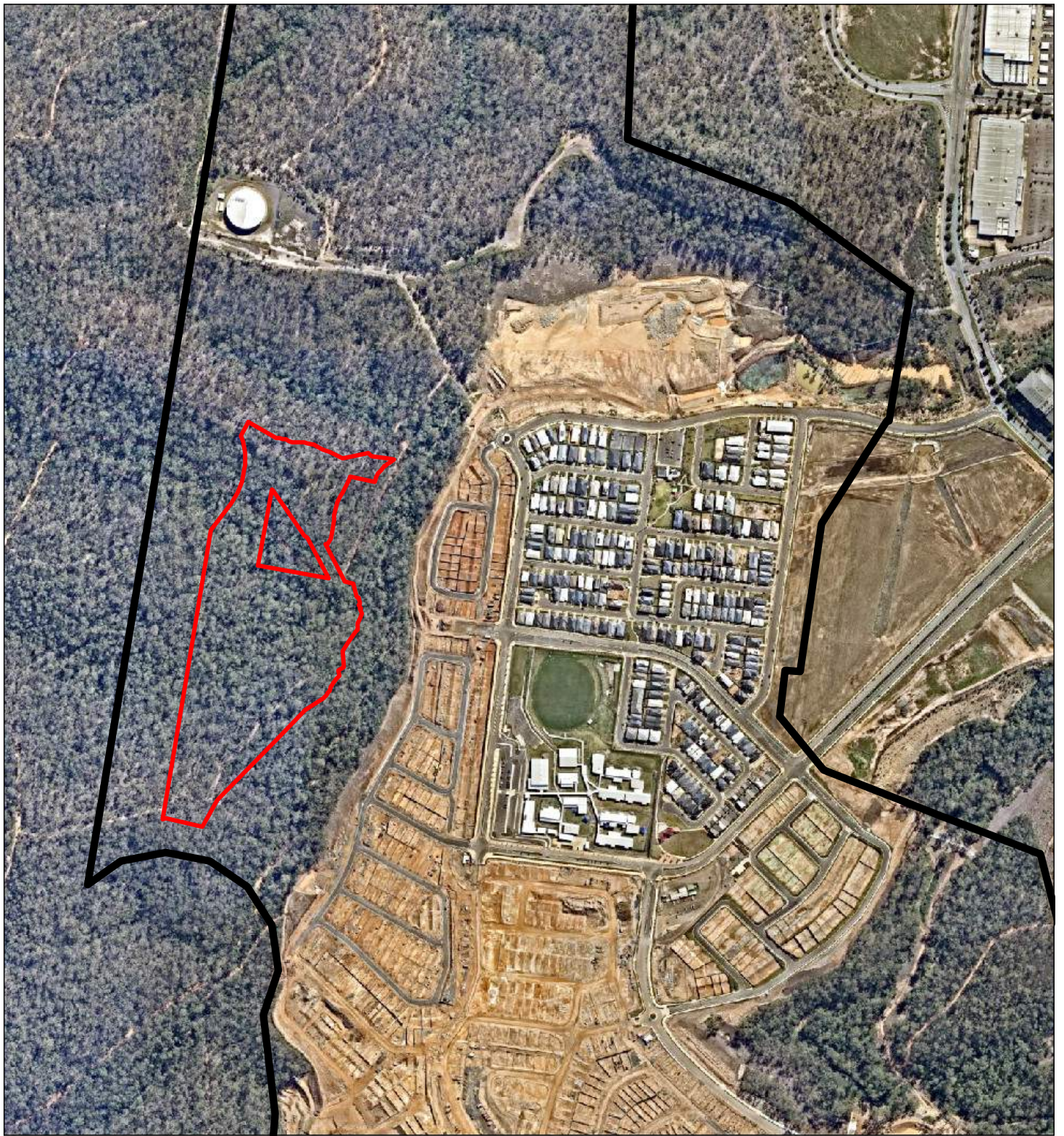
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Springfield Rise

Environmental Pre-Start Checklist

Attachment 2

V17 - EPBC Referral Extent Confirmation



Legend



-  Project EPBC referral area
-  Proposed works extent

Figure 2

*Village 17
Project Referral Area*

File ref. 7522 Attachment 2 EPBC Referral A
Date 11/07/2019
Project Springfield Rise - Op-works

0 50 100 200 300 m
 Scale (A4): 1:8,500 [GDA 1994 MGA Z56]



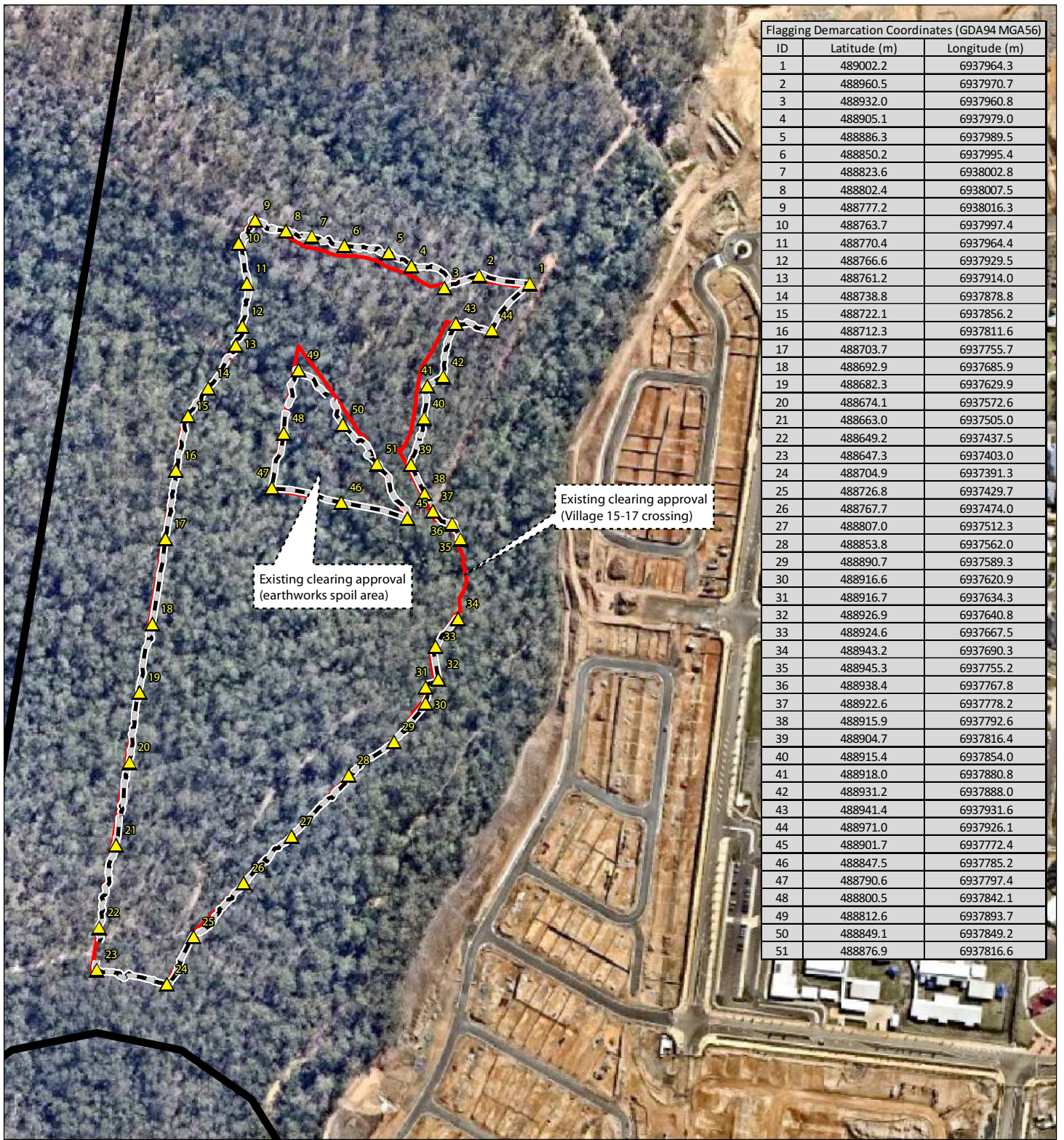
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Springfield Rise

Environmental Pre-Start Checklist

Attachment 3

V17 – Environmental Coordinator Demarcation Flagging Sign-off

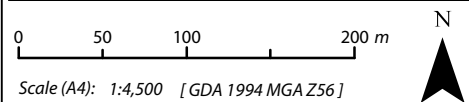


Legend

- Proposed works extent
- Works extent flagging demarcation
- ▲ Flagging demarcation coordinates

Figure 4
 Village 17
 Flagging Demarcation

File ref. 7522 Attachment 4 Demarcation A
Date 11/07/2019
Project Springfield Rise - Op-works



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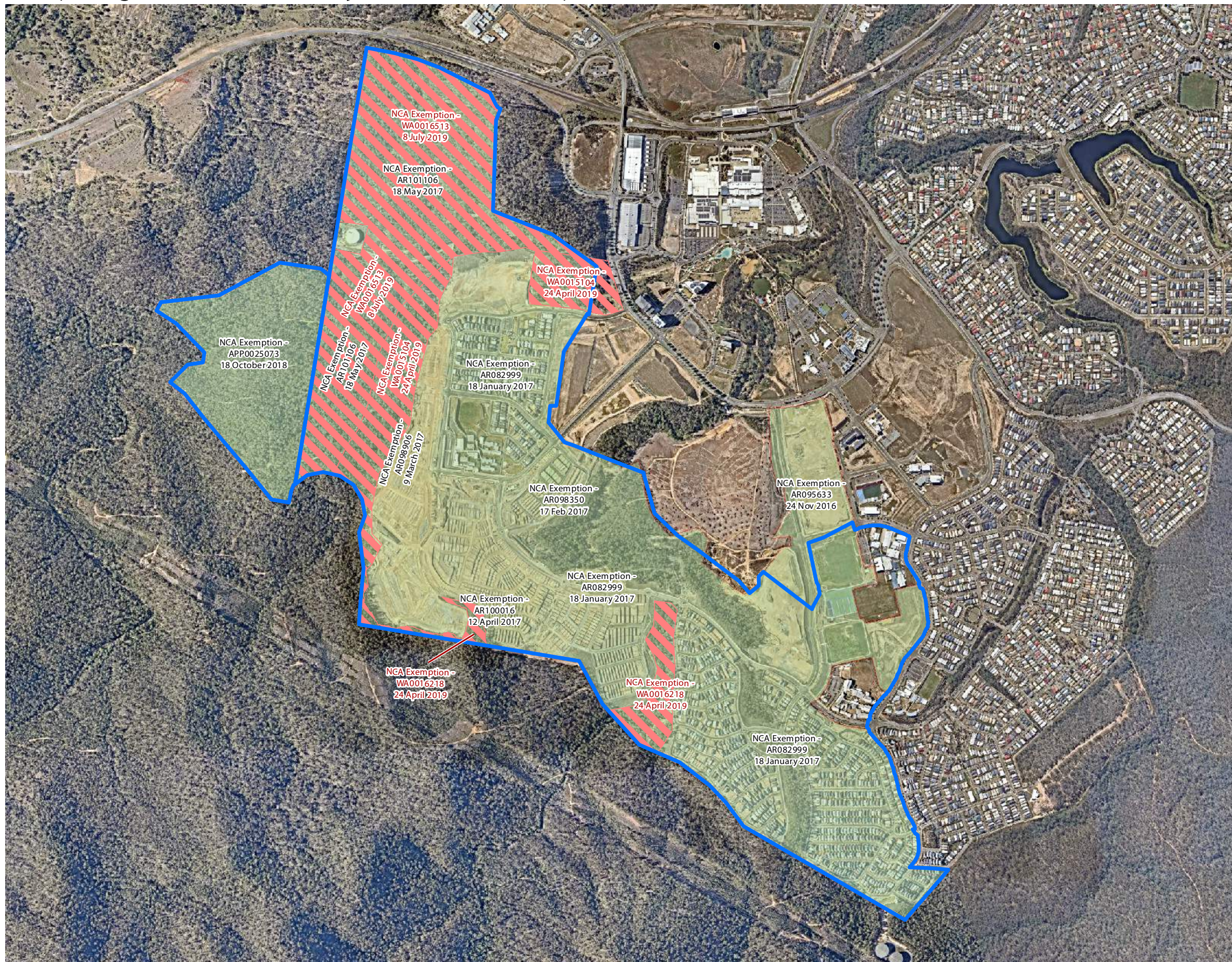
Springfield Rise

Environmental Pre-Start Checklist

Attachment 4

DES Exempt Clearing Protected Plants Notification

1. Springfield Rise - Project NCA Exemption Overview






NOTES
 This plan was prepared as a desktop assessment tool. The information on this plan is not suitable for any other purpose. Property dimensions, areas, numbers of lots and contours and other physical features shown have been compiled from existing information and may not have been verified by field survey. These may need verification if the development application is approved and development proceeds, and may change when a full survey is undertaken or in order to comply with development approval conditions. No reliance should be placed on the information on this plan for detailed design or for any financial dealings involving the land. Saunders Havill Group therefore disclaims any liability for any loss or damage whatsoever or howsoever incurred, arising from any party using or relying upon this plan for any purpose other than as a document prepared for the sole purpose of accompanying a development application and which may be subject to alteration beyond the control of the Saunders Havill Group. Unless a development approval states otherwise, this is not an approved plan.

Layer Sources: QLD GIS Layers (QLD Gov. Information Service 2019), Aerial (Nearmap 2019)

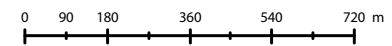
* This note is an integral part of this plan/data. Reproduction of this plan or any part of it without this note being included in full will render the information shown on such reproduction invalid and not suitable for use.

LEGEND

-  Project area
-  NCA - Exempt clearing areas
-  NCA - Revised exempt clearing areas with new approval no.

Issue	Date	Description	Drawn	Checked
G	10/07/2019	Revised exemptions added	TC	KG

Transverse Mercator | GDA 1994 | Zone 56 | 1:16,482 @A3

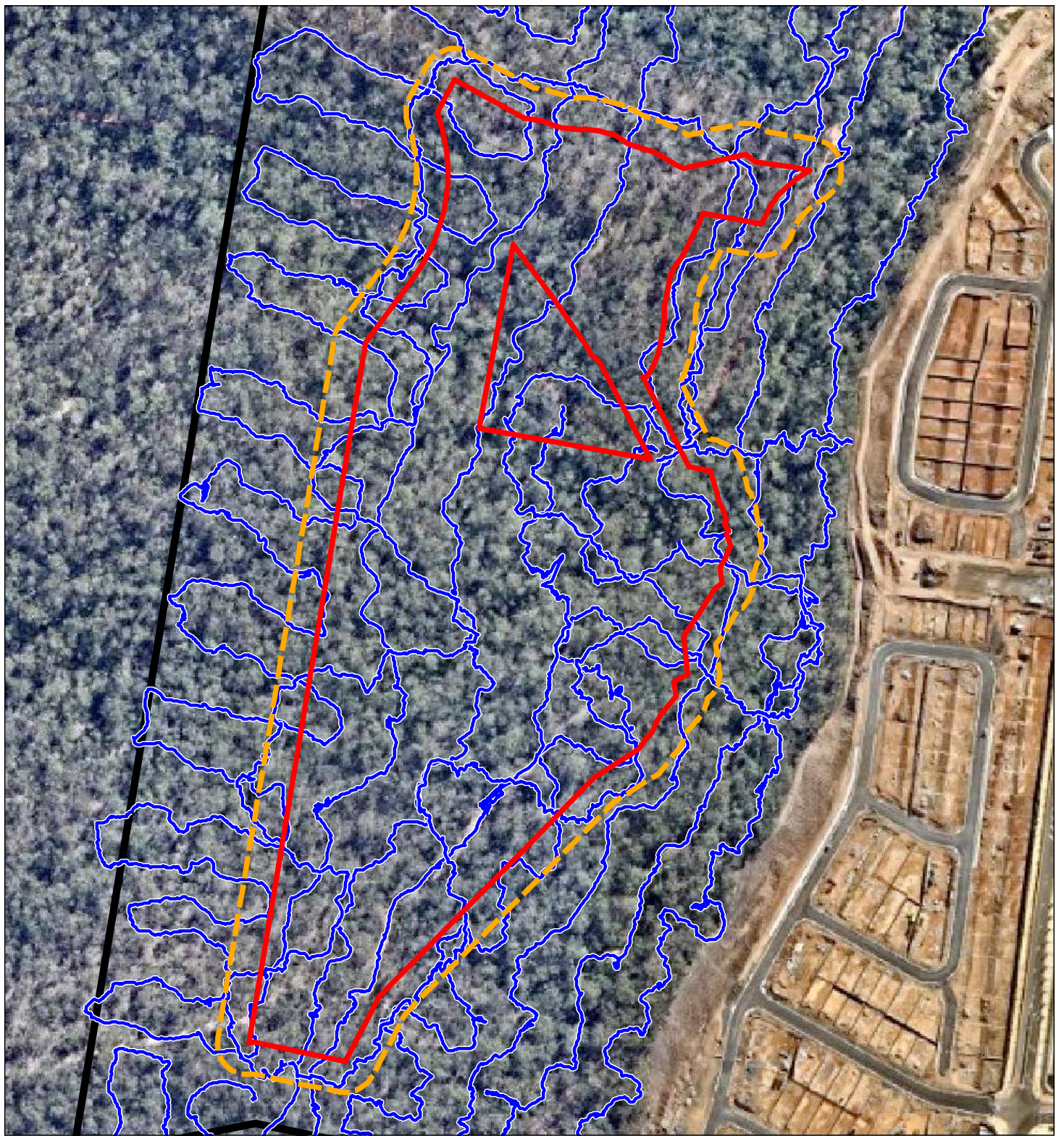


Springfield Rise

Environmental Pre-Start Checklist

Attachment 5

V17 - Plectranthus habrophylls survey and sign-off by Environmental Coordinator



Legend





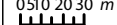
-  Project EPBC referral area
-  Proposed works extent
-  *plectranthus habrophyllus* 20m survey buffer area
-  *plectranthus habrophyllus* meander search

Figure 3

Village 17
plectranthus habrophyllus Survey

File ref. 7522 Attachment 3 Plectranthus A
Date 11/07/2019
Project Springfield Rise - Op-works

0 5 10 20 30 m



Scale (A4): 1:3,500 [GDA 1994 MGA Z56]



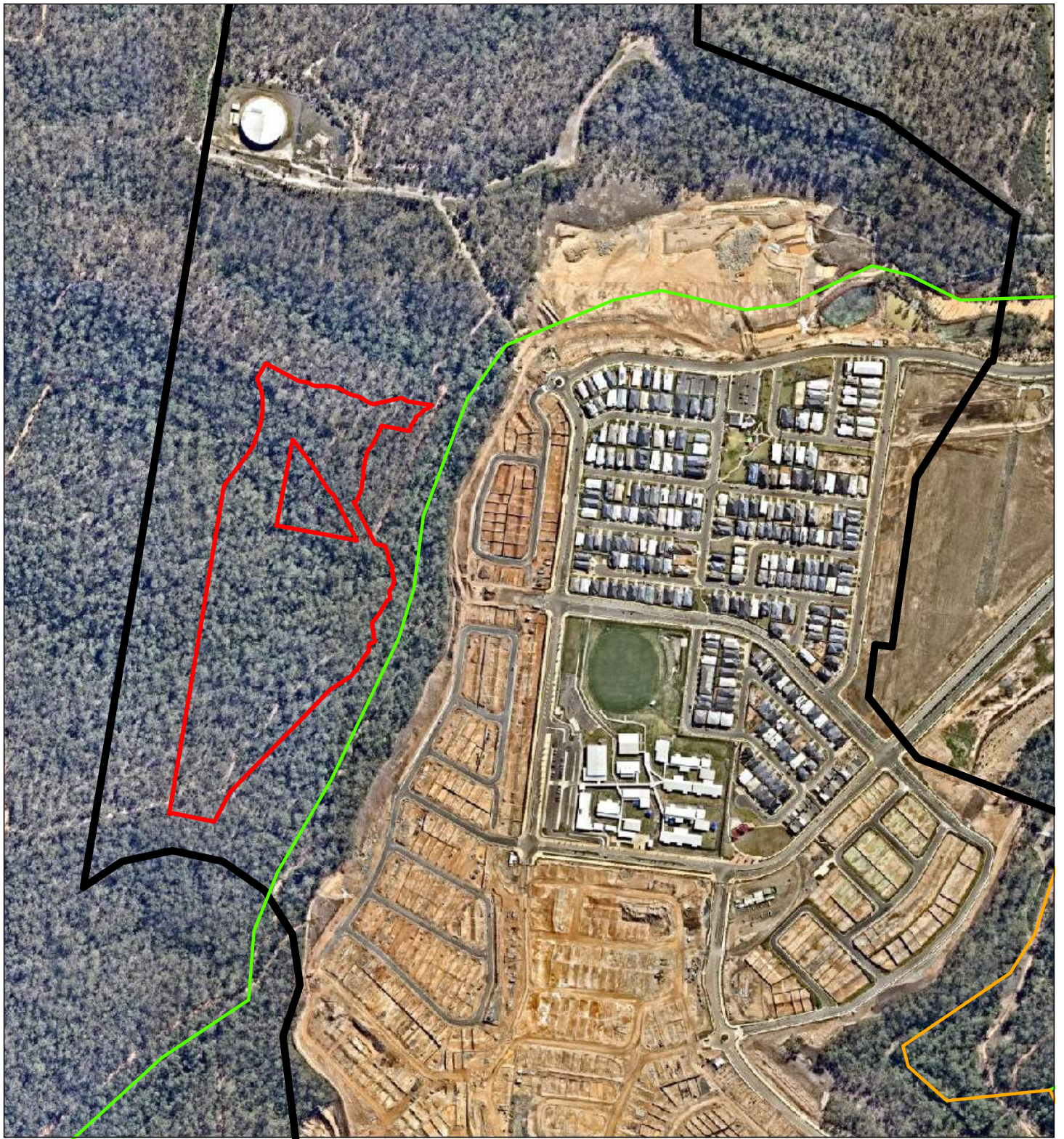
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Springfield Rise


Environmental Pre-Start Checklist


Attachment 6

WWBW and RRP Permit Determination Mapping



Legend

 Project EPBC referral area

 Proposed working extent

Waterways

Risk of Impact

 1 - Low


 2 - Moderate

Figure 5

*Village 17
Waterways for Waterway
Barrier Works*

File ref. 7522 Attachment 5 Waterways A

Date 11/07/2019

Project Springfield Rise - Op-works



Scale (A4): 1:7,500 [GDA 1994 MGA Z56]



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Springfield Rise

Environmental Pre-Start Checklist

Attachment 7

WPMP- V17, prepared by Fauna Spotter Catcher



July 2019

Fauna Spotter Catcher Pre-Clearance Survey and Wildlife Protection & Management Plan

Springfield Rise – Village 17
Spring Mountain, Queensland
Report prepared for Shadforth Civil Contractors



Report prepared by
QLD Fauna Consultancy Pty Ltd
Phone: (07) 3376 9780
Fax: (07) 3376 9740
Email: fauna@qfc.com.au

Date:	19/07/19
Title:	Fauna Spotter Catcher Pre-clearance and Habitat Values Survey Springfield Rise – Village 17, Spring Mountain, Queensland
Author/s:	Bryan Robinson, Ramona Rohwedder
Reviewed by:	Bryan Robinson
Field personnel:	Jonathan Pickvance, Brett Bennett
Status:	Final Report
Filed as:	QFC FHA Shadforth Springfield Rise V17 July 2019.doc

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1. Introduction

1.1 Project Background

Queensland Fauna Consultancy Pty Ltd (QFC) has been engaged by Shadforth Civil Contractors to conduct a Fauna Spotter Catcher Pre-clearance and Habitat Values Survey and present a subsequent report for the Village 17 of the Springfield Rise development, Spring Mountain, Queensland. The site location is presented in Map 1.

The objective of this report is to summarise the existing fauna values present and assign mitigatory strategies applicable to probable species likely to be encountered during the clearing of identified habitats throughout or within specific localities of the site. Fauna species both common and of elevated conservation value have been considered within the parameters of onsite investigations and, where provided to QFC, include review of current fauna and floristic reports that may influence the assemblages expected to utilise the micro habitats evident within the site.

This review encompasses species identified under the provisions of the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* and the Queensland *Nature Conservation Act 1992*. Further consideration is given, where applicable, to species of iconic, cultural and/or regional significance identified under commonwealth, state or local planning instruments aimed at the persistence of biodiversity values within the area.

1.2 Project Location and Site Description

Village 17 is located in the northern portion of the Springfield Rise precinct, and will adjoin Village 18 to the west. Village 17 is will adjoin a wildlife/vegetation corridor along the eastern, southern and northern boundary.

Existing features exhibit primarily a woodland vegetative complex with drainage features present due to an undulating topography. Dominant trees species across several vegetation types include *Eucalyptus*, *Corymbia*, *Angophora* and *Lophostemon* species.



Map 1: Village 17 Clearing Area
(Image provided by Shadforth Civil Contractors, June 2019)

1.3 Current Permits and Authorities

All activities conducted during the site investigations were implemented under the provisions of a number of permits issued to Queensland Fauna Consultancy Pty Ltd by the Department of Environment and Science (DES), formerly the Department of Environment and Heritage Protection (DEHP), and the Department of Employment, Economic Development and Innovation (DEEDI). These permits and additional authorities are listed in Table 1.

Table 1: Current Permits and authorities issued to QFC

Permit/Authorisation	Permit Number	Expiry Date
Damage Mitigation Permit	WIMP17840916	5 th December 2019
Rehabilitation Permit	WA0001454	10 th September 2020
Scientific Purposes Permit	WISP16935816	14 th February 2021
Scientific User Registration	Registration Number 589	27 th February 2022
Animal Ethics	CA 2019/02/1259	27 th February 2022

These permits and approvals enable QFC to conduct the investigation, observation and relocation of protected animals exposed to disturbance due to infrastructure expansion resulting in the destruction of natural and artificial habitats.

2. Methodology

A site inspection was carried out on 28th June 2019 by Qld Fauna Consultancy. A second inspection was undertaken on 18th July 2019 due to time elapsed since the first survey and anticipated clearing commencement. A standard set of observational techniques aimed at maximising the detection of fauna and the probable habitats they may occupy were employed to ascertain and identify the current fauna values throughout the project area. Where species of elevated conservation significance were foreseen as potentially present targeted searches were instigated to further evaluate individual species habitat.

Due to the habitat variability expressed across the development site the composition of investigations may include a range of features that entail specific components indicative of the presence of particular species or faunal groups. This may include where evident, observation of activity or signs of both historical and current use.

These may include but are not limited to the following:

- Identification of terrestrial microhabitats such as ground hollows, rock, burrows, leaf litter, stands of heavy vegetation, fallen branches and bark exfoliations;
- Identification of arboreal micro habitats including basal, trunk and limb hollows, tree fissures, bark exfoliates and arboreal termitaria;
- Identification of constructed arboreal micro habitats including bird nests and Ringtail Possum dreys;
- Artificial habitats including but not limited to ornamental gardens, discarded rubbish, human dwellings and other infrastructure;
- Observation and investigation of aquatic habitats including dams, soaks, creeks, rivers and seasonally inundated vegetation communities. Artificial aquatic habitats may include constructed drains and culverts. Further components of interest include bank profiles and undercuts, submerged and/or exposed timber and rock, immediate aquatic and riparian vegetation, surfacing animals, nesting and/or feeding birds;
- Direct observation of active or exposed fauna within terrestrial, aquatic and arboreal habitats;
- Identification of scats, tracks and scratchings to determine fauna potentially present or to have historically utilised the site for either transient or longer term life history purposes.

2.1 Specific methodology for Koalas *Phascolarctos cinereus*

Due to specific requirements and the cryptic nature of the Koala the following techniques were employed to assist in ascertaining the current and historical presence/absence status of the species at the site:

- Use of binoculars to inspect the crown, forks and trunk of trees for individuals currently occupying the site;
- 'Drip zone' searches at the base of known food trees for the presence of scats to a radius equal to that of the crown of individual trees;
- Inspection of trunks for scratchings indicative of use by Koalas.

3. Findings

The findings endeavor to demarcate the existing habitat profiles and the features present into three distinct groups: terrestrial, arboreal and aquatic. All habitat features present onsite are noted, however it is probable additional features will be present with these being accounted for during the Fauna Spotter Catcher process to be applied to all vegetation clearing across the site.

3.1 Terrestrial Habitat Features

The terrestrial fauna values of the site consist of a variety of different components and microhabitat features. These features include understorey of varying density (Figure 1 and Figure 2), with sections exhibiting moderate to dense vegetative cover consisting primarily of Lantana *Lantana camara* thickets (Figure 3).

Leaf litter and bark exfoliations (Figure 4) are also a feature on site, being present in abundance and at variable depths, providing refugial opportunities and microhabitat connectivity that can be exploited by a number of different native terrestrial vertebrate and invertebrate species. The site is also exhibitive of timber piles, hollow logs and woody debris (Figure 5 to Figure 7).

Rock piles and rocky outcrops also feature throughout the clearance area (Figure 7 to Figure 8) providing potential habitat value for resident and transient fauna. Terrestrial termitaria (Figure 9) may provide foraging and refugial opportunities with Short-beaked Echidna *Tachyglossus aculeatus* foraging activity was noted at several localities (Figure 10)

Mammal assemblages may comprise both native and introduced species, with Macropod scats sighted throughout the clearance survey area (Figure 11). Other potential native mammals occurring on site include the Northern Brown Bandicoot *Isodon macrourus* which may be present in localities with significant vegetative ground cover, and Bandicoot foraging activity was also observed throughout the site (Figure 12).

Localities for identified terrestrial habitat features are presented in Map 2. GPS coordinates for terrestrial habitat features are shown in Table 2. Additional terrestrial habitat features noted during the July inspection are denoted with an asterisk.

A comprehensive list of fauna species recorded in the region can be viewed in Appendix C.

Table 2: Localities for identified terrestrial habitat features

Number	Habitat Feature	GPS Coordinates	
		Latitude	Longitude
1	Bark Exfoliations (Terrestrial)	-27.68524156	152.8853198
2	Bark Exfoliations (Terrestrial)	-27.68399048	152.8860616
3	Bark Exfoliations (Terrestrial)	-27.68534479	152.8854979
4	Bark Exfoliations (Terrestrial)	-27.68495178	152.8869205
5	Hollow Log	-27.68462629	152.8855275
6	Rock Pile	-27.68708785	152.8851547
7	Rock Pile	-27.68759155	152.8851296
8	Rock Pile	-27.68729345	152.8852708
9	Rock Pile	-27.68388367	152.8859033
10	Rock Pile	-27.68583679	152.8861418
11	Terrestrial Termitaria	-27.68251038	152.887976
12	Terrestrial Termitaria	-27.68533325	152.8874902
13	Terrestrial Termitaria	-27.68577576	152.8857625
14	Woody Debris	-27.68430707	152.885497
15	Woody Debris	-27.68520691	152.8853868
16	Woody Debris	-27.68699862	152.8856727
17	Woody Debris	-27.68356323	152.885761
18	Woody Debris	-27.68478394	152.885551
19	Woody Debris	-27.68499756	152.8872045
20*	Burrow	-27.685981	152.886716
21*	Burrow	-27.685828	152.885634
22*	Rock Pile	-27.685302	152.877512
23*	Rock Pile	-27.676912	152.885893
24*	Terrestrial Termitaria	-27.685017	152.887690
25*	Terrestrial Termitaria	-27.685307	152.887510



Figure 1: Sparse understorey in area previously burnt area



Figure 2: Regrowth understorey



Figure 3: Dense Lantana thickets



Figure 4: Dense leaf litter and bark exfoliations



Figure 5: Timber pile



Figure 6: Hollow log



Figure 7: Woody debris and rock piles



Figure 8: Rock piles



Figure 9: Termite mound



Figure 10: Possible Echidna foraging activity



Figure 11: Macropod scat



Figure 12: Bandicoot foraging activity

Map 2: Localities for identified terrestrial habitat features



3.2 Arboreal Habitat Features

The clearance area consists predominately of Eucalypt woodland consisting of trees of varying height, species and density suitable for feeding and nesting resources (Figure 13 to Figure 15). The intermittent contiguous canopy structure within the vegetation represented may be facilitative of arboreal progression for species such as Brushtail Possum *Trichosurus vulpecula* and Common Ringtail Possum *Pseudocheirus peregrinus*.

A number of hollow-bearing trees and stags feature throughout the clearance survey area (Figure 16 to Figure 19), which may provide potential habitat opportunities for arboreal mammals, reptiles, parrots and microbats. Exfoliating bark on tree trunks may provide refugial opportunities for skinks, geckos and microbats (Figure 20).

Arboreal termite mounds are present at the site (Figure 21 to Figure 23), with excavations noted during the inspection. Species such as the Lace Monitor *Varanus varius* and Laughing Kookaburra *Dacelo novaeguineae* utilises arboreal termitaria for egg deposition and long-term incubation. Several avian nests were noted during the survey (Figure 24). The nests did not appear active at the time, however further inspections are recommended immediately prior to clearing commencement. Additional avian nests were noted during the second inspection however, these also did not appear active at the time of the survey.

Localities for identified arboreal habitat features are presented in Map 3. GPS coordinates for all indicative arboreal habitat features are shown in Table 3. Additional arboreal habitat features noted during the July inspection are denoted with an asterisk.

Primary and secondary Koala food trees located in the clearance area include Grey Ironbark *Eucalyptus siderophloia*, Blackbutt *Eucalyptus pilularis*, Flooded Gum *Eucalyptus grandis* Large-leaved Spotted Gum *Corymbia henryi*, Pink Bloodwood *Corymbia intermedia*, Spotted Gum *Corymbia citriodora*, and Swamp Box *Lophostemon suaveolens*. However, no evidence was observed to indicate recent use of these trees by koalas. No koala scats were found during 'drip zone' searches and characteristic scratchings were not found during trunk investigations. A Koala habitat values map for the clearance area is presented in Appendix A.

Table 3: Localities for identified arboreal habitat features

Number	Habitat Feature	GPS Coordinates	
		Latitude	Longitude
1	Arboreal Termitaria	-27.68271698	152.8879996
2	Arboreal Termitaria	-27.68313599	152.8863306
3	Arboreal Termitaria	-27.68601953	152.8854547
4	Arboreal Termitaria	-27.68397522	152.8861133
5	Arboreal Termitaria	-27.68470764	152.8855026
6	Arboreal Termitaria	-27.68670873	152.8855079
7	Arboreal Termitaria	-27.68630858	152.885774
8	Arboreal Termitaria	-27.68563843	152.8863596
9	Arboreal Termitaria	-27.68341064	152.8862262
10	Arboreal Termitaria (with excavation)	-27.68412781	152.8859698
11	Bird Nest	-27.6859436	152.8856056
12	Bird Nest	-27.68582059	152.885715
13	Bird Nest	-27.68557739	152.8863578
14	Dead Stag	-27.68437195	152.8881753
15	Dead Stag	-27.68475342	152.8857728
16	Dead Stag	-27.68478588	152.8857911
17	Dead Stag	-27.68504333	152.8855649
18	Dead Stag	-27.68606567	152.8860288
19	Dead Stag	-27.68600947	152.8862828
20	Dead Stag	-27.68614197	152.8862127
21	Dead Stag	-27.68685913	152.8856988
22	Dead Stag	-27.68684387	152.8854678
23	Dead Stag	-27.68336487	152.8860527
24	Exfoliating Bark (Arboreal)	-27.68695026	152.8851727
25	Exfoliating Bark (Arboreal)	-27.68725586	152.8850622

26	Exfoliating Bark (Arboreal)	-27.6854248	152.8855927
27	Hollow Bearing Tree	-27.68247986	152.8883785
28	Hollow Bearing Tree	-27.68591309	152.8873517
29	Hollow Bearing Tree	-27.68354797	152.8857502
30	Hollow Bearing Tree	-27.68429173	152.885995
31	Hollow Bearing Tree	-27.68595886	152.8851806
32	Hollow Bearing Tree	-27.68516923	152.8871277
33	Hollow Bearing Tree	-27.68438988	152.8870267
34	Hollow Bearing Tree	-27.6839447	152.8859114
35*	Bird Nest	-27.685071	152.887511
36*	Bird Nest	-27.685511	152.887443



Figure 13: Site overview – Eucalypt woodland



Figure 14: Site overview – Eucalypt woodland



Figure 15: Site overview – Canopy structure



Figure 16: Hollow-bearing tree



Figure 17: Hollow-bearing stag



Figure 18: Stag



Figure 19: Stag



Figure 20: Exfoliating bark



Figure 21: Arboreal termitaria



Figure 22: Arboreal termitaria

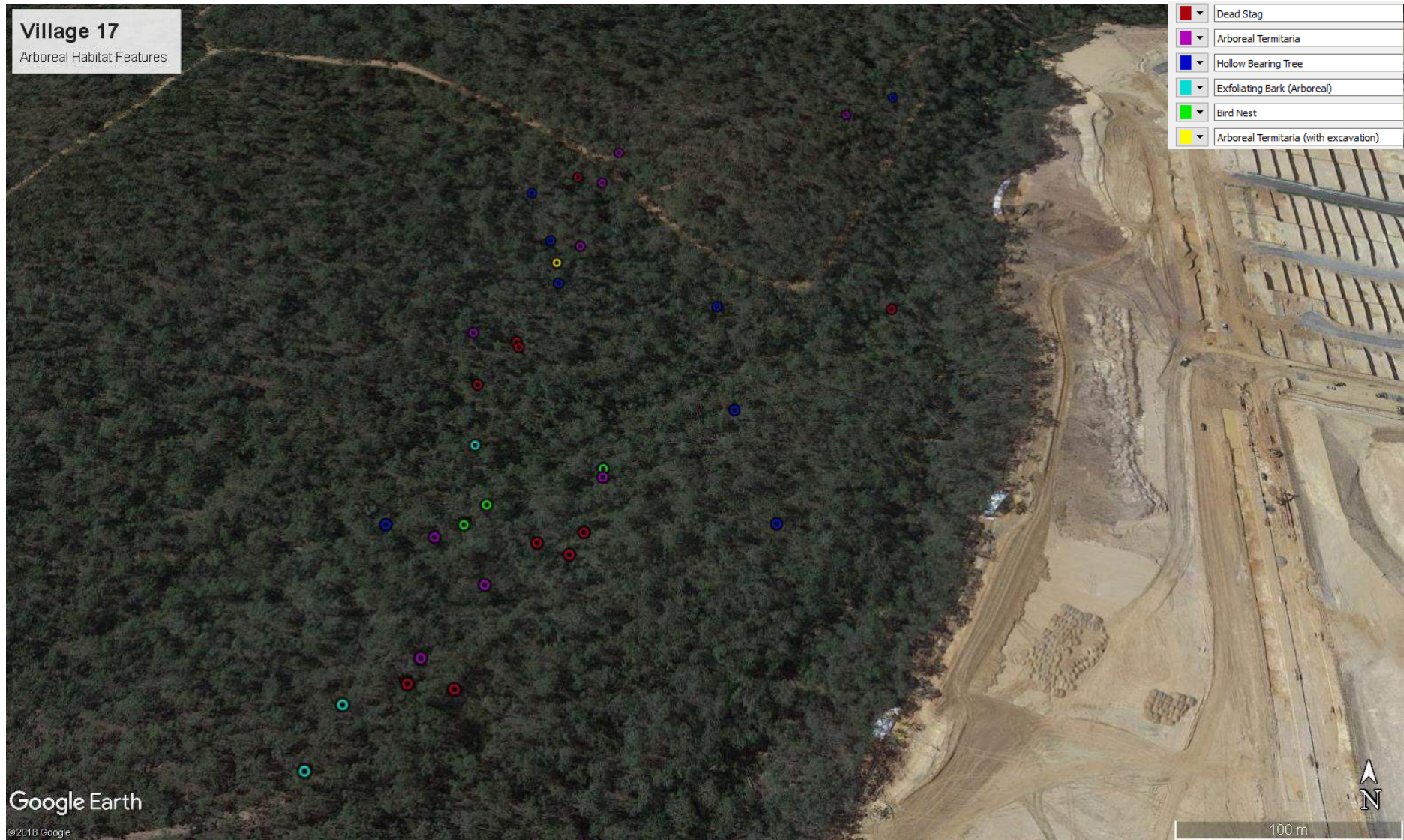


Figure 23: Arboreal termitaria with excavation



Figure 24: Avian nest

Map 3: Localities for identified arboreal habitat features



3.3 Aquatic Habitat Features

An ephemeral drainage feature and associated gullies is located within the clearance survey area (Figure 25). The drainage feature contained no running water at the time of the inspection, however ponded features may provide potential breeding opportunities for amphibians after rainfall events.

Several native species may exploit the various microhabitats present by such an environmental feature, particularly during times of rainfall, including Eastern Sedgefrog *Litoria fallax*, Red-bellied Black Snake *Pseudechis porphyriacus*.



Figure 25: Dry drainage feature

3.4 Endangered, Vulnerable and Near Threatened (EVNT) Species

It is not envisaged that any EVNT fauna species will be detrimentally impacted by the proposed works. However, four species identified within the Online EPBC Protected Matters Report (Appendix B) and the Queensland Government Wildlife Online Search Tool (Appendix C), were considered likely or possible to occur within the site and will require further mitigation during clearing activities.

Although no evidence was found during the site inspection of very recent Koala use the species has previously been recorded in the area. The majority of the site is identified as High Value Bushland under Koala Habitat in South East Queensland mapping sourced from the DES online search tool (see Appendix A). It is advised that dedicated methodologies be employed by a qualified Fauna Spotter specific to the detection of these species prior to vegetation clearing activities.

Table 4: Significant species deemed likely or possible to occur within the clearance survey area

Common Name Scientific Name	Species Information	Likelihood of Occurrence within the Clearance Survey area
Mammals		
Koala <i>Phascolarctos cinereus</i> EPBC: Vulnerable NCA: Vulnerable	Inhabits a range of open forest and woodland communities which may include any of the following noted food trees: <i>Eucalyptus</i> , <i>Corymbia</i> , <i>Melaleuca</i> , <i>Angophora</i> and <i>Lophostemon</i> .	Likely Known food trees for the transient Koala (<i>Phascolarctos cinereus</i>) occur on the clearance site and the species is well documented within the area.
Grey-headed Flying-fox <i>Pteropus poliocephalus</i> EPBC: Vulnerable NCA: Least Concern	The Grey-headed Flying-Fox roosts in aggregations of various sizes on exposed branches, commonly of emergent trees. Roost sites are typically located near water, such as lakes, rivers or the coast. Habitat includes open forests, woodlands, urban parks and gardens.	Possible Suitable vegetation communities containing both feeding and roosting resources occur on and adjacent to the clearance site.
Amphibians		
Tusked Frog <i>Adelotus brevis</i> EPBC: Not Listed NCA: Vulnerable	Inhabits permanent ponds and streams within rainforests, wet to dry forests and farmland areas (Anstis 2013). Nests are constructed under leaf litter, vegetation or logs at the edge of ponds or stream pools in concealed locations (Anstis 2013).	Possible Preferred habitat types present, and the species is documented within the area.

Birds		
<p>Rufous Fantail <i>Rhipidura rufifrons</i></p> <p>EPBC: Migratory and Marine NCA: Special Least Concern</p>	<p>The Rufous Fantail builds a small compact cup nest, of fine grasses bound with spider webs, that is suspended from a tree fork about 5m from the ground. The bottom of the nest is drawn out into a long stem. Both sexes share nest building, incubation and feeding of the young. One or two broods may be raised in a season (Serventy, 1982). Breeding occurs from about September to February with 81% of eggs laid in November-December (Higgins <i>et al.</i> 2001).</p>	<p>Possible Preferred habitat types present, and the species was observed within the area during the inspection.</p>
Reptiles		
<p>Collared Delma <i>Delma torquata</i></p> <p>EPBC: Vulnerable NCA: Vulnerable</p>	<p>Weathered loose rocks, flattish bedrock outcroppings, logs or mats of leaf litter, or in cracks and crevices among tussock grasses. Lays two eggs around December with hatching in February or March (Curtis <i>et al.</i> 2012)</p>	<p>Possible Preferred habitat type and habitat features present.</p>

4. Fauna Impacts

It is important to consider the proposed development surrounding the site and potential for fragmenting habitat and isolating species when investigating potential fauna impacts.

Impacts to fauna as a result of vegetation clearance will include the following:

- Loss of trees for foraging, roosting and nesting;
- Loss of hollow-bearing trees for nesting and refuge;
- Loss of habitat and foraging areas for terrestrial species;
- Loss of overall habitat;
- Potential loss of abundance of some local species.

Other impacts may include:

- Injury or death during felling of trees;
- Injury or death from machinery;
- Alteration of nesting, foraging and general activities due to disturbance.

5. Assessment and Conclusion

Overall the site contains medium value refugial opportunities for arboreal and terrestrial fauna species (see Section 3.1 and 3.2). The species expected within the site are likely to primarily reflect common fauna assemblages for the region; however, provisions will be proposed directly for common fauna and species of conservation significance.

The connectivity to adjacent habitat in conjunction with sequential clearing methodologies will aid in the movement of medium to large size fauna such as Koala and Macropods. Specific methodologies for these species will be detailed within the Wildlife and Habitat Impact Mitigation Plan (WHIMP).

A number of conclusions and recommendations will be presented in the WHIMP, with the specific intention of providing a comprehensive management structure to facilitate minimal impact to fauna during the clearing of vegetation and subsequent disturbance of habitats.

It is advised that all identified fauna habitats onsite be inspected by a DES approved Fauna Spotter prior to vegetation clearing and all vegetation removal activities be supervised during the clearing process. Terrestrial load reduction activities will be conducted ahead of the clearing front where possible. Fauna captured will be relocated to adjacent habitat consistent with the life history requirements of the species requiring translocation. The directives given by Fauna Spotter Catchers should embrace a “best practice” approach which includes implementation of proven specific management techniques for identified habitat types and compliance with legislation relevant to the activity.

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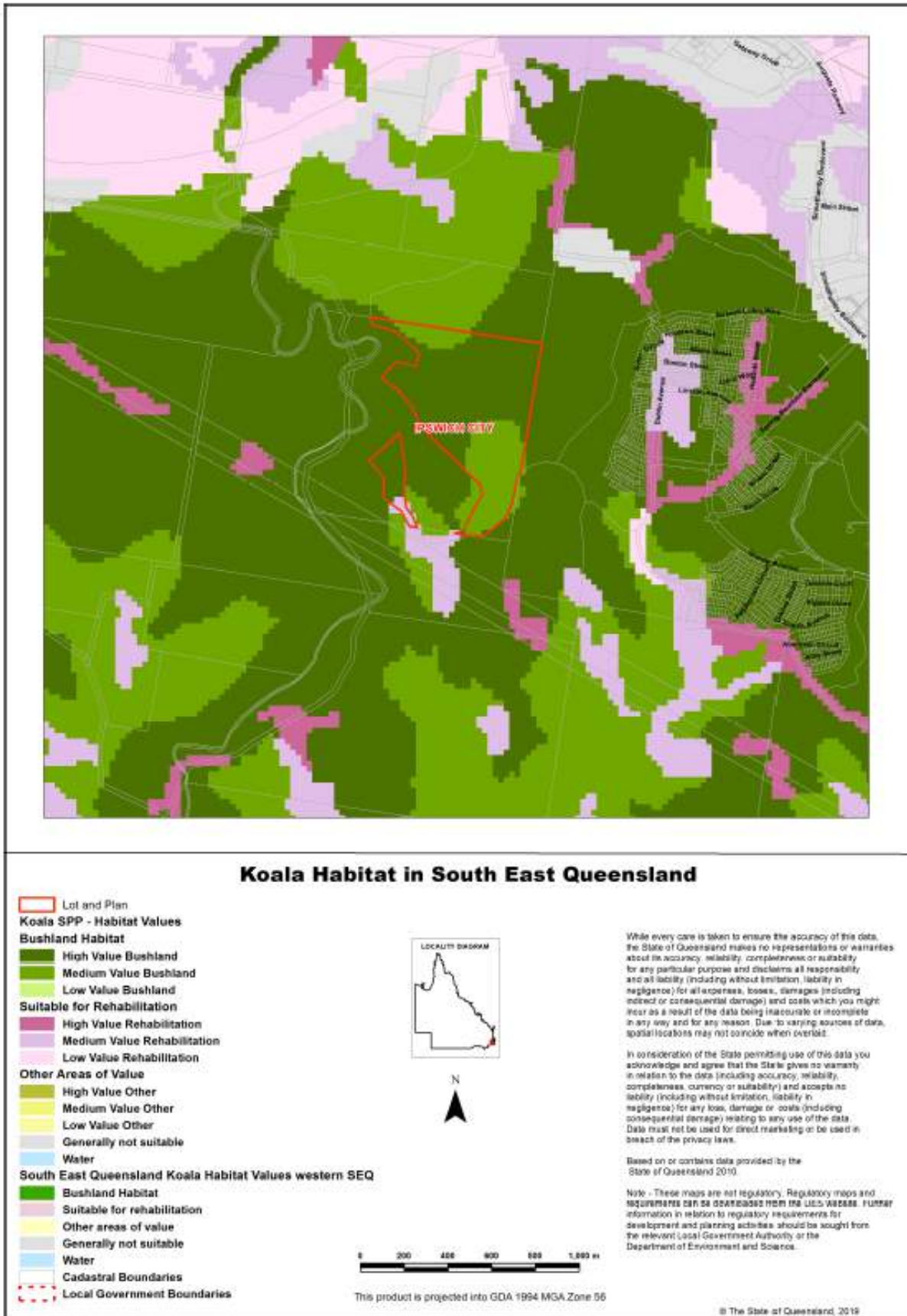
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7. Appendix A: Koala Habitat Values



8. Appendix B: EPBC Act Protected Matters Report



Australian Government
Department of the Environment and Energy

EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected.

Information on the coverage of this report and qualifications on data supporting this report are contained in the caveat at the end of the report.

Information is available about [Environment Assessments](#) and the EPBC Act including significance guidelines, forms and application process details.

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[Summary](#)

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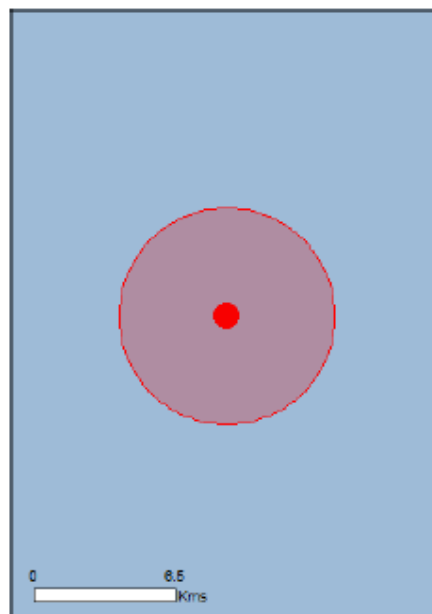
[Matters of NES](#)

[Other Matters Protected by the EPBC Act](#)

[Extra Information](#)

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Summary

Matters of National Environmental Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the [Administrative Guidelines on Significance](#).

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance:	2
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	3
Listed Threatened Species:	37
Listed Migratory Species:	18

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at <http://www.environment.gov.au/heritage>

A [permit](#) may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Land:	1
Commonwealth Heritage Places:	1
Listed Marine Species:	22
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have nominated.

State and Territory Reserves:	1
Regional Forest Agreements:	None
Invasive Species:	33
Nationally Important Wetlands:	1
Key Ecological Features (Marine)	None

Details

Matters of National Environmental Significance

Wetlands of International Importance (Ramsar)	[Resource Information]
Name	Proximity
Moreton bay	30 - 40km upstream
Moreton bay	30 - 40km upstream

Listed Threatened Ecological Communities

[Resource Information]

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Name	Status	Type of Presence
Coastal Swamp Oak (Casuarina glauca) Forest of New South Wales and South East Queensland ecological community	Endangered	Community may occur within area
Lowland Rainforest of Subtropical Australia	Critically Endangered	Community may occur within area
White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland	Critically Endangered	Community likely to occur within area

Listed Threatened Species

[Resource Information]

Name	Status	Type of Presence
Birds		
Anthochaera phrygia Regent Honeyeater [82338]	Critically Endangered	Foraging, feeding or related behaviour may occur within area
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat likely to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Cyclopsitta diophthalma coxeni Coxen's Fig-Parrot [59714]	Endangered	Species or species habitat may occur within area
Dasyornis brachypterus Eastern Bristlebird [533]	Endangered	Species or species habitat likely to occur within area
Erythrotriorchis radiatus Red Goshawk [942]	Vulnerable	Species or species habitat known to occur within area
Geophaps scripta scripta Squatter Pigeon (southern) [64440]	Vulnerable	Species or species habitat may occur within area
Grantiella picta Painted Honeyeater [470]	Vulnerable	Species or species habitat may occur within area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species

Name	Status	Type of Presence
<u>Numenius madagascariensis</u> Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	habitat likely to occur within area Species or species habitat may occur within area
<u>Poephila cincta cincta</u> Southern Black-throated Finch [64447]	Endangered	Species or species habitat may occur within area
<u>Rostratula australis</u> Australian Painted-snipe, Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area
<u>Turnix melanogaster</u> Black-breasted Button-quail [923]	Vulnerable	Species or species habitat likely to occur within area
Insects		
<u>Argynnis hyperbius inconstans</u> Australian Fritillary [88056]	Critically Endangered	Species or species habitat may occur within area
<u>Phylodes imperialis smithersi</u> Pink Underwing Moth [86084]	Endangered	Species or species habitat may occur within area
Mammals		
<u>Chalinolobus dwyer</u> Large-eared Pied Bat, Large Pied Bat [183]	Vulnerable	Species or species habitat likely to occur within area
<u>Dasyurus hallucatus</u> Northern Quoll, Digul [Gogo-Yimidir], WjIngadda [Dambimangari], Wiminj [Martu] [331]	Endangered	Species or species habitat may occur within area
<u>Dasyurus maculatus maculatus (SE mainland population)</u> Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population) [75184]	Endangered	Species or species habitat known to occur within area
<u>Petauroides volans</u> Greater Glider [254]	Vulnerable	Species or species habitat known to occur within area
<u>Petrogale penicillata</u> Brush-tailed Rock-wallaby [225]	Vulnerable	Species or species habitat likely to occur within area
<u>Phascogale cinereus (combined populations of Qld, NSW and the ACT)</u> Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104]	Vulnerable	Species or species habitat known to occur within area
<u>Potorous tridactylus tridactylus</u> Long-nosed Potoroo (SE mainland) [66645]	Vulnerable	Species or species habitat may occur within area
<u>Pteropus poliocephalus</u> Grey-headed Flying-fox [186]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Plants		
<u>Bostioa transversa</u> Three-leaved Bostioa, Yellow Satinheart [16091]	Vulnerable	Species or species habitat likely to occur within area
<u>Cycas ophiolitica</u> [55797]	Endangered	Species or species habitat likely to occur within area
<u>Dichanthium setosum</u> bluegrass [14159]	Vulnerable	Species or species habitat likely to occur within area

Name	Status	Type of Presence
Macadamia integrifolia Macadamia Nut, Queensland Nut Tree, Smooth-shelled Macadamia, Bush Nut, Nut Oak [7326]	Vulnerable	Species or species habitat likely to occur within area
Macadamia tetraphylla Rough-shelled Bush Nut, Macadamia Nut, Rough-shelled Macadamia, Rough-leaved Queensland Nut [6581]	Vulnerable	Species or species habitat may occur within area
Notelaea insyriensis Cooneana Olive [81858]	Critically Endangered	Species or species habitat may occur within area
Notelaea lloydii Lloyd's Olive [15002]	Vulnerable	Species or species habitat likely to occur within area
Phalus australis Lesser Swamp-orchid [5872]	Endangered	Species or species habitat may occur within area
Plectranthus habrophyllus [64589]	Endangered	Species or species habitat likely to occur within area
Samadera bidwillii Quassia [29708]	Vulnerable	Species or species habitat likely to occur within area
Thesium australe Austral Toadflax, Toadflax [15202]	Vulnerable	Species or species habitat likely to occur within area
Reptiles		
Delma torquata Adorned Delma, Collared Delma [1656]	Vulnerable	Species or species habitat may occur within area
Furina dunmali Dunmall's Snake [59254]	Vulnerable	Species or species habitat may occur within area
Saiphos reticulatus Three-toed Snake-tooth Skink [88328]	Vulnerable	Species or species habitat may occur within area
Listed Migratory Species		[Resource Information]
* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.		
Name	Threatened	Type of Presence
Migratory Marine Birds		
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Migratory Terrestrial Species		
Cuculus optatus Oriental Cuckoo, Horsfield's Cuckoo [86651]		Species or species habitat may occur within area
Hirundinopus caudacufus White-throated Needletail [682]		Species or species habitat known to occur within area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat known to occur within area
Monarcha trivirgatus Spectacled Monarch [610]		Species or species habitat may occur within area

Name	Threatened	Type of Presence
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area
Migratory Wetlands Species		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Pandion haliaetus Osprey [952]		Species or species habitat may occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area

Other Matters Protected by the EPBC Act

Commonwealth Land [[Resource Information](#)]

The Commonwealth area listed below may indicate the presence of Commonwealth land in this vicinity. Due to the unreliability of the data source, all proposals should be checked as to whether it impacts on a Commonwealth area, before making a definitive decision. Contact the State or Territory government land department for further information.

Name
Defence - GREENBANK TRAINING AREA

Commonwealth Heritage Places [[Resource Information](#)]

Name	State	Status
Greenbank Military Training Area (part)	QLD	Listed place

Listed Marine Species [[Resource Information](#)]

* Species is listed under a different scientific name on the EPBC Act - Threatened Species List.

Name	Threatened	Type of Presence
Birds		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area
Anseranas semipalmata Magpie Goose [978]		Species or species

Name	Threatened	Type of Presence
Apus pacificus Fork-tailed Swift [678]		habitat may occur within area Species or species habitat likely to occur within area
Ardea alba Great Egret, White Egret [59541]		Species or species habitat likely to occur within area
Ardea ibis Cattle Egret [59542]		Species or species habitat may occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area
Hirundapus caudacutus White-throated Needletail [682]		Species or species habitat known to occur within area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat likely to occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat known to occur within area
Monarcha trivirgatus Spectacled Monarch [610]		Species or species habitat may occur within area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Pandion haliaetus Osprey [952]		Species or species habitat may occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur

Name	Threatened	Type of Presence within area
Rostratula benghalensis (sensu lato) Painted Snipe [889]	Endangered*	Species or species habitat likely to occur within area
Tringa nebuliana Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area

Extra Information

State and Territory Reserves	[Resource Information]
Name	State
White Rock	QLD

Invasive Species	[Resource Information]
Weeds reported here are the 20 species of national significance (WoNS), along with other introduced plants that are considered by the States and Territories to pose a particularly significant threat to biodiversity. The following feral animals are reported: Goat, Red Fox, Cat, Rabbit, Pig, Water Buffalo and Cane Toad. Maps from Landscape Health Project, National Land and Water Resources Audit, 2001.	

Name	Status	Type of Presence
Birds		
<i>Acridotheres tristis</i> Common Myna, Indian Myna [387]		Species or species habitat likely to occur within area
<i>Anas platyrhynchos</i> Mallard [974]		Species or species habitat likely to occur within area
<i>Carduelis carduelis</i> European Goldfinch [403]		Species or species habitat likely to occur within area
<i>Columba livia</i> Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area
<i>Lonchura punctulata</i> Nutmeg Mannikin [399]		Species or species habitat likely to occur within area
<i>Passer domesticus</i> House Sparrow [405]		Species or species habitat likely to occur within area
<i>Streptopelia chinensis</i> Spotted Turtle-Dove [780]		Species or species habitat likely to occur within area
<i>Sturnus vulgaris</i> Common Starling [389]		Species or species habitat likely to occur within area
Frogs		
<i>Rhinella marina</i> Cane Toad [83218]		Species or species habitat known to occur within area
Mammals		

Name	Status	Type of Presence
<i>Bos taurus</i> Domestic Cattle [16]		Species or species habitat likely to occur within area
<i>Canis lupus familiaris</i> Domestic Dog [82654]		Species or species habitat likely to occur within area
<i>Equus caballus</i> Horse [5]		Species or species habitat likely to occur within area
<i>Felis catus</i> Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
<i>Lepus capensis</i> Brown Hare [127]		Species or species habitat likely to occur within area
<i>Mus musculus</i> House Mouse [120]		Species or species habitat likely to occur within area
<i>Oryctolagus cuniculus</i> Rabbit, European Rabbit [128]		Species or species habitat likely to occur within area
<i>Rattus norvegicus</i> Brown Rat, Norway Rat [83]		Species or species habitat likely to occur within area
<i>Rattus rattus</i> Black Rat, Ship Rat [84]		Species or species habitat likely to occur within area
<i>Sus scrofa</i> Pig [6]		Species or species habitat likely to occur within area
<i>Vulpes vulpes</i> Red Fox, Fox [18]		Species or species habitat likely to occur within area
Plants		
<i>Cabomba caroliniana</i> Cabomba, Fanwort, Carolina Watershield, Fish Grass, Washington Grass, Watershield, Carolina Fanwort, Common Cabomba [5171]		Species or species habitat likely to occur within area
<i>Chrysanthemoides monilifera</i> Bitou Bush, Boneseed [18983]		Species or species habitat may occur within area
<i>Eichhornia crassipes</i> Water Hyacinth, Water Orchid, Nile Lily [13466]		Species or species habitat likely to occur within area
<i>Genista monspessulana</i> Montpellier Broom, Cape Broom, Canary Broom, Common Broom, French Broom, Soft Broom [20126]		Species or species habitat likely to occur within area
<i>Lantana camara</i> Lantana, Common Lantana, Kamara Lantana, Large-leaf Lantana, Pink Flowered Lantana, Red Flowered Lantana, Red-Flowered Sage, White Sage, Wild Sage [10892]		Species or species habitat likely to occur within area
<i>Parkinsonia aculeata</i> Parkinsonia, Jerusalem Thorn, Jelly Bean Tree, Horse Bean [12301]		Species or species habitat likely to occur within area
<i>Parthenium hysterophorus</i> Parthenium Weed, Bitter Weed, Carrot Grass, False Ragweed [19566]		Species or species habitat likely to occur

Caveat

The information presented in this report has been provided by a range of data sources as acknowledged at the end of the report.

This report is designed to assist in identifying the locations of places which may be relevant in determining obligations under the Environment Protection and Biodiversity Conservation Act 1999. It holds mapped locations of World and National Heritage properties, Wetlands of International and National Importance, Commonwealth and State/Territory reserves, listed threatened, migratory and marine species and listed threatened ecological communities. Mapping of Commonwealth land is not complete at this stage. Maps have been collated from a range of sources at various resolutions.

Not all species listed under the EPBC Act have been mapped (see below) and therefore a report is a general guide only. Where available data supports mapping, the type of presence that can be determined from the data is indicated in general terms. People using this information in making a referral may need to consider the qualifications below and may need to seek and consider other information sources.

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species distributions have been derived through a variety of methods. Where distributions are well known and if time permits, maps are derived using either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc) together with point locations and described habitat, or environmental modelling (MAXENT or BIOCLIM habitat modelling) using point locations and environmental data layers.

Where very little information is available for species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells, by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull), or captured manually or by using topographic features (national park boundaries, islands, etc). In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More reliable distribution mapping methods are used to update these distributions as time permits.

Only selected species covered by the following provisions of the EPBC Act have been mapped:

- migratory and
- marine

The following species and ecological communities have not been mapped and do not appear in reports produced from this database:

- threatened species listed as extinct or considered as vagrants
- some species and ecological communities that have only recently been listed
- some terrestrial species that overfly the Commonwealth marine area
- migratory species that are very widespread, vagrant, or only occur in small numbers

The following groups have been mapped, but may not cover the complete distribution of the species:

- non-threatened seabirds which have only been mapped for recorded breeding sites
- seals which have only been mapped for breeding sites near the Australian continent

Such breeding sites may be important for the protection of the Commonwealth Marine environment.

Coordinates

-27 6627 152 8870

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

- [-Office of Environment and Heritage, New South Wales](#)
- [-Department of Environment and Primary Industries, Victoria](#)
- [-Department of Primary Industries, Parks, Water and Environment, Tasmania](#)
- [-Department of Environment, Water and Natural Resources, South Australia](#)
- [-Department of Land and Resource Management, Northern Territory](#)
- [-Department of Environmental and Heritage Protection, Queensland](#)
- [-Department of Parks and Wildlife, Western Australia](#)
- [-Environment and Planning Directorate, ACT](#)
- [-Birdlife Australia](#)
- [-Australian Bird and Bat Banding Scheme](#)
- [-Australian National Wildlife Collection](#)
- [-Natural history museums of Australia](#)
- [-Museum Victoria](#)
- [-Australian Museum](#)
- [-South Australian Museum](#)
- [-Queensland Museum](#)
- [-Online Zoological Collections of Australian Museums](#)
- [-Queensland Herbarium](#)
- [-National Herbarium of NSW](#)
- [-Royal Botanic Gardens and National Herbarium of Victoria](#)
- [-Tasmanian Herbarium](#)
- [-State Herbarium of South Australia](#)
- [-Northern Territory Herbarium](#)
- [-Western Australian Herbarium](#)
- [-Australian National Herbarium, Canberra](#)
- [-University of New England](#)
- [-Ocean Biogeographic Information System](#)
- [-Australian Government, Department of Defence](#)
- [Forestry Corporation, NSW](#)
- [-Geoscience Australia](#)
- [-CSIRO](#)
- [-Australian Tropical Herbarium, Cairns](#)
- [-eBird Australia](#)
- [-Australian Government – Australian Antarctic Data Centre](#)
- [-Museum and Art Gallery of the Northern Territory](#)
- [-Australian Government National Environmental Science Program](#)
- [-Australian Institute of Marine Science](#)
- [-Reef Life Survey Australia](#)
- [-American Museum of Natural History](#)
- [-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania](#)
- [-Tasmanian Museum and Art Gallery, Hobart, Tasmania](#)
- Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the [Contact Us](#) page.

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[Department of the Environment](#)
GPO Box 707
Canberra ACT 2601 Australia
+61 2 6274 1111

9. Appendix C: Wildlife Online Extract



Wildlife Online Extract

Search Criteria: Species List for a Specified Point
Species: Animals
Type: Native
Status: All
Records: All
Date: Since 1980
Latitude: -27.6827
Longitude: 152.8879
Distance: 5
Email: ramona@qfc.com.au
Date submitted: Tuesday 02 Jul 2019 09:57:13
Date extracted: Tuesday 02 Jul 2019 10:00:02

The number of records retrieved = 311

Disclaimer

As the DSITIA is still in a process of collating and vetting data, it is possible the information given is not complete. The information provided should only be used for the project for which it was requested and it should be appropriately acknowledged as being derived from Wildlife Online when it is used.

The State of Queensland does not invite reliance upon, nor accept responsibility for this information. Persons should satisfy themselves through independent means as to the accuracy and completeness of this information.

No statements, representations or warranties are made about the accuracy or completeness of this information. The State of Queensland disclaims all responsibility for this information and all liability (including without limitation, liability in negligence) for all expenses, losses, damages and costs you may incur as a result of the information being inaccurate or incomplete in any way for any reason.

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	amphibians	Hylidae	<i>Litoria fallax</i>	eastern sedgefrog		C		27
animals	amphibians	Hylidae	<i>Litoria nasuta</i>	striped rocketfrog		C		7
animals	amphibians	Hylidae	<i>Litoria dentata</i>	bleating treefrog		C		4
animals	amphibians	Hylidae	<i>Litoria peronii</i>	emerald spotted treefrog		C		1
animals	amphibians	Hylidae	<i>Litoria rubella</i>	ruddy treefrog		C		12
animals	amphibians	Hylidae	<i>Cyclorana alboguttata</i>	greenstripe frog		C		1
animals	amphibians	Hylidae	<i>Litoria wilcoxii</i>	eastern stony creek frog		C		6
animals	amphibians	Hylidae	<i>Litoria gracilentia</i>	graceful treefrog		C		18
animals	amphibians	Hylidae	<i>Litoria latopalmata</i>	broad palmed rocketfrog		C		8
animals	amphibians	Hylidae	<i>Litoria brevipalmata</i>	green thighed frog		C		1
animals	amphibians	Hylidae	<i>Litoria caerulea</i>	common green treefrog		C		9
animals	amphibians	Limnodynastidae	<i>Limnodynastes tasmaniensis</i>	spotted grassfrog		C		5
animals	amphibians	Limnodynastidae	<i>Limnodynastes terraereginae</i>	scarlet sided pobblebonk		C		13
animals	amphibians	Limnodynastidae	<i>Platyplectrum ornatum</i>	ornate burrowing frog		C		30
animals	amphibians	Limnodynastidae	<i>Limnodynastes peronii</i>	striped marshfrog		C		15
animals	amphibians	Limnodynastidae	<i>Adelotus brevis</i>	tusked frog		V		4
animals	amphibians	Myobatrachidae	<i>Mixophyes fasciolatus</i>	great barred frog		C		11
animals	amphibians	Myobatrachidae	<i>Pseudophryne coriacea</i>	red backed broodfrog		C		3
animals	amphibians	Myobatrachidae	<i>Crinia parinsignifera</i>	beeping froglet		C		8
animals	amphibians	Myobatrachidae	<i>Pseudophryne raveni</i>	copper backed broodfrog		C		11
animals	amphibians	Myobatrachidae	<i>Pseudophryne major</i>	great brown broodfrog		C		1
animals	amphibians	Myobatrachidae	<i>Uperoleia rugosa</i>	chubby gungan		C		2
animals	amphibians	Myobatrachidae	<i>Uperoleia fusca</i>	dusky gungan		C		1
animals	birds	Acanthizidae	<i>Gerygone olivacea</i>	white-throated gerygone		C		50
animals	birds	Acanthizidae	<i>Acanthiza reguloides</i>	buff-rumped thornbill		C		28
animals	birds	Acanthizidae	<i>Sericornis frontalis</i>	white-browed scrubwren		C		40
animals	birds	Acanthizidae	<i>Acanthiza chrysorrhoa</i>	yellow-rumped thornbill		C		2
animals	birds	Acanthizidae	<i>Gerygone mouki</i>	brown gerygone		C		2
animals	birds	Acanthizidae	<i>Smicromis brevirostris</i>	weebill		C		50
animals	birds	Acanthizidae	<i>Acanthiza lineata</i>	striated thornbill		C		9
animals	birds	Acanthizidae	<i>Acanthiza nana</i>	yellow thornbill		C		8
animals	birds	Acanthizidae	<i>Acanthiza pusilla</i>	brown thornbill		C		19
animals	birds	Acanthizidae	<i>Chthonicola sagittata</i>	speckled warbler		C		19
animals	birds	Accipitridae	<i>Aquila audax</i>	wedge-tailed eagle		C		31
animals	birds	Accipitridae	<i>Elanus axillaris</i>	black-shouldered kite		C		10
animals	birds	Accipitridae	<i>Accipiter fasciatus</i>	brown goshawk		C		15
animals	birds	Accipitridae	<i>Aviceda subcristata</i>	Pacific baza		C		10
animals	birds	Accipitridae	<i>Haliaeetus leucogaster</i>	white-bellied sea-eagle		C		3
animals	birds	Accipitridae	<i>Hieraetus morphnoides</i>	little eagle		C		1
animals	birds	Accipitridae	<i>Accipiter cirrocephalus</i>	collared sparrowhawk		C		2
animals	birds	Accipitridae	<i>Accipiter novaehollandiae</i>	grey goshawk		C		2
animals	birds	Accipitridae	<i>Haliastur indus</i>	brahminy kite		C		1
animals	birds	Aegothelidae	<i>Aegotheles cristatus</i>	Australian owl-nightjar		C		15
animals	birds	Alcedinidae	<i>Ceyx pusillus</i>	little kingfisher		C		1
animals	birds	Alcedinidae	<i>Ceyx azureus</i>	azure kingfisher		C		4
animals	birds	Anatidae	<i>Chenonetta jubata</i>	Australian wood duck		C		24

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	birds	Anatidae	<i>Cygnus atratus</i>	black swan		C		2
animals	birds	Anatidae	<i>Anas superciliosa</i>	Pacific black duck		C		19
animals	birds	Anhingidae	<i>Anhinga novaehollandiae</i>	Australasian darter		C		1
animals	birds	Apodidae	<i>Hirundapus caudacutus</i>	white-throated needletail		SL		9
animals	birds	Ardeidae	<i>Ardea intermedia</i>	intermediate egret		C		3
animals	birds	Ardeidae	<i>Ardea alba modesta</i>	eastern great egret		C		1
animals	birds	Ardeidae	<i>Nycticorax caledonicus</i>	nankeen night-heron		C		3
animals	birds	Ardeidae	<i>Bubulcus ibis</i>	cattle egret		C		16
animals	birds	Ardeidae	<i>Ardea pacifica</i>	white-necked heron		C		6
animals	birds	Ardeidae	<i>Egretta novaehollandiae</i>	white-faced heron		C		20
animals	birds	Artamidae	<i>Artamus superciliosus</i>	white-browed woodswallow		C		1
animals	birds	Artamidae	<i>Artamus leucorhynchus</i>	white-breasted woodswallow		C		2
animals	birds	Artamidae	<i>Cracticus torquatus</i>	grey butcherbird		C		58
animals	birds	Artamidae	<i>Artamus cyanopterus</i>	dusky woodswallow		C		10
animals	birds	Artamidae	<i>Strepera graculina</i>	pied currawong		C		68
animals	birds	Artamidae	<i>Cracticus tibicen</i>	Australian magpie		C		78
animals	birds	Artamidae	<i>Cracticus nigrogularis</i>	pied butcherbird		C		84
animals	birds	Burhinidae	<i>Burhinus grallarius</i>	bush stone-curlew		C		1
animals	birds	Cacatuidae	<i>Cacatua galerita</i>	sulphur-crested cockatoo		C		53
animals	birds	Cacatuidae	<i>Cacatua sanguinea</i>	little corella		C		3
animals	birds	Cacatuidae	<i>Eolophus roseicapilla</i>	galah		C		42
animals	birds	Cacatuidae	<i>Calyptorhynchus lathami lathami</i>	glossy black-cockatoo (eastern)		V		2
animals	birds	Cacatuidae	<i>Calyptorhynchus banksii</i>	red-tailed black-cockatoo		C		5
animals	birds	Campephagidae	<i>Lalage leucomela</i>	varied triller		C		11
animals	birds	Campephagidae	<i>Coracina novaehollandiae</i>	black-faced cuckoo-shrike		C		87
animals	birds	Campephagidae	<i>Coracina tenuirostris</i>	cicadabird		C		34
animals	birds	Campephagidae	<i>Coracina papuensis</i>	white-bellied cuckoo-shrike		C		10
animals	birds	Campephagidae	<i>Lalage tricolor</i>	white-winged triller		C		1
animals	birds	Charadriidae	<i>Vanellus miles novaehollandiae</i>	masked lapwing (southern subspecies)		C		24
animals	birds	Charadriidae	<i>Vanellus miles</i>	masked lapwing		C		2
animals	birds	Ciconiidae	<i>Ephippiorhynchus asiaticus</i>	black-necked stork		C		1
animals	birds	Cisticolidae	<i>Cisticola exilis</i>	golden-headed cisticola		C		24
animals	birds	Climacteridae	<i>Cormobates leucophaea</i>	white-throated treecreeper		C		6
animals	birds	Climacteridae	<i>Climacteris affinis</i>	white-browed treecreeper		C		1
animals	birds	Climacteridae	<i>Cormobates leucophaea metastasis</i>	white-throated treecreeper (southern)		C		52
animals	birds	Columbidae	<i>Geopelia striata</i>	peaceful dove		C		47
animals	birds	Columbidae	<i>Ocyphaps lophotes</i>	crested pigeon		C		39
animals	birds	Columbidae	<i>Phaps chalcoptera</i>	common bronzewing		C		23
animals	birds	Columbidae	<i>Chalcophaps indica</i>	emerald dove		C		6
animals	birds	Columbidae	<i>Geopelia humeralis</i>	bar-shouldered dove		C		43
animals	birds	Columbidae	<i>Macropygia amboinensis</i>	brown cuckoo-dove		C		19
animals	birds	Columbidae	<i>Leucosarcia melanoleuca</i>	wonga pigeon		C		1
animals	birds	Columbidae	<i>Lopholaimus antarcticus</i>	topknot pigeon		C		8
animals	birds	Coraciidae	<i>Eurystomus orientalis</i>	dollarbird		C		36
animals	birds	Corvidae	<i>Corvus coronoides</i>	Australian raven		C		2
animals	birds	Corvidae	<i>Corvus orru</i>	Torresian crow		C		142

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	birds	Cuculidae	<i>Cacomantis pallidus</i>	pallid cuckoo		C		2
animals	birds	Cuculidae	<i>Cacomantis variolosus</i>	brush cuckoo		C		16
animals	birds	Cuculidae	<i>Centropus phasianinus</i>	pheasant coucal		C		24
animals	birds	Cuculidae	<i>Cacomantis flabelliformis</i>	fan-tailed cuckoo		C		31
animals	birds	Cuculidae	<i>Scythrops novaehollandiae</i>	channel-billed cuckoo		C		27
animals	birds	Cuculidae	<i>Chalcites minutillus barnardi</i>	Eastern little bronze-cuckoo		C		1
animals	birds	Cuculidae	<i>Chalcites lucidus</i>	shining bronze-cuckoo		C		13
animals	birds	Cuculidae	<i>Chalcites basalis</i>	Horsfield's bronze-cuckoo		C		9
animals	birds	Cuculidae	<i>Cuculus optatus</i>	oriental cuckoo		SL		5
animals	birds	Cuculidae	<i>Eudynamys orientalis</i>	eastern koel		C		27
animals	birds	Dicruridae	<i>Dicrurus bracteatus bracteatus</i>	spangled drongo (eastern Australia)		C		1
animals	birds	Dicruridae	<i>Dicrurus bracteatus</i>	spangled drongo		C		43
animals	birds	Estrildidae	<i>Neochmia temporalis</i>	red-browed finch		C		52
animals	birds	Estrildidae	<i>Lonchura castaneothorax</i>	chestnut-breasted mannikin		C		9
animals	birds	Estrildidae	<i>Taeniopygia bichenovii</i>	double-barred finch		C		29
animals	birds	Eurostopodidae	<i>Eurostopodus mystacalis</i>	white-throated nightjar		C		15
animals	birds	Falconidae	<i>Falco hypoleucos</i>	grey falcon		V		1
animals	birds	Falconidae	<i>Falco longipennis</i>	Australian hobby		C		3
animals	birds	Falconidae	<i>Falco cenchroides</i>	nankeen kestrel		C		15
animals	birds	Falconidae	<i>Falco peregrinus</i>	peregrine falcon		C		13
animals	birds	Halcyonidae	<i>Todiramphus sanctus</i>	sacred kingfisher		C		35
animals	birds	Halcyonidae	<i>Dacelo novaeguineae</i>	laughing kookaburra		C		104
animals	birds	Halcyonidae	<i>Todiramphus macleayii</i>	forest kingfisher		C		15
animals	birds	Hirundinidae	<i>Cheramoeca leucosterna</i>	white-backed swallow		C		8
animals	birds	Hirundinidae	<i>Petrochelidon ariel</i>	fairy martin		C		9
animals	birds	Hirundinidae	<i>Hirundo neoxena</i>	welcome swallow		C		30
animals	birds	Hirundinidae	<i>Petrochelidon nigricans</i>	tree martin		C		14
animals	birds	Maluridae	<i>Malurus lamberti</i>	variegated fairy-wren		C		56
animals	birds	Maluridae	<i>Malurus cyaneus</i>	superb fairy-wren		C		30
animals	birds	Maluridae	<i>Malurus melanocephalus</i>	red-backed fairy-wren		C		77
animals	birds	Megaluridae	<i>Megalurus timoriensis</i>	tawny grassbird		C		10
animals	birds	Megapodiidae	<i>Alectura lathamii</i>	Australian brush-turkey		C		14
animals	birds	Meliphagidae	<i>Melithreptus lunatus</i>	white-naped honeyeater		C		5
animals	birds	Meliphagidae	<i>Philemon corniculatus</i>	noisy friarbird		C		112
animals	birds	Meliphagidae	<i>Lichenostomus melanops</i>	yellow-tufted honeyeater		C		11
animals	birds	Meliphagidae	<i>Manorina melanocephala</i>	noisy miner		C		83
animals	birds	Meliphagidae	<i>Myzomela sanguinolenta</i>	scarlet honeyeater		C		91
animals	birds	Meliphagidae	<i>Philemon citreogularis</i>	little friarbird		C		18
animals	birds	Meliphagidae	<i>Anthochaera chrysoptera</i>	little wattlebird		C		9
animals	birds	Meliphagidae	<i>Melithreptus albogularis</i>	white-throated honeyeater		C		73
animals	birds	Meliphagidae	<i>Plectorhyncha lanceolata</i>	striped honeyeater		C		18
animals	birds	Meliphagidae	<i>Acanthorhynchus tenuirostris</i>	eastern spinebill		C		19
animals	birds	Meliphagidae	<i>Melithreptus gularis</i>	black-chinned honeyeater		C		6
animals	birds	Meliphagidae	<i>Lichmera indistincta</i>	brown honeyeater		C		52
animals	birds	Meliphagidae	<i>Entomyzon cyanotis</i>	blue-faced honeyeater		C		24
animals	birds	Meliphagidae	<i>Caligavis chrysops</i>	yellow-faced honeyeater		C		97

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animals	birds	Meliphagidae	<i>Meliphaga lewinii</i>	Lewin's honeyeater		C		51
animals	birds	Meliphagidae	<i>Ptilotula fusca</i>	fuscous honeyeater		C		14
animals	birds	Meropidae	<i>Merops ornatus</i>	rainbow bee-eater		C		67
animals	birds	Monarchidae	<i>Symphysichrus trivirgatus</i>	spectacled monarch		SL		8
animals	birds	Monarchidae	<i>Myiagra inquieta</i>	restless flycatcher		C		5
animals	birds	Monarchidae	<i>Myiagra rubecula</i>	leaden flycatcher		C		40
animals	birds	Monarchidae	<i>Myiagra cyanoleuca</i>	satin flycatcher		SL		1
animals	birds	Monarchidae	<i>Grallina cyanoleuca</i>	magpie-lark		C		58
animals	birds	Monarchidae	<i>Monarcha melanopsis</i>	black-faced monarch		SL		16
animals	birds	Motacillidae	<i>Anthus novaeseelandiae</i>	Australasian pipit		C		4
animals	birds	Nectariniidae	<i>Dicaeum hirundinaceum</i>	mistletoebird		C		48
animals	birds	Neosittidae	<i>Daphoenositta chrysoptera</i>	varied sittella		C		37
animals	birds	Oriolidae	<i>Sphecotheres vieillotii</i>	Australasian figbird		C		22
animals	birds	Oriolidae	<i>Oriolus sagittatus</i>	olive-backed oriole		C		39
animals	birds	Pachycephalidae	<i>Colluricincla harmonica</i>	grey shrike-thrush		C		69
animals	birds	Pachycephalidae	<i>Colluricincla megarhyncha</i>	little shrike-thrush		C		12
animals	birds	Pachycephalidae	<i>Pachycephala rufiventris</i>	rufous whistler		C		73
animals	birds	Pachycephalidae	<i>Pachycephala pectoralis</i>	golden whistler		C		46
animals	birds	Pachycephalidae	<i>Falcunculus frontatus</i>	crested shrike-tit		C		1
animals	birds	Pardalotidae	<i>Pardalotus striatus</i>	striated pardalote		C		107
animals	birds	Pardalotidae	<i>Pardalotus punctatus</i>	spotted pardalote		C		40
animals	birds	Pelecanidae	<i>Pelecanus conspicillatus</i>	Australian pelican		C		1
animals	birds	Petroicidae	<i>Eopsaltria australis</i>	eastern yellow robin		C		60
animals	birds	Petroicidae	<i>Microeca fascians</i>	jacky winter		C		22
animals	birds	Petroicidae	<i>Petroica rosea</i>	rose robin		C		27
animals	birds	Phalacrocoracidae	<i>Microcarbo melanoleucos</i>	little pied cormorant		C		8
animals	birds	Phalacrocoracidae	<i>Phalacrocorax sulcirostris</i>	little black cormorant		C		2
animals	birds	Phasianidae	<i>Coturnix ypsilophora</i>	brown quail		C		18
animals	birds	Podargidae	<i>Podargus strigoides</i>	tawny frogmouth		C		24
animals	birds	Podicipedidae	<i>Tachybaptus novaehollandiae</i>	Australasian grebe		C		2
animals	birds	Pomatostomidae	<i>Pomatostomus temporalis</i>	grey-crowned babbler		C		12
animals	birds	Psittacidae	<i>Lathamus discolor</i>	swift parrot		E	CE	1
animals	birds	Psittacidae	<i>Barnardius zonarius</i>	Australian ringneck		C		2
animals	birds	Psittacidae	<i>Parvipsitta pusilla</i>	little lorikeet		C		52
animals	birds	Psittacidae	<i>Platycercus eximius</i>	eastern rosella		C		19
animals	birds	Psittacidae	<i>Alisterus scapularis</i>	Australian king-parrot		C		26
animals	birds	Psittacidae	<i>Platycercus adscitus</i>	pale-headed rosella		C		53
animals	birds	Psittacidae	<i>Trichoglossus chlorolepidotus</i>	scaly-breasted lorikeet		C		72
animals	birds	Psittacidae	<i>Platycercus adscitus palliceps</i>	pale-headed rosella (southern form)		C		2
animals	birds	Psittacidae	<i>Trichoglossus haematodus moluccanus</i>	rainbow lorikeet		C		87
animals	birds	Psophodidae	<i>Cinlosoma punctatum</i>	spotted quail-thrush		C		13
animals	birds	Psophodidae	<i>Psophodes olivaceus</i>	eastern whiplbird		C		53
animals	birds	Ptilonorhynchidae	<i>Ptilonorhynchus maculatus</i>	spotted bowerbird		C		1
animals	birds	Ptilonorhynchidae	<i>Sericulus chrysocephalus</i>	regent bowerbird		C		1
animals	birds	Rallidae	<i>Fulica atra</i>	Eurasian coot		C		1
animals	birds	Rallidae	<i>Porphyrio melanotus</i>	purple swamphen		C		3

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animals	birds	Rallidae	<i>Gallinula tenebrosa</i>	dusky moorhen		C		10
animals	birds	Recurvirostridae	<i>Himantopus himantopus</i>	black-winged stilt		C		1
animals	birds	Rhipiduridae	<i>Rhipidura leucophrys</i>	willie wagtail		C		56
animals	birds	Rhipiduridae	<i>Rhipidura rufifrons</i>	rufous fantail		SL		29
animals	birds	Rhipiduridae	<i>Rhipidura albiscapa</i>	grey fantail		C		77
animals	birds	Rhipiduridae	<i>Rhipidura leucophrys leucophrys</i>	willie wagtail (southern)		C		1
animals	birds	Strigidae	<i>Ninox strenua</i>	powerful owl		V		7
animals	birds	Strigidae	<i>Ninox boobook</i>	southern boobook		C		36
animals	birds	Threskiomithidae	<i>Threskiornis spinicollis</i>	straw-necked ibis		C		9
animals	birds	Threskiomithidae	<i>Platalea regia</i>	royal spoonbill		C		1
animals	birds	Threskiomithidae	<i>Threskiornis molucca</i>	Australian white ibis		C		6
animals	birds	Timaliidae	<i>Zosterops lateralis</i>	silvereye		C		75
animals	birds	Timaliidae	<i>Zosterops lateralis cornwalli</i>	silvereye (eastern)		C		1
animals	birds	Turnicidae	<i>Turnix varius</i>	painted button-quail		C		15
animals	birds	Turnicidae	<i>Turnix pyrrhorthorax</i>	red-chested button-quail		C		1
animals	birds	Tytonidae	<i>Tyto novaehollandiae novaehollandiae</i>	masked owl (southern subspecies)		C		1
animals	insects	Hesperiidae	<i>Neohesperilla xanthomera</i>	yellow grass-skipper				1
animals	insects	Lycaenidae	<i>Candalides cyprotus pallescens</i>	copper pencilled-blue				1
animals	insects	Lycaenidae	<i>Acrodipsas brisbanensis</i>	bronze ant-blue				2
animals	insects	Lycaenidae	<i>Ogyris oroetes oroetes</i>	silky azure				1
animals	insects	Lycaenidae	<i>Ogyris zosine zosine</i>	northern purple azure (southern subspecies)				1
animals	insects	Nymphalidae	<i>Charaxes sempronius sempronius</i>	tailed emperor				1
animals	insects	Nymphalidae	<i>Acraea andromacha andromacha</i>	glasswing				8
animals	insects	Nymphalidae	<i>Junonia villida villida</i>	meadow argus				1
animals	insects	Nymphalidae	<i>Tirumala hamata hamata</i>	blue tiger				1
animals	insects	Nymphalidae	<i>Melanitis leda bankia</i>	evening brown				3
animals	insects	Nymphalidae	<i>Vanessa kershawi</i>	Australian painted lady				2
animals	insects	Nymphalidae	<i>Euploea corinna</i>	common crow				5
animals	insects	Nymphalidae	<i>Danaus petilia</i>	lesser wanderer				6
animals	insects	Papilionidae	<i>Graphium choredon</i>	blue triangle				3
animals	insects	Pieridae	<i>Eurema hecabe</i>	large grass-yellow				4
animals	insects	Pieridae	<i>Eurema smilax</i>	small grass-yellow				1
animals	insects	Pieridae	<i>Delias nigrina</i>	black jezebel				2
animals	insects	Pieridae	<i>Catopsilia pomona</i>	lemon migrant				1
animals	insects	Pieridae	<i>Belenois java teutonia</i>	caper white				1
animals	insects	Pieridae	<i>Eurema brigitta australis</i>	no-brand grass-yellow				1
animals	mammals	Acrobatidae	<i>Acrobates pygmaeus</i>	feathertail glider		C		1
animals	mammals	Canidae	<i>Canis lupus dingo</i>	dingo				6
animals	mammals	Dasyuridae	<i>Antechinus flavipes flavipes</i>	yellow-footed antechinus (south-east Queensland)		C		7
animals	mammals	Dasyuridae	<i>Phascogale tapoatafa tapoatafa</i>	brush-tailed phascogale		C		2
animals	mammals	Dasyuridae	<i>Dasyurus maculatus maculatus</i>	spotted-tailed quoll (southern subspecies)		V	E	1
animals	mammals	Dasyuridae	<i>Antechinus stuartii</i>	brown antechinus		C		1
animals	mammals	Dasyuridae	<i>Sminthopsis murina</i>	common dunnart		C		2

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animals	mammals	Dasyuridae	<i>Planigale maculata</i>	common planigale		C		2
animals	mammals	Macropodidae	<i>Macropus robustus</i>	common wallaroo		C		1
animals	mammals	Macropodidae	<i>Macropus rufogriseus</i>	red-necked wallaby		C		24
animals	mammals	Macropodidae	<i>Macropus dorsalis</i>	black-striped wallaby		C		2
animals	mammals	Macropodidae	<i>Macropus parryi</i>	whiptail wallaby		C		4
animals	mammals	Macropodidae	<i>Macropus giganteus</i>	eastern grey kangaroo		C		22
animals	mammals	Macropodidae	<i>Wallabia bicolor</i>	swamp wallaby		C		14/1
animals	mammals	Miniopteridae	<i>Miniopterus schreibersii oceanensis</i>	eastern bent-wing bat		C		1
animals	mammals	Molossidae	<i>Tadarida australis</i>	white-striped freetail bat		C		13
animals	mammals	Molossidae	<i>Mormopterus ridei</i>	eastern free-tailed bat		C		1
animals	mammals	Molossidae	<i>Mormopterus sp.</i>					2
animals	mammals	Molossidae	<i>Mormopterus lumsdenae</i>	northern free-tailed bat		C		1
animals	mammals	Muridae	<i>Rattus fuscipes</i>	bush rat		C		2
animals	mammals	Muridae	<i>Rattus tunneyi</i>	pale field-rat		C		4
animals	mammals	Peramelidae	<i>Isodon macrourus</i>	northern brown bandicoot		C		8
animals	mammals	Petauridae	<i>Petaurus breviceps</i>	sugar glider		C		8
animals	mammals	Petauridae	<i>Petaurus norfolcensis</i>	squirrel glider		C		29
animals	mammals	Petauridae	<i>Petaurus australis australis</i>	yellow-bellied glider (southern subspecies)		C		1
animals	mammals	Phalangeridae	<i>Trichosurus vulpecula</i>	common brushtail possum		C		36
animals	mammals	Phascolarctidae	<i>Phascolarctos cinereus</i>	koala		V	V	71
animals	mammals	Potoroidae	<i>Aepyprymnus rufescens</i>	rufous bettong		C		1
animals	mammals	Pseudocheiridae	<i>Petauroides volans volans</i>	southern greater glider		V	V	18
animals	mammals	Pseudocheiridae	<i>Pseudocheirus peregrinus</i>	common ringtail possum		C		5
animals	mammals	Pteropodidae	<i>Pteropus poliocephalus</i>	grey-headed flying-fox		C	V	10
animals	mammals	Pteropodidae	<i>Pteropus alecto</i>	black flying-fox		C		1
animals	mammals	Pteropodidae	<i>Pteropus sp.</i>					2
animals	mammals	Pteropodidae	<i>Pteropus scapulatus</i>	little red flying-fox		C		9
animals	mammals	Tachyglossidae	<i>Tachyglossus aculeatus</i>	short-beaked echidna		SL		4
animals	mammals	Vespertilionidae	<i>Nyctophilus sp.</i>					1
animals	mammals	Vespertilionidae	<i>Scotorepens sp.</i>					2
animals	mammals	Vespertilionidae	<i>Scotorepens orion</i>	south-eastern broad-nosed bat		C		3
animals	mammals	Vespertilionidae	<i>Nyctophilus gouldi</i>	Gould's long-eared bat		C		2
animals	mammals	Vespertilionidae	<i>Scotorepens greyii</i>	little broad-nosed bat		C		3
animals	mammals	Vespertilionidae	<i>Chalinolobus gouldii</i>	Gould's wattled bat		C		3
animals	mammals	Vespertilionidae	<i>Scoteanax rueppellii</i>	greater broad-nosed bat		C		1
animals	ray-finned fishes	Ambassidae	<i>Ambassis agassizii</i>	Agassiz's glassfish				1
animals	ray-finned fishes	Anguillidae	<i>Anguilla reinhardtii</i>	longfin eel				3
animals	ray-finned fishes	Eleotridae	<i>Hypseleotris sp.</i>					1
animals	ray-finned fishes	Eleotridae	<i>Hypseleotris compressa</i>	empire gudgeon				1
animals	ray-finned fishes	Plotosidae	<i>Tandanus tandanus</i>	freshwater catfish				1
animals	reptiles	Agamidae	<i>Intelligama lesueurii</i>	eastern water dragon		C		15
animals	reptiles	Agamidae	<i>Diporiphora australis</i>	tommy roundhead		C		7
animals	reptiles	Agamidae	<i>Diporiphora nobbi</i>	nobbi		C		1
animals	reptiles	Agamidae	<i>Pogona barbata</i>	bearded dragon		C		25
animals	reptiles	Boidae	<i>Morelia spilota</i>	carpet python		C		3

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animals	reptiles	Chelidae	<i>Emydura macquarii macquarii</i>	Murray turtle		C		1
animals	reptiles	Colubridae	<i>Boiga irregularis</i>	brown tree snake		C		2
animals	reptiles	Colubridae	<i>Tropidonophis mairii</i>	freshwater snake		C		1
animals	reptiles	Colubridae	<i>Dendrelaphis punctulatus</i>	green tree snake		C		6
animals	reptiles	Diplodactylidae	<i>Oedura tryoni</i>	southern spotted velvet gecko		C		7
animals	reptiles	Diplodactylidae	<i>Nebulifera robusta</i>	robust velvet gecko		C		1
animals	reptiles	Diplodactylidae	<i>Diplodactylus vittatus</i>	wood gecko		C		5
animals	reptiles	Elapidae	<i>Pseudechis porphyriacus</i>	red-bellied black snake		C		7
animals	reptiles	Elapidae	<i>Brachyuropsis australis</i>	coral snake		C		2
animals	reptiles	Elapidae	<i>Cryptophis nigrescens</i>	eastern small-eyed snake		C		6
animals	reptiles	Elapidae	<i>Pseudechis guttatus</i>	spotted black snake		C		2
animals	reptiles	Elapidae	<i>Pseudonaja textilis</i>	eastern brown snake		C		5
animals	reptiles	Elapidae	<i>Vermicella annulata</i>	bandy-bandy		C		1
animals	reptiles	Elapidae	<i>Furina diadema</i>	red-naped snake		C		3
animals	reptiles	Elapidae	<i>Demansia psammophis</i>	yellow-faced whipsnake		C		12
animals	reptiles	Gekkonidae	<i>Gehyra dubia</i>	dubious dtella		C		6
animals	reptiles	Pygopodidae	<i>Lialis burtonis</i>	Burton's legless lizard		C		6
animals	reptiles	Scincidae	<i>Lampropholis amicala</i>	friendly sunskink		C		2
animals	reptiles	Scincidae	<i>Anomalopus verreauxii</i>	three-clawed worm-skink		C		3
animals	reptiles	Scincidae	<i>Lampropholis delicata</i>	dark-flecked garden sunskink		C		17
animals	reptiles	Scincidae	<i>Morethia taeniopleura</i>	fire-tailed skink		C		1
animals	reptiles	Scincidae	<i>Calyptotis scutirostrum</i>	scute-snouted calyptotis		C		5
animals	reptiles	Scincidae	<i>Ophioscincus ophioscincus</i>	yolk-bellied snake-skink		C		2
animals	reptiles	Scincidae	<i>Carlia pectoralis sensu lato</i>			C		3
animals	reptiles	Scincidae	<i>Cryptoblepharus pulcher pulcher</i>	elegant snake-eyed skink		C		31
animals	reptiles	Scincidae	<i>Carlia schmeltzii</i>	robust rainbow-skink		C		3
animals	reptiles	Scincidae	<i>Carlia pectoralis</i>	open-litter rainbow skink		C		1
animals	reptiles	Scincidae	<i>Ctenotus arcanus</i>	arcane ctenotus		C		1
animals	reptiles	Scincidae	<i>Concinnia martini</i>	dark bar-sided skink		C		1
animals	reptiles	Scincidae	<i>Lygisaurus foliorum</i>	tree-base litter-skink		C		8
animals	reptiles	Scincidae	<i>Ctenotus taeniolatus</i>	copper-tailed skink		C		3
animals	reptiles	Scincidae	<i>Concinnia tenuis</i>	bar-sided skink		C		1
animals	reptiles	Scincidae	<i>Karma murrayi</i>	Murray's skink		C		1
animals	reptiles	Scincidae	<i>Carlia vivax</i>	tussock rainbow-skink		C		21
animals	reptiles	Scincidae	<i>Carlia munda</i>	shaded-litter rainbow-skink		C		1
animals	reptiles	Scincidae	<i>Carlia sp.</i>			C		1
animals	reptiles	Scincidae	<i>Tiliqua scincoides</i>	eastern blue-tongued lizard		C		1
animals	reptiles	Scincidae	<i>Ctenotus spaldingi</i>	straight-browed ctenotus		C		4
animals	reptiles	Varanidae	<i>Varanus varius</i>	lace monitor		C		13

CODES

I - Y indicates that the taxon is introduced to Queensland and has naturalised.

Q - Indicates the Queensland conservation status of each taxon under the *Nature Conservation Act 1992*. The codes are Extinct in the Wild (PE), Endangered (E), Vulnerable (V), Near Threatened (NT), Least Concern (C) or Not Protected ().

A - Indicates the Australian conservation status of each taxon under the *Environment Protection and Biodiversity Conservation Act 1999*. The values of EPBC are Conservation Dependent (CD), Critically Endangered (CE), Endangered (E), Extinct (EX), Extinct in the Wild (XW) and Vulnerable (V).

Records – The first number indicates the total number of records of the taxon for the record option selected (i.e. All, Confirmed or Specimens).

This number is output as 99999 if it equals or exceeds this value. The second number located after the / indicates the number of specimen records for the taxon.

This number is output as 999 if it equals or exceeds this value.

Springfield Rise

Environmental Pre-Start Checklist

Attachment 8

WHIMP- V17, prepared by Fauna Spotter Catcher



July 2019

Fauna Spotter Catcher Wildlife and Habitat Impact Mitigation Plan

Springfield Rise – Village 17
Spring Mountain, Queensland
Report prepared for Shadforth Civil Contractors



Report prepared by
QLD Fauna Consultancy Pty Ltd
Phone: (07) 3376 9780
Fax: (07) 3376 9740
Email: fauna@qfc.com.au

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Author/s:	Bryan Robinson, Ramona Rohwedder
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1. Introduction

1.1 Project Background

Queensland Fauna Consultancy Pty Ltd has been engaged by Shadforth Civil Contractors to prepare a Fauna Spotter Catcher Wildlife and Habitat Impact Mitigation Plan for Village 17 of the Springfield Rise Project, Spring Mountain, Queensland.

The objective of this report is to summarise the existing fauna values presented in the Fauna Spotter Catcher Pre-clearance Survey and Wildlife Protection and Management Plan (WPMP) and assign mitigatory strategies applicable to probable species likely to be encountered during the clearing of identified habitats throughout or within specific localities of the site. Fauna species both common and of elevated conservation value have been considered within the parameters of onsite investigations and, where provided to QFC, include review of current fauna and floristic reports that may influence the assemblages expected to utilise the microhabitats evident within the site.

This review encompasses species identified under the provisions of the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* and the Queensland *Nature Conservation Act 1992*. Further consideration is given, where applicable, to species of iconic, cultural and/or regional significance identified under commonwealth, state or local planning instruments aimed at the persistence of biodiversity values within the area.

1.2 Current Permits and Authorities

All activities conducted during the site investigations were implemented under the provisions of a number of permits issued to Queensland Fauna Consultancy Pty Ltd by the Department of Environment and Science (DES), formerly the Department of Environment and Heritage Protection (DEHP), and the Department of Employment, Economic Development and Innovation (DEEDI). These permits and additional authorities are listed in Table 1.

Table 1: Current Permits and authorities issued to QFC

Permit/Authorisation	Permit Number	Expiry Date
Damage Mitigation Permit	WIMP17840916	5 th December 2019
Rehabilitation Permit	WA0001454	10 th September 2020
Scientific Purposes Permit	WISP16935816	14 th February 2021
Scientific User Registration	Registration Number 589	27 th February 2022
Animal Ethics	CA 2019/02/1259	27 th February 2022

These permits and approvals enable QFC to conduct the investigation, observation and relocation of protected animals exposed to disturbance due to infrastructure expansion resulting in the destruction of natural and artificial habitats.

2. Mitigation Strategies

2.1 Fauna Spotter

It is advised that all identified fauna habitats onsite be inspected by a licensed Fauna Spotter prior to vegetation clearing, and all vegetation removal activities be supervised during the clearing process.

2.2 Clearing Methodologies

In accordance to the *Nature Conservation (Koala) Conservation Plan 2006 and Management Program 2006-2016* the following sequential clearing conditions are required to be adhered to:

- Clearing of trees is carried out in a way that ensures koalas living in or near the area being cleared (the clearing site) have enough time to move out of the clearing site without human intervention, including in particular, for a clearing site with an area of more than 6ha, by:
 - Carrying out the clearing in stages; and
 - Ensuring not more than the following is cleared in any one stage:
 - for a clearing site with an area of 6 ha or less—50 percent of the site's area;
 - for a clearing site with an area of more than 6ha—3ha or 3 percent of the site's area, whichever is the greater; and
 - Ensuring that between each stage there is at least one period of 12 hours that starts at 6 p.m. on a day and ends at 6 a.m. on the following day, during which no trees are cleared on the site.

In addition to these measures it is recommended that clearing activities be undertaken in a directional manner specified by the fauna spotter/catcher. This is done so as to reduce the likelihood of negative interactions between fauna and potential hazards e.g. roads and traffic, prevent isolation of fauna through habitat fragmentation, and to ensure that natural dispersal of wildlife away from clearing activities is not impeded. The intended clearing direction can be viewed in Appendix A.

2.3 Fauna Fencing

Temporary fencing has been installed along certain sections of the project, restricting the movement of large fauna species such as Macropods and Koalas onto roadways. As the site is centrally located within the Springfield Rise precinct, fauna fencing around the immediate proposed clearing area should not be required.

2.4 Felling Procedures

Trees identified as having potential fauna values (such as hollows, arboreal termitaria and exfoliating bark) will be clearly identified and subsequently marked for supervision during felling and inspected once felled. Efforts will be made to determine potentially occupant species by way of investigations for indicative signs (scats, scratchings and tracks) on the day(s) of clearing. Where no signs are found or potentially occupant species are undeterminable, machinery operators will be instructed to fell trees in a manner directed at minimising the potential risk of injury to fauna.

All identified microhabitats will be inspected via ground based observation and the direction of felling will be determined considering the safety of personnel, machinery and potentially occupant fauna. Felling procedures will see implementation of a soft felling technique specifically constructed by QFC to achieve minimal deceleration and impact upon felling. This will be achieved under direction of the Fauna Spotter present directly communicating with the plant operator(s).

2.5 Macropods

Though no direct observations were made during the inspection, other signs including Macropod scats have been located within the clearance survey area.

Eastern Grey Kangaroos *Macropus giganteus* and Red-necked Wallaby have required intensive management on other sites within the Springfield area. The area of proposed clearing activities exhibits direct connectivity to other areas of notable habitat values along the northern, southern and western boundary. Therefore, all clearing should proceed as proposed to ensure a higher probability of successful natural progression off site. Any variation from this proposal must be discussed with the senior fauna spotter and a representative from Shadforth's Civil Contractors.

If the macropods then do not disperse of their own accord in response to incremental habitat reductions, or the macropods welfare is deemed to be unduly jeopardized by clearance activities, alternative strategies are to be recommended by the fauna spotter and subsequently implemented.

2.6 General Terrestrial and Arboreal Fauna

Overall the site contains medium value refugial opportunities for arboreal and terrestrial fauna species. The species expected within the site are likely to primarily reflect common fauna assemblages for the region however provisions are proposed directly for common fauna and species of conservation significance.

It is advised that all identified fauna habitats onsite be inspected by a DES approved Fauna Spotter prior to vegetation clearing and all vegetation removal activities be supervised during the clearing process. Terrestrial load reduction activities will be conducted ahead of the clearing front where possible. Fauna captured will be relocated to adjacent habitat consistent with the life history requirements of the species requiring translocation.

2.7 EVNT Fauna

It is not envisaged that any species, listed under the provisions of the *Environment Protection and Biodiversity Conservation Act 1999* or the *Nature Conservation Act 1992*, other than those listed in the WPMP, will require specific management during vegetation clearing activities.

However, specific management for those identified EVNT species will include targeted investigations immediately prior to vegetation removal activities on each day of clearing and subsequently whilst clearing takes place. Preliminary investigations will be supported by additional monitoring applied during clearing activities with a designated fauna spotter operating with each machine actively involved in vegetation or identified habitat disturbance. These should include the following:

Koala:

As favoured Koala food trees on site exceed a diameter of 100mm at 1.3 metres from the ground, requirements under the Koala Plan's 'Koala Habitat Area' provisions trigger the need for inspection and monitoring during vegetation clearing by a qualified Fauna Spotter.

Historically known to occur within the area the Koala will feature highly in daily search efforts with a dedicated and detailed methodology employed as follows:

- Pre clearing (preliminary) investigations to be conducted specifically for Koala detection by one experienced fauna spotter a minimum half hour prior to works each day. The investigation will embrace all designated clearing zones identified for that day inclusive of a 25 metre buffer around that zone;
- Once clearing commences a fauna spotter will accompany each machine providing continuous verification of habitat values and potential identification of undetected koalas ahead of operating plant. This will also account for potentially transient Koalas that may enter the site after preliminary investigations are complete.

Direct observational methodology will include the following components:

- Use of binoculars to inspect the crown, forks and trunk of trees for individuals currently occupying the site;
- 'Drip zone' searches at the base of known food trees for the presence of scats to a radius equal to that of the crown of individual trees;
- Inspection of trunks for scratchings indicative of use by Koalas;
- Repeat observations made of single trees from numerous angles at repeated times throughout the clearing activities by the assigned fauna spotter.

In the event a Koala is detected, the Fauna Spotter will determine the appropriate course of action with exclusion zones implemented and alterations to the clearing plan discussed with the Site Supervisor. Once defined, these directions will be communicated to the plant operators and clearing will proceed in accordance with the recommendations made.

Changes to Koala management strategies highlighted in the *Nature Conservation (Koala) Conservation Plan 2006 and Management Program 2006-2016* have resulted in particular conditions placed on vegetation clearance involving the removal of Koala food trees. These provisions entail an increased responsibility by developers and land clearance operators alike to ensure the welfare of potentially present Koalas in areas identified as having significance for the persistence of this species.

Where significance under planning instruments is assigned provisions may include the restriction of all clearance that directly interferes with any tree a Koala is residing in or surrounding trees that, when felled, may impact on the crown of the host tree. Koalas are to leave via their own volition through a corridor designated by the Fauna Spotter to the closest remaining suitable habitat.

Throughout this time the Koala may not be interfered with by any means unless special dispensation has been sought through the appropriate government body or where the Koala is evidently in a state of compromised health. Only when Koalas have vacated a tree can clearance operations include the identified host tree and surrounding vegetation which composes the established exclusion zone. Recommendations made by the Fauna Spotter on site will embrace these provisions.

Response to Diseased/Injured Koalas

In the event the Fauna Spotter Catcher detects a koala showing signs of disease or injury the following procedure is to be implemented immediately after establishing the machinery exclusion zone:

- Photograph the animal and where possible the specific issue observed (i.e. dirty rump, emaciation);
- Contact Bryan Robinson, Principal Ecologist at QFC, to provide further assessment of the Koala via the images taken;
- Bryan to contact the Ipswich Koala Protection Society (IKPS) President Ruth Lewis for further opinion and collaboratively decide on the relevant response and timing;
- Where deemed to require veterinary assistance a Koala trap will be acquired from IKPS and installed by QFC;
- Bryan to ensure DES are immediately notified of the intended take of the animal;
- All Koalas will be taken to Moggill Koala Hospital for veterinary examination upon capture.

Employed Koala Trapping Technique

A dedicated Koala trap will be utilised in the event a Koala is deemed to require veterinary assistance. The trap used (Figure 1 and Figure 2) will be supplied by IKPS and consists of the following components:

- 1200mm high Core flute wall;
- Steel bracing pins/star pickets;
- Zip ties;
- Purpose built Koala trapping box with guillotine/footpad style closing mechanism.

The core flute wall is placed around the tree the koala is in to form a solid barrier, subsequently channelling the animal to the trapping box when it descends from the tree. Checks are conducted on the trap periodically between 6pm and 6am to check if the Koala has entered the trap. Once captured the Koala is transported within the trapping box to minimise handling and undue stress or interference. Notification is given immediately to Bryan Robinson who will provide transportation and inform IKPS of the pending arrival of the Koala to Moggill Koala Hospital.



Figure 1: Koala trap exterior



Figure 2: Koala trap interior

Grey-headed Flying Fox:

Although no Flying Fox camps or roosts were noted during the site survey, the transient nature of this species and the abundance of available feeding resources would see probability for the species to intermittently utilise the site.

The following recommendations are made for management of potentially occurring Grey-headed Flying Fox:

- Daily Inspection of trees assigned for removal be conducted to detect potential roosting Flying Foxes;
- Trees found to contain roosting Flying Foxes to be left standing and re assessed at the end of each days clearing. Being a transient species, the disturbance associated by the surrounding clearing is likely to see individuals fly off via its own volition come nightfall and not return the following morning, thus negating the need for direct disturbance.

Rufous Fantail:

The site contains preferred habitat types with the potential to support nesting localities for the Rufous Fantail. However, nesting sites unlikely given the time of year.

The following recommendations are made for management of potentially occurring Rufous Fantail:

- Inspection daily of trees assigned for removal in areas of likely occurrence to detect potentially roosting birds;
- Observation of mature birds to ensure individuals are out of immediate felling zones;
- Implementation of a soft felling technique where trees are determined to have potential nests.

Tusked Frog:

Ephemeral aquatic habitats conducive to the presence of the Tusked Frog are noted at a number of localities throughout the site.

Subsequently, it is recommended that daily Inspection of ephemeral aquatic microhabitats be conducted to detect potentially occupant Tusked Frog.

Collared Delma:

The presence of rocky habitat combined with *Eucalyptus* dominated woodlands presents known favorable habitat for the Collared Delma. The following recommendations are made for mitigation during clearing activity:

- Inspection daily of identified geomorphic structures including rocky outcrops, surface rock, leaf litter and bark exfoliates;
- Monitored dismantling of identified microhabitats by fauna spotters with machinery assistance.

3. Wildlife Capture & Removal Plan

Relocation of native fauna is a strategy that may be required during the course of developmental works to up-hold the project's required nature conservation, animal welfare and human safety objectives.

In all circumstance where native fauna are required to be relocated it must be done so, or under the direct supervision of, a suitably licensed fauna spotter/catcher. A summary of the fauna capture, handling and relocations strategies to be implemented by the fauna spotter/catcher for fauna groups deemed likely, or possible, to occur on site are presented in *Table 2*.

Table 2: Fauna capture, handling and relocation strategy table

Animal Group	Capture and handling	Relocation
Lizards Geckoes Dragons Monitors	<ul style="list-style-type: none"> • Place one hand behind the head at the base of the quadrates and the other at the base of the tail behind the hind limbs; • Be cautious when handling smaller skinks and legless lizards as they may discard their tail; • Lizards and geckoes can be placed inside suitably sized calico bags • In the case of large monitor lizards keep the animal’s ventral surface directly away from the body with the tail between the upper arm and torso. • Dragons and small monitors can be placed in suitably sized calico bags. Larger monitors to be placed in suitably sized crate 	<ul style="list-style-type: none"> • Place the lizard head first into a suitable holding crate for later release. <ul style="list-style-type: none"> ○ Dragons & monitors– release up trees or into heavy vegetation; ○ Water dragons – in the vicinity of riparian areas; ○ Skinks, Geckoes, Legless lizards – around creek margins.
Snakes	<ul style="list-style-type: none"> • Due to their mobile nature, large snakes generally do not require to be handled or relocated, with the exception of slow moving species (i.e. pythons) or smaller species; • Snakes should be identified and only moved if competent and safe to do so (see SOP006 Handling Venomous Snakes Procedure); • Do not attempt to catch a snake if you’re not competent; • Injured snakes should be handled with suitable equipment. 	<ul style="list-style-type: none"> • Release in suitable habitat e.g. along creek lines for python and tree snakes • If feasible take them well away from clearance site to a suitable release location • Release discreetly away from high density suburban areas
Small Mammals	<ul style="list-style-type: none"> • Place a gloved hand around the whole animal in the case of small mammals (melomys or rats), • Do not handle rodents by the tail as this will cause damage to the tail sheath • Place the animal in calico bag in a cool place for later relocation. • Minimise holding time to avoid animal gnawing through bags and escaping 	<ul style="list-style-type: none"> • Release animal into area suitable to its habitat requirements. Ensure plenty of cover is available.

Animal Group	Capture and handling	Relocation
<p>Glider Family</p>	<ul style="list-style-type: none"> • Place gloved hands around the animal at initial capture; • Place the glider(s) into a calico bag or suitable animal crate ensuring family groups are kept together for all inclusive release; • Place in a cool dry area during the day. • When using calico bags ensure the bag is hung and well ventilated • Where possible contain gliders within hollow by plugging openings with a towel or calico bag 	<ul style="list-style-type: none"> • Release glider into habitat with natural hollows and canopy cover; • When releasing a family group with more than one furred young (being carried on the back) either: <ul style="list-style-type: none"> ○ Divide young between parents as a mother is unlikely to carry more than one young, ○ Place young in elevated hollow with parents and allow them to move away in their own time. • Place animal in bag at the base of the selected tree, opening the bag wide and allowing the animal to leave the bag when it is ready. • Relocate hollow (with gliders inside) to suitable habitat and cover lightly with foliage so that the gliders can move away of their own accord and are protected from predators.
<p>Amphibians</p>	<ul style="list-style-type: none"> • Amphibians should be handled only when necessary and handling times should be kept to a minimum to help prevent: <ul style="list-style-type: none"> ○ Removal of the protective mucous layer covering the skin of amphibians; ○ To prevent handling stress induced by changes in their body temperature; ○ Risk of spreading pathogens and parasites. • Amphibians from different sites need to be kept isolated from each other, and need to be kept in different containers or bags; • Any dead or sick amphibians need to be quarantined from other amphibians. <p>Amphibians can be handled utilising one of the following methodologies:</p> <ul style="list-style-type: none"> • Bare handed – ensure hands are sterilized before handling and free from lotions, sunscreen etc • Gloves – disposable gloves desirable or disinfect gloves between handling different animals; • Plastic bags – Single use lightweight plastic bags can be used to pick up and handle frogs; again plastic bags should be disposed of before handling amphibians form a different site. • All staff should be knowledgeable and familiar with the <i>Interim Hygiene Protocol for Handling Amphibians – Technical Manual (DEHP)</i> 	<ul style="list-style-type: none"> • Always ensure that amphibians are kept moist until release. This can include storing in a designated container with moist soil or toweling or in a wet calico bag; • Release into suitable adjacent vegetation that is typical of the species requirements; • Suitable release locations include riparian vegetation, low-lying wetlands, alongside creek lines, hollow logs, dams and ponds; • Amphibians from different sites need to be released in separate locations; • Disinfection procedures in relation to amphibians need to be followed.

Animal Group	Capture and handling	Relocation
Macropods	<ul style="list-style-type: none"> Capture and restraint of macropods carries a high risk of injury and fatal hyperthermia/myopathy syndrome, and must not be performed by inexperienced personnel, or without appropriate equipment and sedation. Capture and restraint of healthy macropods (other than pouch young) must be performed using sedation or anaesthesia due to the high risk of developmental myopathy, and other capture and restraint-associated conditions. Sedative and anaesthetic drugs may only be used under direct supervision of a registered veterinarian, or by appropriately licensed persons (Hanger & Nottidge, 2009). 	<ul style="list-style-type: none"> Release animal into suitable to its habitat requirements. Ensure plenty of cover is available. Macropods are to be released within the range of normal movement from their place of origin. E.g. a Kangaroo can be released within 100 km of its origin, based on its capacity to travel long distances. Monitor animals to ensure adequate recovery if sedated.
Microbats	<ul style="list-style-type: none"> Only vaccinated persons are to handle bats If possible plug the hollow opening with a bag or towel and ask the operator to cut the hollow from the tree; Always wear gloves when handling bats. If not contained within a hollow, place bats inside a calico bag and hang upright in a cool place 	<ul style="list-style-type: none"> Relocate hollow (with bats inside) to suitable habitat and cover lightly with foliage so that the bats can move away of their own accord and are protected from predators. Bats not contained within a hollow should be released as late as possible at the end of the day.
Possums	<ul style="list-style-type: none"> Use thick elbow length gloves when handling possums; Try to grip the animal behind the head near the shoulder blades and around the tail so that you have control of the animal; Keep fingers away from the mouth of the animal; Keep the animal's body facing away at all times; Transfer into a thick calico bag and then into a kitty crate. Place in a safe and shady place until you can relocate the animal. 	<ul style="list-style-type: none"> Release the possum into habitat with adequate hollows and cover; Place animal in bag at the base of a select tree, opening the bag and allow the animal to leave the bag when it is ready; When releasing a Ringtail Possum mother with more than one furred young (being carried on her back) it is unlikely that she will carry both young if highly stressed; <ul style="list-style-type: none"> Choose a smaller shrubby tree with vines or heavy foliage (so the adult can construct a drey easily) Watch the adult ascend the tree, it is possible she will only carry one young and so any additional young may be pushed from her back It may be necessary to take one or more of the young to a wildlife carer If possible place mother and young in a suspended hollow, cover lightly with foliage and allow the animals to move on their own accord. This way the mother can ferry young one at a time to a more suitable location.

Animal Group	Capture and handling	Relocation
Birds	<ul style="list-style-type: none"> • Use gloves when handling larger birds • Use a towel to cover the bird and simultaneously restrain the bird and transfer into calico bag • With larger parrots and raptors, restrain head and legs and transfer into a kitty crate • Wrap chicks loosely in a towel and transfer to kitty crate, keep in a warm location. 	<ul style="list-style-type: none"> • Relocate adult birds in suitable habitat • Chicks should be referred to wildlife carer
Koalas	<p>Movement of Koalas is heavily legislated in South East Queensland. Koalas are not to be captured or relocated without the prior consent of Department Environment and Natural Resource Management (DERM). Koalas should be left to move away of their own volition and trees are not to be felled while a Koala remains in occupancy. See SOP003 Koala Management Procedure for further information.</p>	

4. Wildlife Contingency Plan

In the event sick, injured or orphaned protected animals are encountered during the course of the project they shall be administered to in accordance with the *Code of Practice Care of Sick, Injured or Orphaned Protected Animals in Queensland* under the *Nature Conservation Act 1992*.

The stages in which injuries or illness are described under the code are as follows:

Critical: Injuries or illnesses that are life-threatening; for example, an animal that has been struck by a car and has serious head injuries.

Serious: Injuries or illnesses that might reasonably be expected to cause moderate pain (but are not immediately life-threatening), and the animal is not showing obvious signs of distress or pain, or significantly reduced mental activity; for example an animal with a closed fracture but no other apparent injuries and that is alert and responsive.

Mild: The injuries or illness of an animal appear to cause little discomfort, pain or function loss and are not life-threatening (even without immediate vet treatment); for example superficial cuts, superficial bruising or orphaned animals suffering from mild dehydration.

4.1 Basic Wildlife Care

If wildlife requiring care are encountered by the fauna spotter/catcher they will be attended to in the manner set out by the guidelines provided in *Table 4*. Supplementary advice will be sought from a wildlife carer and/or veterinarian where required. QFC have previously utilised experienced local carer groups and vets. These are listed in *Table 3*.

Table 3: List of Local Vets & Wildlife Carer Groups

Vets			
Name	Location	Contact Number	Comments
RSPCA Wildlife Hospital	139 Wacol Station Road, Wacol	07 3426 9999	24 Hours/7days
Carers			
Name	Location	Contact Number	Comments
RSPCA Wildlife Hospital	139 Wacol Station Road, Wacol	07 3426 9999	24 Hours/7days
Ipswich Koala Protection Society	Ipswich	Ruth: 07 5464 6274 / 0419 760 127 Helen: 07 3282 5035 / 0417 604 761	Specialize in koalas however rescue all wildlife

Table 4: Basic Wildlife Care

Birds	Reptiles & Amphibians	Mammals
<p>Egg</p> <p>Viable eggs must be kept warm until transferred to a suitable wildlife carer. It is necessary that the orientation of the eggs be maintained as fixed embryos may be lost. Keep wrapped in a pouch and on a heat source (where available). An ideal temperature is between 25-27° (DEHP 2013); where possible attempt to identify the species so the carer can be informed as the management of eggs can vary in accordance with species and stage of development.</p>	<p>Egg</p> <p>Viable eggs must be kept warm and stable until transferred to a wildlife carer. It is necessary that the orientation of the eggs be maintained as fixed embryos may be lost. Keep wrapped in pouch or towel and place into an animal crate in a safe location.</p>	<p>Neonate</p> <p>Unfurred animals need to be kept warm until transferred to a carer. Place into a pouch and onto a heat pad. Ideal temperature is between 31-34°. 25-27° is appropriate in most other cases (DEHP 2013). Regularly check the animal to ensure it is not overheating by observing for obvious signs of distress (i.e. panting, very warm to the touch, red blotched skin). Adjust the temperature where required. Seek further advice from the carer if you are unsure.</p>
<p>Chick</p> <p>Make sure the animal is correctly identified as different species often have very different requirements. Place chicks into a pouch/towel onto a heat source maintained around 31-34° (only if they have not fledged) and keep in an animal crate until transferred to a carer.</p>	<p>Juvenile</p> <p>Place animals in a suitable lined crate and keep covered in a dark quiet place. Refer to the wildlife contact list in your QFC Folder for a carer who specialises in reptiles.</p>	<p>Juvenile</p> <p>Place into a lined crate and keep covered in a dark and quiet location.</p>
<p>Adult</p> <p>Keep adult birds in a lined animal crate or cage and covered in a quiet area.</p>	<p>Adult</p> <p>Place animals in a suitable lined crate and keep covered in a dark quiet place. Refer to the wildlife contact list in your QFC Folder for a carer who specialises in reptiles.</p>	<p>Adult</p> <p>Place into a lined crate and keep covered in a dark and quiet location.</p>
<p>Feeding</p> <p>Providing food and water is generally not required during short periods (2-3 hrs) though this should be reconsidered if animals need to be held longer. Consult the vet and/or carer for further advice on how to proceed.</p>	<p>Feeding</p> <p>Newly hatched reptiles may require feeding if kept overnight. Consult with QFC for further advice. Snakes and turtles will not require feeding but water should be made available.</p>	<p>Feeding</p> <p>Providing food and water is generally not required during short periods (2-3 hrs) though this should be reconsidered if animals need to be held longer. Consult the carer for further advice on how to proceed.</p>

4.2 First Aid

Animals suffering from serious injuries or illness encountered on the project should be passed on to veterinary care as soon as possible. In the interim a licensed fauna spotter/catcher can provide first aid for the animal and organise suitable transportation.

If a seriously sick or injured animal is encountered the fauna spotter/catcher should:

1. Keep the animal calm by placing into an animal crate and keeping it covered in a dark and quiet location. Isolate any nearby threats such as domestic animals or predators.
2. Quickly and thoroughly inspect the animal for trauma. If the injuries are not serious enough to require euthanasia administer the basic first aid as a minimum (but only if capable to do so)

Representative first aid that may be administered by a fauna spotter/catcher is provided in *Table 5*.

Table 5: Wildlife First Aid

Ailment	First Aid
Bleeding	Using material that is clean and sanitary, apply direct pressure to the affected area. Bandages can be used to hold material in place until vet treatment can be sought. Veterinarian treatment should be sought for further assistance as soon as possible.
Broken limbs	House the animal in a suitably sized animal crate with towels under the animal for comfort. Keep the crate covered and in a quiet location. Proceed to a veterinarian for further assistance as soon as possible.
Injured tails	House the animal in a suitably sized animal crate with towels under the animal for comfort. Keep the crate covered and in a quiet location. Proceed to a veterinarian for further assistance as soon as possible.
Concussions	House the animal in a suitably sized animal crate with towels under the animal for comfort. Keep the crate covered and in a quiet location. Proceed to a veterinarian for further assistance as soon as possible.

4.3 Euthanasia

Section 12 of the code details how to determine when euthanasia is required and how to euthanise animals ethically. The following standards as listed under the code are to be followed when assessing whether euthanasia is required:

- The euthanasia of wildlife where required is to be provided for by all wildlife rehabilitators;
- Euthanasia without exception is to be carried out when:
 - Significant pain or suffering is to be alleviated where it is not able to be managed by a vet;
 - Further treatment is **not** practical or recovery is **not** expected in a way in which the animal can be successfully rehabilitated back to the wild;
 - Resources are not available to provide appropriate care or an acceptable quality of life throughout the likely rehabilitation period.
- Animals that are suffering and have a poor prognosis for survival must be euthanised rather than left to die from the injury or illness. Failure to undertake appropriate action is a breach of the *Animal Care and Protection Act 2001*.
- Unless permission has been granted by the Department of Environment and Heritage Protection for the animal to enter the Queensland Species Management Plan (QSMP) or otherwise advised by the DEHP Wildlife Management Director, animals must be euthanised when:
 - An orphaned animal is not viable or likely to be rehabilitated;
 - No suitable release locations are available;
 - The ability for an animal to reproduce is lost due to an injury, disease or surgical procedure;
 - The ability to move freely or normally (i.e. run, climb, crawl, hop, fly or swim) is permanently impaired. Examples are: a missing or impaired limb, wing, foot or tail that would significantly impair the animal's ability to survive in the wild;
 - The ability to sense environment (i.e. see, smell, feel, taste or hear) is permanently impaired. For example: missing or injured organ such as an eye, ear or nose that would significantly impair the animal's ability to survive in the wild;
 - The ability to catch, find or handle food is permanently impaired;
 - Its advanced age renders it unlikely to survive in the wild.

5. Wildlife Storage & Housing Plan

For wildlife requiring storage, temporary housing and transportation to release sites and/or to a wildlife carer or veterinarian, guidelines set out in the Code of Practice and QFC's Animal Ethics Permit will be followed.

Dependent on the species of animal and condition of the animal, temporary storage and housing of animals will be as follows:

Calico bags: Calico bags will be used to temporarily house fauna such as snakes, lizards and small mammals (including microbats), Bags will range in size from 200mm x 200mm to 600mm x 1800mm. Bag selection will vary according to the size of animals to be placed in them. In the case of snakes a "hoop bag" may be used to facilitate capture. The hoop is approximately 500mm in diameter attached to a handle. The bag is placed around the hoop ensuring a greater area in which to pass the snake through into the bag.

Plastic holding tubs/containers/animal crate: Plastic holding tubs/containers/crates will be used to temporarily house fauna such as snakes, lizards, frogs, small mammals and birds (Plastic holding tubs/containers/crates will range in size from 150mm x 150mm x 120mm to 500mm x 400mm x

400mm. Plastic holding tubs/containers/crates selection will vary according to the size and number of animals to be placed in them.

In addition to this, material is used to line the tub/crate to ensure the animals won't lose its footing. This may include folded towels on the bottom of the crate or a fitted pad. These items are washed between each use to reduce the spread of disease/parasites.

Section 9 of the Code relates to how transportation of wildlife should be undertaken. The following will be adhered to when transporting wildlife to the vet and/or carer:

- Additional pain or distress of the animal is to be avoided;
- Wildlife should only be transported when necessary;
- Transport containers must be appropriate for the species (size, strength and behaviour of species being moved);
- Transport containers must be designed and maintained in a way as to:
 - Prevent injury;
 - Prevent escape;
 - Prevent rolling/tipping during transit;
 - Prevent damage to plumage (feathers);
 - Be hygienic;
 - Minimise stress and
 - Be suitably ventilated.

- Non-compatible species must not be transported in a manner which allows for visual or physical contact;
- Containers must be secured to prevent movement and provide protection from direct sunlight, wind and rain;

Venomous, dangerous or potentially disease transmitting animals must be clearly marked with warning labels (i.e. Caution –‘venomous snake’ or ‘live bat’) and be locked and secured.

6. Wildlife Release & Disposal Plan

Future development area and parkland areas border Village 17 to the north, west and south, and presents a favorable translocation site for fauna encountered during clearing activities. With the exception of highly mobile species such as birds and macropods where natural relocation may occur, it will be necessary for the fauna spotter/catcher to translocate the majority of fauna found into suitable habitat within these areas. A map of the intended release site can be viewed in Appendix B.

In regard to all fauna capture and disposal activities conducted on the project the following records will be made:

- a. species;
- b. identification name or number;
- c. sex (M, F, or unknown);
- d. approximate age or age class (neonate, juvenile, sub-adult, adult);
- e. time and date of capture;
- f. method of capture;
- g. exact point of capture (GPS point);
- h. state of health;
- i. incidents associated with capture likely to affect the animal;
- j. veterinary intervention or treatments;
- k. time held in captivity;
- l. disposal (euthanasia, re-release, translocation etc);
- m. date and time of disposal;
- n. details of disposal (if released, exact point of release GPS);
- o. for released animals: distance in metres from point of capture to point of release.

7. Post Works Impact Minimisation

As the project area will be cleared of all vegetation, post works impact monitoring and/or impact minimisation is deemed not necessary. It is unlikely the vast majority of wildlife will return to the area as all habitat and foraging resources will be removed and habitat connectivity is also not present.

In the event that fauna is found on site post-works, it is recommended personnel contact QFC and a licensed and experienced wildlife consultant can be dispatched to remove and relocate the animal should it be necessary. QFC wildlife consultants are available 24/7 for fauna related call-outs in relation to this project.

It is recommended that if any fauna, such as Kangaroos and Wallabies, are noted in the wider area and appear distressed post-works that QFC be contacted to further assess the situation.

8. Assessment, Conclusion and Fauna Management Recommendations

A number of conclusions and recommendations are presented, with the specific intention of providing a comprehensive management structure to facilitate minimal impact to fauna during the clearing of vegetation and subsequent disturbance of habitats. The directives given by Fauna Spotter Catchers should embrace a “best practice” approach which includes implementation of proven specific management techniques for identified habitat types and compliance with legislation relevant to the activity.

Fauna management is presented here specific to EVNT fauna, general terrestrial and arboreal fauna and aquatic fauna. Although each is treated separately, overlap does occur within target techniques providing a comprehensive approach for target species of all conservation significance.

9. References

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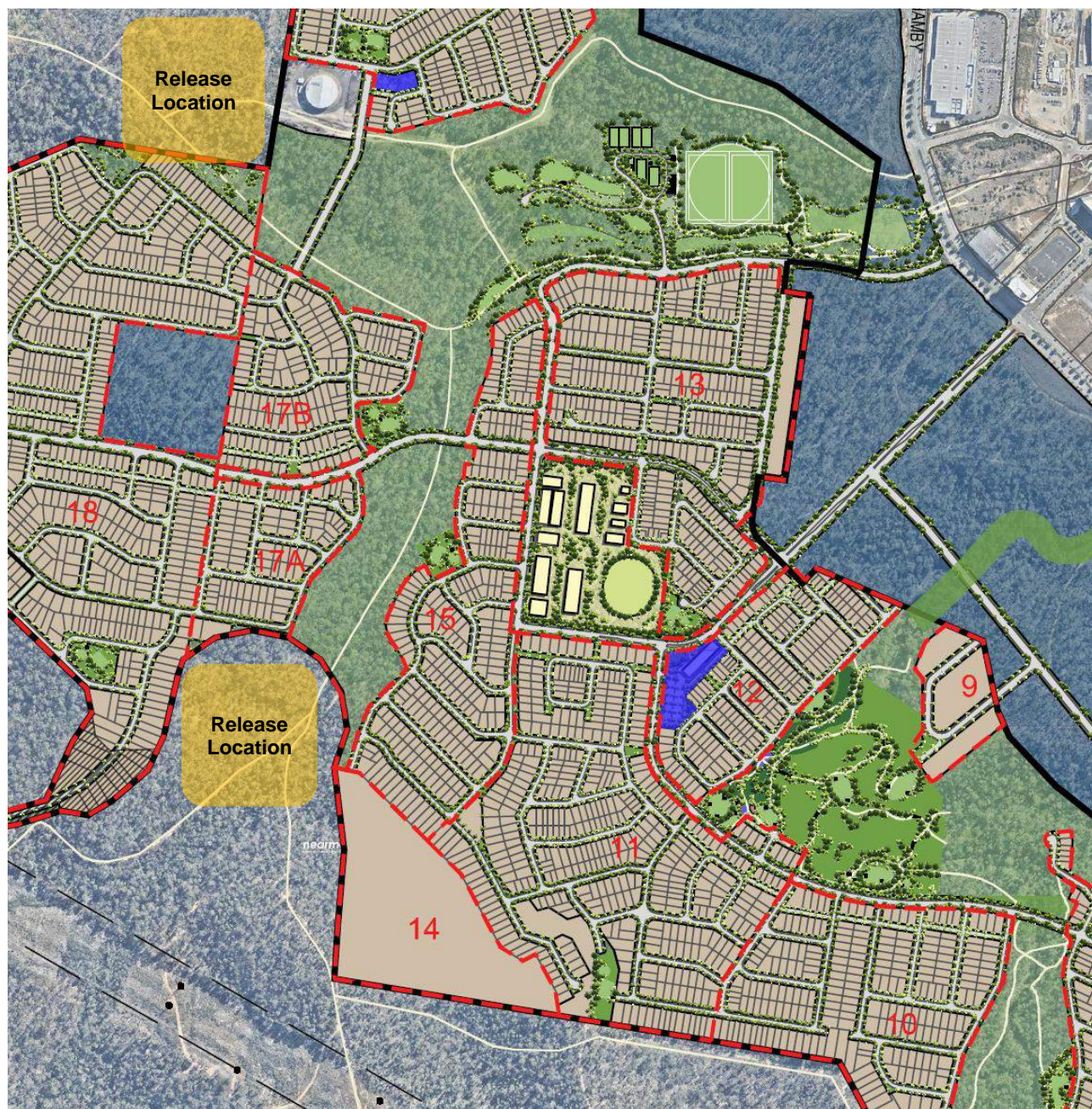
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10. Appendix A: Intended Direction of Clearing



11. Appendix B: Intended Release Site for Wildlife



Springfield Rise

Environmental Pre-Start Checklist

Attachment 9

V17 Contractor Environmental Awareness Acknowledgement Notice

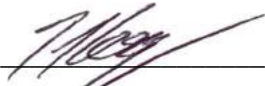
ENVIRONMENTAL AWARENESS

CONTRACTOR ACKNOWLEDGEMENT

I, Tony Hooper, the Contractor (or the Contractor Representative), appointed by Lendlease Communities (Springfield) Pty Ltd, acknowledge receipt and acceptance of the Lendlease Communities rules and policies in the **Village 17 Environmental Pre-Clearance Package**. By signing below, I acknowledge that there are mechanisms in place to ensure all material provided within the **Village 17 Site Based Management Plan (June 2019) and Village 17 Environmental Pre-clearance Package** will be read and understood by all site contractors and sub-contractors prior to commencing works on site.

Shadforth Pty Ltd

Company Name (Please print)



Signature (Contractor / Contractor Representative)

Tony Hooper

Name (Please print)

Project Manager

Title / Position

10 July 2019

Date

Appendix L

Habitat quality assessment results

Habitat Quality Final Summary

- For all environmental offset applications you must:
- Complete form (Environmental Offsets Delivery Form 1-Notice of Election and Advanced Offsets Details)
 - Complete any other forms relevant to your application
 - Provide the mandatory supporting information identified on the forms as being required to accompany your application

Note: This document/tool may be used in relation to undertaking a habitat quality analysis of an impact site/offset site and/or advanced offset site and is designed to be attached to Environmental Offsets Delivery Form 5 - Habitat Quality Details as

Habitat Quality Final Summary Template												
Case Reference												
Project Name												
Total Area		253.8										
PART	Habitat Quality Attributes		Assessment Unit Number									
	Assessment Unit Area (ha)		1	2	3	4	5	6	7	8	9	10
	Regional Ecosystems		RE	12.8-24	12.9-10.19	12.9-10.17	12.9-10.7					
	Bioregion		Bioregion	Southeast Queensland	Southeast Queensland	Southeast Queensland	Southeast Queensland					
1	Site Condition Attributes	1. Recruitment of woody perennial species	Score	3	5	3	5					
		2. Native plant species richness	Score	5	5	3	5					
		- Trees	Score	3	5	3	5					
		- Shrubs	Score	3	3	3	3					
		- Grasses	Score	2.5	3	2.5	2.5					
		- Forbs	Score	5	5	5	5					
		3. Tree canopy height	Score	5	5	5	5					
		- Canopy layer	Score	5	5	5	5					
		- Sub-Canopy Layer	Score									
		- Emergent Layer	Average Score	5	5	5	5					
4. Tree canopy cover	Score	5	5	5	5							
- Canopy layer	Score	2	5	3	3							
- Sub-Canopy Layer	Score											
- Emergent Layer	Average Score	3.5	5	4	4							
5. Shrub canopy cover	Score	5	3	3	3							
6. Native perennial grass cover	Score	5	1	1	0							
7. Organic litter	Score	5	5	5	5							
8. Large trees	Score	10	5	5	10							
9. Coarse woody debris	Score	2	2	5	5							
10. Weed cover	Score	5	5	5	5							
2	Site Context Attributes	11. Size of patch (fragmented)	Score	10	10	10	10					
		12. Connectedness (fragmented)	Score	5	5	5	5					
		13. Context (fragmented)	Score	4	4	4	4					
		14. Distance from water (intact)	Score									
		15. Ecological corridors	Score	6	6	6	6					
3	Species Habitat Index	16. Threats to species	Score	7	7	7	7					
		17. Quality and availability of food and foraging habitat	Score	10	10	10	10					
		18. Quality and availability of shelter	Score	10	10	10	10					
		19. Species mobility capacity	Score	7	7	7	7					
		20. Role of site location to overall population in the State.	Score	4	4	4	4					

Habitat Quality Score (measured)	120.00	115.00	110.00	105.00						
Habitat Quality Score (max)	150.00	150.00	150.00	150.00						
Assessment Unit Area (ha)	14.10	140.70	35.60	63.40	0.00	0.00	0.00	0.00	0.00	0.00
Assessment Unit Habitat Quality Score	7.69	7.37	7.08	7.72						
Size weighting	0.06	0.55	0.14	0.25						
Weighted Assessment Unit Habitat Quality Score	0.43	4.09	0.99	1.93						
FINAL TOTAL HABITAT QUALITY SCORE	7.44									
Administrative Information										
Name of Assessment Officer									Date	
Organisation/Company Name										
Project Name										
Phone Number									Email	

Habitat Quality Final Summary

- For all environmental offset applications you must:
- Complete form (Environmental Offsets Delivery Form 1-Notice of Election and Advanced Offsets Details)
 - Complete any other forms relevant to your application
 - Provide the mandatory supporting information identified on the forms as being required to accompany your application

Note: This document/tool may be used in relation to undertaking a habitat quality analysis of an impact site/offset site and/or advanced offset site and is designed to be attached to Environmental Offsets Delivery Form 5 - Habitat Quality Details as

Habitat Quality Final Summary Template												
Case Reference												
Project Name												
Total Area		69.48										
PART	Habitat Quality Attributes	Requirement	Assessment Unit Number									
	Assessment Unit Area (ha)	1	2	3	4	5	6	7	8	9	10	
	Regional Ecosystems	69.48	0	0	0	0	0	0	0	0	0	
	Bioregion	12.9-10.17										
		Bioregion	Southeast Queensland									
1	Site Condition Attributes	1. Recruitment of woody perennial species	Score	3								
		2. Native plant species richness	Score	3								
		- Trees	Score	3								
		- Shrubs	Score	3								
		- Grasses	Score	3								
		- Forbs	Score	2.5								
		3. Tree canopy height	Score	5								
		- Canopy layer	Score	5								
		- Sub-Canopy Layer	Score	5								
		- Emergent Layer	Score	5								
Average Score	Average Score	5										
4. Tree canopy cover	Score	2										
- Canopy layer	Score	5										
- Sub-Canopy Layer	Score	5										
- Emergent Layer	Score	5										
Average Score	Average Score	3.5										
5. Shrub canopy cover	Score	3										
6. Native perennial grass cover	Score	1										
7. Organic litter	Score	5										
8. Large trees	Score	5										
9. Coarse woody debris	Score	2										
10. Weed cover	Score	5										
2	Site Context Attributes	11. Size of patch (fragmented)	Score	10								
		12. Connectedness (fragmented)	Score	5								
		13. Context (fragmented)	Score	5								
		14. Distance from water (intact)	Score									
		15. Ecological corridors	Score	6								
3	Species-Habitat Index	16. Threats to species	Score	7								
		17. Quality and availability of food and foraging habitat	Score	10								
		18. Quality and availability of shelter	Score	10								
		19. Species mobility capacity	Score	7								
		20. Role of site location to overall population in the State.	Score	4								

Habitat Quality Score (measured)	108.00									
Habitat Quality Score (max)	156.00									
Assessment Unit Habitat Area (ha)	69.48	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Assessment Unit Habitat Quality Score	6.92									
Size weighting	1.00									
Weighted Assessment Unit Habitat Quality Score	6.92									
FINAL TOTAL HABITAT QUALITY SCORE	6.92									
Administrative Information										
Name of Assessment Officer								Date		
Organisation/Company Name										
Project Name										
Phone Number								Email		

Appendix M

Weed Management Plans

Spring Mountain Precinct

AREA 2 WEED MANAGEMENT



ISSUE A 13.11.2017
PRELIMINARY ISSUE

DRAWING SCHEDULE

Dwg No.	Drawing Title	Issue	Date
7243 L 201	Weed Management Plan - Cover Sheet	A	13/11/2017
7243 L 202	Weed Management Plan - Introduction	A	13/11/2017
7243 L 203	Weed Management Plan - Sheet 1	A	13/11/2017
7243 L 204	Weed Management Plan - Sheet 2	A	13/11/2017
7243 L 205	Weed Management Plan - Sheet 3	A	13/11/2017
7243 L 206	Weed Management Plan - Sheet 4	A	13/11/2017
7243 L 207	Weed Management Plan - Sheet 5	A	13/11/2017
7243 L 208	Weed Management Plan - Sheet 6	A	13/11/2017
7243 L 209	Weed Management Plan - Sheet 7	A	13/11/2017
7243 L 210	Weed Management Plan - Sheet 8	A	13/11/2017
7243 L 211	Weed Management Plan - Sheet 9	A	13/11/2017
7243 L 212	Weed Management Plan - Sheet 10	A	13/11/2017
7243 L 213	Weed Management Plan - Technical Notes	A	13/11/2017
7243 L 214	Weed Management Plan - Treatment Techniques	A	13/11/2017
7243 L 215	Weed Management Plan - Treatment Techniques	A	13/11/2017
7243 L 216	Weed Management Plan - Treatment Techniques	A	13/11/2017
7243 L 217	Weed Management Plan - Monitoring & Reporting	A	13/11/2017



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Issue	Date	Description	Checked
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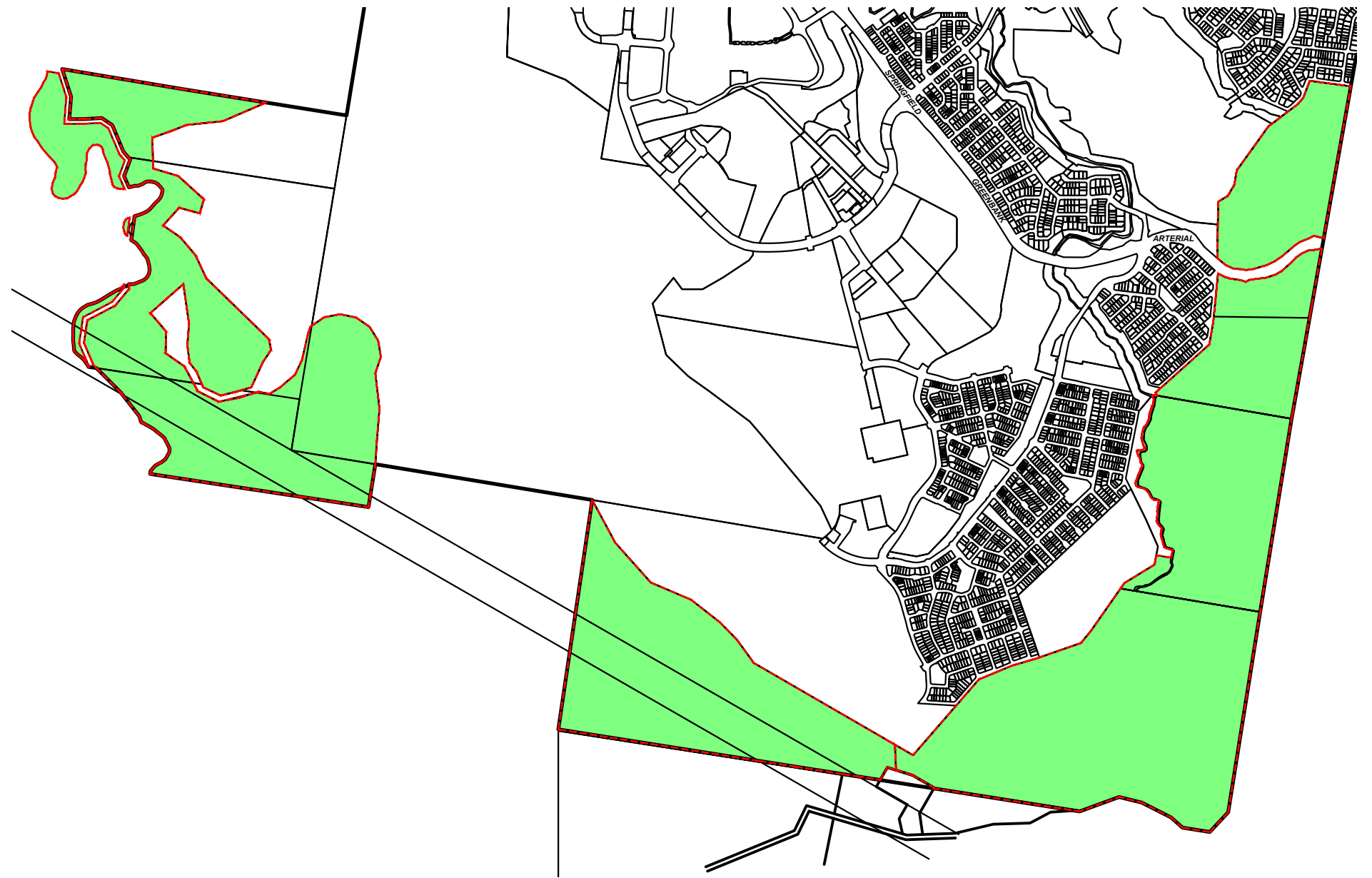
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PROJECT:	Spring Mountain Precinct
SCALE:	AS NOTED

AREA 2 MANAGEMENT PLAN - WEED TREATMENT & REHABILITATION

INTRODUCTION

NOTES

This Weed Management Plan

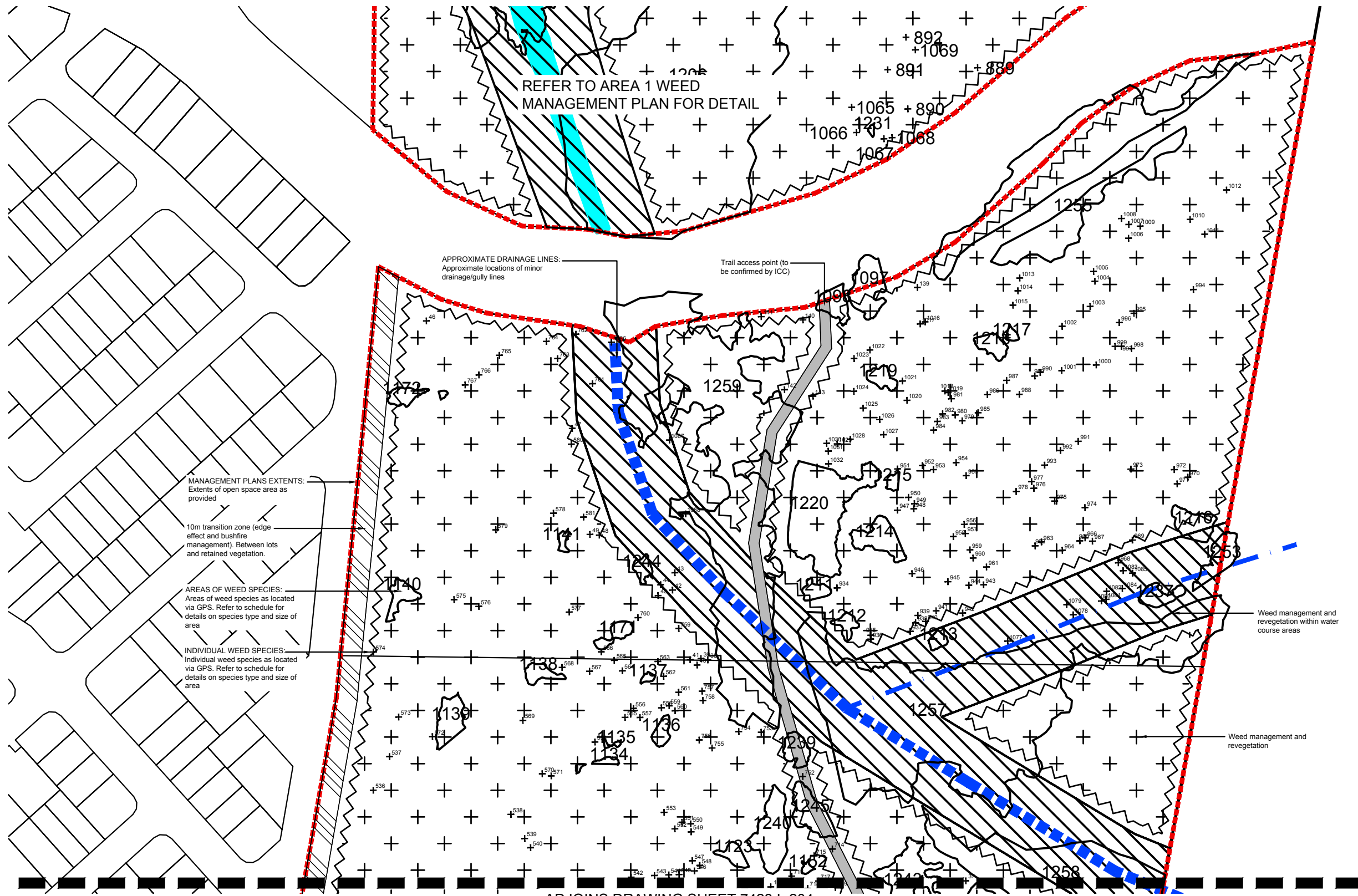


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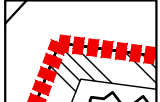

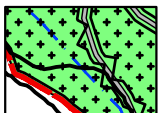
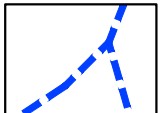

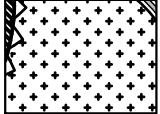
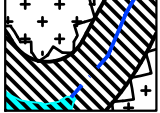
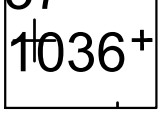
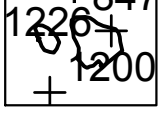
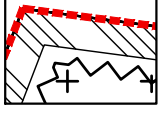
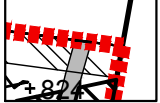
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PROJECT:	Spring Mountain Precinct
SCALE:	AS NOTED

Spring Mountain Precinct

AREA 2 WEED MANAGEMENT PLAN



LEGEND

-  Extent of management plan area
-  Existing fire trail / maintenance access. As provided by ICC in GIS & Refer to Council's Management Plan
-  Approximate minor drainage lines. Minor drainage / gully lines
-  Approximate mapped major drainage lines
-  Extent of existing lake area
-  Weed management and revegetation
-  Weed management and revegetation within water course areas
-  Individual weed species located via GPS
-  Area of weed species located via GPS
-  10m transition zone (Edge effect & bushfire management). Between lots and retained vegetation
-  Trail access point (To be confirmed by ICC)

MANAGEMENT PLANS EXTENTS:
Extents of open space area as provided

10m transition zone (edge effect and bushfire management). Between lots and retained vegetation.

AREAS OF WEED SPECIES:
Areas of weed species as located via GPS. Refer to schedule for details on species type and size of area

INDIVIDUAL WEED SPECIES:
Individual weed species as located via GPS. Refer to schedule for details on species type and size of area

APPROXIMATE DRAINAGE LINES:
Approximate locations of minor drainage/gully lines

Trail access point (to be confirmed by ICC)

ADJOINS DRAWING SHEET 7423 L 204

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Brisbane • Emerald • Gladstone
head office 9 Thompson St Bowen Hills Q 4006
phone 1300 123 SHG web www.saundershavill.com
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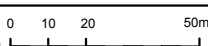
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A	13/11/2017	Preliminary Issue	MS

CLIENT:

PROJECT:
Spring Mountain Precinct

SCALE:
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1:2000@A3



landscape architecture

DRAWING:
Area 2 Management Plan
Weed Management - Sheet 1

DATE: November 17
CHECKED: MS

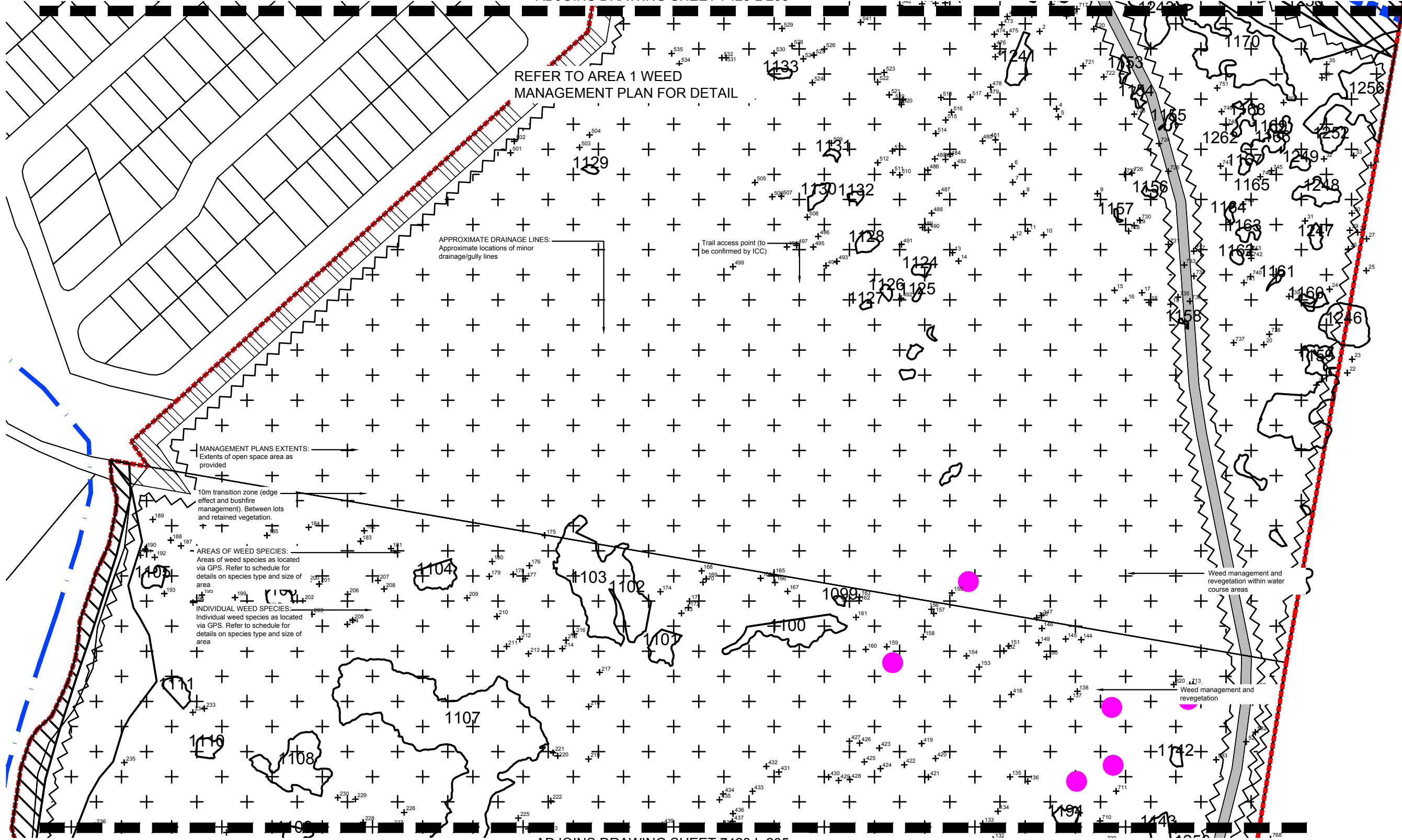
CLIENT REF.: 7243
DRAWN: TL

DRAWING No.: 7243 L 203 WMP A

Spring Mountain Precinct

AREA 2 WEED MANAGEMENT PLAN

ADJOINS DRAWING SHEET 7423 L 203



REFER TO AREA 1 WEED MANAGEMENT PLAN FOR DETAIL

APPROXIMATE DRAINAGE LINES:
Approximate locations of minor drainage/gully lines

Trail access point (to be confirmed by ICC)

MANAGEMENT PLANS EXTENTS:
Extents of open space area as provided

10m transition zone (edge effect and bushfire management). Between lots and retained vegetation.

AREAS OF WEED SPECIES:
Areas of weed species as located via GPS. Refer to schedule for details on species type and size of area








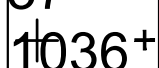



INDIVIDUAL WEED SPECIES:
Individual weed species as located via GPS. Refer to schedule for details on species type and size of area

Weed management and revegetation within water course areas

Weed management and revegetation

ADJOINS DRAWING SHEET 7423 L 205

LEGEND

-  Extent of management plan area
-  Existing fire trail / maintenance access. As provided by ICC in GIS & Refer to Council's Management Plan
-  Approximate minor drainage lines. Minor drainage / gully lines
-  Approximate mapped major drainage lines
-  Extent of existing lake area
-  Weed management and revegetation
-  Weed management and revegetation within water course areas
-  Individual weed species located via GPS
-  Area of weed species located via GPS
-  10m transition zone (Edge effect & bushfire management). Between lots and retained vegetation
-  Trail access point (To be confirmed by ICC)

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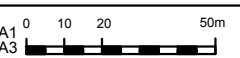
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 ISO14001 Environmental Management System

AMENDMENTS:

Issue	Date	Description	Checked
A	13/11/2017	Preliminary Issue	MS

CLIENT:
 PROJECT:
 Spring Mountain Precinct

SCALE: 1:1000@A1
 1:2000@A3



landscape architecture

DRAWING:
 Area 2 Management Plan
 Weed Management - Sheet 2

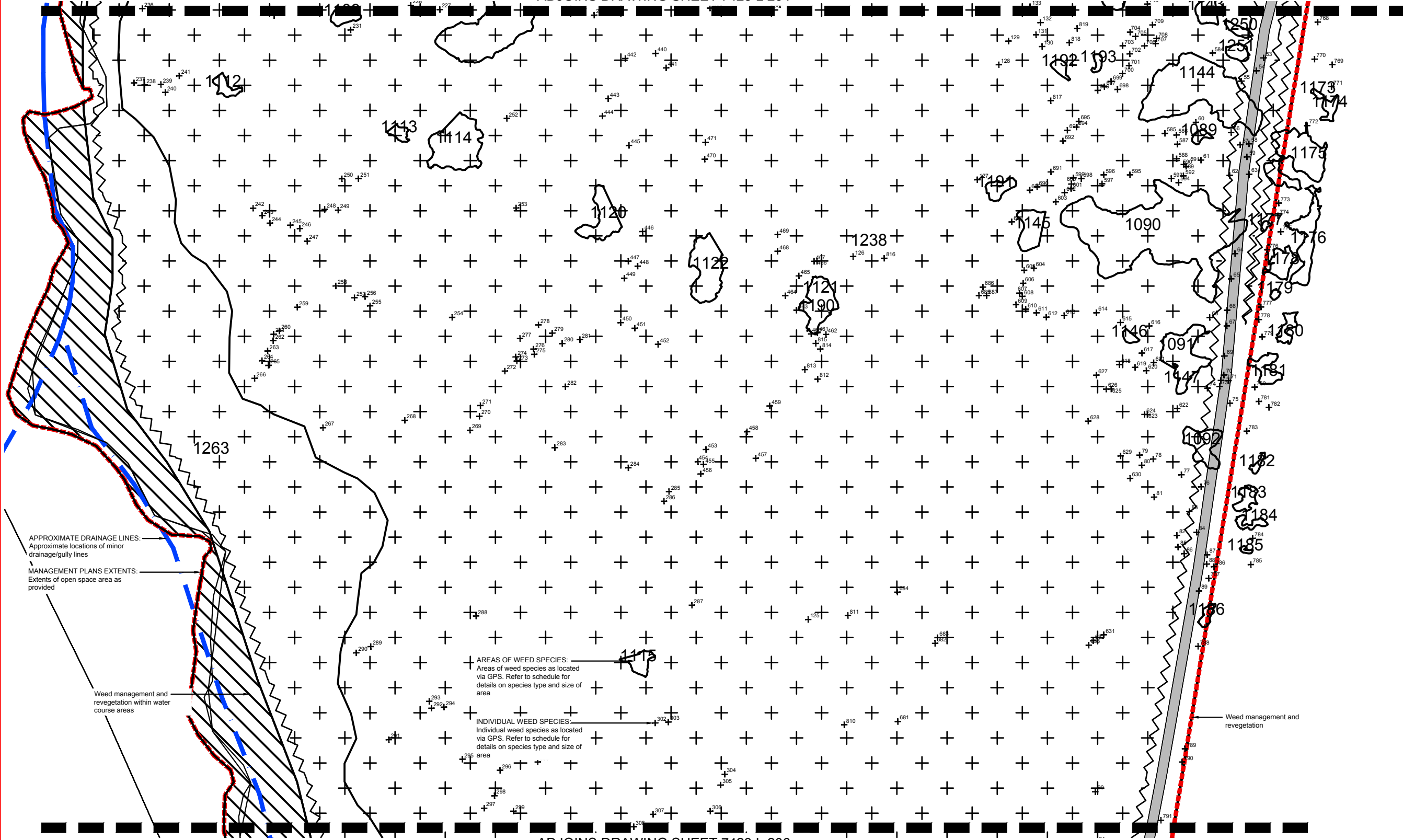
DATE: November 17
 CLIENT REF.: 7243
 DRAWING No.: 7243 L 204 WMP A

CHECKED: MS
 DRAWN: TL

Spring Mountain Precinct

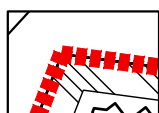


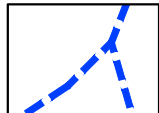


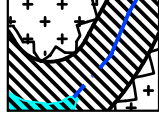
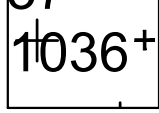
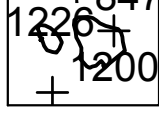
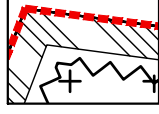
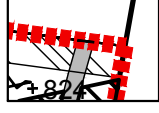
AREA 2 WEED MANAGEMENT PLAN

ADJOINS DRAWING SHEET 7423 L 204



ADJOINS DRAWING SHEET 7423 L 206

LEGEND

-  Extent of management plan area
-  Existing fire trail / maintenance access. As provided by ICC in GIS & Refer to Council's Management Plan
-  Approximate minor drainage lines. Minor drainage / gully lines
-  Approximate mapped major drainage lines
-  Extent of existing lake area
-  Weed management and revegetation
-  Weed management and revegetation within water course areas
-  Individual weed species located via GPS
-  Area of weed species located via GPS
-  10m transition zone (Edge effect & bushfire management). Between lots and retained vegetation
-  Trail access point (To be confirmed by ICC)

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40 YEARS
 1975-2015

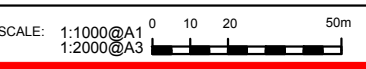
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APPROVED COMPANY
 ISO9001 Quality Management System
 APPROVED COMPANY
 ISO14001 Environmental Management System

AMENDMENTS:			
Issue	Date	Description	Checked
A	13/11/2017	Preliminary Issue	MS

CLIENT:
 PROJECT:
 Spring Mountain Precinct

SCALE: 1:1000@A1
 1:2000@A3



landscape architecture

DRAWING:
 Area 2 Management Plan
 Weed Management - Sheet 3

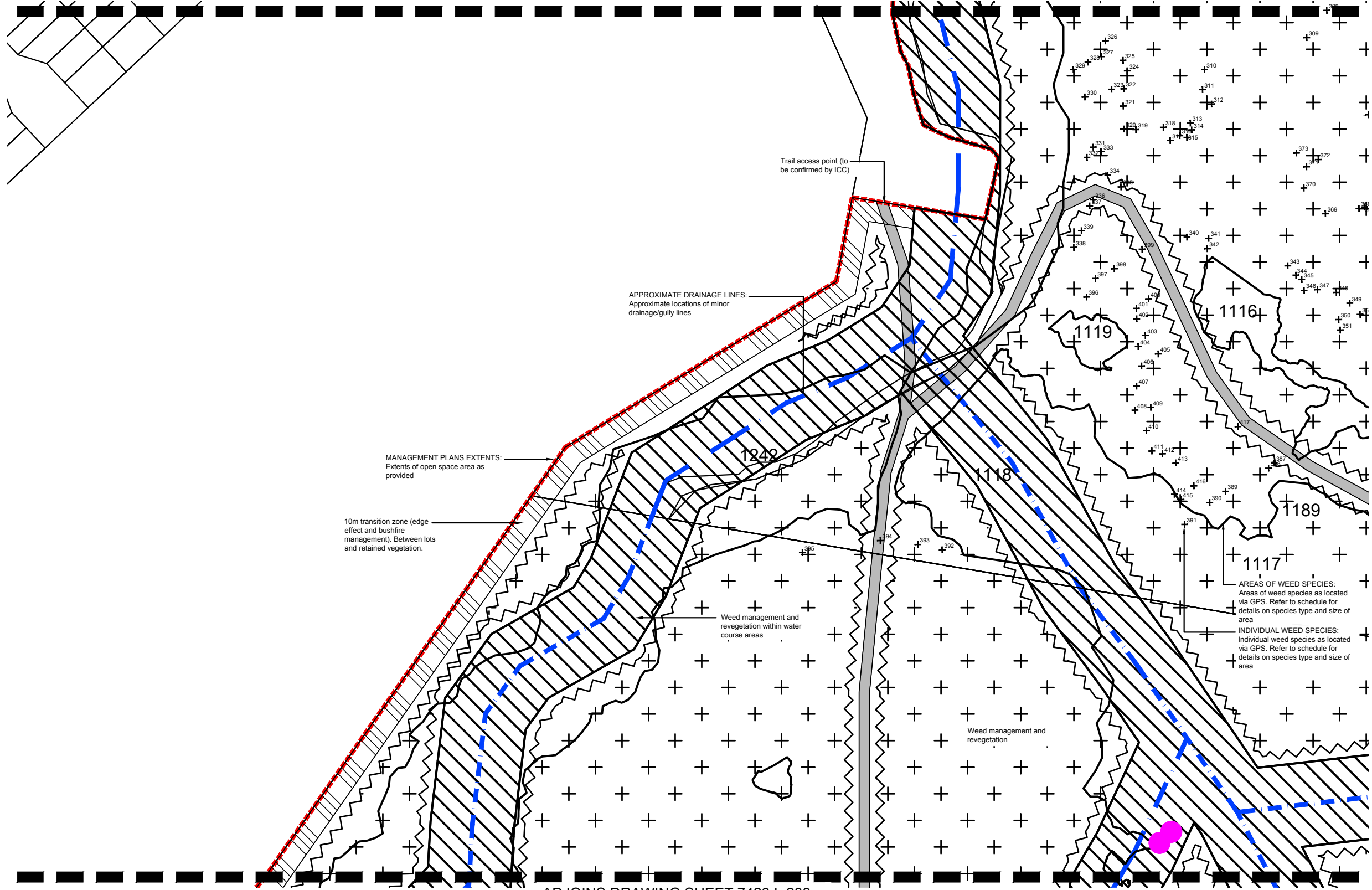
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 CLIENT REF.: 7243 DRAWN: TL
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Spring Mountain Precinct

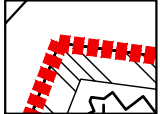


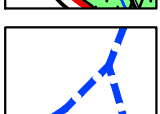


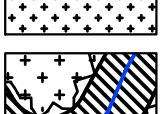
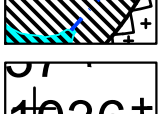
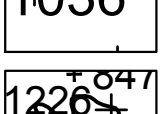
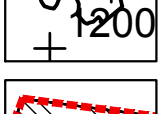


AREA 2 WEED MANAGEMENT PLAN

ADJOINS DRAWING SHEET 7423 L 205

ADJOINS DRAWING SHEET 7423 L 208



LEGEND

-  Extent of management plan area
-  Existing fire trail / maintenance access. As provided by ICC in GIS & Refer to Council's Management Plan
-  Approximate minor drainage lines. Minor drainage / gully lines
-  Approximate mapped major drainage lines
-  Extent of existing lake area
-  Weed management and revegetation
-  Weed management and revegetation within water course areas
-  Individual weed species located via GPS
-  Areas of weed species: Areas of weed species as located via GPS. Refer to schedule for details on species type and size of area
-  Individual weed species: Individual weed species as located via GPS. Refer to schedule for details on species type and size of area
-  10m transition zone (Edge effect & bushfire management). Between lots and retained vegetation
-  Trail access point (To be confirmed by ICC)

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AMENDMENTS:			
Issue	Date	Description	Checked
A	13/11/2017	Preliminary Issue	MS

CLIENT: _____
 PROJECT: Spring Mountain Precinct
 SCALE: 1:1000@A1 0 10 20 50m
 1:2000@A3

landscape architecture

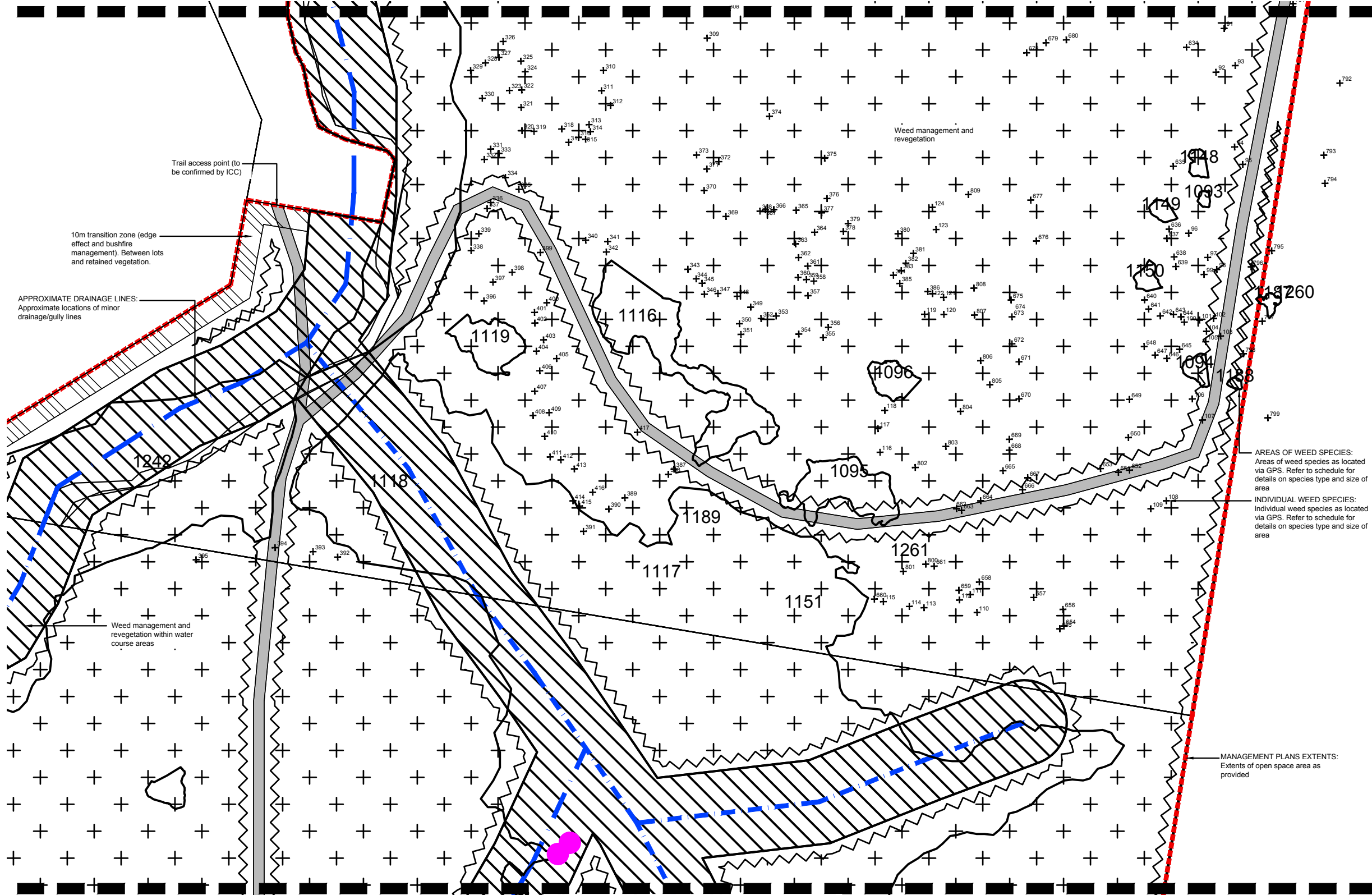
DRAWING: Area 2 Management Plan
 Weed Management - Sheet 4

DATE: November 17 CHECKED: MS
 CLIENT REF.: 7243 DRAWN: TL
 DRAWING No.: 7243 L 206 WMP A

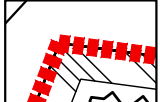

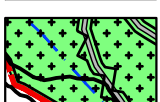



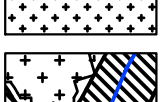

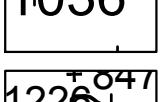
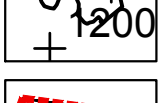

Spring Mountain Precinct

AREA 2 WEED MANAGEMENT PLAN

ADJOINS DRAWING SHEET 7423 L 205



LEGEND

-  Extent of management plan area
-  Existing fire trail / maintenance access. As provided by ICC in GIS & Refer to Council's Management Plan
-  Approximate minor drainage lines. Minor drainage / gully lines
-  Approximate mapped major drainage lines
-  Extent of existing lake area
-  Weed management and revegetation
-  Weed management and revegetation within water course areas
-  Individual weed species located via GPS
-  Area of weed species located via GPS
-  10m transition zone (Edge effect & bushfire management). Between lots and retained vegetation
-  Trail access point (To be confirmed by ICC)

ADJOINS DRAWING SHEET 7423 L 209

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40 YEARS
 1975-2015

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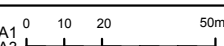
APPROVED COMPANY
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APPROVED COMPANY
 ISO 14001 Environmental Management System

AMENDMENTS:			
Issue	Date	Description	Checked
A	13/11/2017	Preliminary Issue	MS

CLIENT:
 PROJECT:
 Spring Mountain Precinct

SCALE: 1:1000@A1
 1:2000@A3



landscape architecture

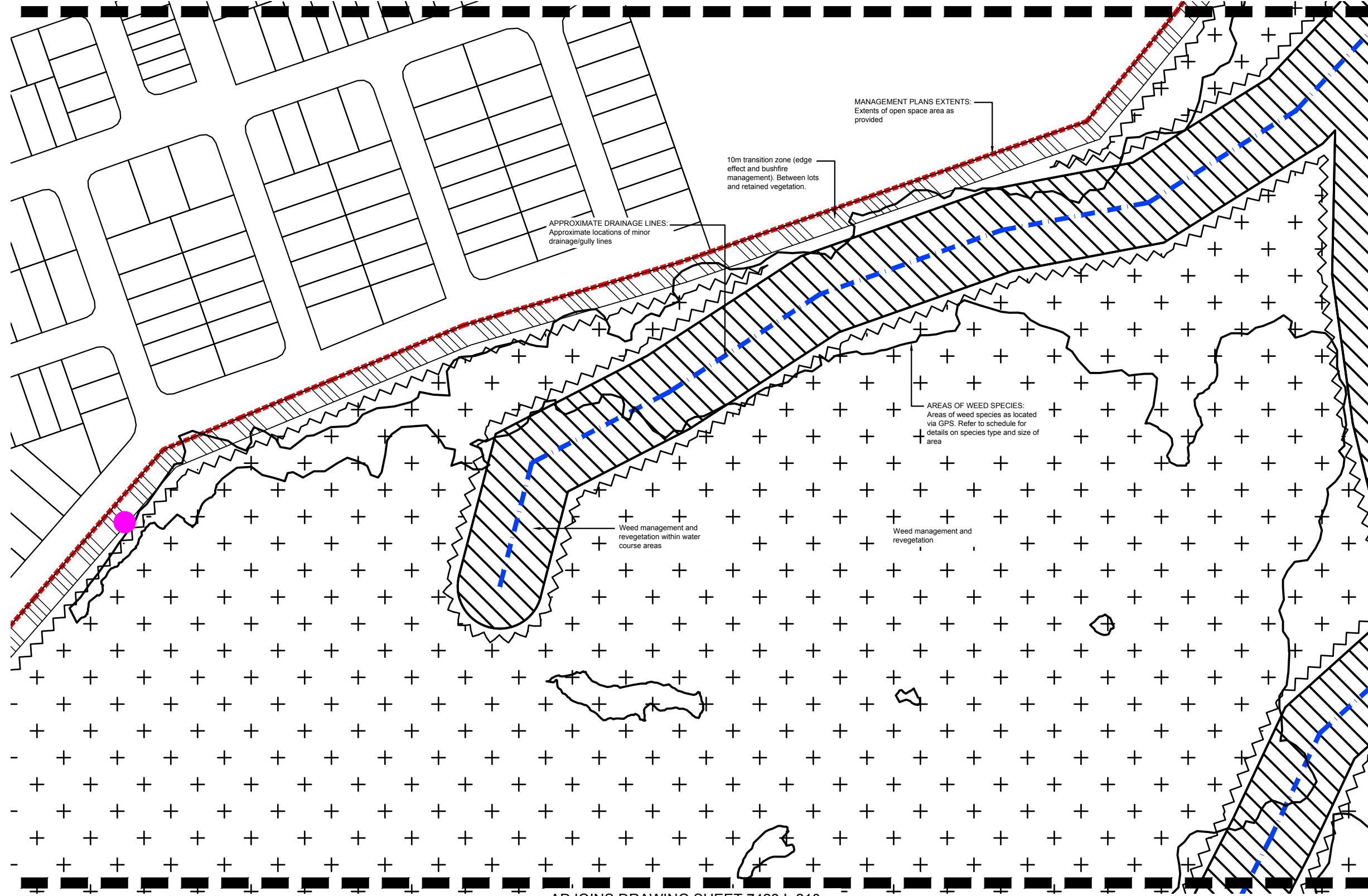
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 Area 2 Management Plan
 Weed Management - Sheet 5

DATE: November 17 CHECKED: MS
 CLIENT REF.: 7243 DRAWN: TL
 DRAWING No.: 7243 L 207 WMP A

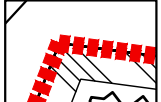


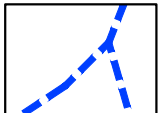

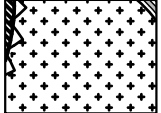
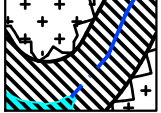
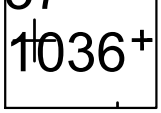
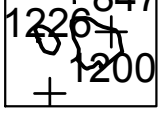
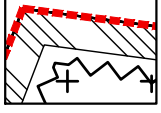
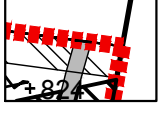
Spring Mountain Precinct

AREA 2 WEED MANAGEMENT PLAN

ADJOINS DRAWING SHEET 7423 L 206



LEGEND

-  Extent of management plan area
-  Existing fire trail / maintenance access. As provided by ICC in GIS & Refer to Council's Management Plan
-  Approximate minor drainage lines. Minor drainage / gully lines
-  Approximate mapped major drainage lines
-  Extent of existing lake area
-  Weed management and revegetation
-  Weed management and revegetation within water course areas
-  Individual weed species located via GPS
-  Area of weed species located via GPS
-  10m transition zone (Edge effect & bushfire management). Between lots and retained vegetation
-  Trail access point (To be confirmed by ICC)

ADJOINS DRAWING SHEET 7423 L 210

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40 YEARS
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APPROVED COMPANY
 ISO9001 Quality Management System
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 ISO14001 Environmental Management System

AMENDMENTS:			
Issue	Date	Description	Checked
A	13/11/2017	Preliminary Issue	MS

CLIENT:	
PROJECT:	Spring Mountain Precinct
SCALE:	1:1000@A1 1:2000@A3

0 10 20 50m

landscape architecture

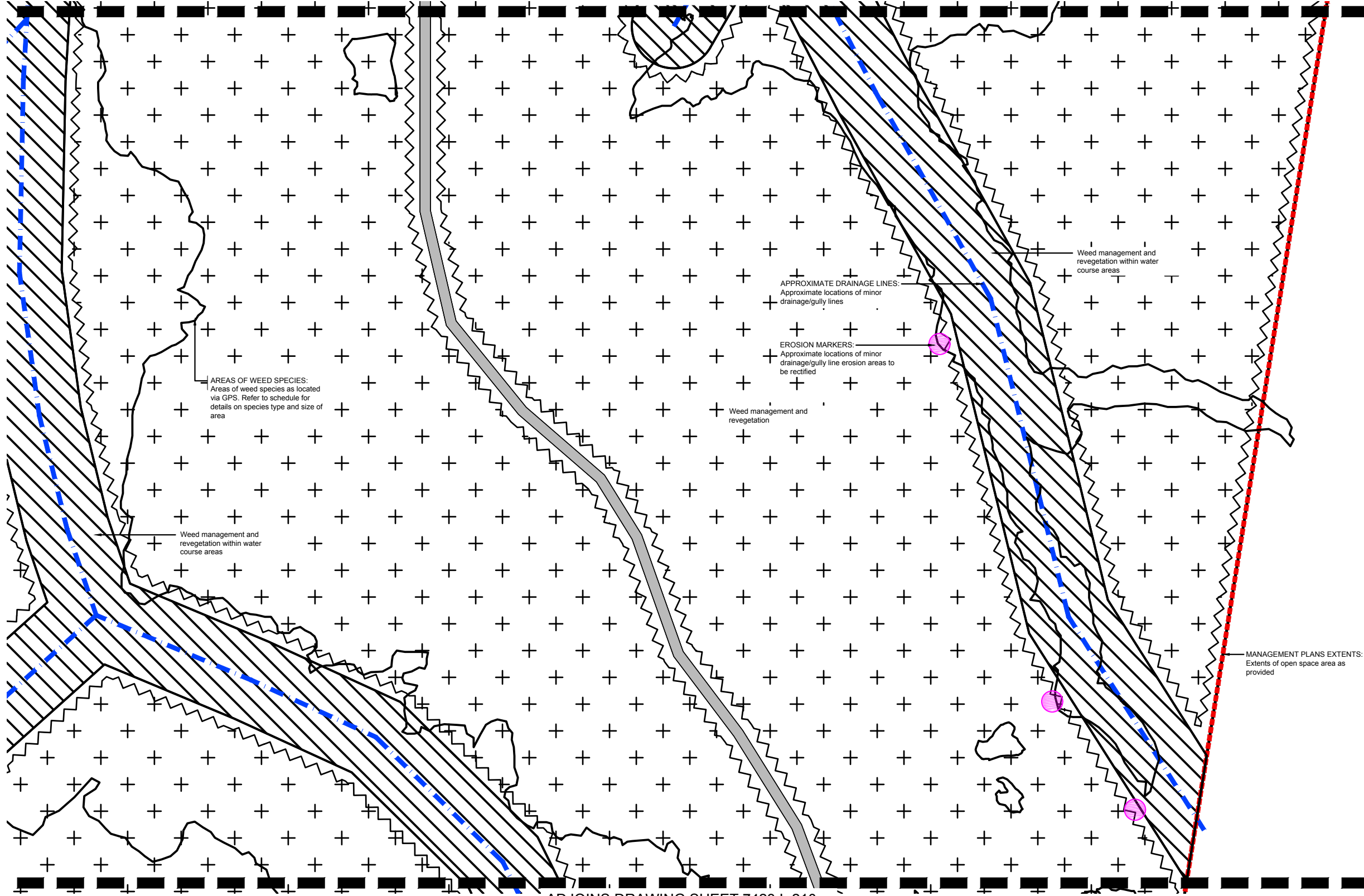
DRAWING:
 Area 2 Management Plan
 Weed Management - Sheet 6

DATE: November 17 CHECKED: MS
 CLIENT REF.: 7243 DRAWN: TL
 DRAWING No.: 7243 L 208 WMP A

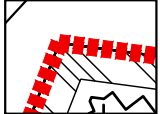


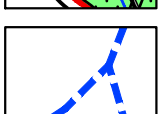


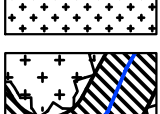
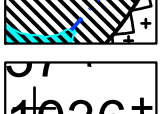
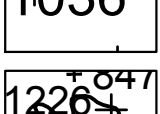
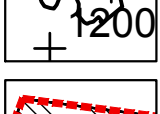

Spring Mountain Precinct

AREA 2 WEED MANAGEMENT PLAN

ADJOINS DRAWING SHEET 7423 L 206



LEGEND

-  Extent of management plan area
-  Existing fire trail / maintenance access. As provided by ICC in GIS & Refer to Council's Management Plan
-  Approximate minor drainage lines. Minor drainage / gully lines
-  Approximate mapped major drainage lines
-  Extent of existing lake area
-  Weed management and revegetation
-  Weed management and revegetation within water course areas
-  Individual weed species located via GPS
-  Area of weed species located via GPS
-  10m transition zone (Edge effect & bushfire management). Between lots and retained vegetation
-  Trail access point (To be confirmed by ICC)

ADJOINS DRAWING SHEET 7423 L 210

AMENDMENTS:			
Issue	Date	Description	Checked
A	13/11/2017	Preliminary Issue	MS

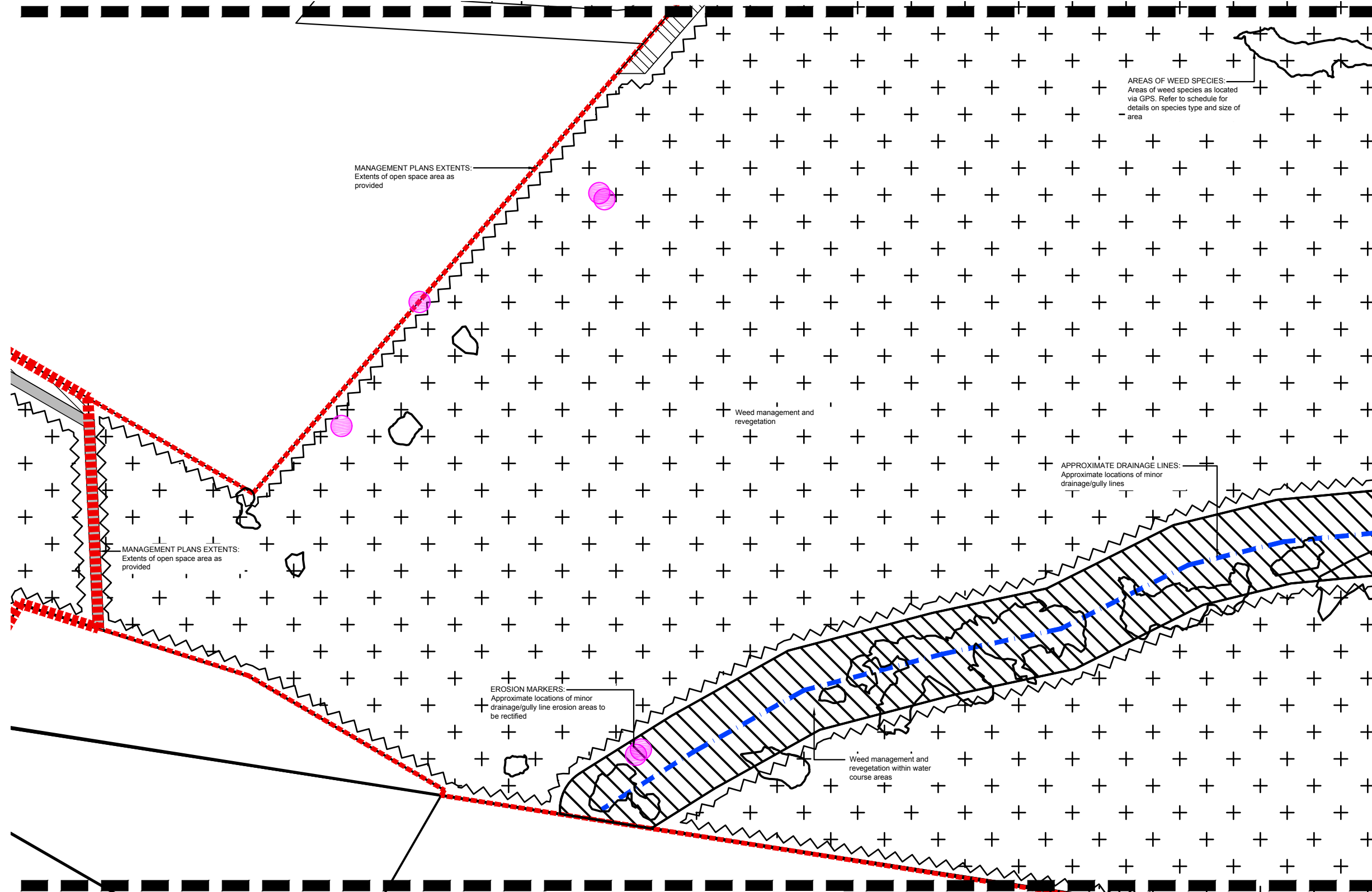
CLIENT:	
PROJECT:	Spring Mountain Precinct
SCALE:	1:1000@A1 1:2000@A3

Spring Mountain Precinct

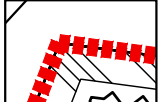


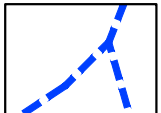

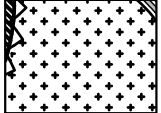
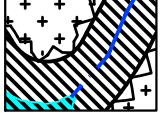
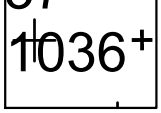
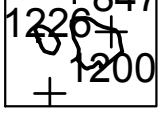
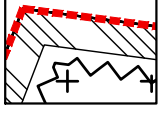
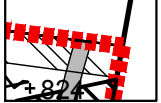
AREA 2 WEED MANAGEMENT PLAN

ADJOINS DRAWING SHEET 7423 L 208

ADJOINS DRAWING SHEET 7423 L 210



LEGEND

-  Extent of management plan area
-  Existing fire trail / maintenance access. As provided by ICC in GIS & Refer to Council's Management Plan
-  Approximate minor drainage lines. Minor drainage / gully lines
-  Approximate mapped major drainage lines
-  Extent of existing lake area
-  Weed management and revegetation
-  Weed management and revegetation within water course areas
-  Individual weed species located via GPS
-  Area of weed species located via GPS
-  10m transition zone (Edge effect & bushfire management). Between lots and retained vegetation
-  Trail access point (To be confirmed by ICC)

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CLIENT:
 PROJECT:
 Spring Mountain Precinct

SCALE: 1:1000@A1
 1:2000@A3

landscape architecture

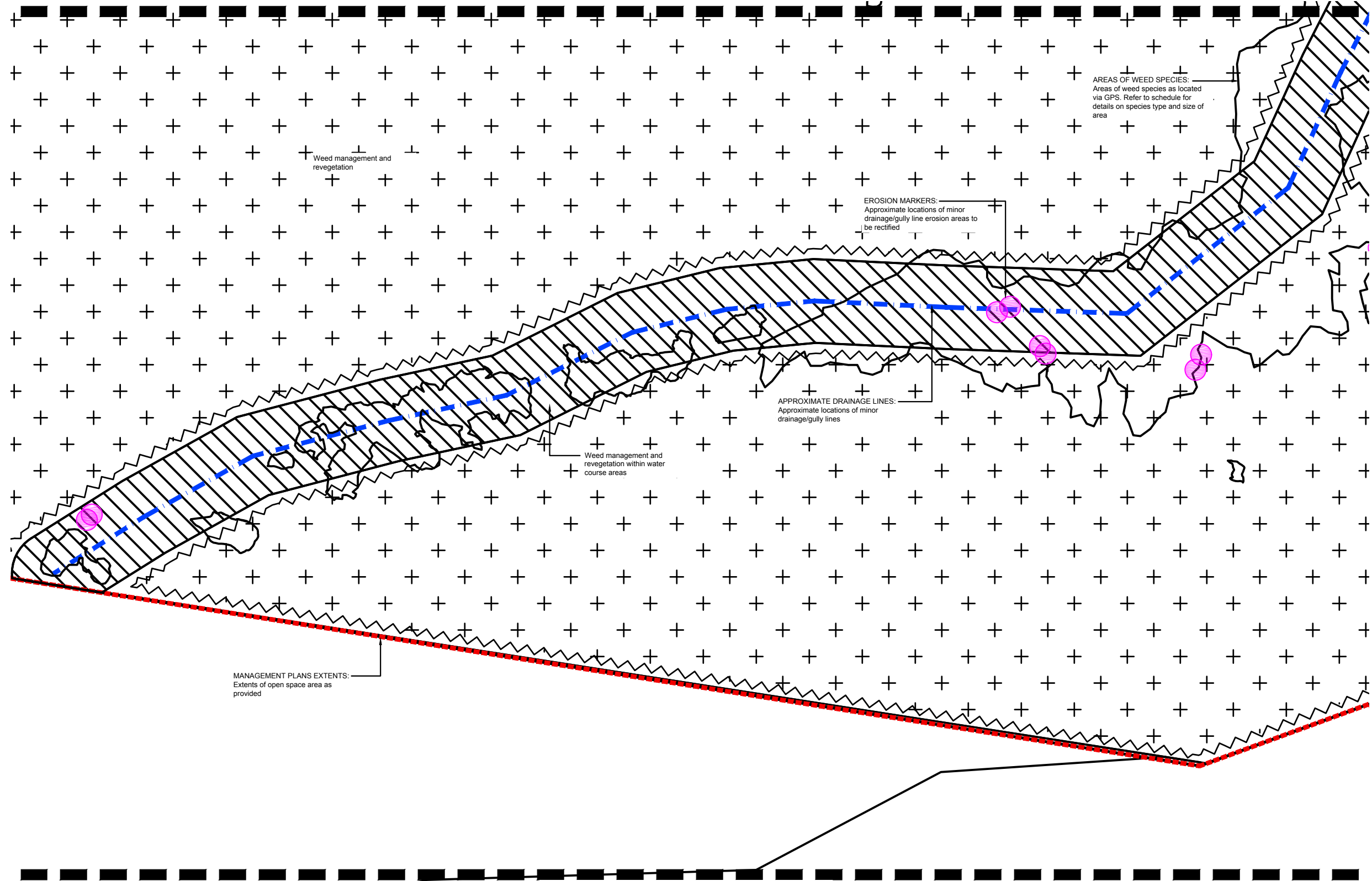
DRAWING:
 Area 2 Management Plan
 Weed Management - Sheet 8

DATE: November 17 CHECKED: MS
 CLIENT REF.: 7243 DRAWN: TL
 DRAWING No.: 7243 L 210 WMP A

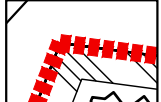

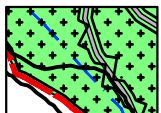
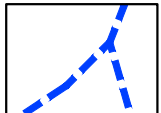

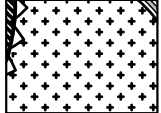
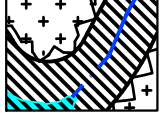
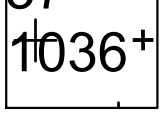
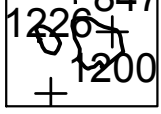
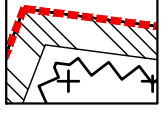
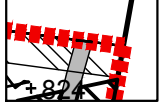
Spring Mountain Precinct

AREA 2 WEED MANAGEMENT PLAN

ADJOINS DRAWING SHEET 7423 L 208



LEGEND

-  Extent of management plan area
-  Existing fire trail / maintenance access. As provided by ICC in GIS & Refer to Council's Management Plan
-  Approximate minor drainage lines. Minor drainage / gully lines
-  Approximate mapped major drainage lines
-  Extent of existing lake area
-  Weed management and revegetation
-  Weed management and revegetation within water course areas
-  Individual weed species located via GPS
-  Area of weed species located via GPS
-  10m transition zone (Edge effect & bushfire management). Between lots and retained vegetation
-  Trail access point (To be confirmed by ICC)

ADJOINS DRAWING SHEET 7423 L 210

saunders havill group
 Saunders Havill Group Pty Ltd ABN 24 144 972 949
 Brisbane • Emerald • Gladstone
 head office 9 Thompson St Bowen Hills Q 4006
 phone 1300 123 SHG web www.saundershavill.com
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 ISO9001 Quality Management System
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 ISO14001 Environmental Management System

AMENDMENTS:			
Issue	Date	Description	Checked
A	13/11/2017	Preliminary Issue	MS

CLIENT:
 PROJECT:
 Spring Mountain Precinct

SCALE: 1:1000@A1
 1:2000@A3

landscape architecture

DRAWING:
 Area 2 Management Plan
 Weed Management - Sheet 9

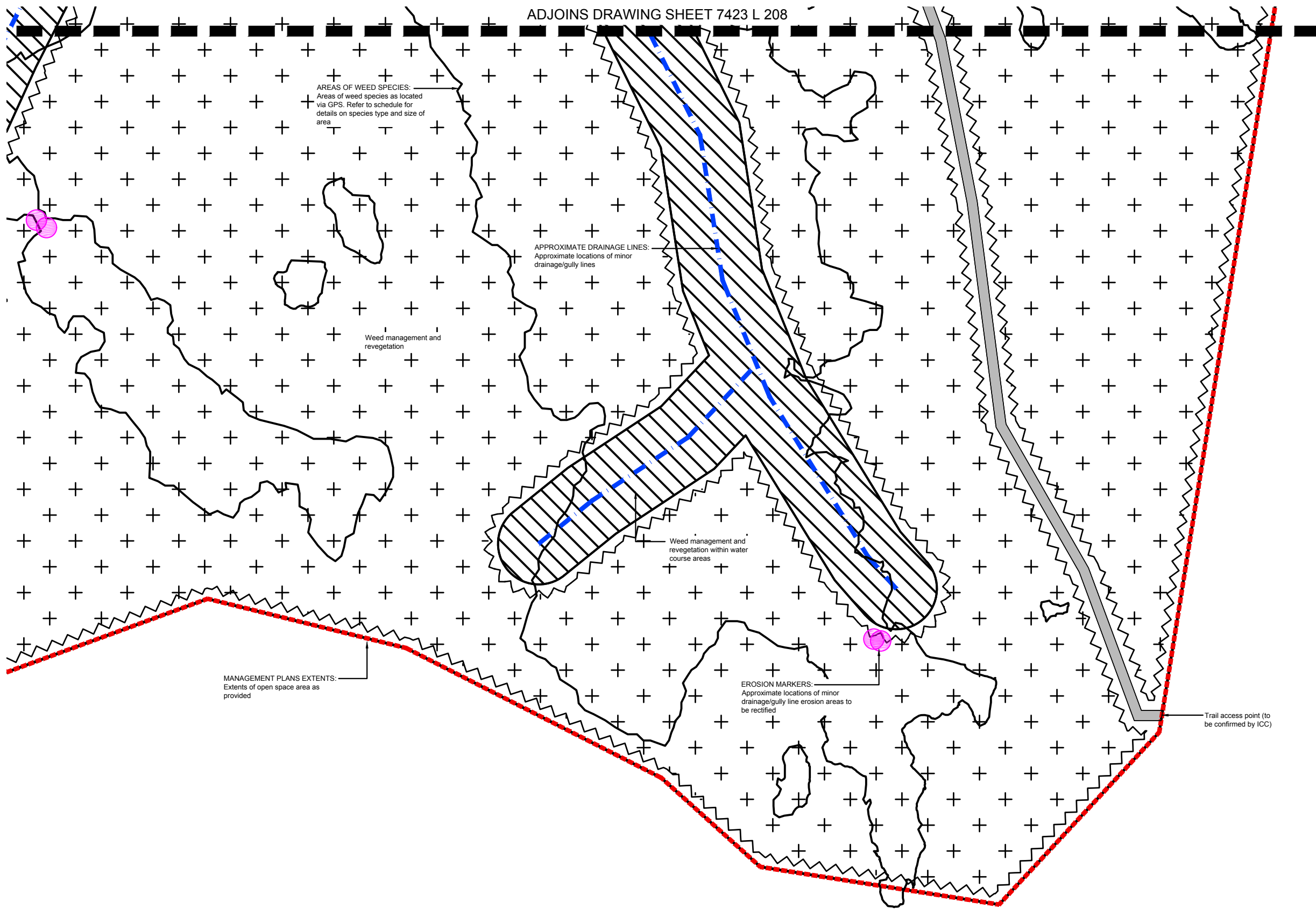
DATE: November 17
 CLIENT REF.: 7243
 DRAWING No.: 7243 L 211 WMP A

CHECKED: MS
 DRAWN: TL

Spring Mountain Precinct

AREA 2 WEED MANAGEMENT PLAN

ADJOINS DRAWING SHEET 7243 L 208



LEGEND

- Extent of management plan area
- Existing fire trail / maintenance access. As provided by ICC in GIS & Refer to Council's Management Plan
- Approximate minor drainage lines. Minor drainage / gully lines
- Approximate mapped major drainage lines
- Extent of existing lake area
- Weed management and revegetation
- Weed management and revegetation within water course areas
- Individual weed species located via GPS
- Area of weed species located via GPS (e.g., 1036+, 1226+, 1200)
- 10m transition zone (Edge effect & bushfire management). Between lots and retained vegetation
- Trail access point (To be confirmed by ICC)

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40 YEARS
 1975-2015

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landscape architecture

DRAWING:
 Area 2 Management Plan
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DATE: November 17 CHECKED: MS
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AREA 2 MANAGEMENT PLAN - TECHNICAL NOTES - GENERAL

NOTES

This Weed Management Plan links specific weed removal and management measures with spatial areas within the declared area included with this application. This Weed Management Plan covers the 173.66ha Area 2 portion of land previously dedicated by Springfield Land Corporation (SLC) to Ipswich City Council (ICC). The main objectives and action items for pest plants are detailed in Table 1 shown on this plan, with the objectives and actions for ecological restoration are detailed in Table 2.

WEED CONTROL PROGRAM TIMING

The primary stage of manual weed removal, treatment and disposal for the parkland dedication is programmed when all existing weeds are removed with secondary and maintenance weeding occurring for another 18 months (18 month program post on-maintenance).

Primary Weed Removal Stage - Consists of the initial weed removal / treatment of site weeds via the methods detailed within the South East Queensland Ecological Restoration Guidelines. Essentially involves the manual removal, stock piling and disposal and initial usage of prescribed herbicides. Additional notes below include:

- Implemented weed control method according to this plan.
- Weed trees located within 20M zone of the existing trail network are to be removed where trunk is cut down to ground level and vegetative matter removed.
- Program timing; primary weed removal phase is considered to be completed when all existing weeds within the stage for the declared area have been removed or treated. Both the secondary phase and the primary phase of weed removal can occur concurrently in different stage areas over time.
- A key map is to be provided logging the progress of areas from primary to secondary phases of weed removal and areas of rehabilitation as part of the reporting progress.

Secondary or Follow-up Weeding - for all areas will involve the quarterly inspection of areas having undergone Primary Weed Removal and treatment of infestations or outbreak as required. Additional notes below include:

- Implemented weed control method according to this plan.
- Weed trees located within 20M zone of the existing trail network are to be removed where trunk is cut down to ground level and vegetative matter removed.
- Program timing; primary weed removal phase is considered to be completed when all existing weeds within the declared area have been removed initially. Both the secondary phase and the primary phase of weed removal can occur concurrently in different work areas over time.
- A key map is to be provided logging the progress of areas from primary to secondary phases of weed removal and areas of rehabilitation as part of the reporting progress.

Maintenance Weeding Phase - final stage of weeding which occurs in areas where the majority of weeds have been removed and treated. Maintenance weeding continues to remove additional outbreaks but also allows for the fostering of natural regeneration and regrowth seedlings. Additional notes below include:

- Implemented weed control method according to this plan.
- Weed trees located within 20M zone of the existing trail network are to be removed where trunk is cut down to ground level and vegetative matter removed.
- Program timing; primary weed removal phase is considered to be completed when all existing weeds within the designated Park have been removed initially. Both the secondary phase and the primary phase of weed removal can occur concurrently in different work areas over time.
- A key map is to be provided logging the progress of areas from primary to secondary phases of weed removal and areas of rehabilitation as part of the reporting progress.

Revegetation occurs in two (2) distinct zones throughout the management area. Refer to Drawing sheets for a full description of proposed plant species, sizes, densities and numbers.

NATURAL REGENERATION

Applies:

- To relatively large, intact and weed-free areas of native vegetation.
- Where the native plants are healthy and capable of regenerating without human intervention.
- When native plant seed is stored in the soil or will be able to reach the site from nearby natural areas, by birds or other animals, wind or water.
- Where the plant community has a high potential for recovery after any short-lived disturbance, such as a fire or cyclonic winds.
- When preventative action is all that is required to avert on-going disturbance, e.g. erection of fencing to prevent intrusion from cattle.

Planting in such sites can work against the aims of restoration by interfering with natural regeneration.

The re-establishing plant community will be similar in structure, composition and diversity to the original vegetation.

ASSISTED NATURAL REGENERATION

Applies:

- To natural areas where the native plant community is largely healthy and functioning.
- When native plant seed is still stored in the soil or will be able to reach the site from nearby natural areas, by birds or other animals, wind or water.
- Where the natural regeneration processes (seedling germination, root suckering etc.) are being inhibited by external factors, such as weed invasion, soil compaction, cattle grazing, mechanical slashing etc.
- When limited human intervention, such as weed removal, minor amelioration of soil conditions, erection of fencing, cessation of slashing, etc. will be enough to trigger the recovery processes through natural regeneration.
- When major component is weed control.

Planting in such sites can work against the aims of restoration by interfering with natural regeneration.

The re-establishing plant community will be similar in structure, composition and diversity to the original vegetation.

TABLE 1: OBJECTIVES AND ACTION ITEMS FOR PEST PLANTS

Threats	Opportunities	Management action	Timeframe	Responsibility
<i>Objective: Protect, manage and enhance the diversity of native flora species and vegetation communities within the estate by controlling pest plants.</i>				
Insufficient monitoring of pest plants	Increased knowledge of pest plant abundance and distribution within the estate	Continue to develop and update the management plan for the estate to identify pest plants present and to recommend and prioritise control and monitoring actions	Annually	Saunders Havill Group (SHG)
Establishment of large infestations of pest plants	Pest plants are controlled effectively and in a way that ensures native vegetation regeneration	Include treating pest plants within the open space area to improve visitors experience to the estate	Ongoing	Contractor
Insufficient resourcing of pest plant control measures	Increased knowledge of pest plant responses to fire	Conduct follow up pest plant treatment after any fires within the estate	As required	Contractor
Lack of education of visitors and local residents as to the adverse impacts pest plants have on the natural environment	Improved public understanding and support for pest plant control	Provide material for public awareness (ie interpretative signage)	As required	Contractor

TABLE 2: OBJECTIVES AND ACTION ITEMS FOR ECOLOGICAL RESTORATION

Threats	Opportunities	Management action	Timeframe	Responsibility
<i>Objective: Protect, manage and enhance the significant habitat values and ecological processes found within the estate, so as to contribute positively to the conservation values of the local and regional area</i>				
Degraded vegetation communities have adverse impacts on other values within the estate, including native flora and fauna species, fire issues and aesthetics	Restore degraded native vegetation communities and minimise impacts associated with pest plants and animals and their control on native flora and fauna, cultural heritage sites, and landscapes within the estate	Prepare and issue a management plan to: <ul style="list-style-type: none"> - clearly prioritise actions and zones (eg. focus on declared and environmental pest plants and mapped biodiversity zones) - Divide the site into sub-zones which can be managed in a systematic and structured way - Align with the fire management plan as burns could provide ecological and economical efficiencies; reducing fuel loads at the same time as acting as a pest plant control - Lantana (especially) should be managed to reduce the fuel load, as this is a major fire hazard Incorporate training (eg. for relevant community groups) <ul style="list-style-type: none"> - Write the plan for the target audience working on the estate (eg. bushcare groups working in particular zones) 	Prior to commencement	Contractor
Pest plant infestations from high use areas may impact on adjacent ecological values	Improve the flora values within the open space area	As part of the site rehabilitation planning for the open space, a planting list of locally occurring plant species for use in rehabilitation is to be provided to enhance population viability where appropriate and possible. Include threatened and locally significant species in plantings.	Ongoing	Contractor
Trail creation, soil compaction and increased erosion	Restore natural habitats to increase the resilience of the estate	Refer to management plans for further detail	As required	Contractor
Pest plant introduction and spread	Decreased abundance of pest plants	Refer to management plans for further detail	As required	Contractor
Disturbance from pest animals	Decreased abundance of pest animals	Refer to management plans for further detail	As required	Contractor
Insufficient resourcing of restoration measures	Improved public understanding of and support	Refer to management plans for further detail	As required	Contractor
Insufficient data on the effectiveness of ecological restoration programs	The populations and diversity of near threatened, threatened or locally significant plant species are protected and enhanced	Refer to management plans for further detail	As required	Contractor

Spring Mountain Precinct

AREA 2 MANAGEMENT PLAN - WEED TREATMENT & REMOVAL STRATEGY

NOTE:
Species highlighted have been identified within the 'Springfield Wildlife Corridor Management Requirements' list which have specified removal and/or treatment techniques for Class 1 or 2 weeds. Environmental weeds and weeds of National Significance (WONS) Class 3 are to be:

- Remove dumped garden weeds from urban interface. Liaise with ICC Supervisor regarding ongoing Compliance issues.
- Lantana controlled within 20m of track edges (ie walking, shared and service).
- Strategic treatment of gully infestations staged from head of gullies downstream utilising cut stump method and chopping lantana into small (150mm) pieces. Areas to be determined by consultation with ICC.
- Assisted natural regeneration following removal including direct seeding utilising endemic seed from site. Follow up weed control by spot spraying emerging weeds in cleared areas or hand removal.

QUEENSLAND HERBARIUM INVASIVE NATURALISED PLANTS IN SOUTH EAST QUEENSLAND										
Rank	Family	Scientific and common names	Subregion	Rec No	Score	Life form & Source	Non-Chemical Control	Chemical Control		
1	Verbenaceae	Lantana camara var. camara (lantana)	10	455	5	S/O	Seedlings: Hand pull	Seedlings: CS&P (G1.5) or cut down and spray regrowth G100 or splatter gun using 1 part G to 9 parts water - apply only when plant is growing, not dormant (ref 1). Shubs: CS&P or FI (G1). Seedlings: CS&P (G1.5) or spray G200 (ref 1).		
2	Asteraceae	Baccharis halimifolia (groundsel bush)	10	168	4.8	S/O	Cut stump prior to flowering	Shubs: CS&P or FI (G1). Seedlings: CS&P (G1.5) or spray G200 (ref 1).		
3	Crassulaceae	Bryophyllum delagoense (mother of millions)	8	38	4.9	H/O	Hand removed and bagged or larger infestations sprayed	Plantlets: spray G200 + MM or MM (ref 1).		
4	Bignoniaceae	Maccladysia unguis-cati (cat's claw creeper)	5	36	4.9	V/O	Tubers: crown or dig up, bag and remove.	Regrowth and tubelings: spray G100 + MM or F100 (ref 1).		
	Basellaceae	Anredera cordifolia (madeira vine)	8	16	4.9	V/O	Small Vines & Tubers: Hand pull. Bag and dispose.	Ascending Stems: S&P (GU). Tubers: gouge, scrape and paint (GU). Ground infestations: spray G200 or G200 + MM (ref 1).		
6	Asparagaceae	Asparagus africanus (ornamental asparagus, asparagus fern)	7	26	4.9	V/O	dig out roots and dispose of at local council landfill site remove entire crown and underground stem to prevent regrowth	fluoroxypyr (200 g/L) @ 35 mL per 1 L diesel/kerosene		
7	Ulmaceae	Celtis sinensis (Chinese celtis)	8	19	4.9	T/O	remove when small hand pull or dig out small seedlings. combine dozing, burning and controlled grazing for large infestations	Stem injection, glyphosate (360 g/L) @ Unlabeled at 1 mL per 2 cm of hole or cut		
8	Lauraceae	Cinnamomum camphora (camphor laurel)	7	25	4.8	T/O	Seedlings: Hand pull	Saplings, CS&P (G1.5). Trees: FI (G1 or G1.5) or C&P (G1.5 or GU for stems up to 8 diameter). Seedlings: spray G200 or G200 + MM Saplings: CS&P (G1.5). Trees: FI (G1.5). Seedlings: spray G200 (ref 1).		
9	Anacardiaceae	Schinus molle (broad-leaf pepper tree)	6	49	4.8	T/O	Seedlings: Hand pull	Seedlings: CS&P (G1.5). Trees: FI (G1.5). Seedlings: spray G200 (ref 1).		
	Salmiaceae	Salvinia molesta (salvinia)	8	57	4.9	Ha/F	Mechanical removal of small infestations. Salvinia weevil (Biological control)	Aquatic areas, calcium dodecylbenzene sulphate (AF-100) @ 1 part to 19 parts kerosene, diquat (vegtrol) 50-100L/ha or 4L/100L water, diquat (water) 50-100L/ha or 4L/100L water, diquat (reglone) 5-10L/ha or 400mL + 150mL Agral / 100L water (see ref 2).		
11	Cobombaceae	Cobombia caroliniana (cobomba, fanwort)	4	12	4.9	Ha/F	Mechanical removal of small infestations	2, 4-D N-Butyl Ester (Rubber Vine Spray) @ 12.5L/mL water (see ref 2 for application guide).		
12	Asteraceae	Chrysanthemoides monilifera subsp. rotundata (bitou bush)	3	23	4.9	S/OA	N/A	Stems: C&P or FI (G1.5). Bushes: spray or cut down and spray regrowth G100 or MM (ref 1).		
13	Porteriacae	Eichhornia crassipes (water hyacinth)	4	8	4.9	Ha/OF	Mechanical removal of small infestations	Waterways: 2, 4-D acid (AF 300) @ 1:200 with water. Aquatic Areas: glyphosate @ 1-1.3L/100L water (see ref 2 for application guide).		
14	Acanthaceae	Hygrophila costata (Glush weed)	3	7	5	Ha/F	Hand pull small infestations. Can be controlled by planting competitive native species.	Glyphosate known to be effective. Species known to occur in waterways so EPA should be contacted before spraying (ref 4).		
	Oleaceae	Ligustrum lucidum (tree privet)	5	9	4.8	T/O	Seedlings: Hand pull	Saplings: CS&P or C&P (G1.5). Trees: FI (G1 or G1.5) or C&P GU for stems up to 8cm diameter. Seedlings: spray MM or G200 + MM if other weeds such as Lantana or Camphor Laurel are present (ref 1).		
16	Asteraceae	Sphagnetocola trilobata (Singapore daisy)	6	34	4.6	H/O	Hand pull	Spray MM or G200 or G200 + MM if other weeds such as Lantana or Camphor Laurel are present (ref 1).		
17	Asteraceae	Ageratina adenophora (croton weed)	6	38	4.6	H/O	Hand pull and hang to dry.	Spray MM or G200 or G200 + MM if other weeds such as Lantana or Camphor Laurel are present (ref 1).		
18	Verbenaceae	Lantana montevidensis (creeping lantana)	8	62	4.8	S/O	Fire and/or mechanical control	Spray (march to may): glyphosate 1L/100L water; metsulfuron methyl 10g/100L water; metsulfuron methyls + glyphosate 173g/100L water; Basal bark (anytime): triclopyr 1L/60L Diesel, picloram + triclopyr @ 1L/60L Diesel. Glyphosate, neat application; Splatt		

19	Fabaceae	Neonotonia wightii (glycine)	5	16	4.7	H/A	N/A	Vines: CS&P (1.1.5) or spray G100 + MM or MM (ref 1).		
	Poaceae	Panicum maximum (green panic and guinea grass)	8	78	4.6	H/A	Hand or mechanical removal of small infestations	Spray glyphosate @ 13mL/L water (ref 2).		
21	Oleaceae	Ligustrum sinense (Chinese privet)	4	11	4.6	T/O	Seedlings: Hand pull	Saplings: CS&P or C&P (G1.5). Trees: FI (G1.5). Seedlings: spray MM or G200 + MM if other weeds such as Lantana or Camphor Laurel are present (ref 1).		
22	Ochnaceae	Ochna serrulata (ochina)	7	33	4.5	S/O	N/A	Stems: CS&P or S&P or FI (G1.5). Seedlings and Regrowth: spray G200 + MM or MM. Trial basal bark F100 or G200 + MM (ref 1).		
23	Asparagaceae	Asparagus aethiopicus cv Sprengeri (asparagus ground fern)	5	35	4.5	H/O	dig out unwanted plants and dispose of at the appropriate council landfill. remove the entire crown of underground stem of plant to prevent regrowth	Spot spray - metsulfuronmethyl (600 g/L) @ 10 g per 100 L water plus wetting agent or 100 g/ha plus wetting agent. Cut stump, spot spray. Apply neat Diesel		
24	Poaceae	Sporobolus pyramidalis and S. natalensis (giant rat's tail grasses)	8	72	4.8	H/U?	Seed heads cut and bagged, remaining leaves sprayed	Small infestations: spray glyphosate @ 15mL/L water, flupropate @ 2mL/L water + ionic wetter @ 1mL/L water. Dense infestations: blanket spraying glyphosate 3L/ha, flupropate 2L/ha (ref 2).		
	Asteraceae	Ageratina riparia (mistflower)	5	38	4.6	H/O	Hand pull and hang to dry.	Spray G100 or MM (ref 1).		
26	Asclepiadaceae	Araujia sericifera (mohvine)	9	38	4.4	V/O	Seedlings & Vines: Hand pull. Bag and remove fruit.	Vines: CS&P (G1.5). Seedlings: spray G200 or G200 + MM or MM (ref 1).		
27	Crassulaceae	Bryophyllum daigremontianum x B. delagoense (hybrid mother-of-millions)	6	15	4.5	H/O	Hand pull and dispose	Plantlets: spray G200 + MM or MM (ref 1).		
28	Convolvulaceae	Ipomoea canina (mile-a-minute)	7	56	4.4	V/O	Vines & Runners: hand pull, roll up and hang to dry.	Vines and Runners: CS&P (G1.5). Larger Stems, Roots and Nodes: spray G100 + MM (ref 1).		
29	Sapindaceae	Cardiospermum grandiflorum (balloon vine)	7	31	4.4	V/O	Seedlings & Small Vines: Hand Pull	Stems: CS&P (G1.5). Seedlings or Small vines: spray G200 or G200 + MM (ref 1).		
30	Asclepiadaceae	Cryptostegia grandiflora (rubber vine)	6	19	4.4	V/O	Scattered or medium-density infestations. Where possible, repeated slashing close to ground level is recommended.	Foliar spray - Follow-up basal bark/cut stump/foliar spray as necessary with Triclopyr + picloram (Grass DS, Grass-up, etc.) @ 0.35-0.5 L/100 L water		
31	Phytolaccaceae	Rivina humilis (baby pepper)	8	61	4.3	H/O	Hand pull and hang to dry.	Spray G100 (ref 1).		
32	Poaceae	Sporobolus africanus (Paramatta grass)	8	48	4.5	H/U	Hand or mechanical removal of small infestations	Small infestations: spray glyphosate @ 15mL/L water, flupropate @ 2mL/L water + ionic wetter @ 1mL/L water. Dense infestations: blanket spraying glyphosate 3L/ha, flupropate 2L/ha (ref 2).		
33	Poaceae	Sporobolus fertilis (giant Paramatta grass)	9	27	4.5	H/U	Hand or mechanical removal of small infestations	Small infestations: spray glyphosate @ 15mL/L water, flupropate @ 2mL/L water + ionic wetter @ 1mL/L water. Dense infestations: blanket spraying glyphosate 3L/ha, flupropate 2L/ha (ref 2).		
34	Poaceae	Eragrostis curvula (African lovegrass)	7	29	4.3	H/U	Chipped out before they flower. When chipping out the plant ensure that the tussock crowns are removed, as this will prevent regrowth. If in seed, the stems must be cut and bagged first.	Glyphosate (360 g/L) (e.g. Weedmaster® Duo) @ 10 ml/1 L water		
35	Asteraceae	Gymnocoronis spilanthoides (Senegal tea)	3	4	4.7	Ha/F		Glyphosate and metsulfuron-methyl @ 15mL/L water		

36	Amaranthaceae	Alternanthera phioxeroides (alligator weed)	1?	3	5	Ha/U	physical removal of plant should not be attempted	Terrestrial plants use Metsulfuron methyl (Brushoff®) + 1mL/L non-ionic wetter @ 80g/ha + 1mL/L non-ionic wetter or 10g/100L water + 1mL/L non-ionic wetter. Free floating plants Glyphosate (Roundup Biactive®) 10 mL/L		
37	Passifloraceae	Passiflora suberosa (cork passionflower)	6	166	4.2	V/O	N/A	Stems: CS&P. Seedlings & Regrowth: spray G200 or G200 + MM (ref 1).		
38	Poaceae	Melinis minutiflora (molasses grass)	5	17	4.5	H/A	Grazing or mowing	Spray: Fluazifop-P 212g/L @ 2L/ha. Glyphosate 360g/L @ 1L/100L water (ref 2).		
39	Aristolochiaceae	Aristolochia elegans (Dutchman's pipe)	8	30	4.3	V/O	Stems: Hand pull. Fruit: Bag and remove.	Stems: CS&P (G1.5). Seedlings: spray G200 or G200 + MM or MM (ref 1).		
40	Convolvulaceae	Ipomoea indica (blue morning glory)	5	24	4.3	V/O	Vines and Runners: hand pull, roll up and hang to dry.	Vines and Runners: CS&P (G1.5). Larger Stems, Roots and Nodes: spray G100 + MM or F150 (ref 1).		
41	Mimosaceae	Leucaena leucocephala (leucaena)	6	14	4.3	STA	Small plants: Hand pull or mechanical removal	Herbicide Control - Basal Bark application: triclopyr 240g/L + picloram 120g/L @ 1L/60L diesel. C&P: triclopyr 240g/L + picloram 120g/L @ 1L per 60L diesel. spray triclopyr 300g/L + picloram 120g/L @ 350mL per 100L water. Combination of chemical and mecha		
42	Poaceae	Bracharia mutica (para grass)	6	18	4.4	Ha/A	Grazing	Herbicide Control - Foliar application (Knapsack): glyphosate 360g/L @ 200mL/15L water; Foliar: glyphosate 360g/L @ 9L/ha; Handgun: glyphosate 360g/L @ 1.3L/100L water (ref 2).		
43	Hydrocharitaceae	Egeria densa (egeria waterweed)	2	7	4.4	Ha/F	hand pulling, cutting and digging with machines effective	N/A		
44	Pinaceae	Pinus elliotii (slash pine)	4	22	4.3	T/A	Seedlings: Hand pull. Saplings and Trees: cut close to ground or ring-bark	Saplings and Trees: FI (G1.5) ensuring thick bark is penetrated (ref 1).		
45	Caesalpiniaceae	Senna pendula var. glabrata (Easter cassia)	7	33	4.2	S/O	Seedlings: Hand pull	Shubs: CS&P or FI (G1.5). Seedlings: spray G200 or G200 + MM or MM, collect and bag seeds (ref 1).		
46	Poaceae	Chloris gayana (Rhodes grass)	9	55	4.3	H/A	Hand pulling and removal of larger clumps	Spray: glyphosate @ 1L/100L water		
47	Crassulaceae	Bryophyllum pinnatum (resurrection plant)	6	17	4.2	H/O	Hand pull and dispose	Plantlets: spray G200 + MM or MM (ref 1).		
48	Asteraceae	Parthenium hysterophorus (parthenium weed)	6	14	4.2	H/U	hand pulling of small areas is not recommended	Spot spray 2,4-D amine 500 g/L @ 0.4 L/100 L		
49	Caprifoliaceae	Lonicera japonica (Japanese honeysuckle)	3	6	4.3	V/O	Vines and Runners: hand pull, roll up and hang to dry.	Vines and Runners: CS&P (G1.5). Larger Stems, Roots and Nodes: spray G100 + MM or MM (ref 1).		
50	Acanthaceae	Thunbergia alata (black eyed susan)	5	22	4.2	H/O	N/A	CS&P (G1.5). spray G200 or G200 + MM (ref 1).		
51	Fabaceae	Macroptilium atropurpureum (siratro)	8	39	4.2	V/A	N/A	Vines: CS&P (1.1.5) or spray G100 + MM or MM (ref 1).		
52	Rosaceae	Rubus ellipticus (yellowberry)	4	26	4.1	S/O	slashing hinders growth, giving some control if plants are slashed before they seed	Graz on DS picloram/triclopyr 1:200 parts water + wetting agent		
53	Colchicaceae	Gloriosa superba (glory lily)	3	26	4.1	V/O	N/A	Young Shoots: spray G200 or G200 + MM. Best results in Oct-Nov and by using 'Pulse' as surfactant (ref 1).		
54	Verbenaceae	Phylla canescens (lippia, Condamine couch)	3	4	4.2	Ha/O	a combined approach of different control methods including chemical and mechanical with land management practices is most effective	Foliar spray 600 g/L Dichloroprop @ 5 ml / 1 L water or 2,4-D amine (500 g/L) + 1% crop oil @ 2-4 L/ha + 1% crop oil		
55	Solanaceae	Solanum seaforthianum (Brazilian nightshade)	8	78	4	V/O	Hand pull	Spray G100 (ref 1).		
56	Araceae	Pistia stratiotes (water lettuce)	3	8	4.1	Ha/OF	Mechanical removal of small infestations	Glyphosate 360g/L @ 1-1.3L/100L water or 6 9L/ha; diquat 20g/L @ 4L/100L water or 50-100L/ha (see ref 2 for application guide).		
57	Asparagaceae	Asparagus plumosus (asparagus fern)	4	8	4.1	V/O	Rhizomes: crown and hang to dry.	Rhizomes: gouge and paint (G1.5). Stems: wind up and spray or cut high and low and spray regrowth G200 or G200 + MM (ref 1).		

saunders havill group Saunders Havill Group Pty Ltd ABN 24 144 972 949
Brisbane • Emerald • Gladstone
head office 9 Thompson St Bowen Hills Q 4006
phone 1300 123 SHG web www.saundershavill.com
surveying • town planning • urban design • environmental management • landscape architecture

40 YEARS
1975-2015

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AMENDMENTS:	Issue	Date	Description	Checked
	A	13/11/2017	Preliminary Issue	MS

CLIENT: _____
PROJECT: Spring Mountain Precinct
SCALE: AS NOTED

landscape architecture
DRAWING: Area 2 Weed Management Plan Weed Management Techniques
DATE: November 17 CHECKED: MS
CLIENT REF.: 7243 DRAWN: TL
DRAWING No.: 7243 L 214 WMP A

Spring Mountain Precinct

AREA 2 MANAGEMENT PLAN - WEED TREATMENT & REMOVAL STRATEGY

58	Commelinaceae	Tradescantia fluminensis (Old use T. albiflora) (wandering jew)	5	9	4.1	H/O	N/A	Spray F150 (as per label) or G200 or G200 + MM. Collect and bag or roll and rake carefully. Dispose (ref 1).
59	Solanaceae	Cestrum parqui (green cestrum)	6	36	3.9	S/O	Seeds: Hand pull	Stems: CS&P (G1.5) or spray G100 (ref 1).
60	Caesalpinaceae	Senna septentrionalis (arsenic bush, was S. floribunda)	6	25	4	S/O	Seeds: Hand pull	Shrubs: CS&P or F/I (G1.5); Seedlings: spray G200 or G200 + MM or MM; collect and bag seeds (ref 1).
61	Solanaceae	Solanum mauritanum (wild tobacco tree)	8	30	4	S/O	Seeds: Hand pull	Shrubs: CS&P (G1.5) or F/I (G1.1.5); Seedlings: spray G200 (ref 1).
62	Apocynaceae	Catharanthus roseus (pink periwinkle)	5	22	4	S/O	Hand pull	Spray G100 (ref 1).
63	Passifloraceae	Passiflora subpeltata (white passion flower)	10	60	3.9	V/O	Stems: Hand pull	Stems: CS&P; Seedlings & Regrowth: spray G200 or G200 + MM (ref 1).
64	Fabaceae	Desmodium uncinatum (silverleaf desmodium)	5	14	4	H/A	Hand pull or crown and dispose	CS&P tuberous roots (G1.5); spray G200 or G200 + MM or MM, collect and bag seeds (ref 1).
65	Poaceae	Melinis repens (red Natal grass)	10	134	4.1	H/A	Grazing or mowing	Spray: Fluazifop-P 212g/L @ 2L/ha. Glyphosate 360g/L @ 1L/100L water (ref 2).
66	Nymphaeaceae	Nymphaea caerulea subsp. zanzibarensis (blue lotus)	4	17	4	Ha/OF	Hand pull small infestations.	Spray with or Diquat glyphosate. Occurs in waterways, thus EPA should be notified before any herbicide use (ref 5).
67	Onagraceae	Oenothera drummondii subsp. drummondii (beach evening primrose)	3	17	4	H/O	Hand pull	Spray G100 (ref 1).
68	Tiliaceae	Triumfetta rhomboides (Chinese burl)	7	44	4	H/U	Hand pull	Spray G100 (ref 1).
69	Haloragaceae	Mynophyllum aquaticum (parrot's feather)	3	15	4	Ha/F	N/A	Spray glyphosate 360g/L @ 100mL/10L water (ref 1).
70	Passifloraceae	Passiflora foetida (stinking passion flower)	7	50	3.9	V/O	Hand Pull	CS&P (G1.5); spray G200 or G200 + MM (ref 1).
71	Asteraceae	Verbesina encelioides (crownbeard)	7	34	4	H/U	Vines: Hand pull and remove. Runners: Roll up and hang to dry.	Stems: S&P (GU); Regrowth and seedlings: spray G200 or G200 + MM (ref 1).
72	Poaceae	Paspalum mandiocanum (broad leaf paspalum)	3	6	4	H/A	N/A	Spray G200 - resistant to weaker strength (ref 1).
73	Poaceae	Paspalum dilatatum (paspalum grass)	10	30	3.9	H/A	Hand pull or dig up	Spray G100 (ref 1).
74	Ruppiaceae	Ruppia maritima (sea tassel)	2	8	4	Ha/F	Hand pull or dig up	Spray G100 (ref 1).
75	Arecaceae	Syagrus romanzoffiana (queen palm)	47	10	3.9	T/O	Seeds: Hand pull or crown; Trees: cut below growing point.	Trees: F/I (G1.5); Seedlings: spray G200 + MM (ref 1).
76	Poaceae	Hymenachne amplexicaulis cv. Olive (hymenachne)	17	1	4	Ha/A	A combined approach of different control methods including mechanical, chemical and biological with land management practices is most effective.	360 g/L Glyphosate (includes Roundup Biactive & Weedmaster Duo) - 1 L/100L water or 10 L/ha delivered by boom.
77	Asteraceae	Senecio tamoides (Canary creeper)	3	8	4	V/O	Vines: Hand pull and remove. Runners: Roll up and hang to dry.	Stems: S&P (GU); Regrowth and seedlings: spray G200 or G200 + MM (ref 1).
78	Poaceae	Cenchrus ciliatus (buffel grass)	4	15	4.1	H/A	Hand or mechanical removal of young plants	Herbicide Control - Glyphosate 7mL/L water; Dichlobenil 600g/100m2; Fluazifop 50-100mL/10L water (ref 2).
79	Acanthaceae	Thunbergia grandiflora (thunbergia, blue thunbergia)	2	3	5?	V/O	N/A	CS&P (G1.5); spray G200 (ref 1).
80	Cactaceae	Opuntia tomentosa (velvet tree pear)	8	46	3.9	S/O	Hand removed, stem injected, or over sprayed with garlon	Spray: Basal Bark application: Injection: Triclopyr: 8L/60L diesel. Picloram + Triclopyr: 1L/60L diesel. Amitrole: 1mL/3cm (ref 3).
81	Euphorbiaceae	Ricinus communis (castor oil plant)	7	20	3.9	S/O	Seeds: Hand pull	Shrubs: S: CS&P or F/I (G1.5); Seedlings: spray G200 (ref 1).
82	Asteraceae	Senecio madagascariensis (fire weed)	6	26	3.8	H/U	Hand pulled and bagged	Stems: S&P (GU); Regrowth and seedlings: spray G200 or G200 + MM (ref 1).
83	Cyperaceae	Cyperus involucreatus (African sedge)	6	15	3.8	Ha/OF	Each has to be dug out with a spade and the entire plant turned over, exposing the root system while making sure all aerial parts of the plant are completely covered.	Aquatic areas - Glyphosate-ipa Land-commercial/Industrial, rights of way - Glyphosate-ipa, glyphosate-mas, mazapyr.

84	Asteraceae	Tithonia diversifolia (Mexican sunflower)	5	11	3.9	H/O	N/A	Stems: CS&P (G1.5) or cut and spray regrowth and seedlings (G100 or MM) (ref 1).
85	Poaceae	Setaria sphacelata (South African pigeon grass)	9	41	3.8	H/A	Hand pull or dig up	Spray G100 (ref 1).
86	Asclepiadaceae	Gomphocarpus physocarpus (balloon cotton bush)	10	132	3.7	S/O	Slash in winter and burn cuttings. Wandering Butterfly can also be used.	Spray: glyphosate @ 1.1000 with water, in spring before seeding (ref 3).
87	Poaceae	Digitaria didactyla (Queensland blue couch)	9	70	3.7	H/A	Hand pull or cultivation	Spot Spray: glyphosate or 2.2-DPA (ref 3).
88	Caesalpinaceae	Gleditsia triacanthos (honey locust)	7	12	3.8	T/O	For the control of dense infestations on grazing land, burning followed by spot spraying is an economical control method.	Hand pull or dig up
89	Poaceae	Paspalum notatum (bahia grass)	4	10	3.8	H/A	Hand pull or dig up	Spray G100 (ref 1).
90	Cactaceae	Opuntia monacantha (drooping tree pear, syn. O. vulgaris)	2	3	4	S/O	Hand removed, stem injected, or over sprayed with garlon	Spray: Basal Bark application: Injection: Triclopyr: 8L/60L diesel. Picloram + Triclopyr: 1L/60L diesel. Amitrole: 1mL/3cm (ref 3).
91	Poaceae	Paspalum conjugatum (paspalum grass)	7	36	3.8	H/A	Cut below crown.	Spot Spray: glyphosate or 2.2-DPA (ref 3).
92	Malvaceae	Hibiscus benghalensis (hibiscus)	3	5	4	S/V/O	Hand pull small infestations.	Seeds: Foliar spray of dicamba, fluoxypyr, and triclopyr/picloram. Larger plants cut stump application of fluoxypyr and triclopyr/picloram with diesel, glyphosate with water and picloram undiluted (ref 7).
93	Solanaceae	Solanum torvum (devil's fig)	6	29	3.9	S/O	Seeds: Hand pull	Shrubs: CS&P (G1.5) or F/I (G1.1.5); Seedlings: spray G200 (ref 1).
94	Caesalpinaceae	Caesalpinia decapetala (thorny poinciana)	4	20	3.9	S/V/O	Seed-heads: Bag and remove.	Stems: CS&P (G1.5); Seedlings: spray G200 or G200 + MM or MM (ref 1).
95	Poaceae	Pennisetum alopecuroides (swamp foxtail)	7	29	3.8	H/O	Hand Pull	Spot Spray: glyphosate or 2.2-DPA (ref 3).
96	Verbenaceae	Duranta erecta (duranta)	6	14	3.6	ST/O	Shrubs: CS&P (1.1.5)	Spray G100 (ref 1).
97	Brassicaceae	Nasturtium officinale (Old use Rorippa nasturtium-aquaticum) (watercress)	7	19	3.7	Ha/FU	Manually grub and destroy.	Spray G100 and replace with local species (ref 1).
98	Polygonaceae	Acalypha sagittata (rambling dock)	4	18	3.7	V/U	Tubers: Dig up, bag and remove.	Tubers: Spray G200 or G200 + MM or MM (ref 1).
99	Poaceae	Cynodon dactylon (couch)	10	45	3.6	H/OA	Hand pull small infestations, removing all roots or smother with mulch.	Spray: glyphosate @ 200mL/15L water. Follow up spray (ref 3).
100	Bignoniaceae	Tecoma stans (yellow bells)	4	16	3.6	ST/O	N/A	Stems: CS&P (G1.5) or spray G200. Seeds: collect, bag and remove (ref 1).
101	Rosaceae	Rhaphiolepis indica (Indian Hawthorn)	3	10	3.5	ST/O	Seeds: Hand pull	Saplings: CS&P (G1.5); Trees: F/I (G1.5); Seedlings: spray G200 or G200 + MM or MM (ref 1).
102	Mimosaceae	Mimosa pudica (common sensitive plant)	4	12	3.7	S/A	N/A	Pastures - Fluoxypyr/Starane 200 @ 1.5 L/ha. Between cropping applications (conservation tillage) - Dicamba/Bavel 200 @ 0.8-1.4 L/ha.
103	Commelinaceae	Callisia fragrans (purple succulent)	3	9	3.9	H/O	N/A	Spray F100 or G200 or G200 + MM; Collect and bag or roll and rake carefully. Dispose (ref 1).
104	Scrophulariaceae	Passiflora tomentosa (passiflora)	3	5	4	H/AO	Seeds: Hand pull	Saplings: CS&P (G1.5); Trees: F/I (G1.5); Seedlings: spray G200 (ref 1).
105	Commelinaceae	Tradescantia zebina (zebrina)	3	12	3.7	H/O	N/A	Spray F100 or G200 or G200 + MM; Collect and bag or roll and rake carefully. Dispose (ref 1).
106	Acanthaceae	Ruellia malacoperma (ruellia)	5	16	3.8	H/O	N/A	Spray G200 + MM (ref 1).
107	Poaceae	Pennisetum clandestinum (kikuyu grass)	4	12	3.8	H/A	Hand Pull	Spot Spray: glyphosate or 2.2-DPA (ref 3).
108	Liliaceae	Lilium formosanum (Taiwan Lily)	5	10	3.8	H/O	Hand pull or crown and dispose	Spray G100 + MM or MM (ref 1).
109	Asteraceae	Sigesbeckia orientalis (Indian weed)	10	148	3.6	H/U	Hand pull or cultivation	Spray with 2.4-D amine or sodium, pr MCPA + dicamba (ref 3).
110	Asteraceae	Bidens pilosa (cobbler's pegs)	10	110	3.5	H/U	Hand pull or cultivation	Spray with 2.4-D amine or sodium, pr MCPA + dicamba (ref 3).
111	Cactaceae	Opuntia stricta (common prickly pear)	7	67	3.6	S/O	Hand removed, stem injected, or over sprayed with garlon	Spray: Basal Bark application: Injection: Triclopyr: 8L/60L diesel. Picloram + Triclopyr: 1L/60L diesel. Amitrole: 1mL/3cm (ref 3).
112	Poaceae	Eleusine indica (crowsfoot grass)	8	56	3.5	H/A	Pull and chip. Replant with native couch.	Spray: glyphosate or 2.2-DPA (ref 3).
113	Poaceae	Axonopus compressus (broad leaved carpet grass)	5	23	3.6	H/AO	Cut stems from trees.	Spot spray with Glyphosate (ref 3).

114	Lamiaceae	Salvia coccinea (red salvia)	9	46	4	H/O	remove small areas by hand or machine	Aquatic areas (drains, channels, margins of streams, lakes and dams) - calcium dodecylbenzene sulphonate (AF-100) @ 1 part in 19 parts kerosene
115	Asteraceae	Ageratum houstonianum (blue billygoat weed)	8	81	3.8	H/UO	N/A	Spray G100 or hand pull and spray regrowth G100 (ref 1).
116	Myrtaceae	Psidium guajava and P. guineense (yellow guava and West Indies guava)	4	7	3.7	ST/AO	N/A	Shrubs: CS&P or F/I (G1.5) or spray G200 + MM or MM. Trunk basal bark F100 or G200 + MM (ref 1).
117	Rosaceae	Rubus bellobatus (kittatinny blackberry)	5	22	3.5	S/O	slashing hinders growth, giving some control if plants are slashed before they seed	Grazon DS picloram/triclopyr 1:200 parts water + wetting agent
118	Myrtaceae	Eugenia uniflora (Brazilian cherry)	4	19	3.5	ST/O	N/A	Stems: CS&P or F/I (G1.5); Bushes: spray or cut down and spray regrowth G100 or MM (ref 1).
119	Oleaceae	Olea europaea (olive)	2	6	47	T/A	Seeds: Hand pull	Trees: F/I (G1.5); Seedlings: spray G200 or G200 + MM (ref 1).
120	Poaceae	Bracharia decumbens (signal grass)	4	14	3.5	H/A	Grazing	Herbicide Control - Foliar application (Knapsack): glyphosate 360g/L @ 200mL/15L water; Foliar: glyphosate 360g/L @ 9L/ha; Handgun: glyphosate 360g/L @ 1.3L/100L water (ref 2).
121	Fabaceae	Stylosanthes scabra (shrubby stylo)	4	4	4.3?	H/A	N/A	Vines: CS&P (1.1.5) or spray G100 + MM or MM (ref 1).
122	Commelinaceae	Commelina benghalensis (henry wandering jew)	4	7	3.5	H/O	Collect and Bag	Spray G200 or G200 + MM (ref 1).
123	Poaceae	Pennisetum purpureum (elephant grass)	2	9	3.5	H/O	Grazing or mechanical removal	N/A (ref 2).
124	Zingiberaceae	Hedychium coronarium (wild ginger)	2	2	3.5	H/O	Small Plants: Hand pull and dispose	Small Plants: spray G200 or G200 + MM. Large Plants: cut and spray regrowth. If rhizomes are at ground level, cut stem and gouge rhizome - fill hole with G1.5 with injector kit or similar (ref 1).
125	Phytolaccaceae	Phytolacca octandra (inkweed)	10	50	3.4	H/O	Hand pull or crown	CS&P (G1.5) or C&P (G1.5); spray G100 (ref 1).
126	Asclepiadaceae	Asclepias curassavica (red cotton bush)	9	43	3.4	S/O	Hand pull; Slash	Slash and/or spray G100 (ref 1).
127	Solanaceae	Lycium ferocissimum (African boxthorn)	17	5	4.4?	S/O	N/A	Stems: C&P (G1.5); Regrowth: spray G200 + MM (ref 1).
128	Mimosaceae	Prosopis pallida (algaroba)	2	2	4	ST/O	When using mechanical control methods, it is important to remove the bud zone of the root system (about 30 cm below the ground surface) if this is not removed, re-shooting can occur.	Basal bark - triclopyr + picloram Access@ @ 1L/60L diesel. Cut stump - triclopyr + picloram Access@ @ 1L/60L diesel. Overall spray - triclopyr + picloram Grazon DS @ 350ml/100L water plus a wetting agent if plant is growing actively
129	Juncaceae	Juncus articulatus (jointed rush)	1	2	4	Ha/FO	Hand pull.	Spot spray with Glyphosate, 2.2-DPA or MCPA + dicamba (ref 3).
130	Cactaceae	Opuntia aurantiaca (tiger pear)	1	2	4	S/O	Hand removed, stem injected, or over sprayed with garlon	Spray: Basal Bark application: Injection: Triclopyr: 8L/60L diesel. Picloram + Triclopyr: 1L/60L diesel. Amitrole: 1mL/3cm (ref 3).
131	Poaceae	Arundo donax (giant reed)	1	4	3.8	H/O	Physical removal of small infestations.	Spot spray or cut stump and spray with Glyphosate (ref 5).
132	Cactaceae	Opuntia imbricata (rope pear)	1	1	4	H/O	Biological controls available: cactoblastis cactorum successful. Mechanical control difficult. Fire can be used.	Spray: Basal Bark application: Injection: Triclopyr: 8L/60L diesel. Picloram + Triclopyr: 1L/60L diesel. Amitrole: 1mL/3cm (ref 3).
133	Bignoniaceae	Pyrostegia venusta (flame vine)	1	1	4	V/O	N/A	CS&P (G1.5); spray G200 (ref 1).
134	Poaceae	Cortaderia selloana (pampas grass)	2	1	3.7	H/O	Small Plants: dig out by hand or machine	Stems: CS&P (G1.5) or cut back and slash and spray regrowth G100 (ref 1).
135	Solanaceae	Solanum hispidum (giant devil's fig)	5	23	3.6	S/O	Hand pull	Spray G100 (ref 1).
136	Agavaceae	Furcraea foetida (Cuban hemp)	3	4	4.3?	S/OA	Dig out by hand or machine	CS&P near ground or spray MM (ref 1).
137	Agavaceae	Furcraea selloa (hemp)	1	2	4?	S/OA	Dig out by hand or machine	CS&P near ground or spray MM (ref 1).
138	Agavaceae	Agave americana (century plant)	4	9	3.7	S/OA	Dig out by hand or machine	CS&P near ground or spray MM (ref 1).

saunders havill group
 Saunders Havill Group Pty Ltd ABN 24 144 972 949
 Brisbane • Emerald • Gladstone
 head office 9 Thompson St Bowen Hills Q 4006
 phone 1300 123 SHG web www.saundershavill.com
 • surveying • town planning • urban design • environmental management • landscape architecture

40 YEARS
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Issue	Date	Description	Checked
A	13/11/2017	Preliminary Issue	MS

AMENDMENTS:

CLIENT: _____

PROJECT: Spring Mountain Precinct

SCALE: AS NOTED

landscape architecture

DRAWING: Area 2 Management Plan Weed Management Techniques

DATE: November 17 CHECKED: MS

CLIENT REF.: 7243 DRAWN: TL

DRAWING No.: 7243 L 215 WMP A

Spring Mountain Precinct

AREA 2 MANAGEMENT PLAN - MONITORING & REPORTING

MONITORING & REPORTING

MONITORING AND REPORTING PROCEDURES

Monitoring and maintenance of the weed management and vegetation, both adjacent to proposed works and within the management area, is a vital component to the success of this management plan set.

An ongoing maintenance schedule, detailing the monitoring program, management intervals, methodologies, and corrective actions for contractors undertaking rehabilitation works within the ecological area is provided below. It is the responsibility of the rehabilitation landscape contractor to ensure the ongoing maintenance and monitoring schedule is actioned. Monitoring of the parkland weed management and revegetation works allows for:

- A review of the pre-established performance indicators for measuring the success of the weed removal and control;
- Ensure the level of protection for existing identified native vegetation inclusive of that which has naturally regenerated;
- Review the rate of spread or contraction of weed infestation within the control program;
- Monitor the rate of assisted regeneration and revegetation of desirable native species promoted in areas where weeds have been removed; and
- Identification of new weed threats or other factors which may be effecting areas designated for ecological rehabilitation.

Monitoring is required for weed eradication, revegetation and assisted regeneration.

MAINTENANCE ACTIONS AND METHODOLOGIES

Tree Retention - Construction Phase

- Ecologist / Arborist to assess tree exclusion zones are adhered to;
- Trees assessed for signs of stress or die back; and
- Implementation of VMP if retained tree roots Critical Root Zone (CRZ) is impacted upon.

Initial Establishment - Rehabilitation Planting

Initial 12 week establishment period applies to all rehabilitation planting works. During this period weekly maintenance is to occur that involves the following:

- Watering;
- Ongoing weed control;
- Fertilising; and
- Replacement of dead or damaged stock.

Ongoing Maintenance - Rehabilitation Planting

After this period, it is recommended that the ecological planting site be maintained on a monthly basis over a 5 year period to ensure that the planting has been successful. The following is to occur:

- Conduct weed spraying, plant watering, plant replacement of losses as necessary to maintain >95% survival rate;
- All other areas of non-use / limited access or steep terrain areas are to be hydro seeded to maintain a minimum 90% ground cover;
- All planting species will be disease free and supplied from an accredited nursery supplier;
- Assess condition of sediment control devices and replace if necessary; and
- Removal of excess sediment from erosion control devices as required.

MONITORING TIME FRAMES

For weed removal and revegetation three (3) Council determined timeframes form the anchor of the monitoring process. These include:

Council Pre-Start - On-site meeting prior to the initial commencement of work within each stage of weed management. Will involve Consultant, Contractor and Council to work through weed treatment areas and clarify works approved and appointed.

On-Maintenance - At the completion of the Primary Weed Removal Stage and Secondary weeding an On-Maintenance meeting will be held with Council to inspect the works on-site in relation to the approved plans and previously agreed on-maintenance criteria.

Off-Maintenance - At the completion of all site weeding works and the agreed maintenance timeframe a final inspection will be held by Council to determine if works have been completed to the required level for Council hand over.

REPORTING

Reporting to Ipswich City Council will occur on a yearly interval during the total period. Council will physically attend the Pre-Start, On-maintenance and Off-maintenance meetings. For this project it is recommended reporting include a short memo styled report responding to agreed criteria. As part of the monitoring a number of pre-determined transect and quadrant sampling sites have been allocated. At these locations a number of baseline studies have been completed and will be repeated post weed removal and maintenance to measure the success of the programmed works. It is also recommended this include a visual diary of imagery from selected locations at each inspection (Including the pre-start and monthly inspections). The imagery for the each period will be included with the report to Council.

In addition to the photo monitoring the biannual report to Council should include sufficient information on:

- Date, time and whether conditions at time of inspection
- Changes in weed extent populations (spreading / contracting)
- Changes in weed densities
- Health of existing vegetation protected by NRM provisions
- Rate of success for revegetation plantings
- Growth and PFC rate of assisted regeneration areas
- Occurrences of new weed infestations or species outbreaks
- Comments on any indirect changes to the area as a result of weed management (ie erosion / change in weed footprints / death to natives)
- Annual reporting is required to be sent to the Department of the Environment (DOE).

NOTES

MONITORING PARAMETERS

The monitoring should address the following issues:

- Maintained health and vigour of retained Remnant Trees adjacent to the corridor;
- Plant growth, percentage cover and survival rates;
- Plant losses through herbivores, disease, vandalism, storm damage or other factors;
- Weed re-growth and control measures;
- Plant replacement;
- Maintenance watering regime; and
- Erosion prevention.

It is also essential to keep an accurate photo record of the retained trees and progress of the rehabilitation planting by setting fixed photo monitoring points across the site. Photos should be taken by a digital camera and recorded in the project file by date and discrete photo monitoring point number. Photo monitoring point locations should be clearly marked on site and mapped by a surveyor or by GPS.

Corrective Actions

If trees adjacent to the sewer alignment disturbance are dying or impacted upon:

- Monitor construction activity;
- Educated construction team on tree retention measures;
- Review and / or respond to tree retention mitigation measures ie. exclusion zones;
- Review VMP for particular trees;
- Remove if necessary unsafe tree;
- Compensation by planting;
- If soil erosion is still occurring in planting zones the following is to occur:
- Review rehabilitation techniques conducted by contractor;
- Assess the potential for disturbance to occur;
- Assess other potential sources or causes of disturbances to occur; and
- Maintain planting regimes to a minimum of 95% survival rate.

If weed infestations occur in planting zones or in disturbed construction area, the following is to occur:

- Review weed removal and weed management techniques conducted by contractor;
- Assess the appropriate use and amounts of herbicides are being used;
- Assess the potential for weeds to occur; and
- Assess other potential sources or causes of weeds to occur.

If there is poor regeneration of plants occurring in ecological areas, the following is to occur:

- Review planting and direct seeding management techniques conducted by contractor;
- Assess the appropriate use and amounts of herbicides are being used in planting areas;
- Assess the potential for weeds to occur in ecological areas; and
- Assess other potential sources or causes of weeds or limited re-growth of native plants to occur, ie. plant pests and disease monitoring.

RESOURCES / ROLES & RESPONSIBILITIES

All resources required to implement this plan will be provided by the proponent (Lendlease). The following roles are applicable:

PROONENT

- Ensure all consultants, contractors, sub contractors or others utilizing the area are aware of the **Weed Management Plan**.
- Appoint appropriate consultants and contractors to undertake works as prescribed on the drawings and conditioned by **Ipswich City Council**.
- Cover the costs of all necessary resources to ensure works are completed as per the approved documents.

CONSULTANTS

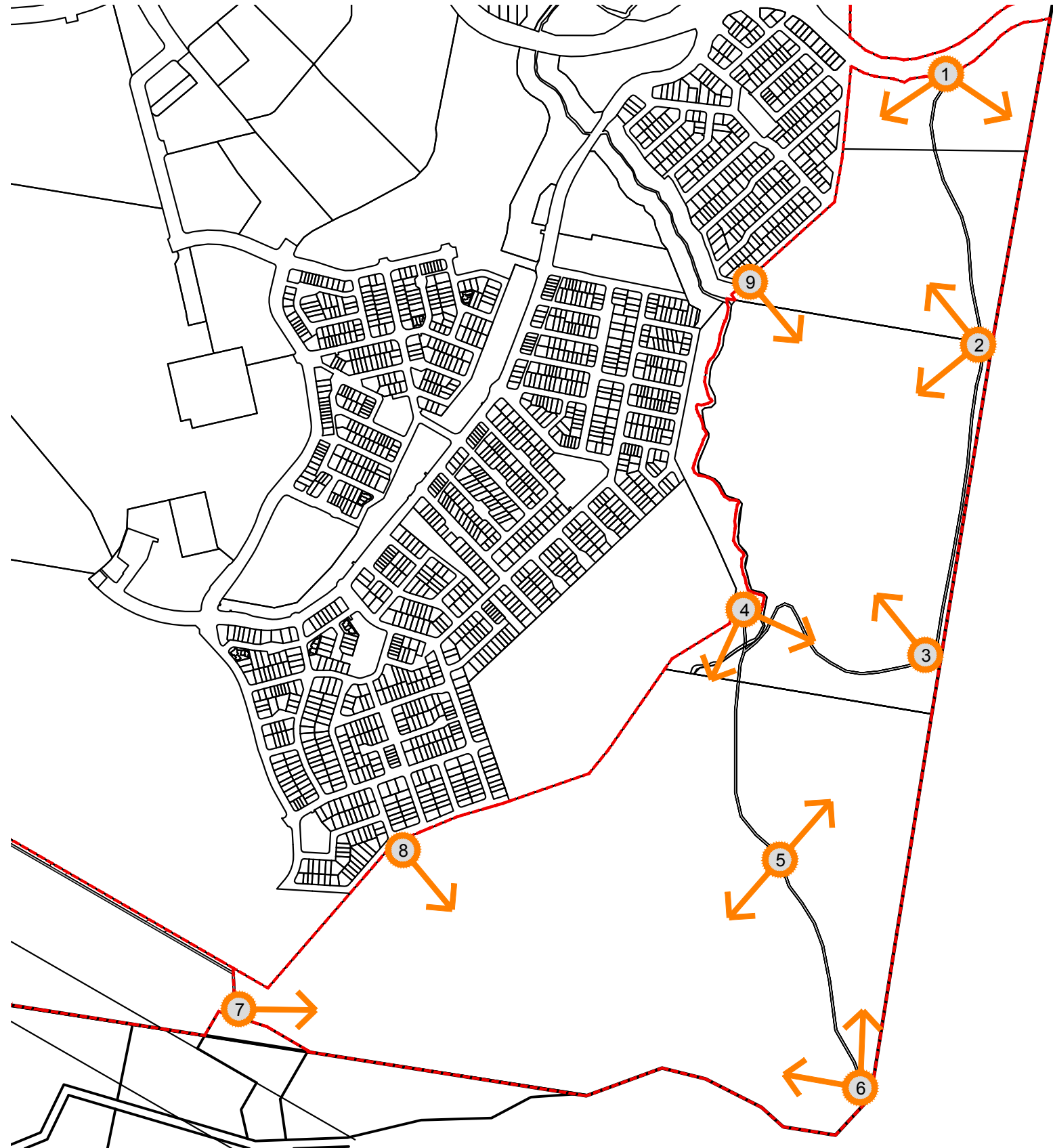
- Brief the proponent on their requirements in implementing and maintaining works as per the **Weed Management Plan**.
- Attend pre start, on maintenance and off maintenance meetings.
- Undertake monitoring and reporting to **Ipswich City Council** as set up by this document.
- Be available to respond to technical queries or departures to the approved documentation when on-site conditions require changes.
- Liaise with Council throughout all stages of approval, initial works and maintenance of works.

COUNCIL

- Provide technical expertise via commentary on the approval of documentation.
- Attend pre-start, on and off maintenance inspections.
- Undertake random inspections through the Secondary weed management and Maintenance weed management phases.
- Accept and review biannual reports as dictated in this document.

CONTRACTOR

- Complete works in strict accordance with the documentation.
- Recommend changes to the documentation when specific experience or on-site conditions require so.
- Attend pre-start, on and off maintenance inspections.



AMENDMENTS:			
Issue	Date	Description	Checked
A	13/11/2017	Preliminary Issue	MS

CLIENT:	
PROJECT:	Spring Mountain Precinct
SCALE:	1:2000@A1 1:4000@A3

Spring Mountain Precinct

AREA 3 WEED MANAGEMENT



ISSUE A 13.11.2017
PRELIMINARY ISSUE

DRAWING SCHEDULE

Dwg No.	Drawing Title	Issue	Date																			
7243 L 301	Weed Management Plan - Cover Sheet	A	13/11/2017																			
7243 L 302	Weed Management Plan - Introduction	A	13/11/2017																			
7243 L 303	Weed Management Plan - Sheet 1	A	13/11/2017																			
7243 L 304	Weed Management Plan - Sheet 2	A	13/11/2017																			
7243 L 305	Weed Management Plan - Sheet 3	A	13/11/2017																			
7243 L 306	Weed Management Plan - Sheet 4	A	13/11/2017																			
7243 L 307	Weed Management Plan - Sheet 5	A	13/11/2017																			
7243 L 308	Weed Management Plan - Sheet 6	A </tr <tr> <td>7243 L 309</td> <td>Weed Management Plan - Technical Notes</td> <td>A</td> <td>13/11/2017</td> </tr> <tr> <td>7243 L 310</td> <td>Weed Management Plan - Treatment Techniques</td> <td>A</td> <td>13/11/2017</td> </tr> <tr> <td>7243 L 311</td> <td>Weed Management Plan - Treatment Techniques</td> <td>A</td> <td>13/11/2017</td> </tr> <tr> <td>7243 L 312</td> <td>Weed Management Plan - Treatment Techniques</td> <td>A</td> <td>13/11/2017</td> </tr> <tr> <td>7243 L 313</td> <td>Weed Management Plan - Monitoring & Reporting</td> <td>A</td> <td>13/11/2017</td> </tr>	7243 L 309	Weed Management Plan - Technical Notes	A	13/11/2017	7243 L 310	Weed Management Plan - Treatment Techniques	A	13/11/2017	7243 L 311	Weed Management Plan - Treatment Techniques	A	13/11/2017	7243 L 312	Weed Management Plan - Treatment Techniques	A	13/11/2017	7243 L 313	Weed Management Plan - Monitoring & Reporting	A	13/11/2017
7243 L 309	Weed Management Plan - Technical Notes	A	13/11/2017																			
7243 L 310	Weed Management Plan - Treatment Techniques	A	13/11/2017																			
7243 L 311	Weed Management Plan - Treatment Techniques	A	13/11/2017																			
7243 L 312	Weed Management Plan - Treatment Techniques	A	13/11/2017																			
7243 L 313	Weed Management Plan - Monitoring & Reporting	A	13/11/2017																			



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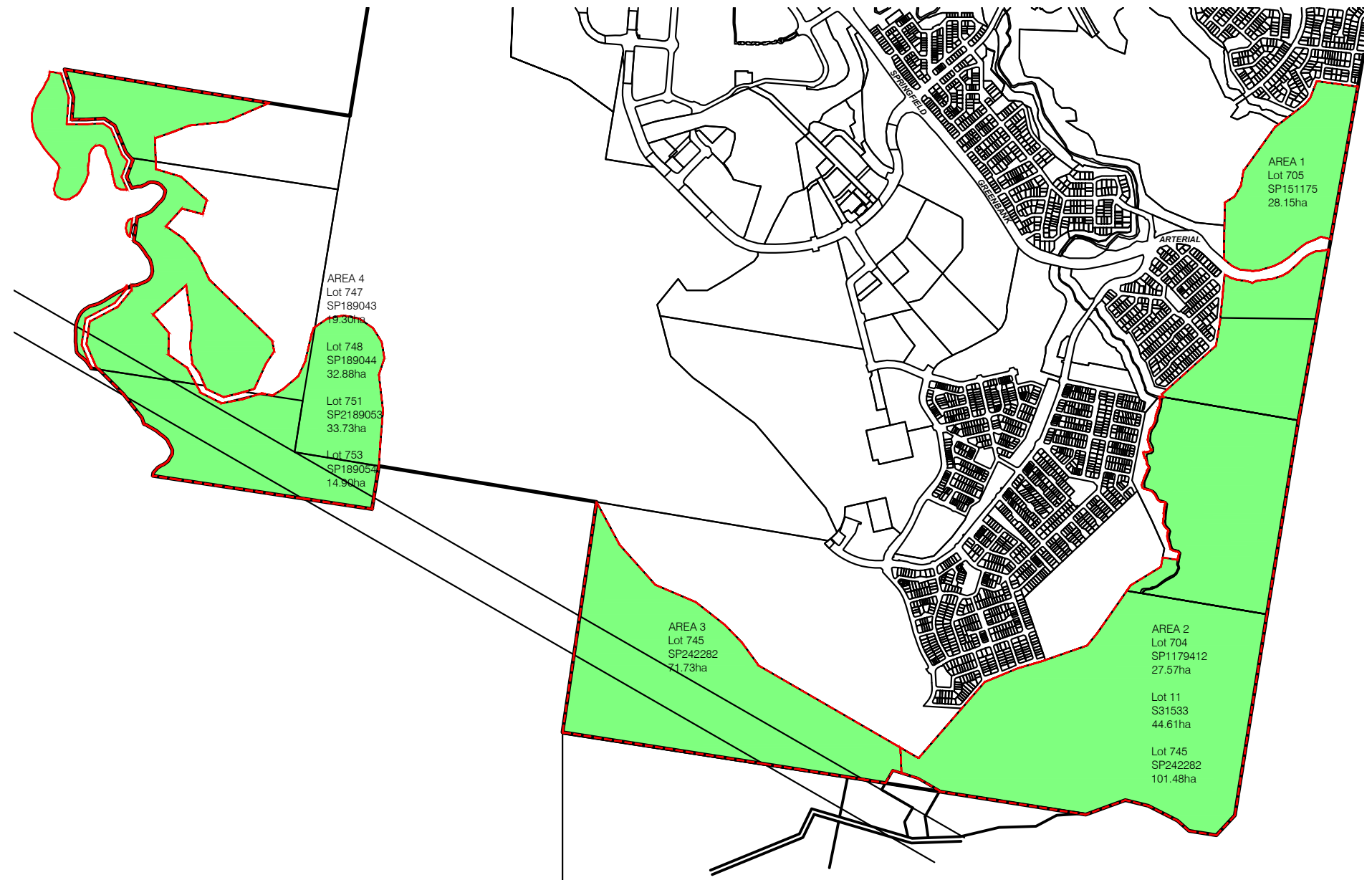
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PROJECT:	Spring Mountain Precinct
SCALE:	AS NOTED

AREA 3 MANAGEMENT PLAN - WEED TREATMENT & REHABILITATION

INTRODUCTION

NOTES

This Weed Management Plan

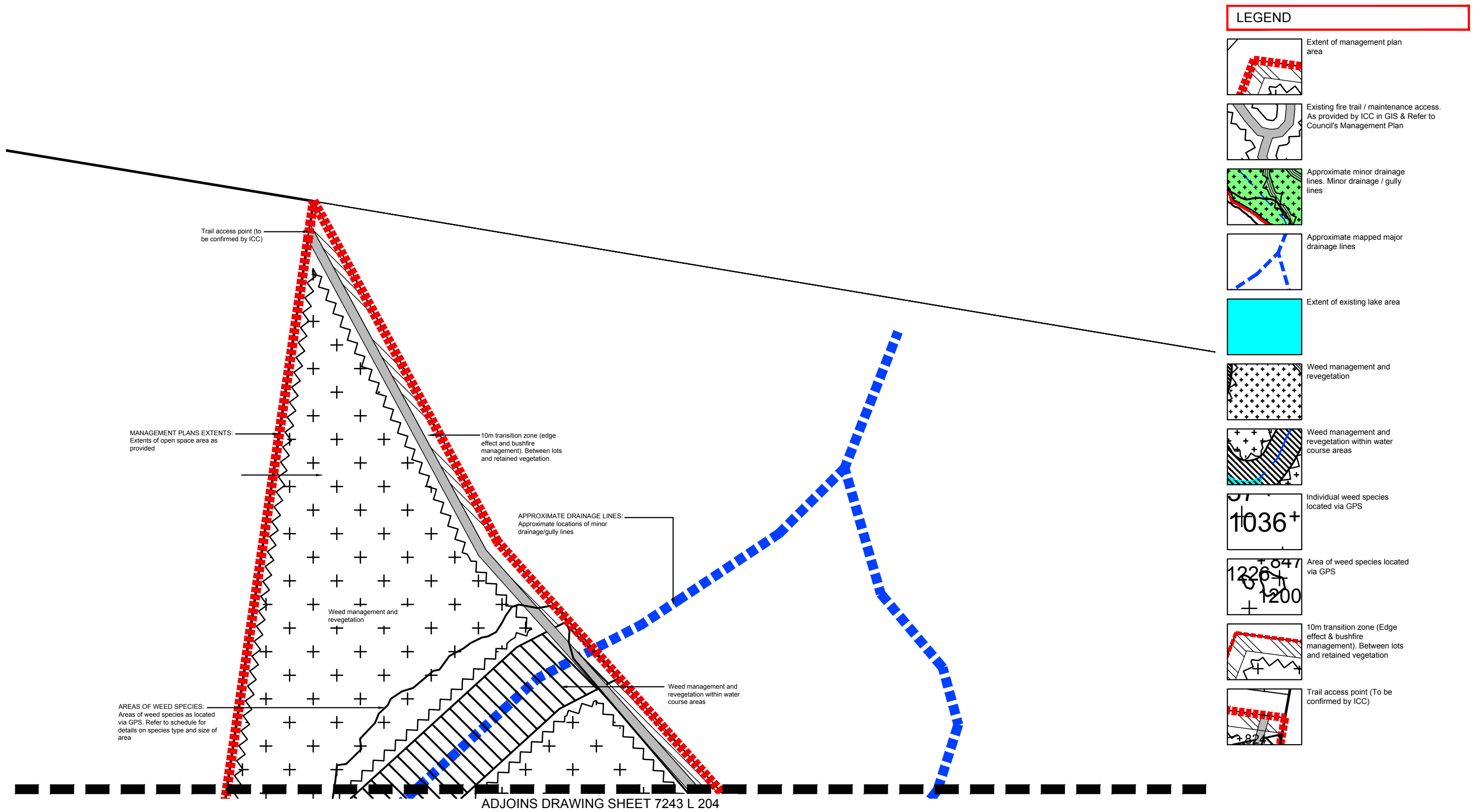


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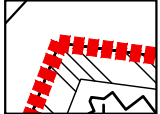


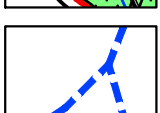

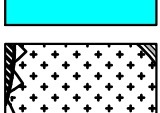
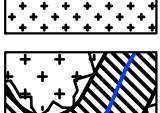
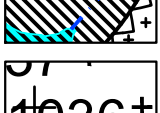
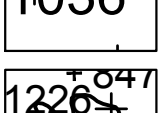
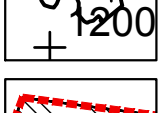

CLIENT:
 PROJECT: Spring Mountain Precinct
 SCALE: AS NOTED

Spring Mountain Precinct

AREA 3 WEED MANAGEMENT PLAN



LEGEND

-  Extent of management plan area
-  Existing fire trail / maintenance access. As provided by ICC in GIS & Refer to Council's Management Plan
-  Approximate minor drainage lines. Minor drainage / gully lines
-  Approximate mapped major drainage lines
-  Extent of existing lake area
-  Weed management and revegetation
-  Weed management and revegetation within water course areas
-  Individual weed species located via GPS
-  Area of weed species located via GPS
-  10m transition zone (Edge effect & bushfire management). Between lots and retained vegetation
-  Trail access point (To be confirmed by ICC)

Trail access point (to be confirmed by ICC)

MANAGEMENT PLANS EXTENTS:
Extents of open space area as provided

10m transition zone (edge effect and bushfire management). Between lots and retained vegetation.

APPROXIMATE DRAINAGE LINES:
Approximate locations of minor drainage/gully lines

Weed management and revegetation

Weed management and revegetation within water course areas

AREAS OF WEED SPECIES:
Areas of weed species as located via GPS. Refer to schedule for details on species type and size of area

ADJOINS DRAWING SHEET 7243 L 204

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 head office 9 Thompson St Bowen Hills Q 4006
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40 YEARS
1975-2015

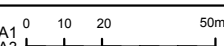
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AMENDMENTS:			
Issue	Date	Description	Checked
A	13/11/2017	Preliminary Issue	MS

CLIENT:
PROJECT:
Spring Mountain Precinct

SCALE: 1:1000@A1
1:2000@A3



landscape architecture

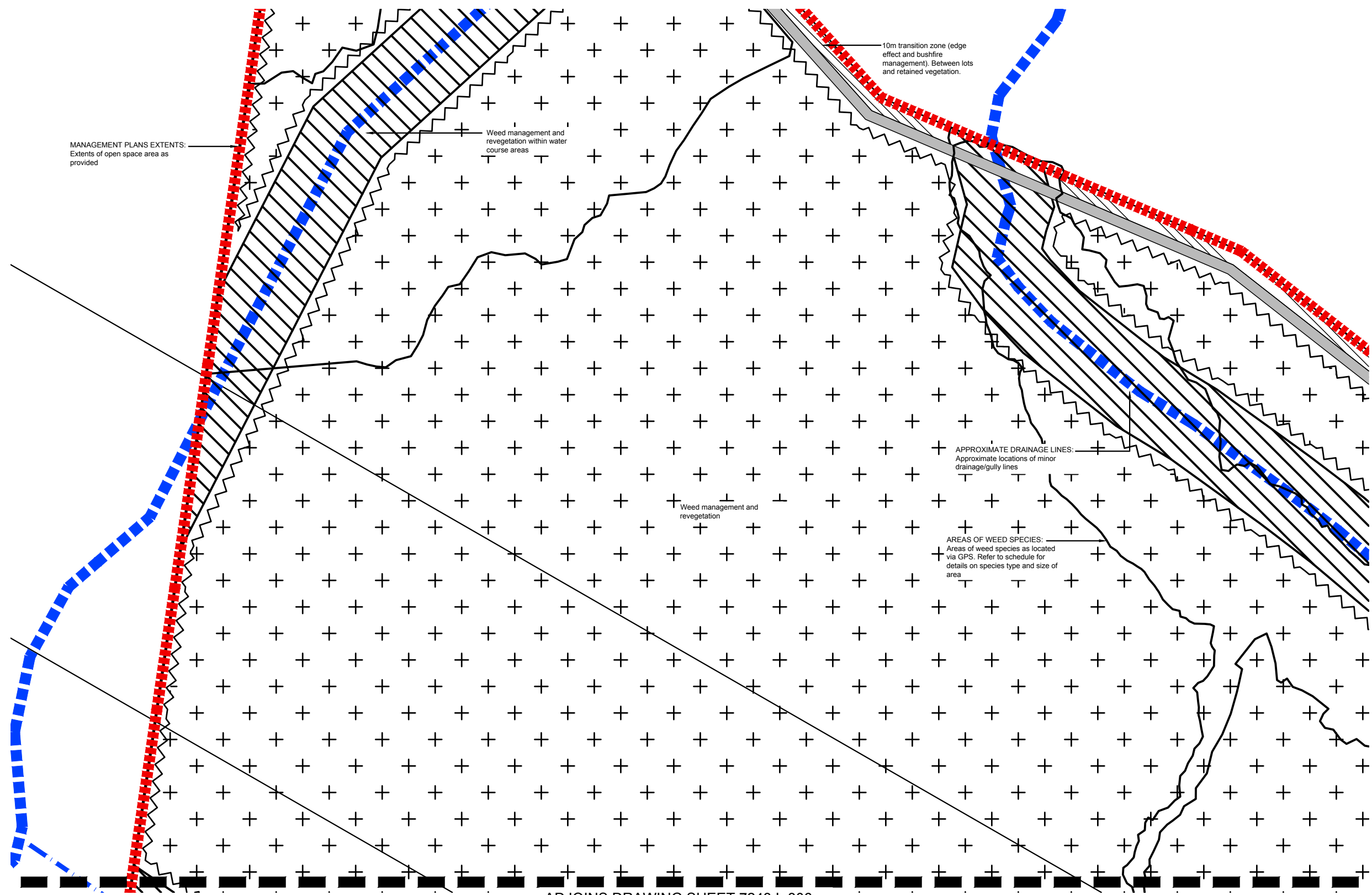
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Area 3 Management Plan
Weed Management - Sheet 1

DATE: November 17
CLIENT REF.: 7243
DRAWING No.: 7243 L 303 WMP A

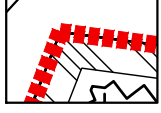

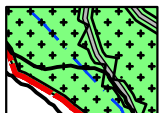
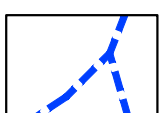


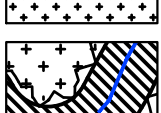
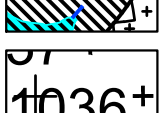
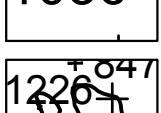


CHECKED: MS
DRAWN: TL

Spring Mountain Precinct

AREA 3 WEED MANAGEMENT PLAN



LEGEND

-  Extent of management plan area
-  Existing fire trail / maintenance access. As provided by ICC in GIS & Refer to Council's Management Plan
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-  Trail access point (To be confirmed by ICC)

ADJOINS DRAWING SHEET 7243 L 306

AMENDMENTS:			
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A	13/11/2017	Preliminary Issue	MS

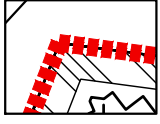
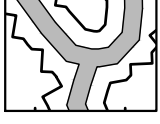

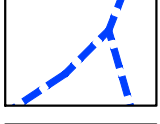

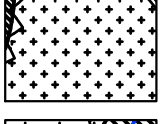
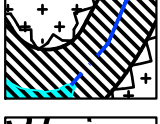
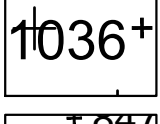
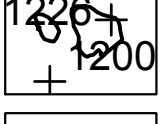

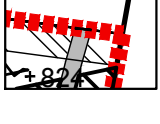
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PROJECT:	Spring Mountain Precinct
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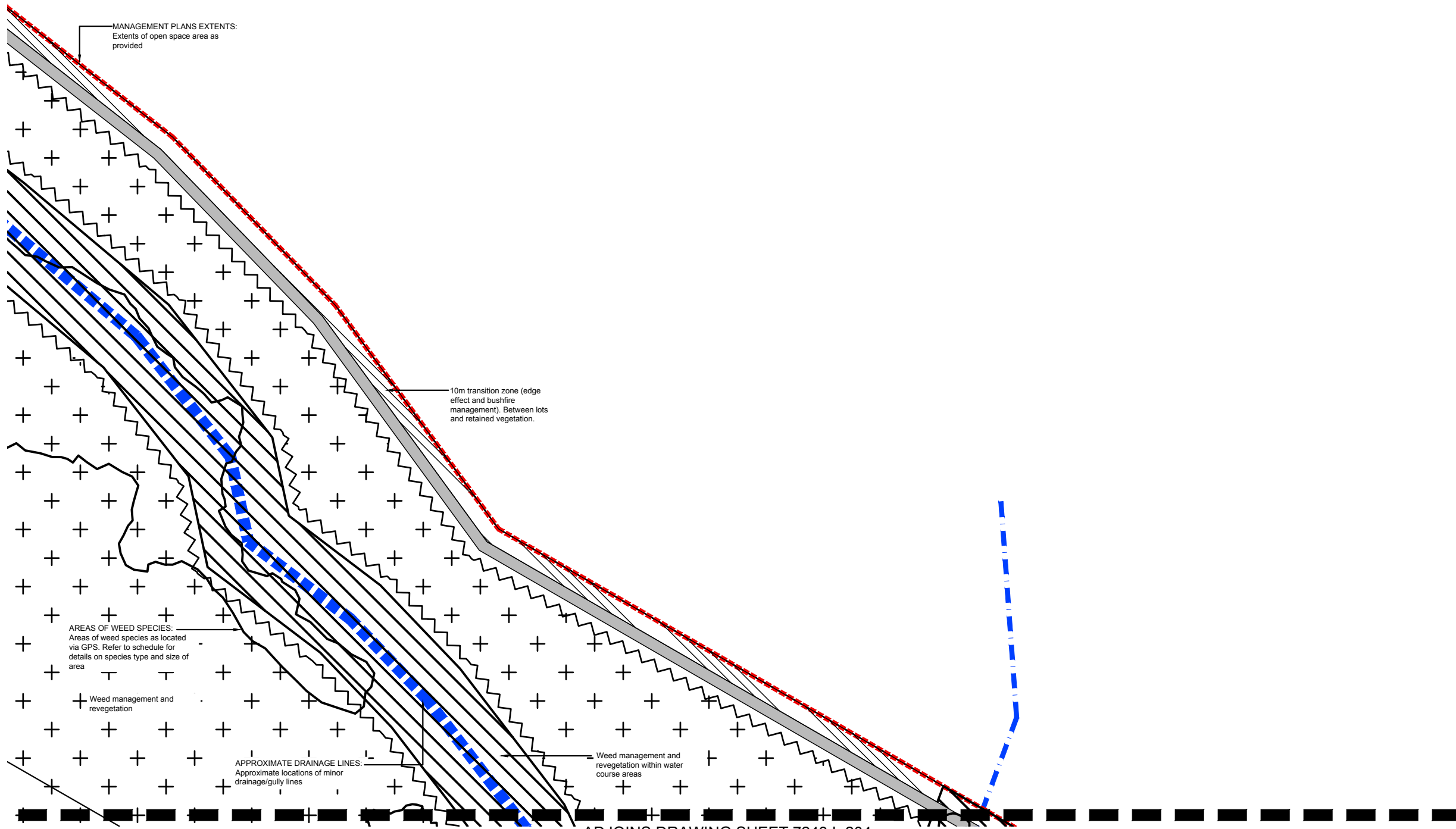
Spring Mountain Precinct

AREA 3 WEED MANAGEMENT PLAN



LEGEND

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40 YEARS
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Issue	Date	Description	Checked
A	13/11/2017	Preliminary Issue	MS

CLIENT: _____

PROJECT: Spring Mountain Precinct

SCALE: 1:1000@A1
 1:2000@A3

landscape architecture

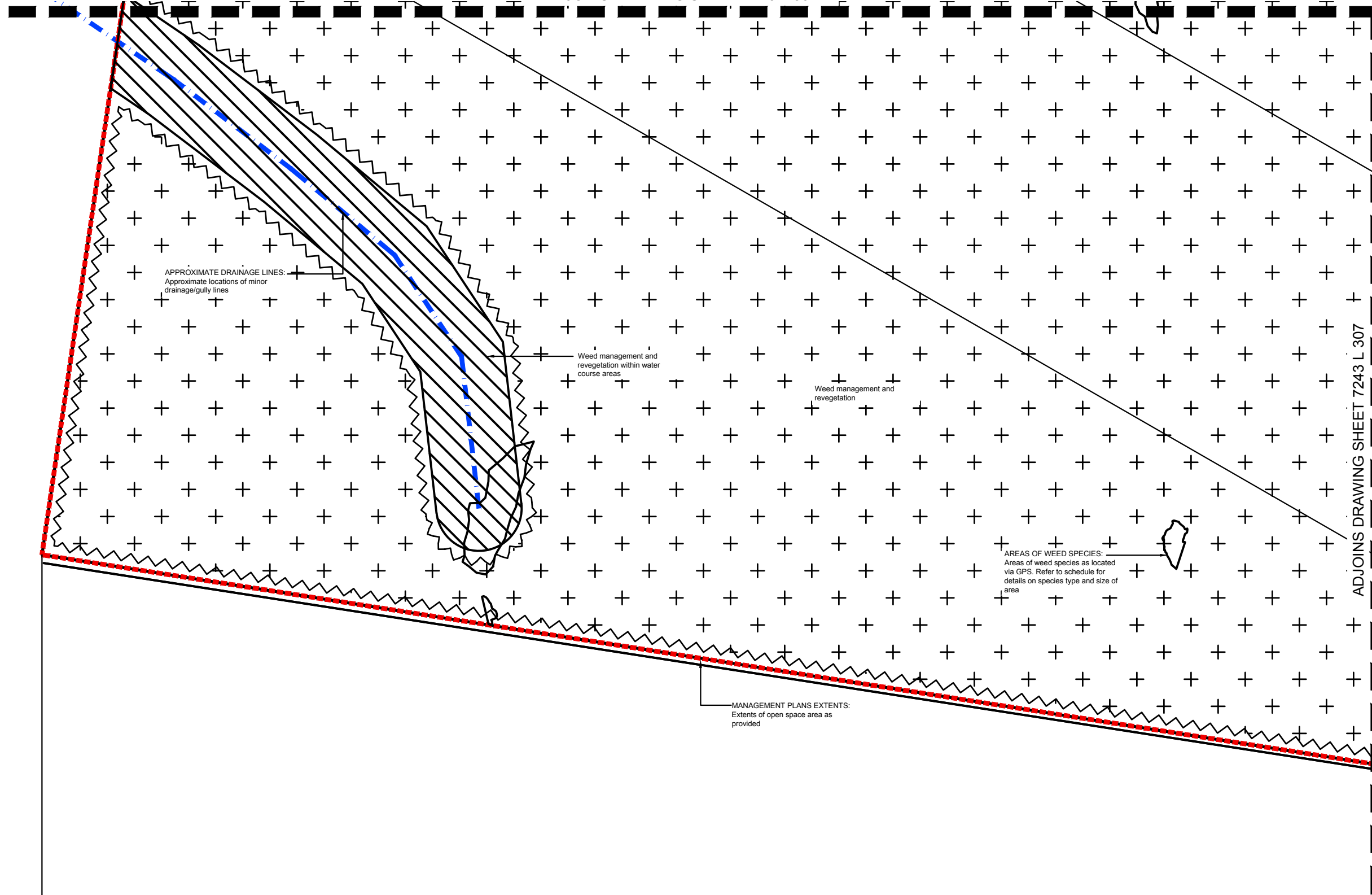
DRAWING: Area 3 Management Plan
 Weed Management - Sheet 3

DATE: November 17 CHECKED: MS
 CLIENT REF.: 7243 DRAWN: TL
 DRAWING No.: 7243 L 305 WMP A

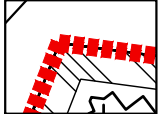


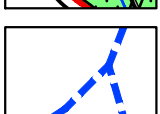


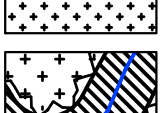
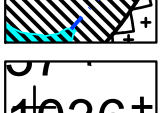
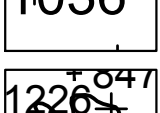
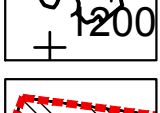

Spring Mountain Precinct

AREA 3 WEED MANAGEMENT PLAN

ADJOINS DRAWING SHEET 7243 L 304



LEGEND

-  Extent of management plan area
-  Existing fire trail / maintenance access. As provided by ICC in GIS & Refer to Council's Management Plan
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APPROXIMATE DRAINAGE LINES:
Approximate locations of minor drainage/gully lines

Weed management and revegetation within water course areas

Weed management and revegetation

AREAS OF WEED SPECIES:
Areas of weed species as located via GPS. Refer to schedule for details on species type and size of area

MANAGEMENT PLANS EXTENTS:
Extents of open space area as provided

ADJOINS DRAWING SHEET 7243 L 307

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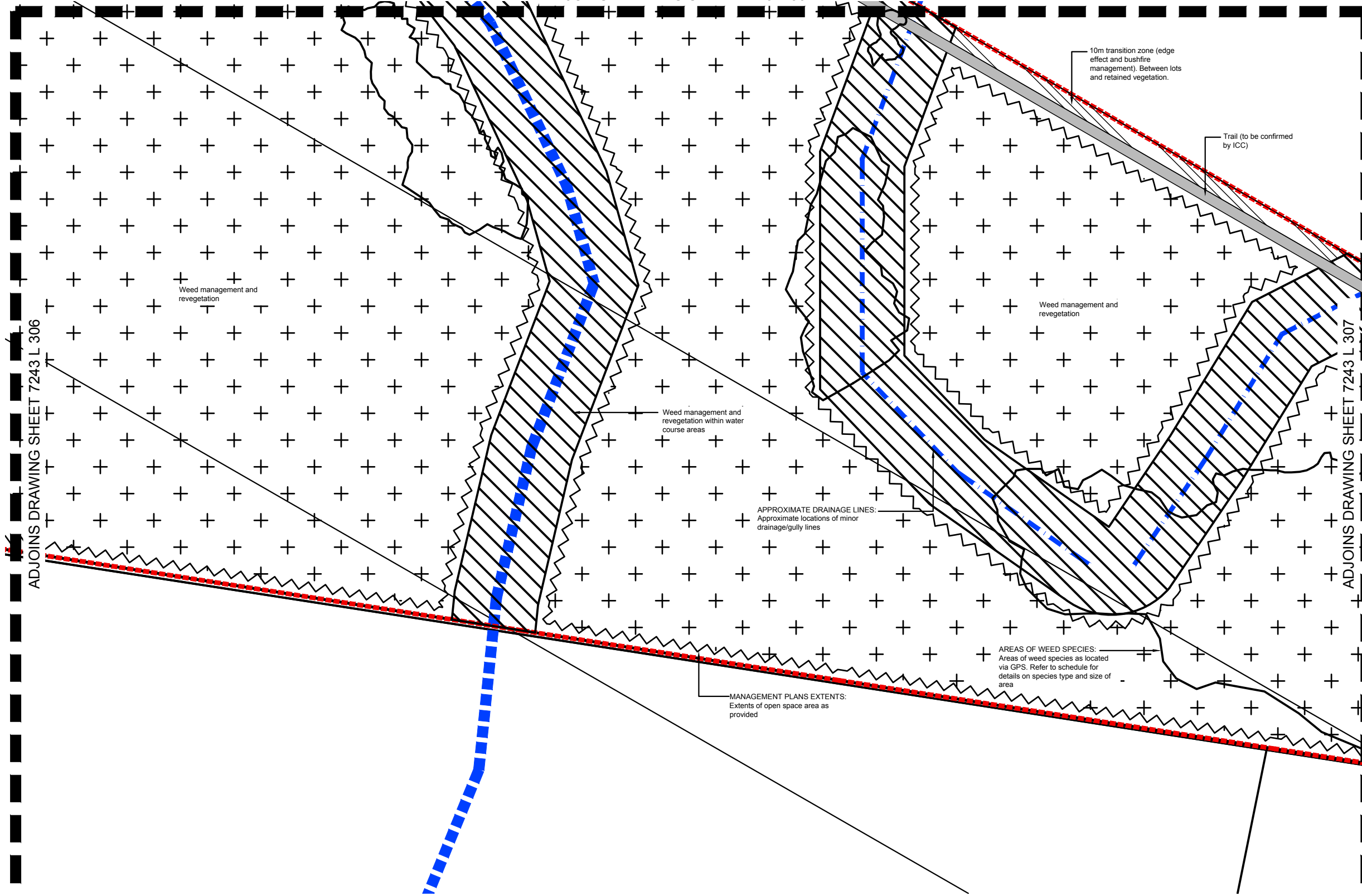
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 PROJECT: Spring Mountain Precinct
 SCALE: 1:1000@A1
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landscape architecture
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 Weed Management - Sheet 4
 DATE: November 17 CHECKED: MS
 CLIENT REF.: 7243 DRAWN: TL
 DRAWING No.: 7243 L 306 WMP A

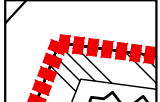





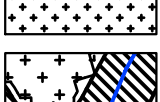

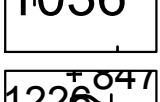
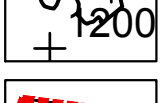

Spring Mountain Precinct

AREA 3 WEED MANAGEMENT PLAN

ADJOINS DRAWING SHEET 7243 L 304



LEGEND

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-  Existing fire trail / maintenance access. As provided by ICC in GIS & Refer to Council's Management Plan
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ADJOINS DRAWING SHEET 7243 L 306

ADJOINS DRAWING SHEET 7243 L 307

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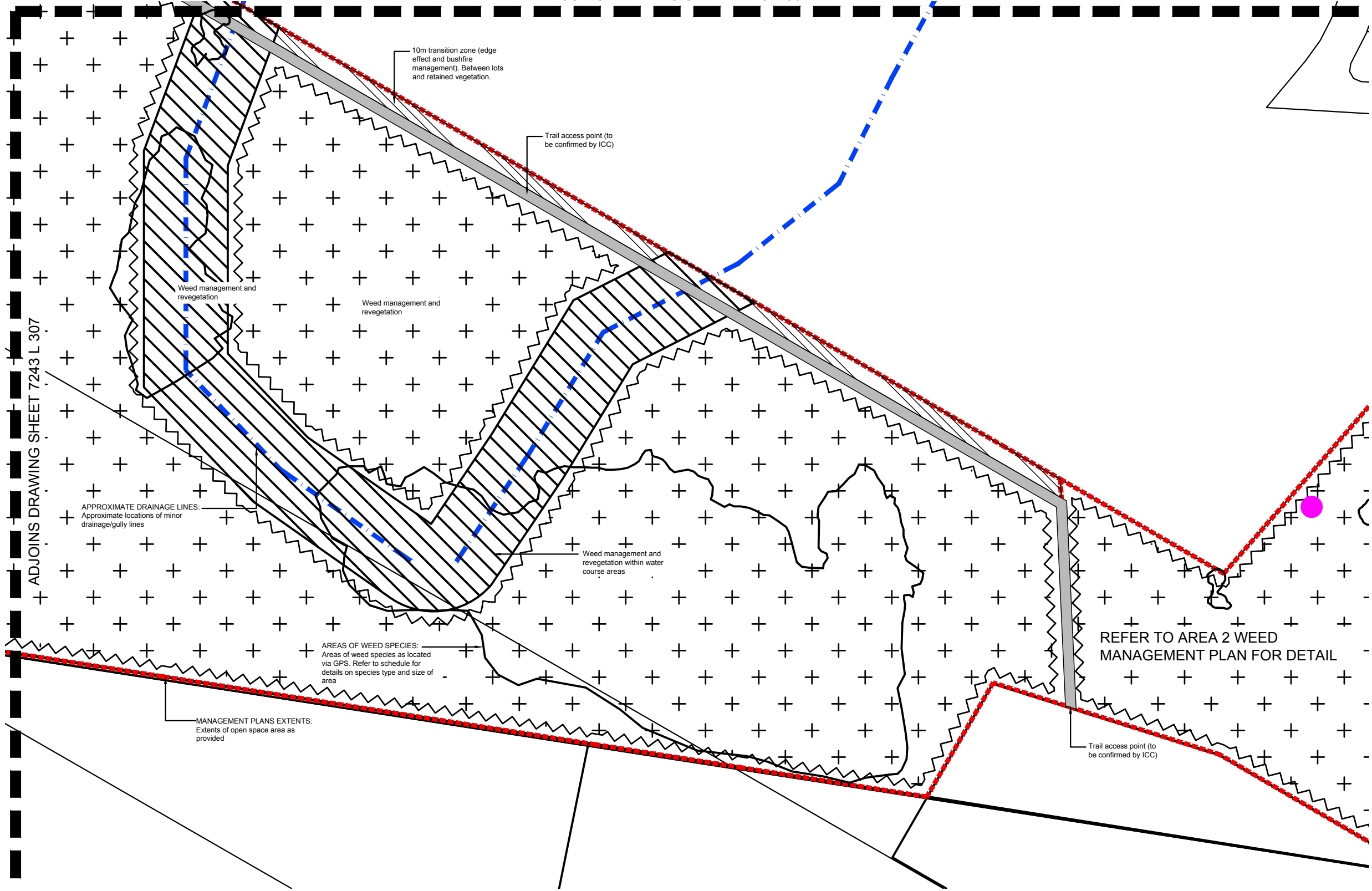
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landscape architecture
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 Weed Management - Sheet 5
 DATE: November 17 CHECKED: MS
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 DRAWING No.: 7243 L 307 WMP A

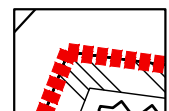


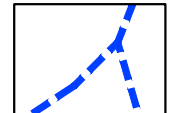


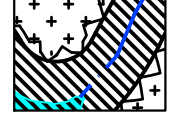
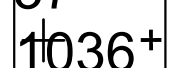
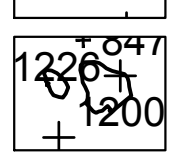
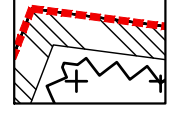
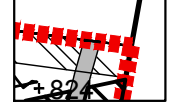
Spring Mountain Precinct

AREA 3 WEED MANAGEMENT PLAN

ADJOINS DRAWING SHEET 7243 L 304



LEGEND

-  Extent of management plan area
-  Existing fire trail / maintenance access. As provided by ICC in GIS & Refer to Council's Management Plan
-  Approximate minor drainage lines. Minor drainage / gully lines
-  Approximate mapped major drainage lines
-  Extent of existing lake area
-  Weed management and revegetation
-  Weed management and revegetation within water course areas
-  Individual weed species located via GPS
-  Area of weed species located via GPS
-  10m transition zone (Edge effect & bushfire management). Between lots and retained vegetation
-  Trail access point (To be confirmed by ICC)

ADJOINS DRAWING SHEET 7243 L 307

saunders havill group
 Saunders Havill Group Pty Ltd ABN 24 144 972 949
 Brisbane • Emerald • Gladstone
 head office 9 Thompson St Bowen Hills Q 4006
 phone 1300 123 SHG web www.saundershavill.com
 ■ surveying ■ town planning ■ urban design ■ environmental management ■ landscape architecture



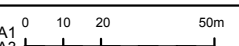
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APPROVED COMPANY ISO9001 Quality Management System
 APPROVED COMPANY ISO14001 Environmental Management System

AMENDMENTS:			
Issue	Date	Description	Checked
A	13/11/2017	Preliminary Issue	MS

CLIENT:
 PROJECT:
 Spring Mountain Precinct

SCALE: 1:1000@A1
 1:2000@A3



landscape architecture

DRAWING:
 Area 3 Management Plan
 Weed Management - Sheet 6

DATE: November 17 CHECKED: MS
 CLIENT REF.: 7243 DRAWN: TL
 DRAWING No.: 7243 L 308 WMP A

AREA 3 MANAGEMENT PLAN - TECHNICAL NOTES - GENERAL

NOTES

This Weed Management Plan links specific weed removal and management measures with spatial areas within the declared area included with this application. This Weed Management Plan covers the 71.73ha Area 3 portion of land previously dedicated by Springfield Land Corporation (SLC) to Ipswich City Council (ICC). The main objectives and action items for pest plants are detailed in Table 1 shown on this plan, with the objectives and actions for ecological restoration are detailed in Table 2.

WEED CONTROL PROGRAM TIMING

The primary stage of manual weed removal, treatment and disposal for the parkland dedication is programmed when all existing weeds are removed with secondary and maintenance weeding occurring for another 18 months (18 month program post on-maintenance).

Primary Weed Removal Stage - Consists of the initial weed removal / treatment of site weeds via the methods detailed within the South East Queensland Ecological Restoration Guidelines. Essentially involves the manual removal, stock piling and disposal and initial usage of prescribed herbicides. Additional notes below include:

- Implemented weed control method according to this plan.
- Weed trees located within 20M zone of the existing trail network are to be removed where trunk is cut down to ground level and vegetative matter removed.
- Program timing; primary weed removal phase is considered to be completed when all existing weeds within the stage for the declared area have been removed or treated. Both the secondary phase and the primary phase of weed removal can occur concurrently in different stage areas over time.
- A key map is to be provided logging the progress of areas from primary to secondary phases of weed removal and areas of rehabilitation as part of the reporting progress.

Secondary or Follow-up Weeding - for all areas will involve the quarterly inspection of areas having undergone Primary Weed Removal and treatment of infestations or outbreak as required. Additional notes below include:

- Implemented weed control method according to this plan.
- Weed trees located within 20M zone of the existing trail network are to be removed where trunk is cut down to ground level and vegetative matter removed.
- Program timing; primary weed removal phase is considered to be completed when all existing weeds within the declared area have been removed initially. Both the secondary phase and the primary phase of weed removal can occur concurrently in different work areas over time.
- A key map is to be provided logging the progress of areas from primary to secondary phases of weed removal and areas of rehabilitation as part of the reporting progress.

Maintenance Weeding Phase - final stage of weeding which occurs in areas where the majority of weeds have been removed and treated. Maintenance weeding continues to remove additional outbreaks but also allows for the fostering of natural regeneration and regrowth seedlings. Additional notes below include:

- Implemented weed control method according to this plan.
- Weed trees located within 20M zone of the existing trail network are to be removed where trunk is cut down to ground level and vegetative matter removed.
- Program timing; primary weed removal phase is considered to be completed when all existing weeds within the designated Park have been removed initially. Both the secondary phase and the primary phase of weed removal can occur concurrently in different work areas over time.
- A key map is to be provided logging the progress of areas from primary to secondary phases of weed removal and areas of rehabilitation as part of the reporting progress.

Revegetation occurs in two (2) distinct zones throughout the management area. Refer to Drawing sheets for a full description of proposed plant species, sizes, densities and numbers.

NATURAL REGENERATION

Applies:

- To relatively large, intact and weed-free areas of native vegetation.
- Where the native plants are healthy and capable of regenerating without human intervention.
- When native plant seed is stored in the soil or will be able to reach the site from nearby natural areas, by birds or other animals, wind or water.
- Where the plant community has a high potential for recovery after any short-lived disturbance, such as a fire or cyclonic winds.
- When preventative action is all that is required to avert on-going disturbance, e.g. erection of fencing to prevent intrusion from cattle.

Planting in such sites can work against the aims of restoration by interfering with natural regeneration.

The re-establishing plant community will be similar in structure, composition and diversity to the original vegetation.

ASSISTED NATURAL REGENERATION

Applies:

- To natural areas where the native plant community is largely healthy and functioning.
- When native plant seed is still stored in the soil or will be able to reach the site from nearby natural areas, by birds or other animals, wind or water.
- Where the natural regeneration processes (seedling germination, root suckering etc.) are being inhibited by external factors, such as weed invasion, soil compaction, cattle grazing, mechanical slashing etc.
- When limited human intervention, such as weed removal, minor amelioration of soil conditions, erection of fencing, cessation of slashing, etc. will be enough to trigger the recovery processes through natural regeneration.
- When major component is weed control.

Planting in such sites can work against the aims of restoration by interfering with natural regeneration.

The re-establishing plant community will be similar in structure, composition and diversity to the original vegetation.

TABLE 1: OBJECTIVES AND ACTION ITEMS FOR PEST PLANTS

Threats	Opportunities	Management action	Timeframe	Responsibility
<i>Objective: Protect, manage and enhance the diversity of native flora species and vegetation communities within the estate by controlling pest plants.</i>				
Insufficient monitoring of pest plants	Increased knowledge of pest plant abundance and distribution within the estate	Continue to develop and update the management plan for the estate to identify pest plants present and to recommend and prioritise control and monitoring actions	Annually	Saunders Havill Group (SHG)
Establishment of large infestations of pest plants	Pest plants are controlled effectively and in a way that ensures native vegetation regeneration	Include treating pest plants within the open space area to improve visitors experience to the estate	Ongoing	Contractor
Insufficient resourcing of pest plant control measures	Increased knowledge of pest plant responses to fire	Conduct follow up pest plant treatment after any fires within the estate	As required	Contractor
Lack of education of visitors and local residents as to the adverse impacts pest plants have on the natural environment	Improved public understanding and support for pest plant control	Provide material for public awareness (ie interpretative signage)	As required	Contractor

TABLE 2: OBJECTIVES AND ACTION ITEMS FOR ECOLOGICAL RESTORATION

Threats	Opportunities	Management action	Timeframe	Responsibility
<i>Objective: Protect, manage and enhance the significant habitat values and ecological processes found within the estate, so as to contribute positively to the conservation values of the local and regional area</i>				
Degraded vegetation communities have adverse impacts on other values within the estate, including native flora and fauna species, fire issues and aesthetics	Restore degraded native vegetation communities and minimise impacts associated with pest plants and animals and their control on native flora and fauna, cultural heritage sites, and landscapes within the estate	Prepare and issue a management plan to: <ul style="list-style-type: none"> - clearly prioritise actions and zones (eg. focus on declared and environmental pest plants and mapped biodiversity zones) - Divide the site into sub-zones which can be managed in a systematic and structured way - Align with the fire management plan as burns could provide ecological and economical efficiencies; reducing fuel loads at the same time as acting as a pest plant control - Lantana (especially) should be managed to reduce the fuel load, as this is a major fire hazard Incorporate training (eg. for relevant community groups) <ul style="list-style-type: none"> - Write the plan for the target audience working on the estate (eg. bushcare groups working in particular zones) 	Prior to commencement	Contractor
Pest plant infestations from high use areas may impact on adjacent ecological values	Improve the flora values within the open space area	As part of the site rehabilitation planning for the open space, a planting list of locally occurring plant species for use in rehabilitation is to be provided to enhance population viability where appropriate and possible. Include threatened and locally significant species in plantings.	Ongoing	Contractor
Trail creation, soil compaction and increased erosion	Restore natural habitats to increase the resilience of the estate	Refer to management plans for further detail	As required	Contractor
Pest plant introduction and spread	Decreased abundance of pest plants	Refer to management plans for further detail	As required	Contractor
Disturbance from pest animals	Decreased abundance of pest animals	Refer to management plans for further detail	As required	Contractor
Insufficient resourcing of restoration measures	Improved public understanding of and support	Refer to management plans for further detail	As required	Contractor
Insufficient data on the effectiveness of ecological restoration programs	The populations and diversity of near threatened, threatened or locally significant plant species are protected and enhanced	Refer to management plans for further detail	As required	Contractor

Spring Mountain Precinct

AREA 3 MANAGEMENT PLAN - WEED TREATMENT & REMOVAL STRATEGY

NOTE:

Species highlighted have been identified within the 'Springfield Wildlife Corridor Management Requirements' list which have specified removal and/or treatment techniques for Class 1 or 2 weeds. Environmental weeds and weeds of National Significance (WONS) Class 3 are to be:

- Remove dumped garden weeds from urban interface. Liaise with ICC Supervisor regarding ongoing Compliance issues.
- Lantana controlled within 20m of track edges (ie walking, shared and service).
- Strategic treatment of gully infestations staged from head of gullies downstream utilising cut stump method and chopping lantana into small (150mm) pieces. Areas to be determined by consultation with ICC.
- Assisted natural regeneration following removal including direct seeding utilising endemic seed from site. Follow up weed control by spot spraying emerging weeds in cleared areas or hand removal.

QUEENSLAND HERBARIUM INVASIVE NATURALISED PLANTS IN SOUTH EAST QUEENSLAND										
Rank	Family	Scientific and common names	Subregion	Rec. No.	Score	Life form & Source	Non-Chemical Control	Chemical Control		
1	Verbenaceae	Lantana camara var. camara (lantana)	10	455	5	S/O	Seedlings: Hand pull	Seedlings: CS&P (G1.5) Shubs: blanket spray G100 or cut down and spray regrowth G100 or splatter gun using 1 part G to 9 parts water - apply only when plant is growing, not dormant (ref 1).		
2	Asteraceae	Baccharis halimifolia (groundsel bush)	10	168	4.8	S/O	Cut stump prior to flowering	Shubs: CS&P or FI (G1). Seedlings: CS&P (G1.5) or spray G200 (ref 1).		
3	Crassulaceae	Bryophyllum delagoense (mother of millions)	8	38	4.9	H/O	Hand removed and bagged or larger infestations sprayed	Plantlets: spray G200 + MM or MM (ref 1).		
4	Bignoniaceae	Macfadaya unguis-cati (cat's claw creeper)	5	36	4.9	V/O	Tubers: crown or dig up, bag and remove.	Regrowth and tubelings: spray G100 + MM or F100 (ref 1).		
	Basellaceae	Anredera cordifolia (madeira vine)	8	16	4.9	V/O	Small Vines & Tubers: Hand pull Bag and dispose.	Ascending Stems: S&P (GU). Tubers: gouge, scrape and paint (GU). Ground infestations: spray G200 or G200 + MM (ref 1).		
6	Asparagaceae	Asparagus africanus (ornamental asparagus, asparagus fern)	7	26	4.9	V/O	dig out roots and dispose of at local council landfill site remove entire crown and underground stem to prevent regrowth	fluoxypyr (200 g/L) @ 35 mL per 1 L diesel/kerosene		
7	Ulmaceae	Celtis sinensis (Chinese celtis)	8	19	4.9	T/O	remove when small hand pull or dig out small seedlings combine dozing, burning and controlled grazing for large infestations	Stem injection, glyphosate (360 g/L) @ Unlimited at 1 mL per 2 cm of hole or cut		
8	Lauraceae	Cinnamomum camphora (camphor laurel)	7	25	4.8	T/O	Seedlings: Hand pull	Saplings: CS&P (G1.5). Trees: FI (G1 or G1.5) or C&P (G1.5 or GU for stems up to 8 diameter). Seedlings: spray G200 or G200 + MM Saplings: CS&P (G1.5). Trees: FI (G1.5). Seedlings: spray G200 (ref 1).		
9	Anacardiaceae	Schinus molle (broad-leaf pepper tree)	6	49	4.8	T/O	Seedlings: Hand pull	Aquatic areas, calcium dodecylbenzene sulphate (AF-100) @ 1 part to 19 parts kerosene, diquat (vegtrol) 50-100L/ha or 4L/100L water, diquat (water) 50-100L/ha or 4L/100L water, diquat (reglone) 5-10L/ha or 400mL + 150mL Agral / 100L water (see ref 2).		
	Salmiaceae	Salvinia molesta (salvinia)	8	57	4.9	Ha/F	Mechanical removal of small infestations. Salvinia weevil (Biological control)			
11	Cobombaceae	Cobombia caroliniana (cobomba, fanwort)	4	12	4.9	Ha/F	Mechanical removal of small infestations	2, 4-D N-Butyl Ester (Rubber Vine Spray) @ 12.5L/ML water (see ref 2 for application guide).		
12	Asteraceae	Chrysanthemoides monilifera subsp. rotundata (bitou bush)	3	23	4.9	S/OA	N/A	Stems: C&P or FI (G1.5). Bushes: spray or cut down and spray regrowth G100 or MM (ref 1).		
13	Porteriacae	Eichhornia crassipes (water hyacinth)	4	8	4.9	Ha/OF	Mechanical removal of small infestations	Waterways: 2, 4-D acid (AF 300) @ 1:200 with water. Aquatic Areas: glyphosate @ 1-1.3L/100L water (see ref 2 for application guide).		
14	Acanthaceae	Hypochaeris costata (Glush weed)	3	7	5	Ha/F	Hand pull small infestations. Can be controlled by planting competitive native species.	Glyphosate known to be effective. Species known to occur in waterways so EPA should be contacted before spraying (ref 4).		
	Oleaceae	Ligustrum lucidum (tree privet)	5	9	4.8	T/O	Seedlings: Hand pull	Saplings: CS&P or C&P (G1.5). Trees: FI (G1 or G1.5) or C&P GU for stems up to 8cm diameter. Seedlings: spray MM or G200 + MM if other weeds such as Lantana or Camphor Laurel are present (ref 1).		
16	Asteraceae	Sphagnetocola trilobata (Singapore daisy)	6	34	4.6	H/O	Hand pull	Spray MM or G200 or G200 + MM if other weeds such as Lantana or Camphor Laurel are present (ref 1).		
17	Asteraceae	Ageratina adenophora (croton weed)	6	38	4.6	H/O	Hand pull and hang to dry.			
18	Verbenaceae	Lantana montevidensis (creeping lantana)	8	62	4.8	S/O	Fire and/or mechanical control	Spray (march to may): glyphosate 1L/100L water; metsulfuron methyl 10g/100L water; metsulfuron methyls + glyphosate 173g/100L water; Basal bark (anytime): triclopyr 1L/60L Diesel, picloram + triclopyr @ 1L/60L Diesel. Glyphosate, neat application; Splatt		

19	Fabaceae	Neonotonia wightii (glycine)	5	16	4.7	H/A	N/A	Vines: CS&P (1.1.5) or spray G100 + MM or MM (ref 1). Spray: glyphosate @ 13mL/L water (ref 2).		
	Poaceae	Panicum maximum (green panic and guinea grass)	8	78	4.6	H/A	Hand or mechanical removal of small infestations			
21	Oleaceae	Ligustrum sinense (Chinese privet)	4	11	4.6	T/O	Seedlings: Hand pull	Saplings: CS&P or C&P (G1.5). Trees: FI (G1.5). Seedlings: spray MM or G200 + MM if other weeds such as Lantana or Camphor Laurel are present (ref 1).		
22	Ochnaceae	Ochna semialata (ochina)	7	33	4.5	S/O	N/A	Stems: CS&P or S&P or FI (G1.5). Seedlings and Regrowth: spray G200 + MM or MM. Tidal basal bark F100 or G200 + MM (ref 1).		
23	Asparagaceae	Asparagus aethiopicus cv Sprengeri (asparagus ground fern)	5	35	4.5	H/O	dig out unwanted plants and dispose of at the appropriate council landfill. remove the entire crown of underground stem of plant to prevent regrowth	Spot spray - metsulfuronmethyl (600 g/L) @ 10 g per 100 L water plus wetting agent or 100 g/ha plus wetting agent. Cut stump, spot spray. Apply neat Diesel		
24	Poaceae	Sporobolus pyramidalis and S. natalensis (giant rat's tail grasses)	8	72	4.8	H/U?	Seed heads cut and bagged, remaining leaves sprayed	Small infestations: spray glyphosate @ 15mL/L water, flupropate @ 2mL/L water + ionic wetter @ 1mL/L water. Dense infestations: blanket spraying glyphosate 3L/ha, flupropate 2L/ha (ref 2). Spray G100 or MM (ref 1).		
	Asteraceae	Ageratina riparia (mistflower)	5	38	4.6	H/O	Hand pull and hang to dry.			
26	Asclepiadaceae	Araujia sericifera (mothvine)	9	38	4.4	V/O	Seedlings & Vines: Hand pull. Bag and remove fruit.	Vines: CS&P (G1.5). Seedlings: spray G200 or G200 + MM or MM (ref 1).		
27	Crassulaceae	Bryophyllum daigremontianum x B. delagoense (hybrid mother-of-millions)	6	15	4.5	H/O	Hand pull and dispose	Plantlets: spray G200 + MM or MM (ref 1).		
28	Convolvulaceae	Ipomoea canina (mille-a-minute)	7	56	4.4	V/O	Vines & Runners: hand pull, roll up and hang up to dry.	Vines and Runners: CS&P (G1.5). Larger Stems, Roots and Nodes: spray G100 + MM (ref 1).		
29	Sapindaceae	Cardiospermum grandiflorum (balloon vine)	7	31	4.4	V/O	Seedlings & Small Vines: Hand Pull	Stems: CS&P (G1.5). Seedlings or Small vines: spray G200 or G200 + MM (ref 1).		
30	Asclepiadaceae	Cryptostegia grandiflora (rubber vine)	6	19	4.4	V/O	Scattered or medium-density infestations. Where possible, repeated slashing close to ground level is recommended.	Foliar spray - Follow-up basal bark/cut stump/foliar spray as necessary with Triclopyr + picloram (Grass DS, Grass-up, etc.) @ 0.35-0.5 L/100L water		
31	Phytolaccaceae	Rivina humilis (baby pepper)	8	61	4.3	H/O	Hand pull and hang to dry	Spray G100 (ref 1).		
32	Poaceae	Sporobolus africanus (Parramatta grass)	8	48	4.5	H/U	Hand or mechanical removal of small infestations	Small infestations: spray glyphosate @ 15mL/L water, flupropate @ 2mL/L water + ionic wetter @ 1mL/L water. Dense infestations: blanket spraying glyphosate 3L/ha, flupropate 2L/ha (ref 2).		
33	Poaceae	Sporobolus fertilis (giant Parramatta grass)	9	27	4.5	H/U	Hand or mechanical removal of small infestations	Small infestations: spray glyphosate @ 15mL/L water, flupropate @ 2mL/L water + ionic wetter @ 1mL/L water. Dense infestations: blanket spraying glyphosate 3L/ha, flupropate 2L/ha (ref 2).		
34	Poaceae	Eragrostis curvula (African lovegrass)	7	29	4.3	H/U	Chipped out before they flower. When chipping out the plant ensure that the tussock crowns are removed, as this will prevent regrowth. If in seed, the stems must be cut and bagged first, place plant material in a sealed plastic bag, leave in sunlight to rot then burn or dispose of at a council-approved land fill tip	Glyphosate (360 g/L) (e.g. Weedmaster® Duo) @ 10 ml/1 L water		
35	Asteraceae	Gymnocoronis spilanthoides (Senegal tea)	3	4	4.7	Ha/F		Glyphosate and metsulfuron-methyl @ 15mL/L water		

36	Amaranthaceae	Alternanthera phioxeroides (alligator weed)	1?	3	6	Ha/U	physical removal of plant should not be attempted	Terrestrial plants use Metsulfuron methyl (Brushoff®) + 1mL/L non-ionic wetter @ 80g/ha + 1mL/L non-ionic wetter or 10g/100L water + 1mL/L non-ionic wetter. Free floating plants Glyphosate (Roundup Biactive®) 10 mL/L		
37	Passifloraceae	Passiflora suberosa (cork passionflower)	8	166	4.2	V/O	N/A	Stems: CS&P. Seedlings & Regrowth: spray G200 or G200 + MM (ref 1).		
38	Poaceae	Melinis minutiflora (molasses grass)	5	17	4.5	H/A	Grazing or mowing	Spray: Fluazifop-P 212g/L @ 2L/ha. Glyphosate 360g/L @ 1L/100L water (ref 2).		
39	Aristolochiaceae	Aristolochia elegans (Dutchman's pipe)	8	30	4.3	V/O	Stems: Hand pull. Fruit: Bag and remove.	Stems: CS&P (G1.5). Seedlings: spray G200 or G200 + MM or MM (ref 1).		
40	Convolvulaceae	Ipomoea indica (blue morning glory)	5	24	4.3	V/O	Vines and Runners: hand pull, roll up and hang to dry.	Vines and Runners: CS&P (G1.5). Larger Stems, Roots and Nodes: spray G100 + MM or F150 (ref 1).		
41	Mimosaceae	Leucaena leucocephala (leucaena)	6	14	4.3	STA	Small plants: Hand pull or mechanical removal	Herbicide Control - Basal Bark application: triclopyr 240g/L + picloram 120g/L @ 1L/60L diesel, C&P: triclopyr 240g/L + picloram 120g/L @ 1L per 60L diesel, spray triclopyr 300g/L + picloram 120g/L @ 350mL per 100L water. Combination of chemical and mecha		
42	Poaceae	Bracharia mutica (para grass)	6	18	4.4	Ha/A	Grazing	Herbicide Control - Foliar application (Knapsack): glyphosate 360g/L @ 200mL/15L water; Foliar: glyphosate 360g/L @ 9L/ha; Handgun: glyphosate 360g/L @ 1.3L/100L water (ref 2).		
43	Hydrocharitaceae	Egeria densa (egeria waterweed)	2	7	4.4	Ha/F	hand pulling, cutting and digging with machines effective	N/A		
44	Pinaceae	Pinus elliotii (slash pine)	4	22	4.3	T/A	Seedlings: Hand pull. Saplings and Trees: cut close to ground or ring-bark	Saplings and Trees: FI (G1.5) ensuring thick bark is penetrated (ref 1).		
45	Caesalpiniaceae	Senna pendula var. glabrata (Easter cassia)	7	33	4.2	S/O	Seedlings: Hand pull	Shubs: CS&P or FI (G1.5). Seedlings: spray G200 or G200 + MM or MM, collect and bag seeds (ref 1). Spray: glyphosate @ 1L/100L water		
46	Poaceae	Chloris gayana (Rhodes grass)	9	55	4.3	H/A	Hand pulling and removal of larger clumps			
47	Crassulaceae	Bryophyllum pinnatum (resurrection plant)	6	17	4.2	H/O	Hand pull and dispose	Plantlets: spray G200 + MM or MM (ref 1).		
48	Asteraceae	Parthenium hysterophorus (parthenium weed)	6	14	4.2	H/U	hand pulling of small areas is not recommended	Spot spray 2,4-D amine 500 g/L @ 0.4 L/100 L		
49	Caprifoliaceae	Lonicera japonica (Japanese honeysuckle)	3	6	4.3	V/O	Vines and Runners: hand pull, roll up and hang to dry.	Vines and Runners: CS&P (G1.5). Larger Stems, Roots and Nodes: spray G100 + MM or MM (ref 1).		
50	Acanthaceae	Thunbergia alata (black eyed susan)	5	22	4.2	H/O	N/A	CS&P (G1.5). spray G200 or G200 + MM (ref 1).		
51	Fabaceae	Macroptilium atropurpureum (siratro)	8	39	4.2	V/A	N/A	Vines: CS&P (1.1.5) or spray G100 + MM or MM (ref 1).		
52	Rosaceae	Rubus ellipticus (yellowberry)	4	26	4.1	S/O	slashing hinders growth, giving some control if plants are slashed before they seed	Graz on DS picloram/triclopyr 1:200 parts water + wetting agent		
53	Colchicaceae	Gloriosa superba (glory lily)	3	26	4.1	V/O	N/A	Young Shoots: spray G200 or G200 + MM. Best results in Oct-Nov and by using 'Pulse' as surfactant (ref 1).		
54	Verbenaceae	Phyla canescens (lippia, Candamine couch)	3	4	4.2	Ha/O	a combined approach of different control methods including chemical and mechanical with land management practices is most effective	Foliar spray 600 g/L Dichlorprop @ 5 ml / 1 L water or 2,4-D amine (500 g/L) + 1% crop oil @ 2-4 L/ha + 1% crop oil		
55	Solanaceae	Solanum seaforthianum (Brazilian nightshade)	8	78	4	V/O	Hand pull	Spray G100 (ref 1).		
56	Araceae	Pistia stratiotes (water lettuce)	3	8	4.1	Ha/OF	Mechanical removal of small infestations	Glyphosate 360g/L @ 1-1.3L/100L water or 6 9L/ha; diquat 20g/L @ 4L/100L water or 50-100L/ha (see ref 2 for application guide).		
57	Asparagaceae	Asparagus plumosus (asparagus fern)	4	8	4.1	V/O	Rhizomes: crown and hang to dry.	Rhizomes: gouge and paint (G1.5). Stems: wind up and spray or cut high and low and spray regrowth G200 or G200 + MM (ref 1).		

saunders havill group Saunders Havill Group Pty Ltd ABN 24 144 972 949
 Brisbane • Emerald • Gladstone
 head office 9 Thompson St Bowen Hills Q 4006
 phone 1300 123 SHG web www.saundershavill.com
 surveying • town planning • urban design • environmental management • landscape architecture

40 YEARS 1975-2015

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APPROVED COMPANY ISO9001 Quality Management System
 APPROVED COMPANY ISO14001 Environmental Management System

AMENDMENTS:	Issue	Date	Description	Checked
	A	13/11/2017	Preliminary Issue	MS

CLIENT:	PROJECT:	SCALE:
	Spring Mountain Precinct	AS NOTED

landscape architecture

DRAWING: Area 3 Weed Management Plan Weed Management Techniques

DATE: November 17 CHECKED: MS
 CLIENT REF.: 7243 DRAWN: TL
 DRAWING No.: 7243 L 310 WMP A

Spring Mountain Precinct

AREA 3 MANAGEMENT PLAN - WEED TREATMENT & REMOVAL STRATEGY

Plant Family	Species Name	5	9	4.1	H/O	N/A	Treatment Strategy
58 Commelinaceae	Tradescantia fluminensis (Old use T. albiflora) (wandering jew)	5	9	4.1	H/O	N/A	Spray F150 (as per label) or G200 or G200 + MM. Collect and bag or roll and rake carefully. Dispose (ref 1)
59 Solanaceae	Cestrum parqui (green cestrum)	6	36	3.9	S/O	Seeds: Hand pull	Stems: CS&P (G1.5) or spray G100 (ref 1)
60 Caesalpinaceae	Senna septentrionalis (arsenic bush, was S. floribunda)	6	25	4	S/O	Seeds: Hand pull	Shrubs: CS&P or F/I (G1.5); Seedlings: spray G200 or G200 + MM or MM; collect and bag seeds (ref 1)
61 Solanaceae	Solanum mauritanum (wild tobacco tree)	8	30	4	S/O	Seeds: Hand pull	Shrubs: CS&P (G1.5) or F/I (G1.1.5); Seedlings: spray G200 (ref 1)
62 Apocynaceae	Catharanthus roseus (pink periwinkle)	5	22	4	S/O	Hand pull	Spray G100 (ref 1)
63 Passifloraceae	Passiflora subpeltata (white passion flower)	10	60	3.9	V/O	Stems: Hand pull	Stems: CS&P; Seedlings & Regrowth: spray G200 or G200 + MM (ref 1)
64 Fabaceae	Desmodium uncinatum (silverleaf desmodium)	5	14	4	H/A	Hand pull or crown and dispose	CS&P tuberous roots (G1.5); spray G200 or G200 + MM or MM, collect and bag seeds (ref 1)
65 Poaceae	Melinis repens (red Natal grass)	10	134	4.1	H/A	Grazing or mowing	Spray: Fluazifop-P 212g/L @ 2L/ha. Glyphosate 360g/L @ 1L/100L water (ref 2)
66 Nymphaeaceae	Nymphaea caerulea subsp. zanzibarensis (blue lotus)	4	17	4	Ha/OF	Hand pull small infestations.	Spray with or Diquat glyphosate. Occurs in waterways, thus EPA should be notified before any herbicide use (ref 5). Spray G100 (ref 1)
67 Onagraceae	Oenothera drummondii subsp. drummondii (beach evening primrose)	3	17	4	H/O	Hand pull	Spray G100 (ref 1)
68 Tiliaceae	Triumfetta rhomboides (Chinese burr)	7	44	4	H/U	Hand pull	Spray G100 (ref 1)
69 Haloragaceae	Mynophyllum aquaticum (parrot's feather)	3	15	4	Ha/F	N/A	Spray: glyphosate 360g/L @ 100mL/10L water (ref 1)
70 Passifloraceae	Passiflora foetida (stinking passion flower)	7	50	3.9	V/O	Hand Pull	CS&P (G1.5); spray G200 or G200 + MM (ref 1)
71 Asteraceae	Verbesina encelioides (crownbeard)	7	34	4	H/U	Vines: Hand pull and remove. Runners: Roll up and hang to dry.	Stems: S&P (GU); Regrowth and seedlings: spray G200 or G200 + MM (ref 1)
72 Poaceae	Paspalum mandiocanum (broad leaf paspalum)	3	6	4	H/A	N/A	Spray G200 - resistant to weaker strength (ref 1)
73 Poaceae	Paspalum dilatatum (paspalum grass)	10	30	3.9	H/A	Hand pull or dig up	Spray G100 (ref 1)
74 Ruppiaceae	Ruppia maritima (sea tassel)	2	8	4	Ha/F	Hand pull or dig up	Spray G100 (ref 1)
75 Arecaceae	Syagrus romanzoffiana (queen palm)	47	10	3.9	T/O	Seeds: Hand pull or crown; Trees: cut below growing point	Trees: F/I (G1.5); Seedlings: spray G200 + MM (ref 1)
76 Poaceae	Hymenachne amplexicaulis cv. Olive (hymenachne)	17	1	4	Ha/A	A combined approach of different control methods including mechanical, chemical and biological with land management practices is most effective	360 g/L Glyphosate (includes Roundup Biactive & Weedmaster Duo) - 1 L/100L water or 10 L/ha delivered by boom
77 Asteraceae	Senecio tamoides (Canary creeper)	3	8	4	V/O	Vines: Hand pull and remove. Runners: Roll up and hang to dry.	Stems: S&P (GU); Regrowth and seedlings: spray G200 or G200 + MM (ref 1)
78 Poaceae	Cenchrus ciliatus (buffel grass)	4	15	4.1	H/A	Hand or mechanical removal of young plants	Herbicide Control - Glyphosate 7mL/L water; Dichlobenil 600g/100m2; Fluazifop 50-100mL/10L water (ref 2)
79 Acanthaceae	Thunbergia grandiflora (thunbergia, blue thunbergia)	2	3	5?	V/O	N/A	CS&P (G1.5); spray G200 (ref 1)
80 Cactaceae	Opuntia tomentosa (velvet tree pear)	8	46	3.9	S/O	Hand removed, stem injected, or over sprayed with garlon	Spray: Basal Bark application: Injection: Triclopyr: 8L/60L diesel. Picloram + Triclopyr: 1L/60L diesel. Amitrole: 1mL/3cm (ref 3)
81 Euphorbiaceae	Ricinus communis (castor oil plant)	7	20	3.9	S/O	Seeds: Hand pull	Shrubs: S: CS&P or F/I (G1.5); Seedlings: spray G200 (ref 1)
82 Asteraceae	Senecio madagascariensis (fire weed)	6	26	3.8	H/U	Hand pulled and bagged	Stems: S&P (GU); Regrowth and seedlings: spray G200 or G200 + MM (ref 1)
83 Cyperaceae	Cyperus involucreatus (African sedge)	6	15	3.8	Ha/OF	Each has to be dug out with a spade and the entire plant turned over, exposing the root system while making sure all aerial parts of the plant are completely covered	Aquatic areas - Glyphosate-ipa Land-commercial/industrial, rights of way - Glyphosate-ipa, glyphosate-mas, mazapzyr
84 Asteraceae	Tithonia diversifolia (Mexican sunflower)	5	11	3.9	H/O	N/A	Stems: CS&P (G1.5) or cut and spray regrowth and seedlings (G100 or MM) (ref 1)
85 Poaceae	Setaria sphaeralata (South African pigeon grass)	9	41	3.8	H/A	Hand pull or dig up	Spray: G100 (ref 1)
86 Asclepiadaceae	Gomphocarpus physocarpus (balloon cotton bush)	10	132	3.7	S/O	Slash in winter and burn cuttings. W and/or Butterfly can also be used.	Spray: glyphosate @ 1.1000 with water, in spring before seeding (ref 3)
87 Poaceae	Digitaria didactyla (Queenland blue couch)	9	70	3.7	H/A	Hand pull or cultivation	Spot Spray: glyphosate or 2.2-DPA (ref 3)
88 Caesalpinaceae	Gleditsia triacanthos (honey locust)	7	12	3.8	T/O	For the control of dense infestations on grazing land, burning followed by spot spraying is an economical control method.	Hand pull or dig up
89 Poaceae	Paspalum notatum (bahia grass)	4	10	3.8	H/A	Hand pull or dig up	Spray G100 (ref 1)
90 Cactaceae	Opuntia monacantha (drooping tree pear, syn. O. vulgaris)	2	3	4	S/O	Hand removed, stem injected, or over sprayed with garlon	Spray: Basal Bark application: Injection: Triclopyr: 8L/60L diesel. Picloram + Triclopyr: 1L/60L diesel. Amitrole: 1mL/3cm (ref 3)
91 Poaceae	Paspalum conjugatum (paspalum grass)	7	36	3.8	H/A	Cut below crown.	Spot Spray: glyphosate or 2.2-DPA (ref 3)
92 Malpighiaceae	Hiptage benghalensis (hiptage)	3	5	4	S/V/O	Hand pull small infestations.	Seeds: Foliar spray of dicamba, fluoxypyr, and triclopyr/picloram. Larger plants cut stump application of fluoxypyr and triclopyr/picloram with diesel, glyphosate with water and picloram undiluted (ref 7)
93 Solanaceae	Solanum torvum (devil's fig)	6	29	3.9	S/O	Seeds: Hand pull	Shrubs: CS&P (G1.5) or F/I (G1.1.5); Seedlings: spray G200 (ref 1)
94 Caesalpinaceae	Caesalpinia decapetala (thorny poinciana)	4	20	3.9	S/V/O	Seed-heads: Bag and remove.	Stems: CS&P (G1.5); Seedlings: spray G200 or G200 + MM or MM (ref 1)
95 Poaceae	Pennisetum alopecuroides (swamp foxtail)	7	29	3.8	H/O	Hand Pull	Spot Spray: glyphosate or 2.2-DPA (ref 3)
96 Verbenaceae	Duranta erecta (duranta)	6	14	3.6	ST/O	Shrubs: CS&P (1.1.5)	Spray G100 (ref 1)
97 Brassicaceae	Nasturtium officinale (Old use Rorippa nasturtium-aquaticum) (watercress)	7	19	3.7	Ha/FU	Manually grub and destroy.	Spray G100 and replace with local species (ref 1)
98 Polygonaceae	Acalypha sagittata (rambling dock)	4	18	3.7	V/U	Tubers: Dig up, bag and remove.	Tubers: Spray G200 or G200 + MM or MM (ref 1)
99 Poaceae	Cynodon dactylon (couch)	10	45	3.6	H/OA	Hand pull small infestations, removing all roots or smother with mulch	Spray: glyphosate @ 200mL/15L water. Follow up spray (ref 3)
100 Bignoniaceae	Tecoma stans (yellow bells)	4	16	3.6	ST/O	N/A	Stems: CS&P (G1.5) or spray G200. Seeds: collect, bag and remove (ref 1)
101 Rosaceae	Rhaphiolepis indica (Indian Hawthorn)	3	10	3.5	ST/O	Seeds: Hand pull	Saplings: CS&P (G1.5); Trees: F/I (G1.5); Seedlings: spray G200 or G200 + MM or MM (ref 1)
102 Mimosaceae	Mimosa pudica (common sensitive plant)	4	12	3.7	S/A	N/A	Pastures - Fluoxypyr/Starane 200 @ 1.5 L/ha Between cropping applications (conservation tillage) - Dicamba/Bavel 200 @ 0.8-1.4 L/ha
103 Commelinaceae	Callisia fragrans (purple succulent)	3	9	3.9	H/O	N/A	Spray F100 or G200 or G200 + MM. Collect and bag or roll and rake carefully. Dispose (ref 1)
104 Scrophulariaceae	Pastinaca tomentosa (paolonia)	3	5	4	Ha/O	Seeds: Hand pull	Saplings: CS&P (G1.5); Trees: F/I (G1.5); Seedlings: spray G200 (ref 1)
105 Commelinaceae	Tradescantia zebrina (zebrina)	3	12	3.7	H/O	N/A	Spray F100 or G200 or G200 + MM. Collect and bag or roll and rake carefully. Dispose (ref 1)
106 Acanthaceae	Ruellia malacosepala (ruellia)	5	16	3.8	H/O	N/A	Spray G200 + MM (ref 1)
107 Poaceae	Pennisetum clandestinum (kikuyu grass)	4	12	3.8	H/A	Hand Pull	Spot Spray: glyphosate or 2.2-DPA (ref 3)
108 Liliaceae	Lilium formosanum (Taiwan Lily)	5	10	3.8	H/O	Hand pull or crown and dispose	Spray: G100 + MM or MM (ref 1)
109 Asteraceae	Sigesbeckia orientalis (Indian weed)	10	148	3.6	H/U	Hand pull or cultivation	Spray with 2.4-D amine or sodium, pr MCPA + dicamba (ref 3)
110 Asteraceae	Bidens pilosa (cobbler's pegs)	10	110	3.5	H/U	Hand pull or cultivation	Spray with 2.4-D amine or sodium, pr MCPA + dicamba (ref 3)
111 Cactaceae	Opuntia stricta (common prickly pear)	7	67	3.6	S/O	Hand removed, stem injected, or over sprayed with garlon	Spray: Basal Bark application: Injection: Triclopyr: 8L/60L diesel. Picloram + Triclopyr: 1L/60L diesel. Amitrole: 1mL/3cm (ref 3)
112 Poaceae	Eleusine indica (crowfoot grass)	8	56	3.5	H/A	Pull and chip. Replant with native couch.	Spray: glyphosate or 2.2-DPA (ref 3)
113 Poaceae	Axonopus compressus (broad leaved carpet grass)	5	23	3.6	Ha/O	Cut stems from roots.	Spot spray with Glyphosate (ref 3)
114 Lamiaceae	Salvia coccinea (red salvia)	9	46	4	H/O	remove small areas by hand or machine	Aquatic areas (drains, channels, margins of streams, lakes and dams) - calcium dodecylbenzene sulphonate (AF-100) @ 1 part in 19 parts kerosene
115 Asteraceae	Ageratum houstonianum (blue billygoat weed)	8	81	3.8	H/UO	N/A	Spray G100 or hand pull and spray regrowth G100 (ref 1)
116 Myrtaceae	Psidium guajava and P. guineense (yellow guava and West Indies guava)	4	7	3.7	ST/AO	N/A	Shrubs: CS&P or F/I (G1.5) or spray G200 + MM or MM. Trunk basal bark F100 or G200 + MM (ref 1)
117 Rosaceae	Rubus bellobatus (kittatinny blackberry)	5	22	3.5	S/O	slashing hinders growth, giving some control if plants are slashed before they seed	Grazon DS plicoram/triclopyr 1:200 parts water + wetting agent
118 Myrtaceae	Eugenia uniflora (Brazilian cherry)	4	19	3.5	ST/O	N/A	Stems: CS&P or F/I (G1.5); Bushes: spray or cut down and spray regrowth G100 or MM (ref 1)
119 Oleaceae	Olea europaea (olive)	2	6	47	T/A	Seeds: Hand pull	Trees: F/I (G1.5); Seedlings: spray G200 or G200 + MM (ref 1)
120 Poaceae	Bracharia decumbens (signal grass)	4	14	3.5	H/A	Grazing	Herbicide Control - Foliar application (Knapack): glyphosate 360g/L @ 200mL/15L water; Foliar: glyphosate 360g/L @ 9L/ha; Handgun: glyphosate 360g/L @ 1.3L/100L water (ref 2)
121 Fabaceae	Stylosanthes scabra (shrubby stylo)	4	4	4.3?	H/A	N/A	Vines: CS&P (1.1.5) or spray G100 + MM or MM (ref 1)
122 Commelinaceae	Commelina benghalensis (henry wandering jew)	4	7	3.5	H/O	Collect and Bag	Spray G200 or G200 + MM (ref 1)
123 Poaceae	Pennisetum purpureum (elephant grass)	2	9	3.5	H/O	Grazing or mechanical removal	N/A (ref 2)
124 Zingiberaceae	Hedychium coronarium (wild ginger)	2	2	3.5	H/O	Small Plants: Hand pull and dispose	Small Plants: spray G200 or G200 + MM. Large Plants: cut and spray regrowth. If rhizomes are at ground level, cut stem and gouge rhizome - fill hole with G1.5 with injector kit or similar (ref 1)
125 Phytolaccaceae	Phytolacca octandra (inkweed)	10	50	3.4	H/O	Hand pull or crown	CS&P (G1.5) or C&P (G1.5); spray G100 (ref 1)
126 Asclepiadaceae	Asclepias curassavica (red cotton bush)	9	43	3.4	S/O	Hand pull; Slash	Slash and/or spray G100 (ref 1)
127 Solanaceae	Lycium ferocissimum (African boxthorn)	17	5	4.4?	S/O	N/A	Stems: C&P (G1.5); Regrowth: spray G200 + MM (ref 1)
128 Mimosaceae	Prosopis pallida (algaroba)	2	2	4	ST/O	When using mechanical control methods, it is important to remove the bud zone of the root system (about 30 cm below the ground surface) if this is not removed, re-shooting can occur.	Basal bark - triclopyr + picloram Access@ @ 1L/60L diesel. Cut stump - triclopyr + picloram Access@ @ 1L/60L diesel. Overall spray - triclopyr + picloram Grazon DS@ @ 350ml/100L water plus a wetting agent if plant is growing actively
129 Juncaceae	Juncus articulatus (jointed rush)	1	2	4	Ha/FO	Hand pull.	Spot spray with Glyphosate, 2.2-DPA or MCPA + dicamba (ref 3)
130 Cactaceae	Opuntia aurantiaca (tiger pear)	1	2	4	S/O	Hand removed, stem injected, or over sprayed with garlon	Spray: Basal Bark application: Injection: Triclopyr: 8L/60L diesel. Picloram + Triclopyr: 1L/60L diesel. Amitrole: 1mL/3cm (ref 3)
131 Poaceae	Arundo donax (giant reed)	1	4	3.8	H/O	Physical removal of small infestations	Spot spray or cut stump and spray with Glyphosate (ref 5)
132 Cactaceae	Opuntia imbricata (rope pear)	1	1	4	H/O	Biological controls available: cactoblastis cactorum successful. Mechanical control difficult. Fire can be used.	Spray: Basal Bark application: Injection: Triclopyr: 8L/60L diesel. Picloram + Triclopyr: 1L/60L diesel. Amitrole: 1mL/3cm (ref 3)
133 Bignoniaceae	Pyrostegia venusta (flame vine)	1	1	4	V/O	N/A	CS&P (G1.5); spray G200 (ref 1)
134 Poaceae	Cortaderia selloana (pampas grass)	2	1	3.7	H/O	Small Plants: dig out by hand or machine	Stems: CS&P (G1.5) or cut back and slash and spray regrowth G100 (ref 1)
135 Solanaceae	Solanum hispidum (giant devil's fig)	5	23	3.6	S/O	Hand pull	Spray G100 (ref 1)
136 Agavaceae	Furcraea foetida (Cuban hemp)	3	4	4.3?	S/OA	Dig out by hand or machine	CS&P near ground or spray MM (ref 1)
137 Agavaceae	Furcraea selloa (hemp)	1	2	4?	S/OA	Dig out by hand or machine	CS&P near ground or spray MM (ref 1)
138 Agavaceae	Agave americana (century plant)	4	9	3.7	S/OA	Dig out by hand or machine	CS&P near ground or spray MM (ref 1)

saunders havill group
 Saunders Havill Group Pty Ltd ABN 24 144 972 949
 Brisbane • Emerald • Gladstone
 head office 9 Thompson St Bowen Hills Q 4006
 phone 1300 123 SHG web www.saundershavill.com
 surveying • town planning • urban design • environmental management • landscape architecture

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A	13/11/2017	Preliminary Issue	MS

CLIENT:
 PROJECT:
 Spring Mountain Precinct

SCALE:
 AS NOTED

landscape architecture

DRAWING:
 Area 3 Management Plan
 Weed Management Techniques

DATE: November 17 CHECKED: MS
 CLIENT REF.: 7243 DRAWN: TL
 DRAWING No.: 7243 L 311 WMP A

AREA 3 MANAGEMENT PLAN - WEED TREATMENT & REMOVAL STRATEGY

139	Rutaceae	Murraya paniculata cv. Exotica (murraya)	6	26	3.6	S/O	Seedlings: Hand pull	Shrubs: CS&P or F/I (G1.5); Seedlings: spray G200 (ref 1)
140	Rosaceae	Rubus discolor (R. fruticosus complex, a blackberry)	4	10	3.7	S/OA	slashing hinders growth, giving some control if plants are slashed before they seed	Grazon DS picloram/triclopyr 1:200 parts water + wetting agent. A variety of herbicides may be used to control this species including (ref 5)
141	Brassicaceae	Cakile edentula (American sea rocket)	4	24	3.7	H/U	Manually grub and destroy	Spray G100 and replace with local species (ref 1)
142	Balsaminaceae	Impatiens walleriana (balsam)	2	6	3.7	H/O	N/A	Spray G100 (ref 1)
143	Agavaceae	Agave sisalana (sisal)	2	4	3.7	S/OA	Dig out by hand or machine	CS&P near ground or spray MM (ref 1)
144	Agavaceae	Agave vivipara var. vivipara (sisal)	2	3	3.7	S/OA	Dig out by hand or machine	CS&P near ground or spray MM (ref 1)
145	Rosaceae	Prunus munsoniana (wild goose plum)	7	31	3.7	ST/A	Seedlings: Hand pull	Shrubs: CS&P or F/I (G1.5); Seedlings: spray G200 (ref 1)
146	Poaceae	Echinochloa crus-galli (barnyard grass)	6	34	3.7	H/A	Hand pull or dig out; small infestations	Spot spraying with Glyphosate or 2,2-DPA (ref 3)
147	Asteraceae	Solidago canadensis var. scabra (Canadian goldenrod)	7	15	4.7	H/O	Hand pull and hang to dry	Spray MM or G200 or G200 + MM if other weeds such as Lantana or Camphor Laurel are present (ref 1)
148	Fabaceae	Pueraria lobata (kudzu)	3	4	3.6	V/S/O	Slash, diminish by shading site	CS&P (G1.5) spray G200 or MM (ref 1)
149	Alismataceae	Sagittaria graminea var. platyphylla (sagittaria arrowhead)	3	7	3.5	Ha/FO	Physical removal of small infestations	Spot Spray with Glyphosate at 1.0L/100L water (ref 5)
150	Nymphaeaceae	Nymphaea mexicana (yellow waterlily)	2	4	3.7	Ha/OF	Hand pull small infestations	Spray with or Diquat Glyphosate. Occurs in waterways, thus EPA should be notified before any herbicide use (ref 5)
151	Poaceae	Phyllostachys aurea (fishpole bamboo)	1	2	3.7	S/O	N/A	Stems: cut and fill segment (G1.5). Regrowth: spray G100 (ref 1)
152	Euphorbiaceae	Jatropha gossypifolia (cotton-leaf physic nut, belly ache bush)	1	1	3.7	S/O	Hand pull	Spray G100 (ref 1)
153	Makaceae	Sida rhomboides (Paddy's lucerne)	9	69	3.6	S/U	Hand pull or dig out	Spray with 2,4-D amine or fluoxypyr (ref 3)
154	Poaceae	Themeda quadrivalvis (grader grass)	8	25	3.6	H/A	Hand pull or dig out; small infestations	Spot spraying with Glyphosate or 2,2-DPA (ref 3)
155	Poaceae	Andropogon virginicus (whisky grass)	6	14	3.6	H/A	Hand pull or dig out; small infestations	Spot spraying with Glyphosate or 2,2-DPA (ref 3)
156	Bignoniaceae	Jacaranda mimosifolia (jacaranda)	4	12	3.4	T/O	Seedlings: Hand pull	Saplings: CS&P (G1.5); Trees: F/I (G1.5); Seedlings: spray G200 (ref 1)
157	Acanthaceae	Justicia betonica (squirrel tail)	2	4	4	S/O	Hand pull small infestations. Can be controlled by planting competitive native species	Glyphosate known to be effective. Species known to occur in waterways. DERM should be contacted before spraying in waterways (ref 4)
158	Mimosaceae	Acacia boliviana (Bolivian wattle)	1	1	4	T/O	Mechanical or chain removal	Basal Bark or cut stump application. Triclopyr 600g/L at 1.0L/120L diesel. Triclopyr + Picloram 240 g/L + 120 g/L at 1.0L/60L diesel. Picloram 45 g/kg undiluted (ref 5)
159	Simaroubaceae	Ailanthus altissima (tree of heaven)	1?	3	3.5	T/O	Seedlings: Hand pull	Seedlings: CS&P (G1.5); Trees: F/I (G1.5); Seedlings: spray G200 or MM (ref 1)
160	Poaceae	Echinochloa colona (awnless barnyard grass)	9	44	3.3	H/A	Hand or mechanical removal of small infestations	Spray: glyphosate @ 13mL/1L water (ref 2)
161	Cyperaceae	Cyperus brevifolius (Mullumbimby couch)	8	53	3.4	H/O	Each has to be dug out with a spade and the entire plant turned over, exposing the root system while making sure all aerial parts of the plant are completely covered.	Aquatic areas - Glyphosate-pa Land - commercial/industrial, rights of way - Glyphosate-pa, glyphosate-ma, imazapyr
162	Moraceae	Morus alba (white mulberry)	3	10	3.4	T/O	N/A	Trees: F/I (G1.5), stack cut branches above the ground to dry. Saplings: CS&P (G1.5); Seedlings: spray G200 (ref 1)
163	Arecaceae	Colocasia esculenta (taro)	3	4	3.4	H/AO	Hand pull	Cut at base and apply glyphosate or metsulfuron methyl. Plant often occurs in waterways so consult DERM prior to application (ref 6)
164	Cannaceae	Canna indica (canna lily)	3	9	3.3	H/O	Dig out entire plant	Cut/Slash and spray regrowth G200 or G200 + MM. Collect and bag seeds. Resistant to herbicide (ref 1)
165	Buddlejaceae	Buddleja madagascariensis (buddleja)	5	6	3.4	S/V/O	N/A	Stems: CS&P (1.1.5); Vines: spray or cut down and spray regrowth G200 (ref 1)
166	Bignoniaceae	Tecoma capensis (Cape honeysuckle)	3	8	4	ST/O	N/A	Stems: CS&P (G1.5) or spray G200; Seeds: collect, bag and remove (ref 1)
167	Cactaceae	Hamsia martinii (hamsia cactus)	2?	4	4	S/O	The use of the biological mealy-bug agent is recommended	Triclopyr + picloram at 1.0L/60L diesel. Dichloroprop 600 g/L at 1.0L/60L water, metsulfuron methyl 600 g/L at 2.0L/100L water (ref 5)
168	Acanthaceae	Thunbergia laurifolia (laurel clock vine)	1	1	4	V/O	N/A	CS&P (G1.5) spray G200 (ref 1)
169	Fabaceae	Erythrina crista-galli (cockspur coral tree)	2?	4	3.5	T/O	N/A	F/I (G1.5) or C&P stumps. Cut and stack branches above ground to dry to prevent sprouting. F/I sprouted branches (G1.5) or spray regrowth G200 + MM or MM. Trial Tordon (ref 1)
170	Sapindaceae	Koelerutera elegans (Chinese rain tree)	1?	1	3.6?	T/O	Seedlings: Hand pull	Trees: F/I (G1.5) or C&P stumps (G1.5); Saplings: CS&P (G1); stack cut branches above ground to dry; Seedlings: spray (G200) (ref 1)
171	Zingiberaceae	Hedychium gardenianum (ginger lily)	1?	3	3.6	H/O	Small Plants: Hand pull and dispose	Small Plants: spray G200 or G200 + MM; Large Plants: cut and spray regrowth. If rhizomes are at ground level, cut stem and gouge rhizome - fill hole with G1.5 with injector kit or similar (ref 1)
172	Acanthaceae	Hypoestes phytostachya (polka-dot plant)	3	5	3.5	H/O	Hand pull or crown and dispose	Spray G200 or G200 + MM (ref 1)
173	Caprifoliaceae	Sambucus canadensis (American elder)	3	7	3.4	ST/O	Vines and Runners: hand pull, roll up and hang to dry	Vines and Runners: CS&P (G1.5). Larger Stems, Roots and Nodes: spray G100 + MM or MM (ref 1)
174	Asteraceae	Conyza sumatrensis (tail feebane)	9	45	3.3	H/U	Hand or mechanical removal of small infestations	Seedlings: Altrazine or Chlorsulfuron in combination with competitive native species; Plants: Glyphosate and Tordon 75-D mix. Glyphosate ratio depends on other weeds present (ref 2)
175	Fabaceae	Tipuana tipu (tipuana)	2	5	3.4	T/O	Seedlings: Hand pull	Saplings: CS&P (G1.5); Trees: F/I (G1.5); Seedlings: spray G200 (ref 1)
176	Asteraceae	Tageetes minuta (stinking roger)	8	32	3.3	H/U	Hand pull and hang to dry	Spray MM or G200 or G200 + MM if other weeds such as Lantana or Camphor Laurel are present (ref 1)
177	Caesalpiniaceae	Chamaecrista rotundifolia (round-leaf cassia)	6	14	3.3	ST/A	Seedlings: Hand pull	Shrubs: CS&P or F/I (G1.5); Seedlings: spray G200 or G200 + MM or MM, collect and bag seeds (ref 1)
178	Poaceae	Cenchrus echinatus (Mossman river grass)	8	43	3.3	H/A	Hand or mechanical removal of young plants	Herbicide Control - Glyphosate 7mL/L water, Dichlobenil 600g/100m2, Fluazifop 50-100mL/10L water (ref 2)
179	Asteraceae	Conyza canadensis (Canadian feebane)	10	55	3.3	H/U	Hand or mechanical removal of small infestations	Seedlings: Altrazine or Chlorsulfuron in combination with competitive native species; Plants: Glyphosate and Tordon 75-D mix. Glyphosate ratio depends on other weeds present (ref 2)
180	Euphorbiaceae	Euphorbia cyathophora (painted spurge)	8	20	3.3	H/O	Hand pull	Spray G100 (ref 1)
181	Poaceae	Setaria palmifolia (palm leaf setaria)	5	13	3.3	H/O	Hand pull or dig up	Spray G100 (ref 1)
182	Euphorbiaceae	Euphorbia heterophylla (milk weed)	5	12	3.4	H/O?	Hand pull	Spray G100 (ref 1)
183	Fabaceae	Desmodium intortum (greenleaf desmodium)	4	11	3.3	H/A	Hand pull or crown and dispose	CS&P tuberous roots (G1.5); spray G200 or G200 + MM or MM; collect and bag seeds; Monitor regrowth over 2 - 3 years (ref 1)
184	Poaceae	Pennisetum setaceum (fountain grass)	3	11	3.3	H/O	Hand Pull	Spot Spray: glyphosate or 2,2-DPA (ref 3)
185	Asteraceae	Conyza bonariensis (flax-leaf feebane)	7	38	3.3	H/U	Hand or mechanical removal of small infestations	Seedlings: Altrazine or Chlorsulfuron in combination with competitive native species; Plants: Glyphosate and Tordon 75-D mix. Glyphosate ratio depends on other weeds present (ref 2)
186	Solanaceae	Solanum elaeagnifolium (a tobacco bush)	7	19	3.2	S/O	Hand pull	Spray G100 (ref 1)
187	Poaceae	Slenotaphrum secundatum (buffalo grass)	3	23	3.2	H/AO	Hand or mechanical removal of small infestations	Spray: glyphosate @ 13mL/1L water (ref 2)
188	Apocynaceae	Cascabela thevetia (syn. Thevetia peruviana) (yellow oleander)	5	9	3.1	ST/O	Hand pull small infestations. Slashing can be used but should be followed up by herbicide application.	Basal bark application of fluoxypyr (35mL/1L Diesel); Stem injection Glyphosate (1L/2L Water); Cut stump application of fluoxypyr (1L/55L Diesel); Foliar Spray of fluoxypyr 1:100 for larger plants. 1:200 for seedlings (ref 2)
189	Rubiaceae	Coffea arabica (coffee)	3	7	3.2	ST/A	Saplings: Hand pull	Shrubs: F/I (G1) between flower and fruit set; Saplings: CS&P (G1); Seedlings: spray G200 or G200 + MM (ref 1)
190	Bignoniaceae	Spathodea campanulata (African tulip tree)	17	1	3.4	T/O	N/A	Saplings: CS&P (G1.5); Trees: F/I (G1.5); Seedlings: spray G200 (ref 1)
191	Fabaceae	Macrotylopa axillare (perennial horse gram)	4	12	3.1	V/HA	N/A	Vines: CS&P (1.1.5) or spray G100 + MM or MM (ref 1)
192	Indiaceae	Watsonia meriana var. bulbifera (bulbil watsonia)	2	3	3.1	H/O	Dig up, bag and remove	Spray G200 + MM (ref 1)
193	Passifloraceae	Passiflora edulis (passion fruit)	6	12	3.2	V/AO	Hand Pull	CS&P (G1.5), spray G200 or G200 + MM (ref 1)
194	Asteraceae	Zinnia peruviana (wild zinnia)	6	33	3.1	H/O	Seedlings: Hand pull	Shrubs: CS&P or F/I (G1); Seedlings: CS&P (G1.5) or spray G200 (ref 1)
195	Dracaenaceae	Sansevieria trispicata (sansevieria)	2?	7	3.1	H/O	Hand pull or dig up	Spray G100 + MM (ref 1)
196	Poaceae	Digitaria eriantha (pangola grass)	5	20	3.1	H/A	Hand pull or cultivation	Spot Spray: glyphosate or 2,2-DPA (ref 3)
197	Rosaceae	Enobotrya japonica (loquat)	3	5	3.1	T/O	Seedlings: Hand pull	Saplings: CS&P (G1.5); Trees: F/I (G1.5); Seedlings: spray G200 or G200 + MM or MM (ref 1)
198	Cactaceae	Acanthocereus tetragonus (sword pear)	1	1	3.3	S/O	Biological controls available, cactoblastis cactorum successful. Mechanical control difficult. Fire can be used.	Spray: Basal Bark application, Injection: Triclopyr: 8L/60L diesel, Picloram + Triclopyr: 1L/60L diesel, Amitrole: 1mL/3cm (ref 3)
199	Mimosaceae	Acacia nilotica subsp. indica (prickly acacia)	3	3	4.4?	T/A	Mechanical or chain removal	Basal Bark or cut stump application. Triclopyr 600g/L at 1.0L/120L diesel. Triclopyr + Picloram 240 g/L + 120 g/L at 1.0L/60L diesel. Picloram 45 g/kg undiluted (ref 5)
200	Mimosaceae	Acacia farnesiana (mimosa bush)	6	15	3.1	T/A	Mechanical removal of small plants	Basal Bark or cut stump application of Triclopyr + Picloram 240 g/L + 120 g/L at 1.0L/60L diesel. Foliar application of Clopyralid 300g/L at 500mL/1L water (ref 5)

Explanatory notes:
 Sub-region: Number of the ten sub-regions of the Southeast Queensland bioregion (Young and Dillewaard 1999) within which species recorded
 Rec no.: Total number of records for species within study area, Queensland Herbarium CORVEG and HERBRECS data
 Scores: Based on panel data of invasiveness, 5 (highest) to 3 (moderate). ? indicate doubtful scores.
 Life forms: T-tree (woody plant >5m), ST-small tree (2-5m), S-shrub (woody <2m), H-herb (grasses & forbes), Ha-aquatic herbs.
 Source: A-agriculture, O-ornamental and landscaping, F-fish aquarium, U-unintentional introduction and/or contaminant.

Abbreviations: Control Methods
 CS&P = cut scrape and paint
 S&P = scrape and paint
 C&P = cut and paint
 F/I = frill or inject stem

Abbreviations: Herbicides
 G = Glyphosate, eg Roundup Biactive, Weedmaster Duo
 MM = Metsulfuron methyl, eg Brushoff
 F = Fluoxypyr, eg Starane

Abbreviations: Herbicide Dilution Rates for High Concentration Applications
 GU = Glyphosate undiluted
 G1 = 1 part water to 1 part glyphosate
 G1.5 = 1.5 parts water to 1 part glyphosate
 G4 = 4 parts water to 1 part glyphosate

Abbreviations: Herbicide Spray Concentrations
 G100 = 100mL glyphosate per 10L of water + surfactant, eg 20mL LI 700 per 10L
 G200 = 200mL glyphosate per 10L of water + surfactant, eg 50mL LI 700 per 10L
 G100 + MM = 100mL glyphosate + 1.5g metsulfuron methyl per 10L of water + wetting agent, eg 2mL Agral per 10L water
 G200 + MM = 200mL glyphosate + 1.5g metsulfuron methyl per 10L of water + wetting agent, eg 2mL Agral per 10L water
 MM = 1.5g metsulfuron methyl per 10L water + wetting agent, eg 2mL Agral per 10L water
 F100 = 100mL fluoxypyr per 10L water
 F150 = 150mL fluoxypyr per 10L water

Other Abbreviations
 # = Locally non-indigenous native species
 Ref 1. Big Scrub Rainforest Landcare Group (2008). 'Common Weeds of Subtropical Rainforests of Eastern Australia: A practical manual on their
 Ref 2. Department of Primary Industries and Fisheries (QLD). 'Weeds and pest animals and ants'.
 Ref 3. Holland et al. (1996). 'Suburban Weeds', DPI QLD.
 Ref 4. Port Stephens Council (NSW). 'Weed Busters'.
 Ref 5. Department of Primary Industries (NSW). 'Noxious and Environmental Weed Handbook, 3rd Edition'.
 Ref 6. Department of Environment and Conservation, 'Florabase', (DEC: WA)
 Ref 7. Vitelli, J.S. and Madigan, B.A. and Van Haaren, P.E. and Setter, S. and Logan, P. (2009) Control of the invasive liana, Hiptage benghalensis. Weed Biology and Management, 9 (1), pp 54-62.

saunders havill group Saunders Havill Group Pty Ltd ABN 24 144 972 949
 Brisbane • Emerald • Gladstone
 head office 9 Thompson St Bowen Hills Q 4006
 phone 1300 123 5HG web www.saundershavill.com
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40 YEARS 1975-2015

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APPROVED COMPANY ISO 9001 Quality Management System
 APPROVED COMPANY ISO 14001 Environmental Management System

Issue	Date	Description	Checked
A	13/11/2017	Preliminary Issue	MS

CLIENT:
 PROJECT: Spring Mountain Precinct
 SCALE: AS NOTED

landscape architecture

DRAWING: Area 3 Management Plan Weed Management Techniques

DATE: November 17 CHECKED: MS
 CLIENT REF.: 7243 DRAWN: TL
 DRAWING No.: 7243 L 312 WMP A

Spring Mountain Precinct

AREA 3 MANAGEMENT PLAN - MONITORING & REPORTING

MONITORING & REPORTING

MONITORING AND REPORTING PROCEDURES

Monitoring and maintenance of the weed management and vegetation, both adjacent to proposed works and within the management area, is a vital component to the success of this management plan set.

An ongoing maintenance schedule, detailing the monitoring program, management intervals, methodologies, and corrective actions for contractors undertaking rehabilitation works within the ecological area is provided below. It is the responsibility of the rehabilitation landscape contractor to ensure the ongoing maintenance and monitoring schedule is actioned. Monitoring of the parkland weed management and revegetation works allows for:

- A review of the pre-established performance indicators for measuring the success of the weed removal and control;
- Ensure the level of protection for existing identified native vegetation inclusive of that which has naturally regenerated;
- Review the rate of spread or contraction of weed infestation within the control program;
- Monitor the rate of assisted regeneration and revegetation of desirable native species promoted in areas where weeds have been removed; and
- Identification of new weed threats or other factors which may be effecting areas designated for ecological rehabilitation.

Monitoring is required for weed eradication, revegetation and assisted regeneration.

MAINTENANCE ACTIONS AND METHODOLOGIES

Tree Retention - Construction Phase

- Ecologist / Arborist to assess tree exclusion zones are adhered to;
- Trees assessed for signs of stress or die back; and
- Implementation of VMP if retained tree roots Critical Root Zone (CRZ) is impacted upon.

Initial Establishment - Rehabilitation Planting

Initial 12 week establishment period applies to all rehabilitation planting works. During this period weekly maintenance is to occur that involves the following:

- Watering;
- Ongoing weed control;
- Fertilising; and
- Replacement of dead or damaged stock.

Ongoing Maintenance - Rehabilitation Planting

After this period, it is recommended that the ecological planting site be maintained on a monthly basis over a 5 year period to ensure that the planting has been successful. The following is to occur:

- Conduct weed spraying, plant watering, plant replacement of losses as necessary to maintain >95% survival rate;
- All other areas of non-use / limited access or steep terrain areas are to be hydro seeded to maintain a minimum 90% ground cover;
- All planting species will be disease free and supplied from an accredited nursery supplier;
- Assess condition of sediment control devices and replace if necessary; and
- Removal of excess sediment from erosion control devices as required.

MONITORING TIME FRAMES

For weed removal and revegetation three (3) Council determined timeframes form the anchor of the monitoring process. These include:

Council Pre-Start - On-site meeting prior to the initial commencement of work within each stage of weed management. Will involve Consultant, Contractor and Council to work through weed treatment areas and clarify works approved and appointed.

On-Maintenance - At the completion of the Primary Weed Removal Stage and Secondary weeding an On-Maintenance meeting will be held with Council to inspect the works on-site in relation to the approved plans and previously agreed on-maintenance criteria.

Off-Maintenance - At the completion of all site weeding works and the agreed maintenance timeframe a final inspection will be held by Council to determine if works have been completed to the required level for Council hand over.

REPORTING

Reporting to Ipswich City Council will occur on a yearly interval during the total period. Council will physically attend the Pre-Start, On-maintenance and Off-maintenance meetings. For this project it is recommended reporting include a short memo styled report responding to agreed criteria. As part of the monitoring a number of pre-determined transect and quadrant sampling sites have been allocated. At these locations a number of baseline studies have been completed and will be repeated post weed removal and maintenance to measure the success of the programmed works. It is also recommended this include a visual diary of imagery from selected locations at each inspection (Including the pre-start and monthly inspections). The imagery for the each period will be included with the report to Council.

In addition to the photo monitoring the biannual report to Council should include sufficient information on:

- Date, time and whether conditions at time of inspection
- Changes in weed extent populations (spreading / contracting)
- Changes in weed densities
- Health of existing vegetation protected by NRM provisions
- Rate of success for revegetation plantings
- Growth and PFC rate of assisted regeneration areas
- Occurrences of new weed infestations or species outbreaks
- Comments on any indirect changes to the area as a result of weed management (ie erosion / change in weed footprints / death to natives)
- Annual reporting is required to be sent to the Department of the Environment (DOE).

NOTES

MONITORING PARAMETERS

The monitoring should address the following issues:

- Maintained health and vigour of retained Remnant Trees adjacent to the corridor;
- Plant growth, percentage cover and survival rates;
- Plant losses through herbivores, disease, vandalism, storm damage or other factors;
- Weed re-growth and control measures;
- Plant replacement;
- Maintenance watering regime; and
- Erosion prevention.

It is also essential to keep an accurate photo record of the retained trees and progress of the rehabilitation planting by setting fixed photo monitoring points across the site. Photos should be taken by a digital camera and recorded in the project file by date and discrete photo monitoring point number. Photo monitoring point locations should be clearly marked on site and mapped by a surveyor or by GPS.

Corrective Actions

If trees adjacent to the sewer alignment disturbance are dying or impacted upon:

- Monitor construction activity;
- Educated construction team on tree retention measures;
- Review and / or respond to tree retention mitigation measures ie. exclusion zones;
- Review VMP for particular trees;
- Remove if necessary unsafe tree;
- Compensation by planting;
- If soil erosion is still occurring in planting zones the following is to occur:
- Review rehabilitation techniques conducted by contractor;
- Assess the potential for disturbance to occur;
- Assess other potential sources or causes of disturbances to occur; and
- Maintain planting regimes to a minimum of 95% survival rate.

If weed infestations occur in planting zones or in disturbed construction area, the following is to occur:

- Review weed removal and weed management techniques conducted by contractor;
- Assess the appropriate use and amounts of herbicides are being used;
- Assess the potential for weeds to occur; and
- Assess other potential sources or causes of weeds to occur.

If there is poor regeneration of plants occurring in ecological areas, the following is to occur:

- Review planting and direct seeding management techniques conducted by contractor;
- Assess the appropriate use and amounts of herbicides are being used in planting areas;
- Assess the potential for weeds to occur in ecological areas; and
- Assess other potential sources or causes of weeds or limited re-growth of native plants to occur, ie. plant pests and disease monitoring.

RESOURCES / ROLES & RESPONSIBILITIES

All resources required to implement this plan will be provided by the proponent (Lendlease). The following roles are applicable:

PROONENT

- Ensure all consultants, contractors, sub contractors or others utilizing the area are aware of the Weed Management Plan.
- Appoint appropriate consultants and contractors to undertake works as prescribed on the drawings and conditioned by Ipswich City Council.
- Cover the costs of all necessary resources to ensure works are completed as per the approved documents.

CONSULTANTS

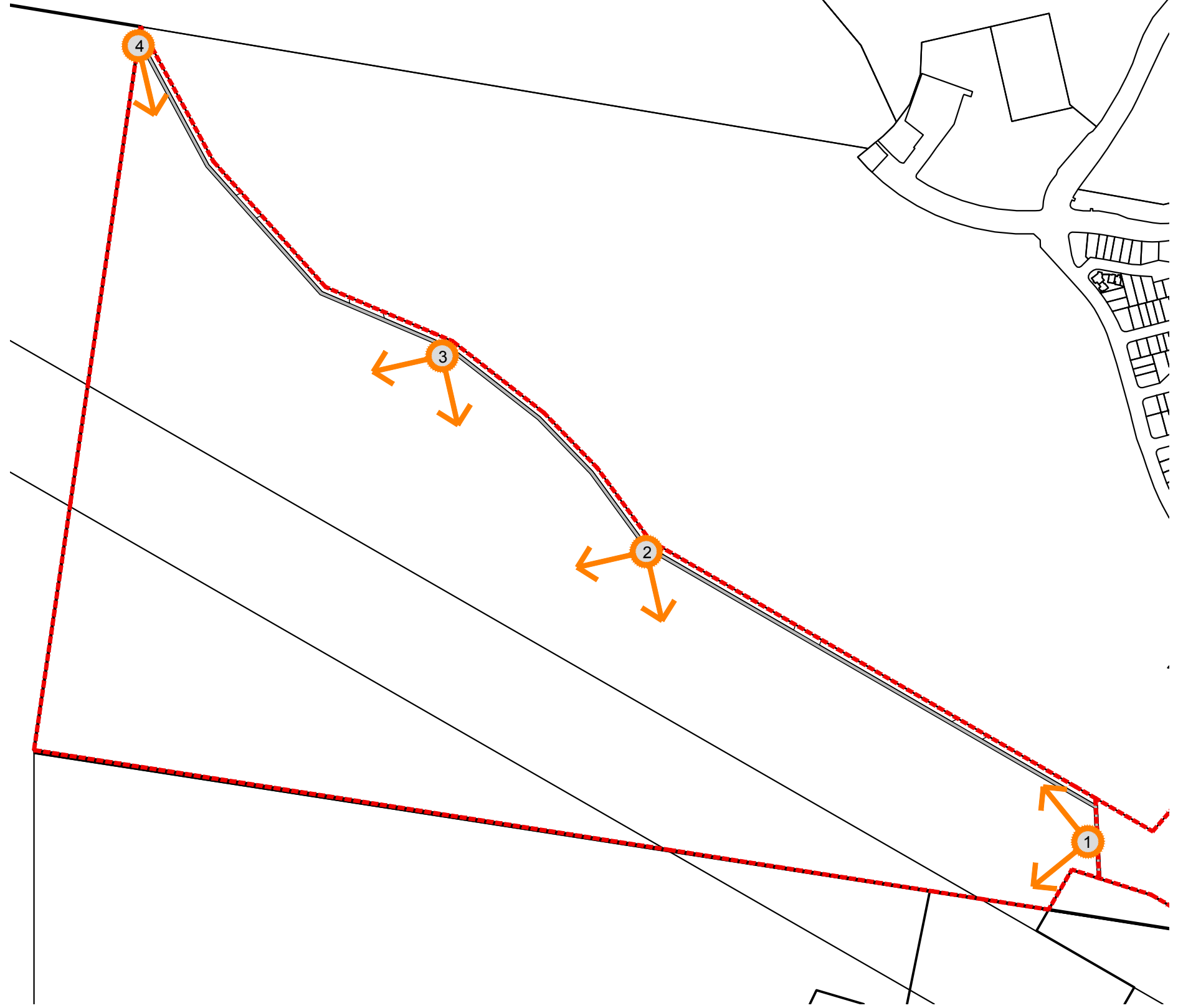
- Brief the proponent on their requirements in implementing and maintaining works as per the Weed Management Plan.
- Attend pre start, on maintenance and off maintenance meetings.
- Undertake monitoring and reporting to Ipswich City Council as set up by this document.
- Be available to respond to technical queries or departures to the approved documentation when on-site conditions require changes.
- Liaise with Council throughout all stages of approval, initial works and maintenance of works.

COUNCIL

- Provide technical expertise via commentary on the approval of documentation.
- Attend pre-start, on and off maintenance inspections.
- Undertake random inspections through the Secondary weed management and Maintenance weed management phases.
- Accept and review biannual reports as dictated in this document.

CONTRACTOR

- Complete works in strict accordance with the documentation.
- Recommend changes to the documentation when specific experience or on-site conditions require so.
- Attend pre-start, on and off maintenance inspections.



saunders havill group
 Saunders Havill Group Pty Ltd ABN 24 144 972 949
 Brisbane • Emerald • Gladstone
 head office 9 Thompson St Bowen Hills Q 4006
 phone 1300 123 SHG web www.saundershavill.com
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AMENDMENTS:			
Issue	Date	Description	Checked
A	13/11/2017	Preliminary Issue	MS

CLIENT:	
PROJECT:	Spring Mountain Precinct
SCALE:	NOT TO SCALE

landscape architecture

DRAWING:
 Area 3 Weed Management Plan
 Monitoring & Reporting

DATE: November 17	CHECKED: MS
CLIENT REF.: 7243	DRAWN: TL
DRAWING No.: 7243 L 313 WMP A	

Spring Mountain Precinct

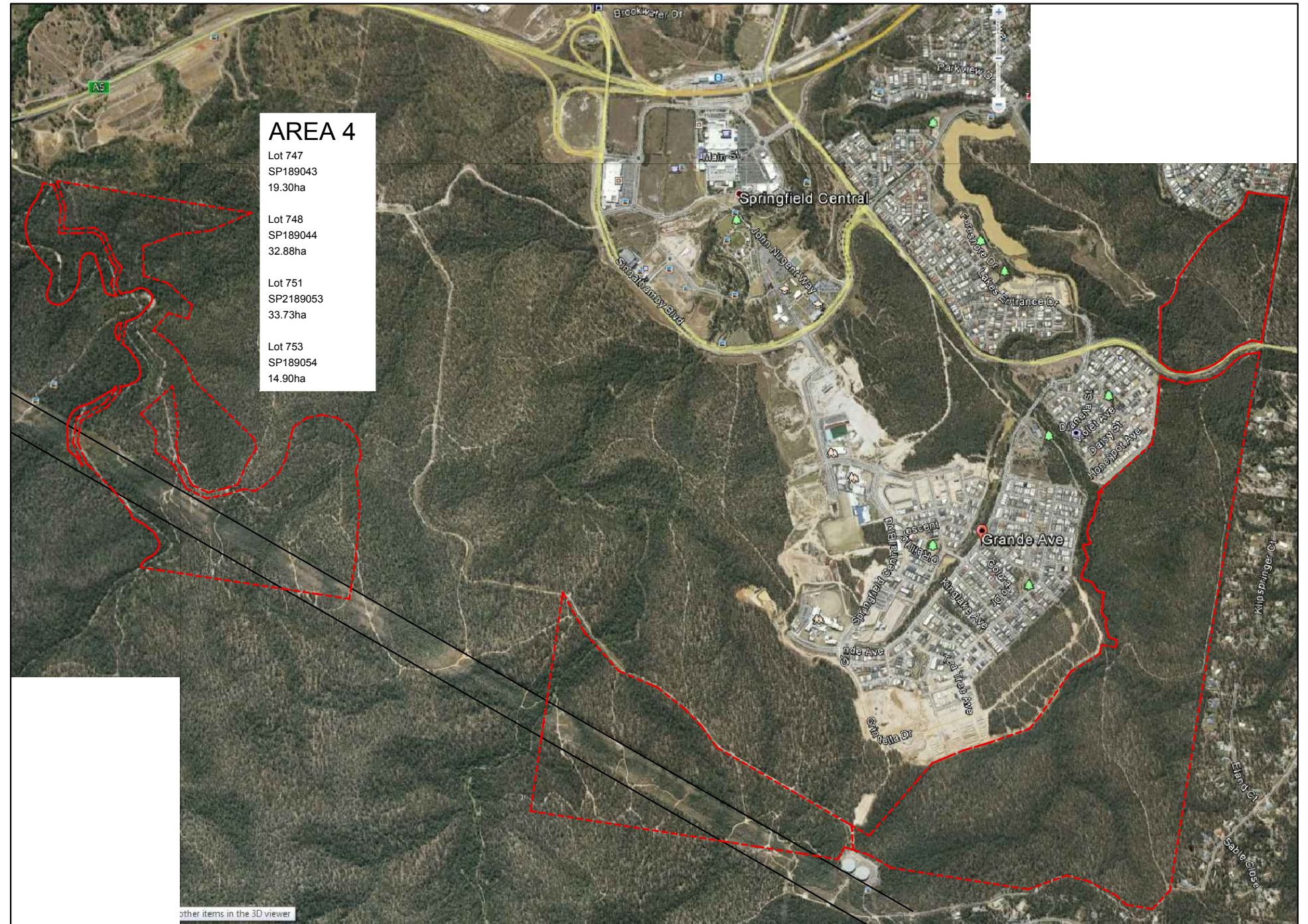
AREA 4 WEED MANAGEMENT



ISSUE A 13.11.2017
PRELIMINARY ISSUE

DRAWING SCHEDULE

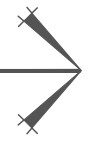
Dwg No.	Drawing Title	Issue	Date
7243 L 401	Weed Management Plan - Cover Sheet	A	13/11/2017
7243 L 402	Weed Management Plan - Introduction	A	13/11/2017
7243 L 403	Weed Management Plan - Sheet 1	A	13/11/2017
7243 L 404	Weed Management Plan - Sheet 2	A	13/11/2017
7243 L 405	Weed Management Plan - Sheet 3	A	13/11/2017
7243 L 406	Weed Management Plan - Sheet 4	A	13/11/2017
7243 L 407	Weed Management Plan - Sheet 5	A	13/11/2017
7243 L 408	Weed Management Plan - Sheet 6	A	13/11/2017
7243 L 409	Weed Management Plan - Sheet 7	A	13/11/2017
7243 L 410	Weed Management Plan - Sheet 8	A	13/11/2017
7243 L 411	Weed Management Plan - Sheet 9	A	13/11/2017
7243 L 412	Weed Management Plan - Sheet 10	A	13/11/2017
7243 L 413	Weed Management Plan - Technical Notes	A	13/11/2017
7243 L 414	Weed Management Plan - Treatment Techniques	A	13/11/2017
7243 L 415	Weed Management Plan - Treatment Techniques	A	13/11/2017
7243 L 416	Weed Management Plan - Treatment Techniques	A	13/11/2017
7243 L 417	Weed Management Plan - Monitoring & Reporting	A	13/11/2017



AMENDMENTS:			
Issue	Date	Description	Checked
A	13/11/2017	Preliminary Issue	MS

CLIENT:	
PROJECT:	Spring Mountain Precinct
SCALE:	AS NOTED

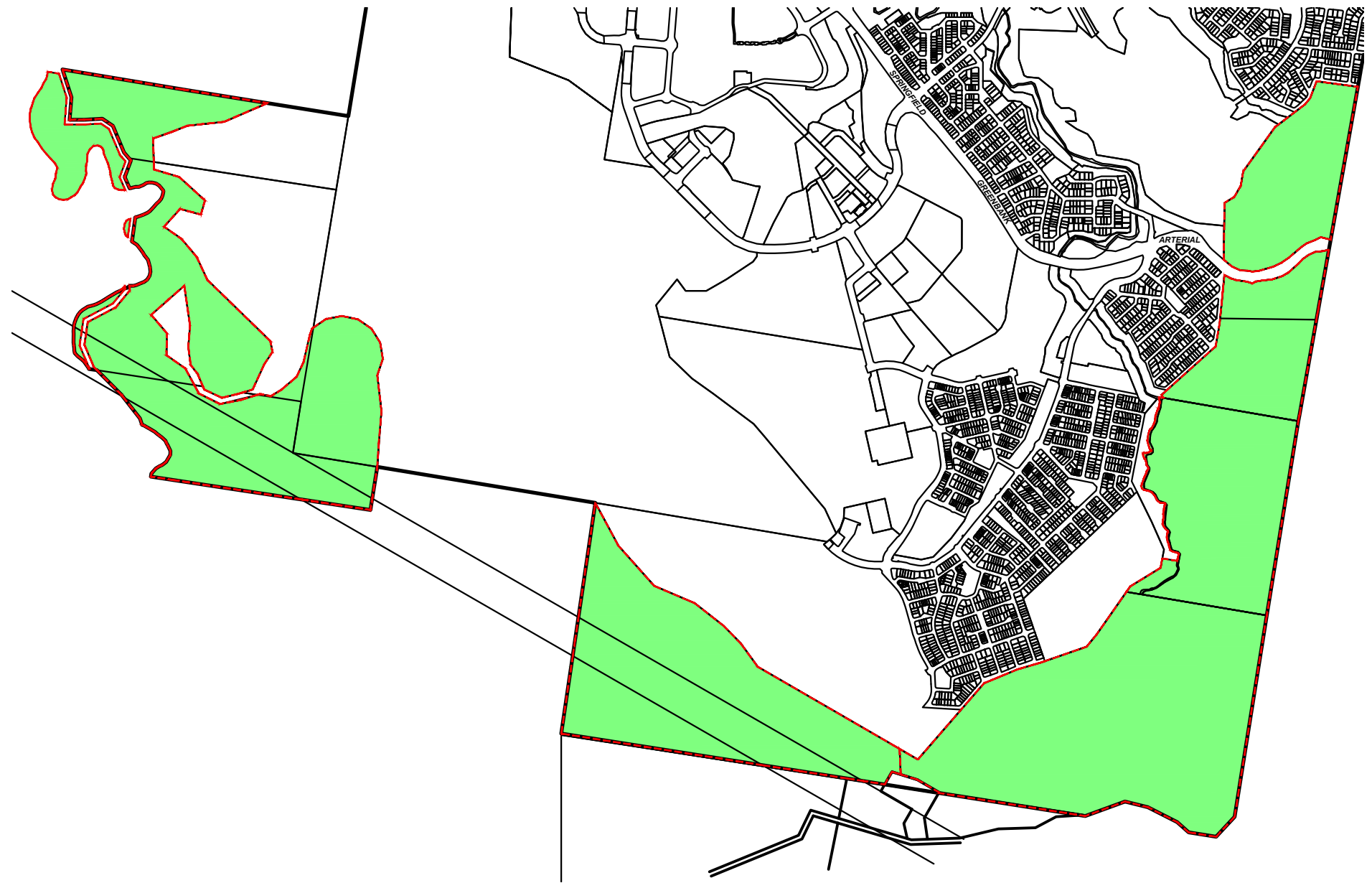
AREA 4 MANAGEMENT PLAN - WEED TREATMENT & REHABILITATION



INTRODUCTION

NOTES

This Weed Management Plan

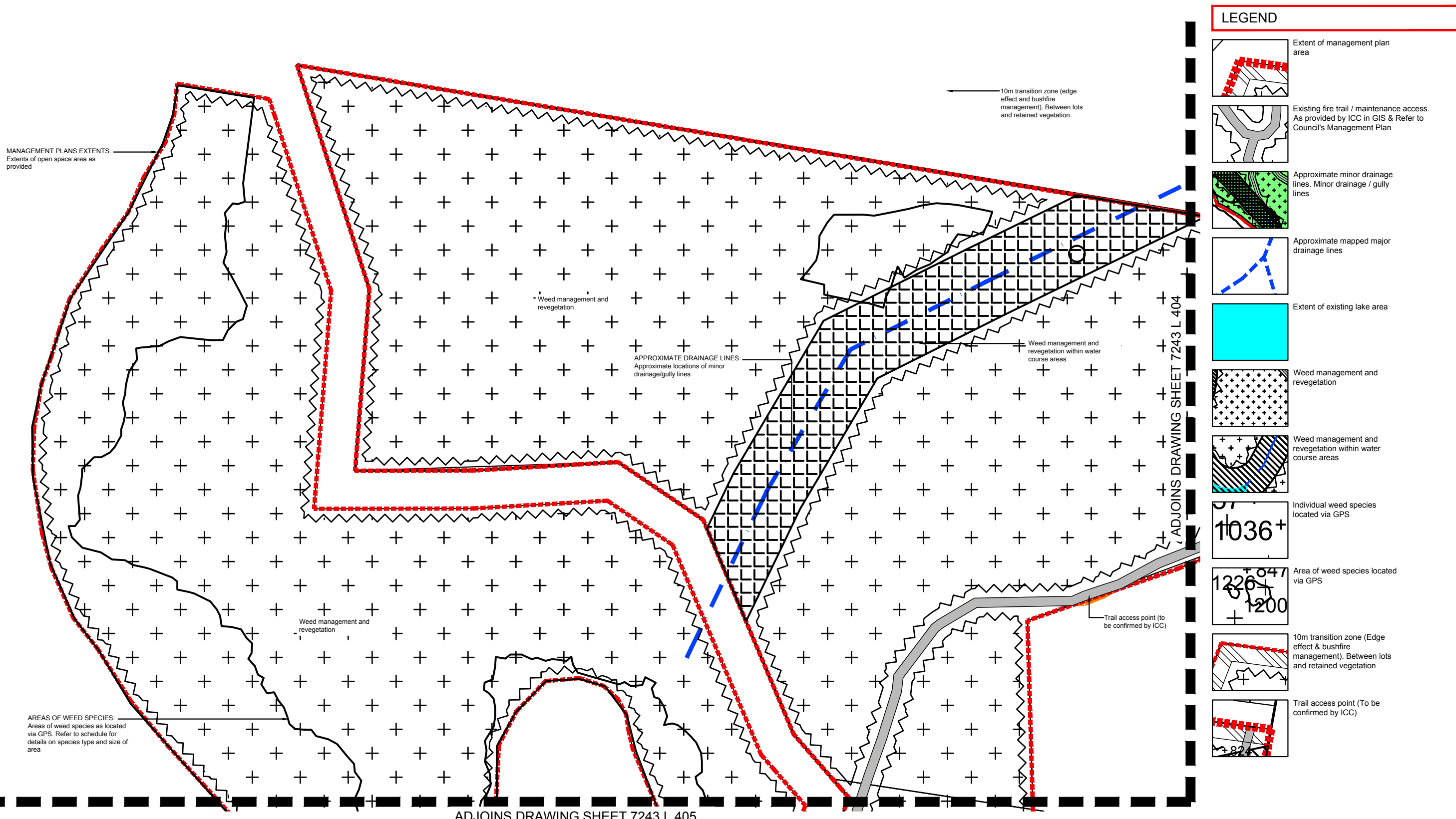


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Spring Mountain Precinct

AREA 4 WEED MANAGEMENT PLAN



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 Saunders Havill Group Pty Ltd ABN 24 144 972 949
 Brisbane • Emerald • Gladstone
 head office 9 Thompson St Bowen Hills Q 4006
 phone 1300 123 SHG web www.saundershavill.com
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AMENDMENTS:

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A	13/11/2017	Preliminary Issue	MS

CLIENT:

PROJECT:
Spring Mountain Precinct

SCALE: 1:1000@A1
1:2000@A3

landscape architecture

DRAWING:
Area 4 Management Plan
Weed Management - Sheet 1

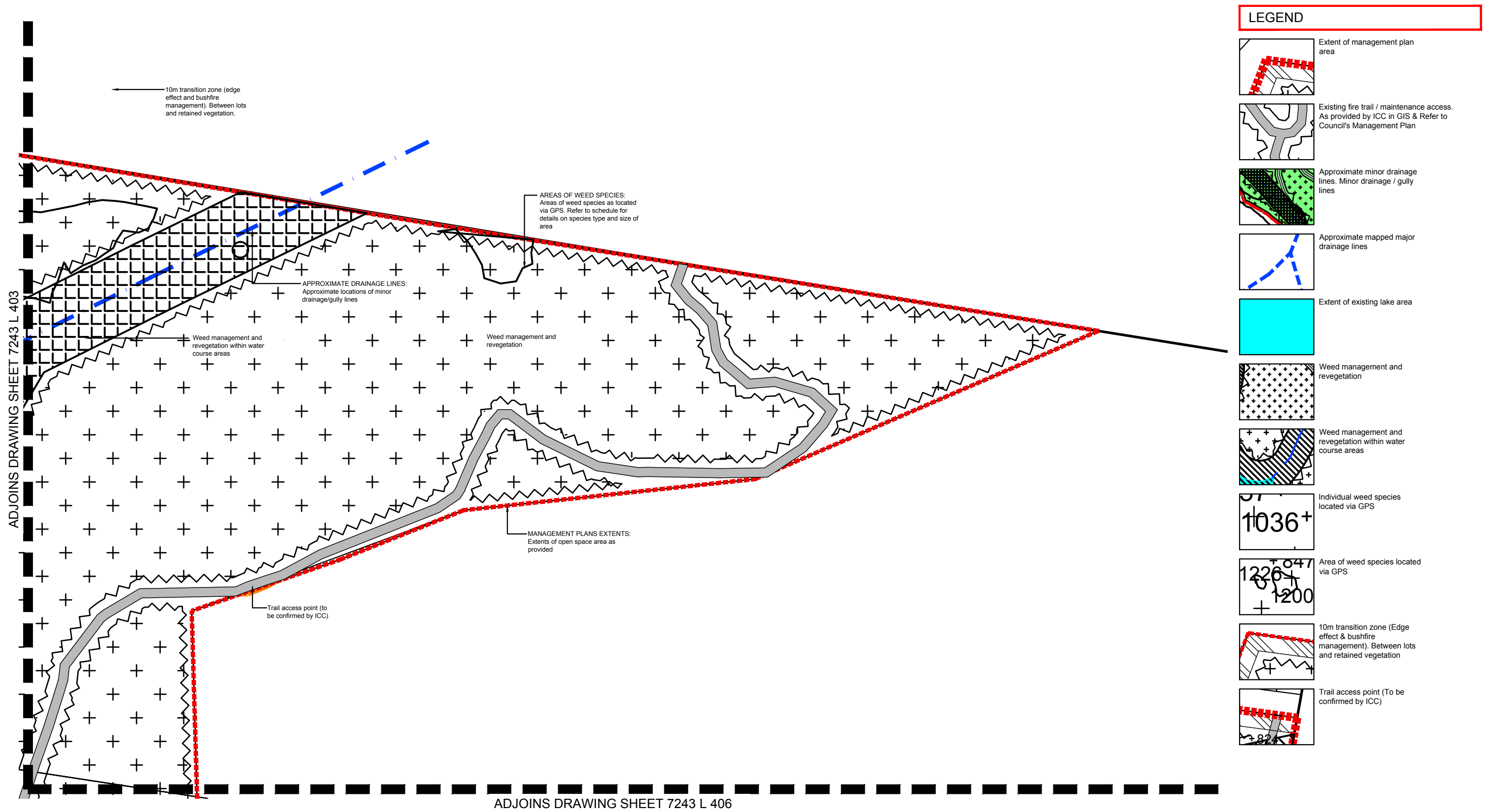
DATE: November 17
CHECKED: MS

CLIENT REF.: 7243
DRAWN: TL




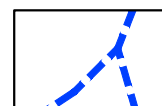



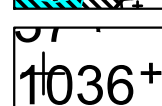

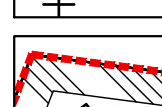

DRAWING No.: 7243 L 403 WMP A

Spring Mountain Precinct

AREA 4 WEED MANAGEMENT PLAN



LEGEND

-  Extent of management plan area
-  Existing fire trail / maintenance access. As provided by ICC in GIS & Refer to Council's Management Plan
-  Approximate minor drainage lines. Minor drainage / gully lines
-  Approximate mapped major drainage lines
-  Extent of existing lake area
-  Weed management and revegetation
-  Weed management and revegetation within water course areas
-  Individual weed species located via GPS
-  Area of weed species located via GPS
-  10m transition zone (Edge effect & bushfire management). Between lots and retained vegetation
-  Trail access point (To be confirmed by ICC)

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40 YEARS
 1975-2015

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 APPROVED COMPANY
 ISO14001 Environmental Management System

AMENDMENTS:			
Issue	Date	Description	Checked
A	13/11/2017	Preliminary Issue	MS

CLIENT: _____
 PROJECT: Spring Mountain Precinct
 SCALE: 1:1000@A1
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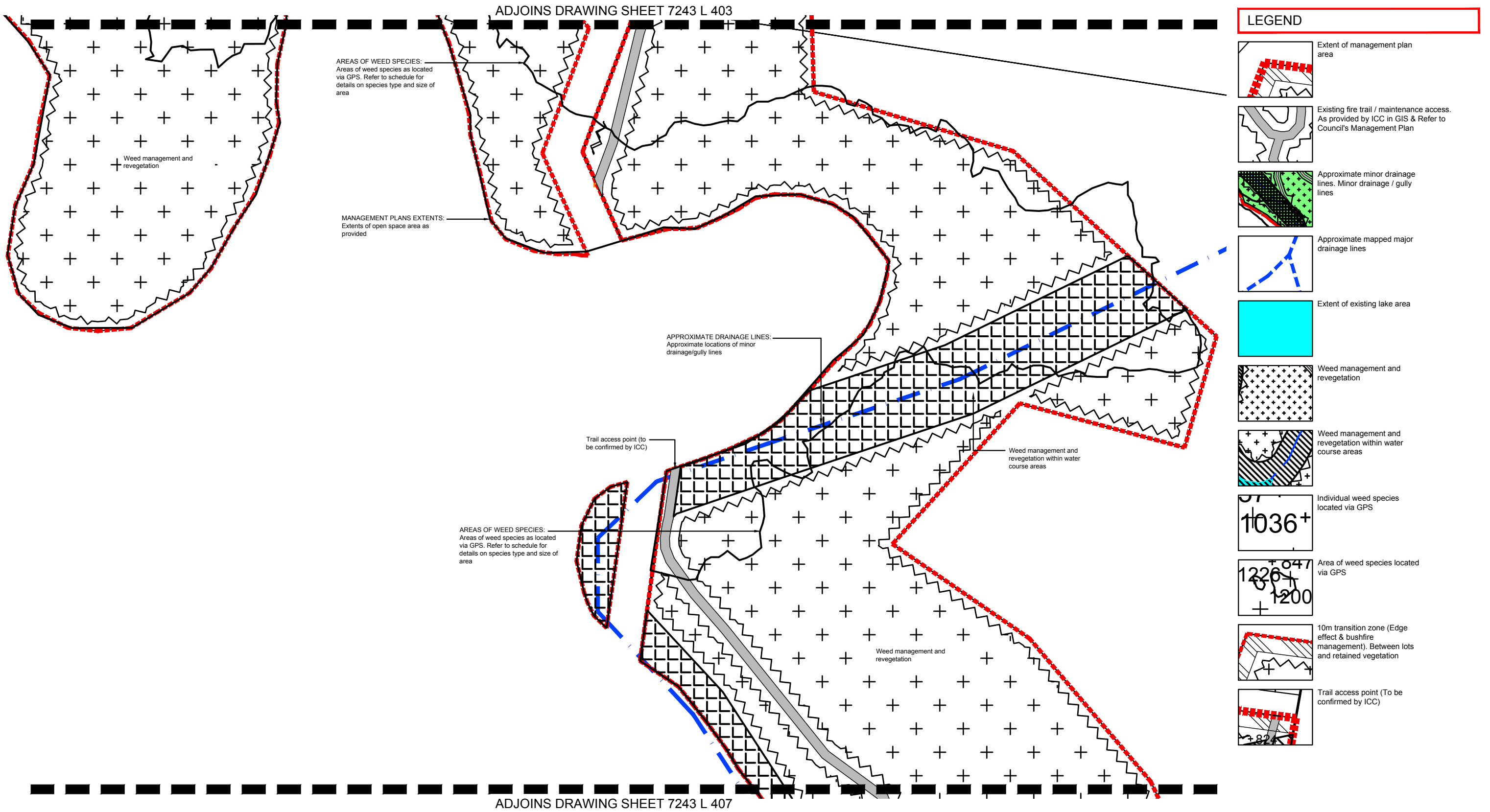
landscape architecture

DRAWING: Area 4 Management Plan
 Weed Management - Sheet 2




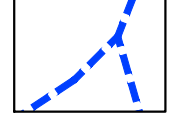

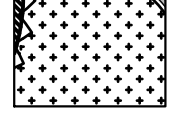
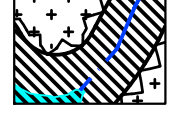
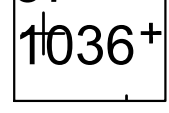
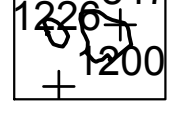
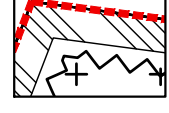
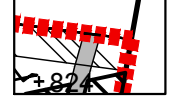
DATE: November 17 CHECKED: MS
 CLIENT REF.: 7243 DRAWN: TL
 DRAWING No.: 7243 L 404 WMP A

Spring Mountain Precinct

AREA 4 WEED MANAGEMENT PLAN



LEGEND

-  Extent of management plan area
-  Existing fire trail / maintenance access. As provided by ICC in GIS & Refer to Council's Management Plan
-  Approximate minor drainage lines. Minor drainage / gully lines
-  Approximate mapped major drainage lines
-  Extent of existing lake area
-  Weed management and revegetation
-  Weed management and revegetation within water course areas
-  Individual weed species located via GPS
-  Area of weed species located via GPS
-  10m transition zone (Edge effect & bushfire management). Between lots and retained vegetation
-  Trail access point (To be confirmed by ICC)

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A	13/11/2017	Preliminary Issue	MS

CLIENT: _____
 PROJECT: Spring Mountain Precinct
 SCALE: 1:1000@A1 0 10 20 50m
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landscape architecture

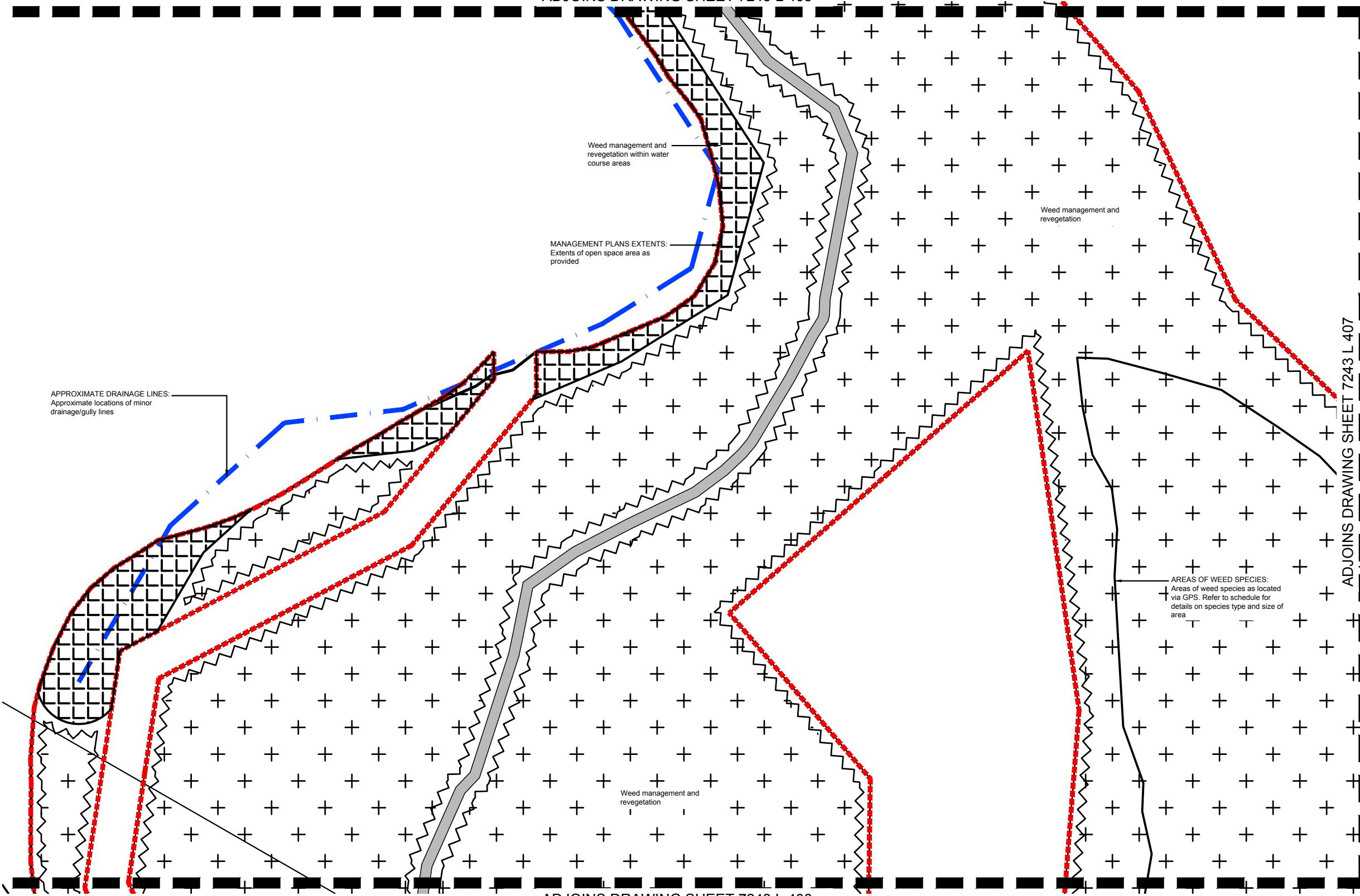
DRAWING: Area 4 Management Plan
 Weed Management - Sheet 3

DATE: November 17 CHECKED: MS
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 DRAWING No.: 7243 L 405 WMP A

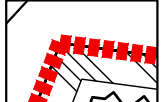


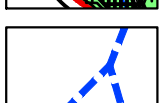


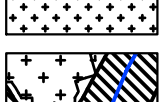

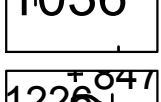
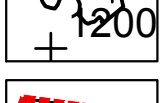

Spring Mountain Precinct

AREA 4 WEED MANAGEMENT PLAN

ADJOINS DRAWING SHEET 7243 L 405



LEGEND

-  Extent of management plan area
-  Existing fire trail / maintenance access. As provided by ICC in GIS & Refer to Council's Management Plan
-  Approximate minor drainage lines. Minor drainage / gully lines
-  Approximate mapped major drainage lines
-  Extent of existing lake area
-  Weed management and revegetation
-  Weed management and revegetation within water course areas
-  Individual weed species located via GPS
-  Area of weed species located via GPS
-  10m transition zone (Edge effect & bushfire management). Between lots and retained vegetation
-  Trail access point (To be confirmed by ICC)

ADJOINS DRAWING SHEET 7243 L 408

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A	13/11/2017	Preliminary Issue	MS

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PROJECT:	Spring Mountain Precinct
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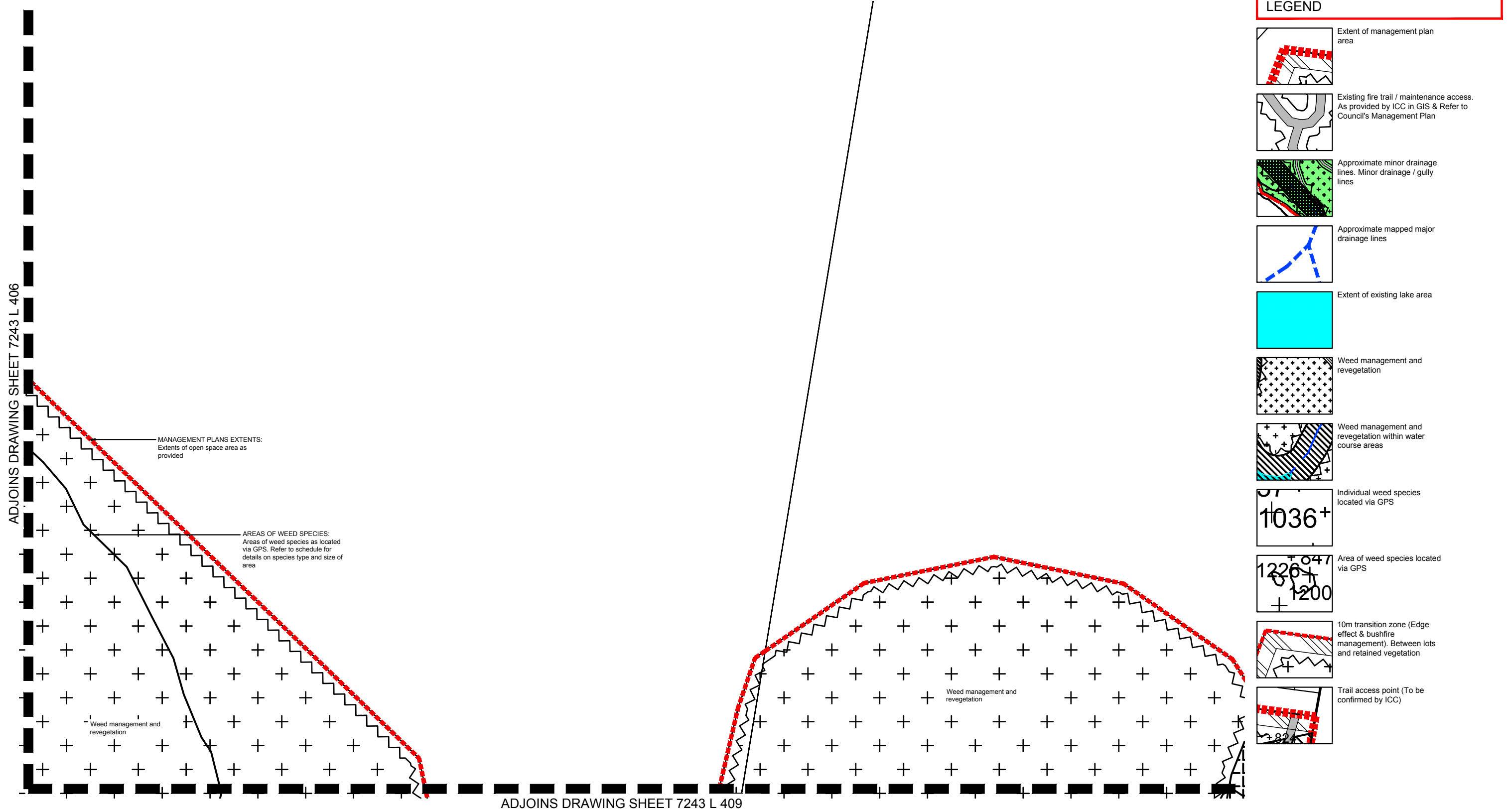
landscape architecture

DRAWING:
 Area 4 Management Plan
 Weed Management - Sheet 4

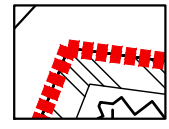
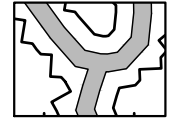

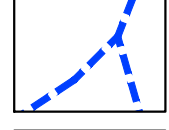


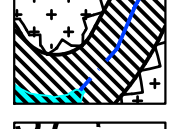
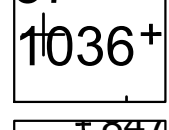
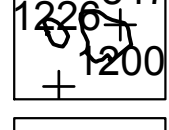

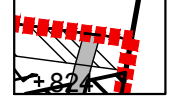
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CLIENT REF.: 7243	DRAWN: TL
DRAWING No.: 7243 L 406 WMP A	

Spring Mountain Precinct

AREA 4 WEED MANAGEMENT PLAN



LEGEND

-  Extent of management plan area
-  Existing fire trail / maintenance access. As provided by ICC in GIS & Refer to Council's Management Plan
-  Approximate minor drainage lines. Minor drainage / gully lines
-  Approximate mapped major drainage lines
-  Extent of existing lake area
-  Weed management and revegetation
-  Weed management and revegetation within water course areas
-  Individual weed species located via GPS
-  Area of weed species located via GPS
-  10m transition zone (Edge effect & bushfire management). Between lots and retained vegetation
-  Trail access point (To be confirmed by ICC)

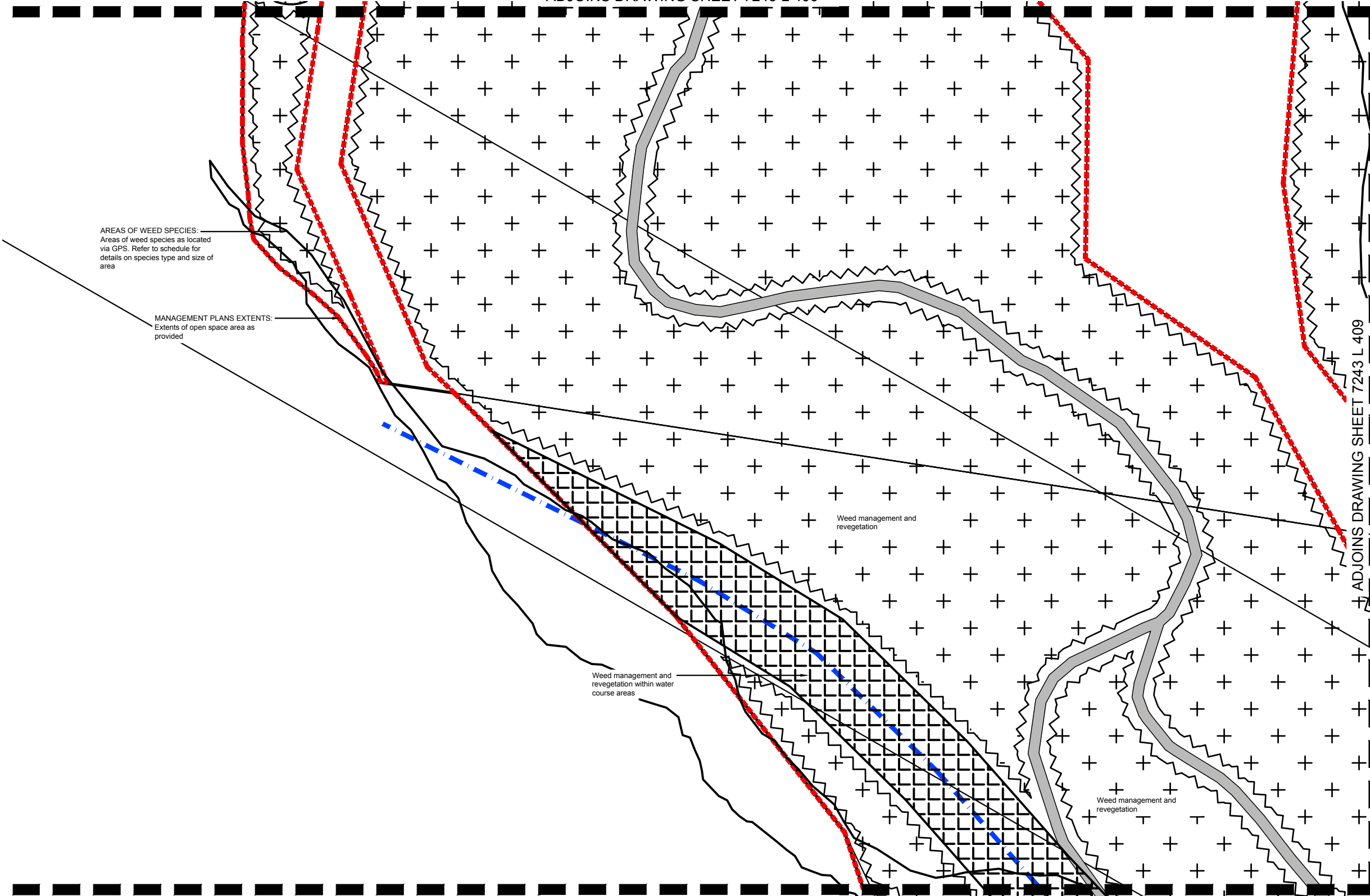
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Issue	Date	Description	Checked
A	13/11/2017	Preliminary Issue	MS

CLIENT:	
PROJECT:	Spring Mountain Precinct
SCALE:	1:1000@A1 1:2000@A3

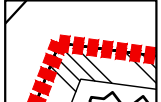


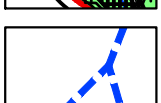


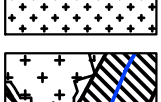

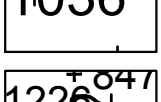
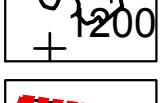

Spring Mountain Precinct

AREA 4 WEED MANAGEMENT PLAN

ADJOINS DRAWING SHEET 7243 L 406



LEGEND

-  Extent of management plan area
-  Existing fire trail / maintenance access. As provided by ICC in GIS & Refer to Council's Management Plan
-  Approximate minor drainage lines. Minor drainage / gully lines
-  Approximate mapped major drainage lines
-  Extent of existing lake area
-  Weed management and revegetation
-  Weed management and revegetation within water course areas
-  Individual weed species located via GPS
-  Area of weed species located via GPS
-  10m transition zone (Edge effect & bushfire management). Between lots and retained vegetation
-  Trail access point (To be confirmed by ICC)

AREAS OF WEED SPECIES:
Areas of weed species as located via GPS. Refer to schedule for details on species type and size of area

MANAGEMENT PLANS EXTENTS:
Extents of open space area as provided

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40 YEARS
1975-2015

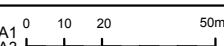
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CLIENT:
PROJECT:
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SCALE: 1:1000@A1
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landscape architecture

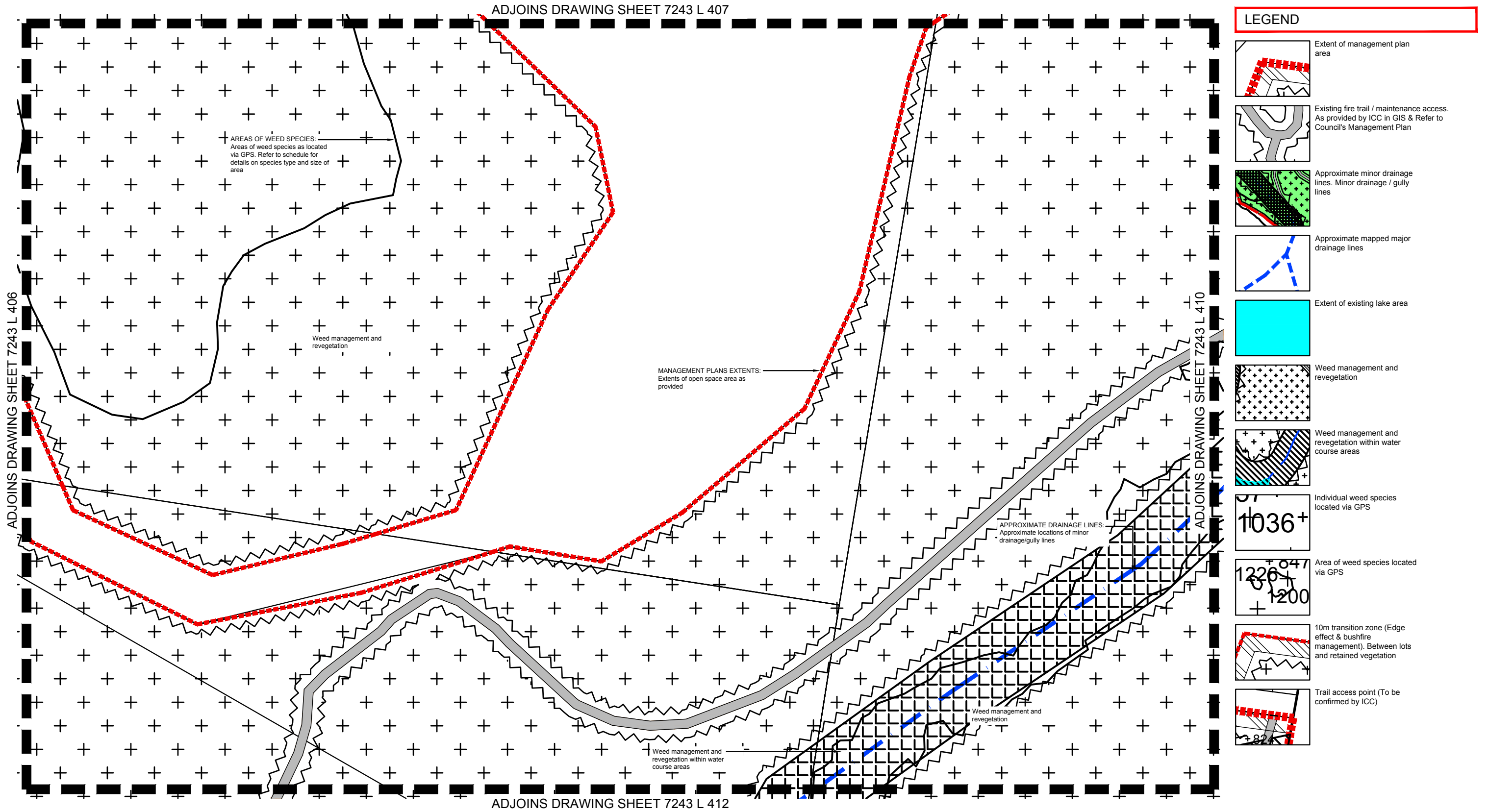
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Area 4 Management Plan
Weed Management - Sheet 6

DATE: November 17
CLIENT REF.: 7243
DRAWING No.: 7243 L 408 WMP A

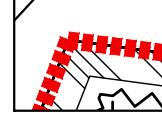


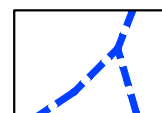
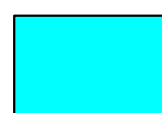
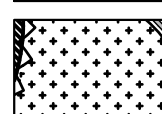
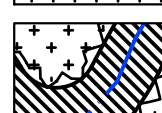
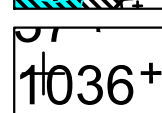
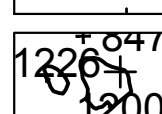
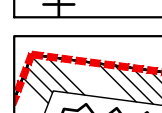

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DRAWN: TL

Spring Mountain Precinct

AREA 4 WEED MANAGEMENT PLAN



LEGEND

-  Extent of management plan area
-  Existing fire trail / maintenance access. As provided by ICC in GIS & Refer to Council's Management Plan
-  Approximate minor drainage lines. Minor drainage / gully lines
-  Approximate mapped major drainage lines
-  Extent of existing lake area
-  Weed management and revegetation
-  Weed management and revegetation within water course areas
-  Individual weed species located via GPS
-  Area of weed species located via GPS
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A	13/11/2017	Preliminary Issue	MS

CLIENT:	
PROJECT:	Spring Mountain Precinct
SCALE:	1:1000@A1 1:2000@A3

landscape architecture

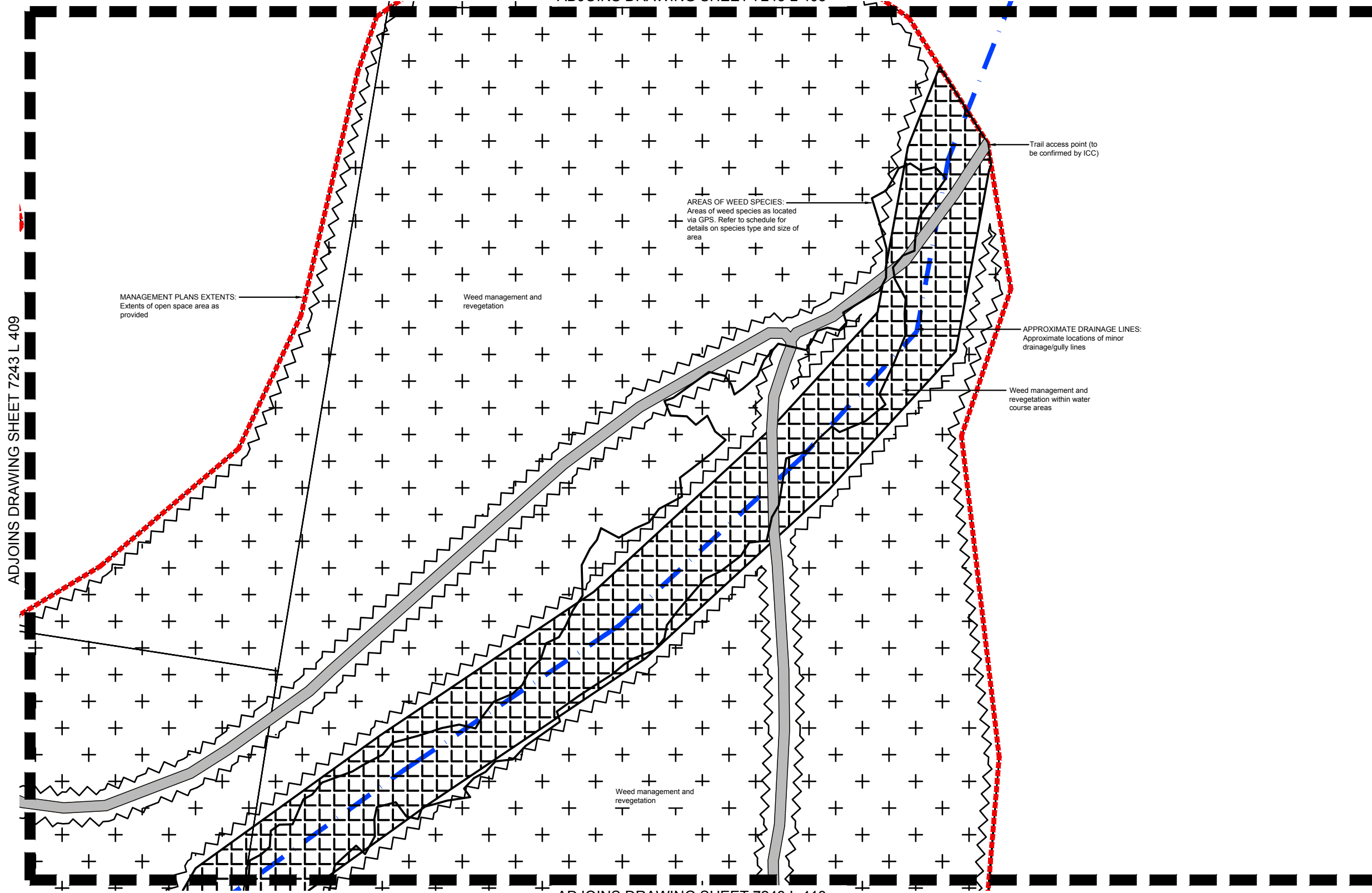
DRAWING:
 Area 4 Management Plan
 Weed Management - Sheet 7

DATE: November 17 CHECKED: MS
 CLIENT REF.: 7243 DRAWN: TL
 DRAWING No.: 7243 L 409 WMP A

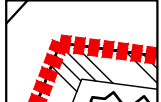


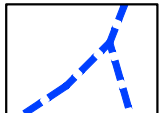

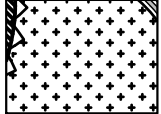
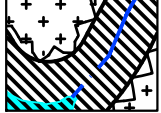
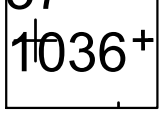
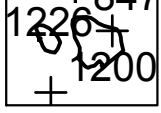
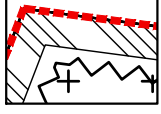
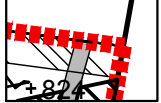
Spring Mountain Precinct

AREA 4 WEED MANAGEMENT PLAN

ADJOINS DRAWING SHEET 7243 L 408



LEGEND

-  Extent of management plan area
-  Existing fire trail / maintenance access. As provided by ICC in GIS & Refer to Council's Management Plan
-  Approximate minor drainage lines. Minor drainage / gully lines
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-  Individual weed species located via GPS
-  Area of weed species located via GPS
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ADJOINS DRAWING SHEET 7243 L 409

ADJOINS DRAWING SHEET 7243 L 413

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CLIENT:	
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landscape architecture

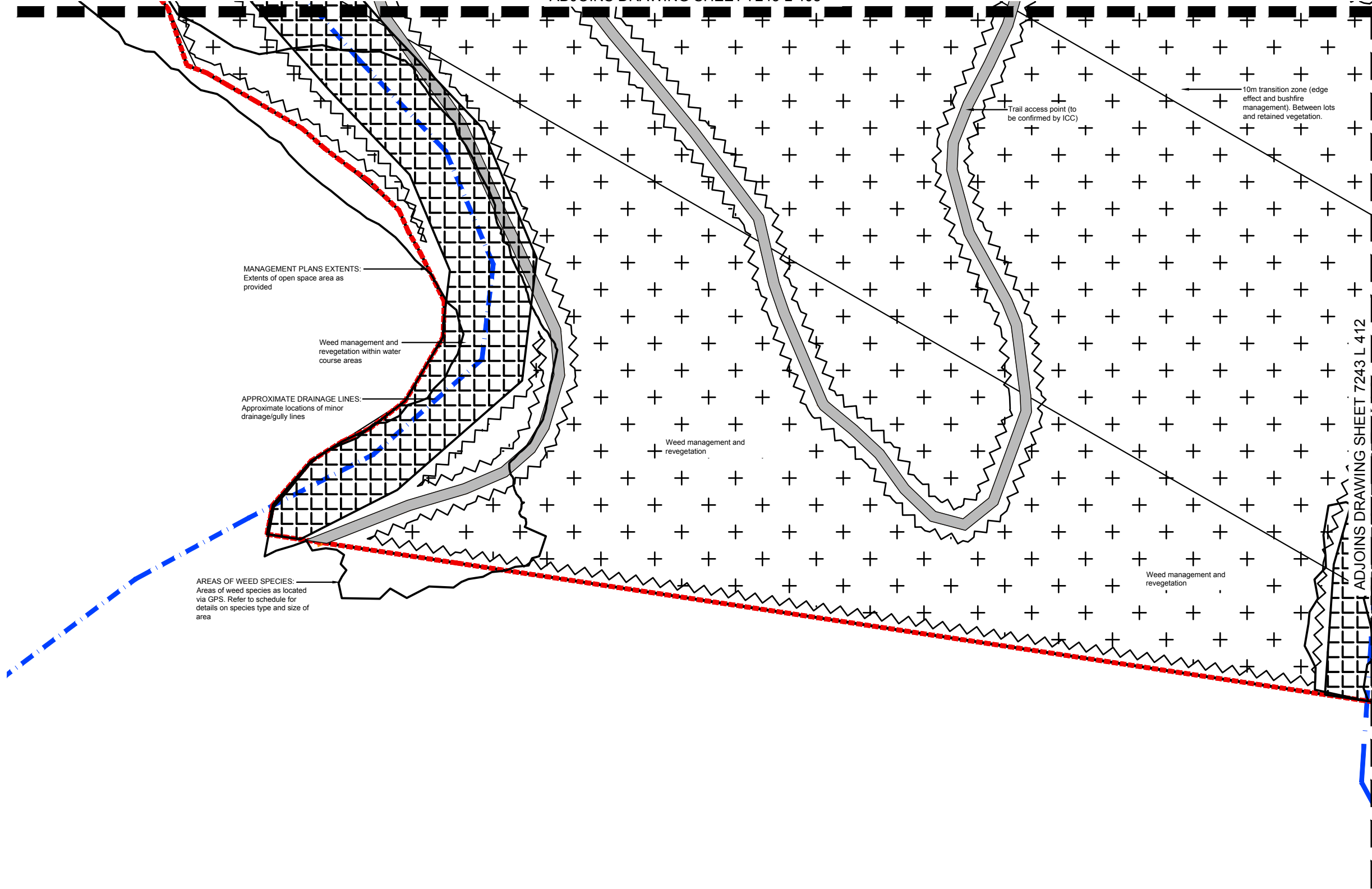
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 Weed Management - Sheet 8

DATE: November 17	CHECKED: MS
CLIENT REF.: 7243	DRAWN: TL
DRAWING No.: 7243 L 410 WMP A	







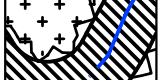
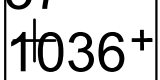
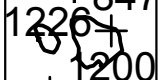


Spring Mountain Precinct

AREA 4 WEED MANAGEMENT PLAN

ADJOINS DRAWING SHEET 7243 L 408



LEGEND

-  Extent of management plan area
-  Existing fire trail / maintenance access. As provided by ICC in GIS & Refer to Council's Management Plan
-  Approximate minor drainage lines. Minor drainage / gully lines
-  Approximate mapped major drainage lines
-  Extent of existing lake area
-  Weed management and revegetation
-  Weed management and revegetation within water course areas
-  Individual weed species located via GPS
-  Area of weed species located via GPS
-  10m transition zone (Edge effect & bushfire management). Between lots and retained vegetation
-  Trail access point (To be confirmed by ICC)

MANAGEMENT PLANS EXTENTS:
Extents of open space area as provided

Weed management and revegetation within water course areas

APPROXIMATE DRAINAGE LINES:
Approximate locations of minor drainage/gully lines

AREAS OF WEED SPECIES:
Areas of weed species as located via GPS. Refer to schedule for details on species type and size of area

Weed management and revegetation

Weed management and revegetation

ADJOINS DRAWING SHEET 7243 L 412

saunders havill group
 Saunders Havill Group Pty Ltd ABN 24 144 972 949
 Brisbane • Emerald • Gladstone
 head office 9 Thompson St Bowen Hills Q 4006
 phone 1300 123 SHG web www.saundershavill.com
 surveying • town planning • urban design • environmental management • landscape architecture

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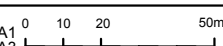
APPROVED COMPANY
 ISO9001 Quality Management System
 APPROVED COMPANY
 ISO14001 Environmental Management System

AMENDMENTS:			
Issue	Date	Description	Checked
A	13/11/2017	Preliminary Issue	MS

CLIENT: _____

PROJECT: Spring Mountain Precinct

SCALE: 1:1000@A1
1:2000@A3



landscape architecture

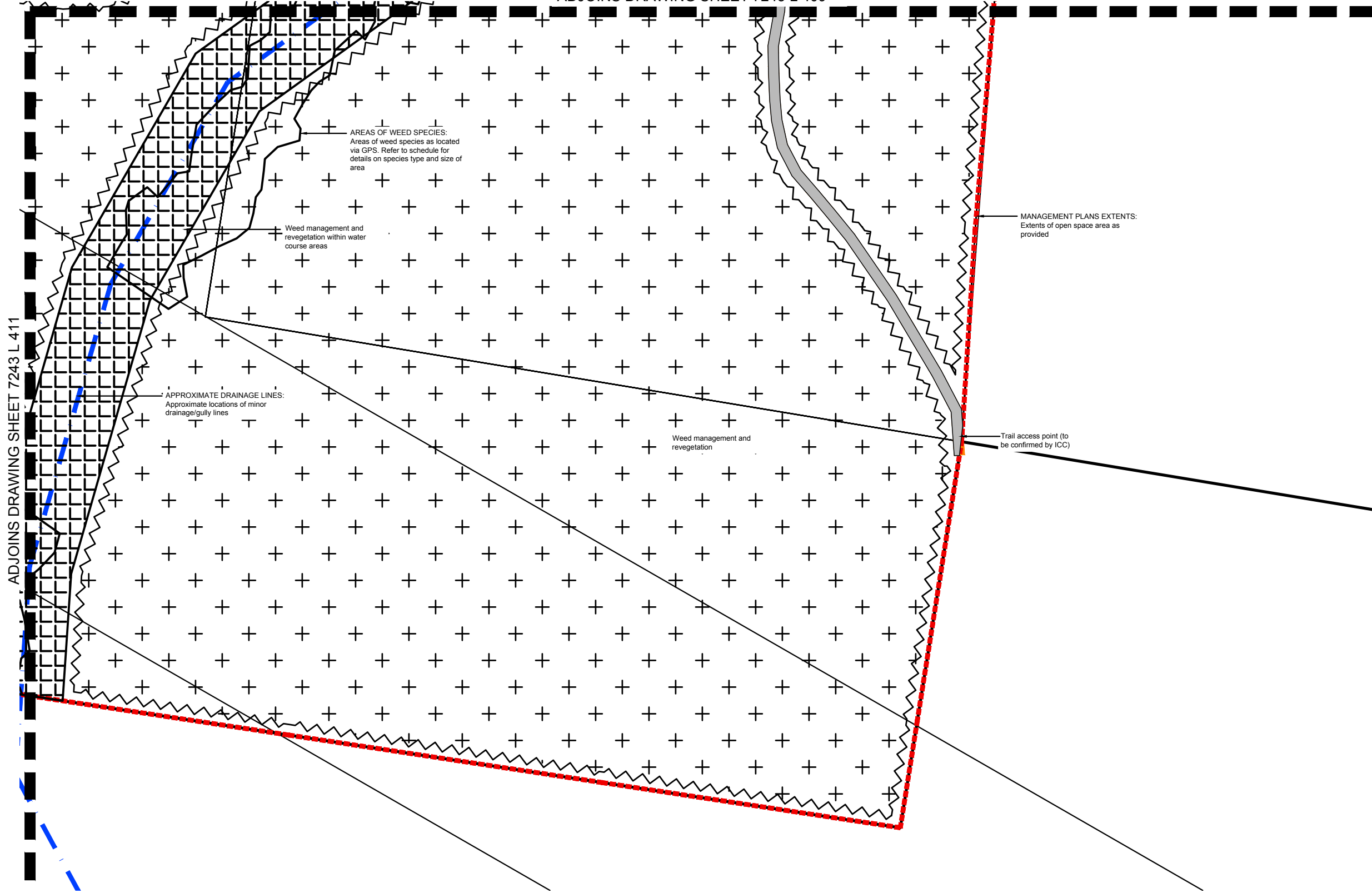
DRAWING: Area 4 Management Plan
Weed Management - Sheet 9

DATE: November 17 CHECKED: MS
 CLIENT REF.: 7243 DRAWN: TL
 DRAWING No.: 7243 L 411 WMP A

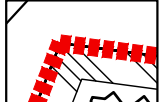


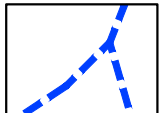

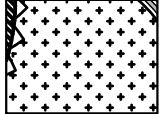
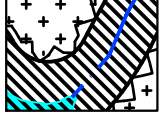
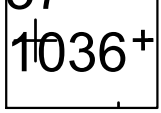
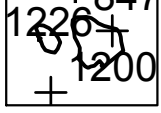
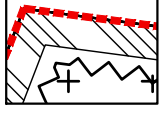
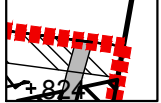
Spring Mountain Precinct

AREA 4 WEED MANAGEMENT PLAN

ADJOINS DRAWING SHEET 7243 L 409



LEGEND

-  Extent of management plan area
-  Existing fire trail / maintenance access. As provided by ICC in GIS & Refer to Council's Management Plan
-  Approximate minor drainage lines. Minor drainage / gully lines
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ADJOINS DRAWING SHEET 7243 L 411

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A	13/11/2017	Preliminary Issue	MS

CLIENT: _____
 PROJECT: Spring Mountain Precinct
 SCALE: 1:1000@A1
 1:2000@A3

landscape architecture
 DRAWING: Area 4 Management Plan
 Weed Management - Sheet 10
 DATE: November 17 CHECKED: MS
 CLIENT REF.: 7243 DRAWN: TL
 DRAWING No.: 7243 L 412 WMP A

AREA 4 MANAGEMENT PLAN - TECHNICAL NOTES - GENERAL

NOTES

This Weed Management Plan links specific weed removal and management measures with spatial areas within the declared area included with this application. This Weed Management Plan covers the 100.81ha Area 4 portion of land previously dedicated by Springfield Land Corporation (SLC) to Ipswich City Council (ICC). The main objectives and action items for pest plants are detailed in Table 1 shown on this plan, with the objectives and actions for ecological restoration are detailed in Table 2.

WEED CONTROL PROGRAM TIMING

The primary stage of manual weed removal, treatment and disposal for the parkland dedication is programmed when all existing weeds are removed with secondary and maintenance weeding occurring for another 18 months (18 month program post on-maintenance).

Primary Weed Removal Stage - Consists of the initial weed removal / treatment of site weeds via the methods detailed within the South East Queensland Ecological Restoration Guidelines. Essentially involves the manual removal, stock piling and disposal and initial usage of prescribed herbicides. Additional notes below include:

- Implemented weed control method according to this plan.
- Weed trees located within 20M zone of the existing trail network are to be removed where trunk is cut down to ground level and vegetative matter removed.
- Program timing; primary weed removal phase is considered to be completed when all existing weeds within the stage for the declared area have been removed or treated. Both the secondary phase and the primary phase of weed removal can occur concurrently in different stage areas over time.
- A key map is to be provided logging the progress of areas from primary to secondary phases of weed removal and areas of rehabilitation as part of the reporting progress.

Secondary or Follow-up Weeding - for all areas will involve the quarterly inspection of areas having undergone Primary Weed Removal and treatment of infestations or outbreak as required. Additional notes below include:

- Implemented weed control method according to this plan.
- Weed trees located within 20M zone of the existing trail network are to be removed where trunk is cut down to ground level and vegetative matter removed.
- Program timing; primary weed removal phase is considered to be completed when all existing weeds within the declared area have been removed initially. Both the secondary phase and the primary phase of weed removal can occur concurrently in different work areas over time.
- A key map is to be provided logging the progress of areas from primary to secondary phases of weed removal and areas of rehabilitation as part of the reporting progress.

Maintenance Weeding Phase - final stage of weeding which occurs in areas where the majority of weeds have been removed and treated. Maintenance weeding continues to remove additional outbreaks but also allows for the fostering of natural regeneration and regrowth seedlings. Additional notes below include:

- Implemented weed control method according to this plan.
- Weed trees located within 20M zone of the existing trail network are to be removed where trunk is cut down to ground level and vegetative matter removed.
- Program timing; primary weed removal phase is considered to be completed when all existing weeds within the designated Park have been removed initially. Both the secondary phase and the primary phase of weed removal can occur concurrently in different work areas over time.
- A key map is to be provided logging the progress of areas from primary to secondary phases of weed removal and areas of rehabilitation as part of the reporting progress.

Revegetation occurs in two (2) distinct zones throughout the management area. Refer to Drawing sheets for a full description of proposed plant species, sizes, densities and numbers.

NATURAL REGENERATION

Applies:

- To relatively large, intact and weed-free areas of native vegetation.
- Where the native plants are healthy and capable of regenerating without human intervention.
- When native plant seed is stored in the soil or will be able to reach the site from nearby natural areas, by birds or other animals, wind or water.
- Where the plant community has a high potential for recovery after any short-lived disturbance, such as a fire or cyclonic winds.
- When preventative action is all that is required to avert on-going disturbance, e.g. erection of fencing to prevent intrusion from cattle.

Planting in such sites can work against the aims of restoration by interfering with natural regeneration.

The re-establishing plant community will be similar in structure, composition and diversity to the original vegetation.

ASSISTED NATURAL REGENERATION

Applies:

- To natural areas where the native plant community is largely healthy and functioning.
- When native plant seed is still stored in the soil or will be able to reach the site from nearby natural areas, by birds or other animals, wind or water.
- Where the natural regeneration processes (seedling germination, root suckering etc.) are being inhibited by external factors, such as weed invasion, soil compaction, cattle grazing, mechanical slashing etc.
- When limited human intervention, such as weed removal, minor amelioration of soil conditions, erection of fencing, cessation of slashing, etc. will be enough to trigger the recovery processes through natural regeneration.
- When major component is weed control.

Planting in such sites can work against the aims of restoration by interfering with natural regeneration.

The re-establishing plant community will be similar in structure, composition and diversity to the original vegetation.

TABLE 1: OBJECTIVES AND ACTION ITEMS FOR PEST PLANTS

Threats	Opportunities	Management action	Timeframe	Responsibility
<i>Objective: Protect, manage and enhance the diversity of native flora species and vegetation communities within the estate by controlling pest plants.</i>				
Insufficient monitoring of pest plants	Increased knowledge of pest plant abundance and distribution within the estate	Continue to develop and update the management plan for the estate to identify pest plants present and to recommend and prioritise control and monitoring actions	Annually	Saunders Havill Group (SHG)
Establishment of large infestations of pest plants	Pest plants are controlled effectively and in a way that ensures native vegetation regeneration	Include treating pest plants within the open space area to improve visitors experience to the estate	Ongoing	Contractor
Insufficient resourcing of pest plant control measures	Increased knowledge of pest plant responses to fire	Conduct follow up pest plant treatment after any fires within the estate	As required	Contractor
Lack of education of visitors and local residents as to the adverse impacts pest plants have on the natural environment	Improved public understanding and support for pest plant control	Provide material for public awareness (ie interpretative signage)	As required	Contractor

TABLE 2: OBJECTIVES AND ACTION ITEMS FOR ECOLOGICAL RESTORATION

Threats	Opportunities	Management action	Timeframe	Responsibility
<i>Objective: Protect, manage and enhance the significant habitat values and ecological processes found within the estate, so as to contribute positively to the conservation values of the local and regional area</i>				
Degraded vegetation communities have adverse impacts on other values within the estate, including native flora and fauna species, fire issues and aesthetics	Restore degraded native vegetation communities and minimise impacts associated with pest plants and animals and their control on native flora and fauna, cultural heritage sites, and landscapes within the estate	Prepare and issue a management plan to: <ul style="list-style-type: none"> - clearly prioritise actions and zones (eg. focus on declared and environmental pest plants and mapped biodiversity zones) - Divide the site into sub-zones which can be managed in a systematic and structured way - Align with the fire management plan as burns could provide ecological and economical efficiencies; reducing fuel loads at the same time as acting as a pest plant control - Lantana (especially) should be managed to reduce the fuel load, as this is a major fire hazard Incorporate training (eg. for relevant community groups) <ul style="list-style-type: none"> - Write the plan for the target audience working on the estate (eg. bushcare groups working in particular zones) 	Prior to commencement	Contractor
Pest plant infestations from high use areas may impact on adjacent ecological values	Improve the flora values within the open space area	As part of the site rehabilitation planning for the open space, a planting list of locally occurring plant species for use in rehabilitation is to be provided to enhance population viability where appropriate and possible. Include threatened and locally significant species in plantings.	Ongoing	Contractor
Trail creation, soil compaction and increased erosion	Restore natural habitats to increase the resilience of the estate	Refer to management plans for further detail	As required	Contractor
Pest plant introduction and spread	Decreased abundance of pest plants	Refer to management plans for further detail	As required	Contractor
Disturbance from pest animals	Decreased abundance of pest animals	Refer to management plans for further detail	As required	Contractor
Insufficient resourcing of restoration measures	Improved public understanding of and support	Refer to management plans for further detail	As required	Contractor
Insufficient data on the effectiveness of ecological restoration programs	The populations and diversity of near threatened, threatened or locally significant plant species are protected and enhanced	Refer to management plans for further detail	As required	Contractor

Spring Mountain Precinct

AREA 4 MANAGEMENT PLAN - WEED TREATMENT & REMOVAL STRATEGY

NOTE: Species highlighted have been identified within the 'Springfield Wildlife Corridor Management Requirements' list which have specified removal and/or treatment techniques for Class 1 or 2 weeds. Environmental weeds and weeds of National Significance (WONS) Class 3 are to be:

- Remove dumped garden weeds from urban interface. Liaise with ICC Supervisor regarding ongoing Compliance issues.
- Lantana controlled within 20m of track edges (ie walking, shared and service).
- Strategic treatment of gully infestations staged from head of gullies downstream utilising cut stump method and chopping lantana into small (150mm) pieces. Areas to be determined by consultation with ICC.
- Assisted natural regeneration following removal including direct seeding utilising endemic seed from site. Follow up weed control by spot spraying emerging weeds in cleared areas or hand removal.

QUEENSLAND HERBARIUM INVASIVE NATURALISED PLANTS IN SOUTH EAST QUEENSLAND										
Rank	Family	Scientific and common names	Subregion	Rec No	Score	Life form & Source	Non-Chemical Control	Chemical Control		
1	Verbenaceae	Lantana camara var. camara (lantana)	10	455	5	S/O	Seedlings: Hand pull	Seedlings: CS&P (G1.5) or cut down and spray regrowth G100 or splatter gun using 1 part G to 9 parts water - apply only when plant is growing, not dormant (ref 1). Shubs: CS&P or FI (G1). Seedlings: CS&P (G1.5) or spray G200 (ref 1).		
2	Asteraceae	Baccharis halimifolia (groundsel bush)	10	168	4.8	S/O	Cut stump prior to flowering	Shubs: CS&P or FI (G1). Seedlings: CS&P (G1.5) or spray G200 (ref 1).		
3	Crassulaceae	Bryophyllum delagoense (mother of millions)	8	38	4.9	H/O	Hand removed and bagged or larger infestations sprayed	Plantlets: spray G200 + MM or MM (ref 1).		
4	Bignoniaceae	Macfadaya unguis-cati (cat's claw creeper)	5	36	4.9	V/O	Tubers: crown or dig up, bag and remove.	Regrowth and tubelings: spray G100 + MM or F100 (ref 1).		
	Basellaceae	Anredera cordifolia (madeira vine)	8	16	4.9	V/O	Small Vines & Tubers: Hand pull. Bag and dispose.	Ascending Stems: S&P (GU). Tubers: gouge, scrape and paint (GU). Ground infestations: spray G200 or G200 + MM (ref 1).		
6	Asparagaceae	Asparagus africanus (ornamental asparagus, asparagus fern)	7	26	4.9	V/O	dig out roots and dispose of at local council landfill site remove entire crown and underground stem to prevent regrowth	fluoxypyr (200 g/L) @ 35 mL per 1 L diesel/kerosene		
7	Ulmaceae	Celtis sinensis (Chinese celtis)	8	19	4.9	T/O	remove when small hand pull or dig out small seedlings, combine dozing, burning and controlled grazing for large infestations	Stem injection, glyphosate (360 g/L) @ Unlabeled at 1 mL per 2 cm of hole or cut		
8	Lauraceae	Cinnamomum camphora (camphor laurel)	7	25	4.8	T/O	Seedlings: Hand pull	Saplings: CS&P (G1.5). Trees: FI (G1 or G1.5) or C&P (G1.5 or GU for stems up to 8 diameter). Seedlings: spray G200 or G200 + MM Saplings: CS&P (G1.5). Trees: FI (G1.5). Seedlings: spray G200 (ref 1).		
9	Anacardiaceae	Schinus molle (broad-leaf pepper tree)	6	49	4.8	T/O	Seedlings: Hand pull	Aquatic areas, calcium dodecylbenzene sulphate (AF-100) @ 1 part to 19 parts kerosene, diquat (vegtrol) 50-100L/ha or 4L/100L water, diquat (water) 50-100L/ha or 4L/100L water, diquat (reglone) 5-10L/ha or 400mL + 150mL Agral / 100L water (see ref 2).		
	Salmiaceae	Salvinia molesta (salvinia)	8	57	4.9	Ha/F	Mechanical removal of small infestations. Salvinia weevil (Biological control)			
11	Cobombaceae	Cobombia caroliniana (cobomba, fanwort)	4	12	4.9	Ha/F	Mechanical removal of small infestations	2, 4-D N-Butyl Ester (Rubber Vine Spray) @ 12.5L/Ml water (see ref 2 for application guide).		
12	Asteraceae	Chrysanthemoides monilifera subsp. rotundata (bitou bush)	3	23	4.9	S/OA	N/A	Stems: C&P or FI (G1.5). Bushes: spray or cut down and spray regrowth G100 or MM (ref 1).		
13	Porteraceae	Eichhornia crassipes (water hyacinth)	4	8	4.9	Ha/OF	Mechanical removal of small infestations	Waterways: 2, 4-D acid (AF 300) @ 1:200 with water. Aquatic Areas: glyphosate @ 1-1.3L/100L water (see ref 2 for application guide).		
14	Acanthaceae	Hypochaeris costata (Glush weed)	3	7	5	Ha/F	Hand pull small infestations. Can be controlled by planting competitive native species.	Glyphosate known to be effective. Species known to occur in waterways so EPA should be contacted before spraying (ref 4).		
	Oleaceae	Ligustrum lucidum (tree privet)	5	9	4.8	T/O	Seedlings: Hand pull	Saplings: CS&P or C&P (G1.5). Trees: FI (G1 or G1.5) or C&P GU for stems up to 8cm diameter. Seedlings: spray MM or G200 + MM if other weeds such as Lantana or Camphor Laurel are present (ref 1).		
16	Asteraceae	Sphagneticola trilobata (Singapore daisy)	6	34	4.6	H/O	Hand pull	Spray MM or G200 or G200 + MM if other weeds such as Lantana or Camphor Laurel are present (ref 1).		
17	Asteraceae	Ageratina adenophora (croton weed)	6	38	4.6	H/O	Hand pull and hang to dry.			
18	Verbenaceae	Lantana montevidensis (creeping lantana)	8	62	4.8	S/O	Fire and/or mechanical control	Spray (march to may): glyphosate 1L/100L water; metsulfuron methyl 10g/100L water; metsulfuron methyls + glyphosate 173g/100L water; Basal bark (anytime): triclopyr 1L/60L Diesel, picloram + triclopyr @ 1L/60L Diesel. Glyphosate, neat application; Splatt		

19	Fabaceae	Neonotonia wightii (glycine)	5	16	4.7	H/A	N/A	Vines: CS&P (1.1.5) or spray G100 + MM or MM (ref 1).		
	Poaceae	Panicum maximum (green panic and guinea grass)	8	78	4.6	H/A	Hand or mechanical removal of small infestations	Spray glyphosate @ 13mL/L water (ref 2).		
21	Oleaceae	Ligustrum sinense (Chinese privet)	4	11	4.6	T/O	Seedlings: Hand pull	Saplings: CS&P or C&P (G1.5). Trees: FI (G1.5). Seedlings: spray MM or G200 + MM if other weeds such as Lantana or Camphor Laurel are present (ref 1).		
22	Ochnaceae	Ochna semialata (ochina)	7	33	4.5	S/O	N/A	Stems: CS&P or S&P or FI (G1.5). Seedlings and Regrowth: spray G200 + MM or MM. Tidal basal bark F100 or G200 + MM (ref 1).		
23	Asparagaceae	Asparagus aethiopicus cv Sprengeri (asparagus ground fern)	5	35	4.5	H/O	dig out unwanted plants and dispose of at the appropriate council landfill. remove the entire crown of underground stem of plant to prevent regrowth	Spot spray - metsulfuronmethyl (600 g/L) @ 10 g per 100 L water plus wetting agent or 100 g/ha plus wetting agent. Cut stump, spot spray. Apply neat Diesel		
24	Poaceae	Sporobolus pyramidalis and S. natalensis (giant rat's tail grasses)	8	72	4.8	H/U?	Seed heads cut and bagged, remaining leaves sprayed	Small infestations: spray glyphosate @ 15mL/L water, flupropate @ 2mL/L water + ionic wetter @ 1mL/L water. Dense infestations: blanket spraying glyphosate 3L/ha, flupropate 2L/ha (ref 2).		
	Asteraceae	Ageratina riparia (mistflower)	5	38	4.6	H/O	Hand pull and hang to dry.	Spray G100 or MM (ref 1).		
26	Asclepiadaceae	Araujia sericifera (mothvine)	9	38	4.4	V/O	Seedlings & Vines: Hand pull. Bag and remove fruit.	Vines: CS&P (G1.5). Seedlings: spray G200 or G200 + MM or MM (ref 1).		
27	Crassulaceae	Bryophyllum daigremontianum x B. delagoense (hybrid mother-of-millions)	6	15	4.5	H/O	Hand pull and dispose	Plantlets: spray G200 + MM or MM (ref 1).		
28	Convolvulaceae	Ipomoea canca (mile-a-minute)	7	56	4.4	V/O	Vines & Runners: hand pull, roll up and hang up to dry.	Vines and Runners: CS&P (G1.5). Larger Stems, Roots and Nodes: spray G100 + MM (ref 1).		
29	Sapindaceae	Cardiospermum grandiflorum (balloon vine)	7	31	4.4	V/O	Seedlings & Small Vines: Hand Pull	Stems: CS&P (G1.5). Seedlings or Small vines: spray G200 or G200 + MM (ref 1).		
30	Asclepiadaceae	Cryptostegia grandiflora (rubber vine)	6	19	4.4	V/O	Scattered or medium-density infestations. Where possible, repeated slashing close to ground level is recommended.	Foliar spray - Follow-up basal bark/cut stump/foliar spray as necessary with Triclopyr + picloram (Grass DS, Grass-up, etc.) @ 0.35-0.5 L/100L water		
31	Phytolaccaceae	Rivina humilis (baby pepper)	8	61	4.3	H/O	Hand pull and hang to dry	Spray G100 (ref 1).		
32	Poaceae	Sporobolus africanus (Parramatta grass)	8	48	4.5	H/U	Hand or mechanical removal of small infestations	Small infestations: spray glyphosate @ 15mL/L water, flupropate @ 2mL/L water + ionic wetter @ 1mL/L water. Dense infestations: blanket spraying glyphosate 3L/ha, flupropate 2L/ha (ref 2).		
33	Poaceae	Sporobolus fertilis (giant Parramatta grass)	9	27	4.5	H/U	Hand or mechanical removal of small infestations	Small infestations: spray glyphosate @ 15mL/L water, flupropate @ 2mL/L water + ionic wetter @ 1mL/L water. Dense infestations: blanket spraying glyphosate 3L/ha, flupropate 2L/ha (ref 2).		
34	Poaceae	Eragrostis curvula (African lovegrass)	7	29	4.3	H/U	Chipped out before they flower. When chipping out the plant ensure that the tussock crowns are removed, as this will prevent regrowth. If in seed, the stems must be cut and bagged first.	Glyphosate (360 g/L) (e.g. Weedmaster® Duo) @ 10 ml/1 L water		
35	Asteraceae	Gymnocoronis spilanthoides (Senegal tea)	3	4	4.7	Ha/F		Glyphosate and metsulfuron-methyl @ 15mL/L water		

36	Amaranthaceae	Alternanthera phioxeroides (alligator weed)	1?	3	5	Ha/U	physical removal of plant should not be attempted	Terrestrial plants use Metsulfuron methyl (Brushoff®) + 1mL/L non-ionic wetter @ 80g/ha + 1mL/L non-ionic wetter or 10g/100L water + 1mL/L non-ionic wetter. Free floating plants Glyphosate (Roundup Biactive®) 10 mL/L		
37	Passifloraceae	Passiflora suberosa (cork passionflower)	6	166	4.2	V/O	N/A	Stems: CS&P. Seedlings & Regrowth: spray G200 or G200 + MM (ref 1).		
38	Poaceae	Melinis minutiflora (molasses grass)	5	17	4.5	H/A	Grazing or mowing	Spray: Fluazifop-P 212g/L @ 2L/ha. Glyphosate 360g/L @ 1L/100L water (ref 2).		
39	Aristolochiaceae	Aristolochia elegans (Dutchman's pipe)	8	30	4.3	V/O	Stems: Hand pull. Fruit: Bag and remove.	Stems: CS&P (G1.5). Seedlings: spray G200 or G200 + MM or MM (ref 1).		
40	Convolvulaceae	Ipomoea indica (blue morning glory)	5	24	4.3	V/O	Vines and Runners: hand pull, roll up and hang to dry.	Vines and Runners: CS&P (G1.5). Larger Stems, Roots and Nodes: spray G100 + MM or F150 (ref 1).		
41	Mimosaceae	Leucaena leucocephala (leucaena)	6	14	4.3	STA	Small plants: Hand pull or mechanical removal	Herbicide Control - Basal Bark application: triclopyr 240g/L + picloram 120g/L @ 1L/60L diesel. C&P: triclopyr 240g/L + picloram 120g/L @ 1L per 60L diesel. spray triclopyr 300g/L + picloram 120g/L @ 350mL per 100L water. Combination of chemical and mecha		
42	Poaceae	Bracharia mutica (para grass)	6	18	4.4	Ha/A	Grazing	Herbicide Control - Foliar application (Knapsack): glyphosate 360g/L @ 200mL/15L water; Foliar: glyphosate 360g/L @ 9L/ha; Handgun: glyphosate 360g/L @ 1.3L/100L water (ref 2).		
43	Hydrocharitaceae	Egeria densa (egeria waterweed)	2	7	4.4	Ha/F	hand pulling, cutting and digging with machines effective	N/A		
44	Pinaceae	Pinuselliottii (slash pine)	4	22	4.3	T/A	Seedlings: Hand pull. Saplings and Trees: cut close to ground or ring-bark	Saplings and Trees: FI (G1.5) ensuring thick bark is penetrated (ref 1).		
45	Caesalpiniaceae	Senna pendula var. glabrata (Easter cassia)	7	33	4.2	S/O	Seedlings: Hand pull	Shubs: CS&P or FI (G1.5). Seedlings: spray G200 or G200 + MM or MM, collect and bag seeds (ref 1).		
46	Poaceae	Chloris gayana (Rhodes grass)	9	55	4.3	H/A	Hand pulling and removal of larger clumps	Spray: glyphosate @ 1L/100L water		
47	Crassulaceae	Bryophyllum pinnatum (resurrection plant)	6	17	4.2	H/O	Hand pull and dispose	Plantlets: spray G200 + MM or MM (ref 1).		
48	Asteraceae	Parthenium hysterophorus (parthenium weed)	6	14	4.2	H/U	hand pulling of small areas is not recommended	Spot spray 2,4-D amine 500 g/L @ 0.4 L/100 L		
49	Caprifoliaceae	Lonicera japonica (Japanese honeysuckle)	3	6	4.3	V/O	Vines and Runners: hand pull, roll up and hang to dry.	Vines and Runners: CS&P (G1.5). Larger Stems, Roots and Nodes: spray G100 + MM or MM (ref 1).		
50	Acanthaceae	Thunbergia alata (black eyed susan)	5	22	4.2	H/O	N/A	CS&P (G1.5). spray G200 or G200 + MM (ref 1).		
51	Fabaceae	Macroptilium atropurpureum (siratro)	8	39	4.2	V/A	N/A	Vines: CS&P (1.1.5) or spray G100 + MM or MM (ref 1).		
52	Rosaceae	Rubus ellipticus (yellowberry)	4	26	4.1	S/O	slashing hinders growth, giving some control if plants are slashed before they seed	Graz on DS picloram/triclopyr 1:200 parts water + wetting agent		
53	Colchicaceae	Gloriosa superba (glory lily)	3	26	4.1	V/O	N/A	Young Shoots: spray G200 or G200 + MM. Best results in Oct-Nov and by using 'Pulse' as surfactant (ref 1).		
54	Verbenaceae	Phylla canescens (lippia, Candamine couch)	3	4	4.2	Ha/O	a combined approach of different control methods including chemical and mechanical with land management practices is most effective	Foliar spray 600 g/L Dichloroprop @ 5 ml / 1 L water or 2,4-D amine (500 g/L) + 1% crop oil @ 2-4 L/ha + 1% crop oil		
55	Solanaceae	Solanum seaforthianum (Brazilian nightshade)	8	78	4	V/O	Hand pull	Spray G100 (ref 1).		
56	Araceae	Pistia stratiotes (water lettuce)	3	8	4.1	Ha/OF	Mechanical removal of small infestations	Glyphosate 360g/L @ 1-1.3L/100L water or 6 9L/ha; diquat 20g/L @ 4L/100L water or 50-100L/ha (see ref 2 for application guide).		
57	Asparagaceae	Asparagus plumosus (asparagus fern)	4	8	4.1	V/O	Rhizomes: crown and hang to dry.	Rhizomes: gouge and paint (G1.5). Stems: wind up and spray or cut high and low and spray regrowth G200 or G200 + MM (ref 1).		

saunders havill group
 Saunders Havill Group Pty Ltd ABN 24 144 972 949
 Brisbane • Emerald • Gladstone
 head office 9 Thompson St Bowen Hills Q 4006
 phone 1300 123 SHG web www.saundershavill.com
 surveying • town planning • urban design • environmental management • landscape architecture

40 YEARS
 1975-2015

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Issue	Date	Description	Checked
A	13/11/2017	Preliminary Issue	MS

CLIENT: _____

PROJECT: Spring Mountain Precinct

SCALE: AS NOTED

landscape architecture

DRAWING: Area 4 Weed Management Plan Weed Management Techniques

DATE: November 17 CHECKED: MS

CLIENT REF.: 7243 DRAWN: TL

DRAWING No.: 7243 L 414 WMP A

Spring Mountain Precinct

AREA 4 MANAGEMENT PLAN - WEED TREATMENT & REMOVAL STRATEGY

ID	Family	Species	5	9	4.1	H/O	N/A	Treatment
58	Comelinaceae	Tradescantia fluminensis (Old use T. albiflora) (wandering jew)	5	9	4.1	H/O	N/A	Spray F150 (as per label) or G200 or G200 + MM. Collect and bag or roll and rake carefully. Dispose (ref 1).
59	Solanaceae	Cestrum parqui (green cestrum)	6	36	3.9	S/O	Seeds: Hand pull	Stems: CS&P (G1.5) or spray G100 (ref 1).
60	Caesalpinaceae	Senna septentrionalis (arsenic bush, was S. floribunda)	6	25	4	S/O	Seeds: Hand pull	Shrubs: CS&P or F/I (G1.5); Seedlings: spray G200 or G200 + MM or MM; collect and bag seeds (ref 1).
61	Solanaceae	Solanum mauritanum (wild tobacco tree)	8	30	4	S/O	Seeds: Hand pull	Shrubs: CS&P (G1.5) or F/I (G1.1.5); Seedlings: spray G200 (ref 1).
62	Apocynaceae	Catharanthus roseus (pink periwinkle)	5	22	4	S/O	Hand pull	Spray G100 (ref 1).
63	Passifloraceae	Passiflora subpeltata (white passion flower)	10	60	3.9	V/O	Stems: Hand pull	Stems: CS&P; Seedlings & Regrowth: spray G200 or G200 + MM (ref 1).
64	Fabaceae	Desmodium uncinatum (silverleaf desmodium)	5	14	4	H/A	Hand pull or crown and dispose	CS&P tuberous roots (G1.5); spray G200 or G200 + MM or MM, collect and bag seeds (ref 1).
65	Poaceae	Melinis repens (red Natal grass)	10	134	4.1	H/A	Grazing or mowing	Spray Fluazifop-P 212g/L @ 2L/ha. Glyphosate 360g/L @ 1L/100L water (ref 2).
66	Nymphaeaceae	Nymphaea caerulea subsp. zanzibariensis (blue lotus)	4	17	4	Ha/OF	Hand pull small infestations.	Spray with or Diquat glyphosate. Occurs in waterways, thus EPA should be notified before any herbicide use (ref 5). Spray G100 (ref 1).
67	Onagraceae	Oenothera drummondii subsp. drummondii (beach evening primrose)	3	17	4	H/O	Hand pull	Spray G100 (ref 1).
68	Tiliaceae	Triumfetta rhomboides (Chinese burl)	7	44	4	H/U	Hand pull	Spray G100 (ref 1).
69	Haloragaceae	Mynophyllum aquaticum (parrot's feather)	3	15	4	Ha/F	N/A	Spray glyphosate 360g/L @ 10mL/10L water (ref 1).
70	Passifloraceae	Passiflora foetida (stinking passion flower)	7	50	3.9	V/O	Hand Pull	CS&P (G1.5); spray G200 or G200 + MM (ref 1).
71	Asteraceae	Verbesina encelioides (crownbeard)	7	34	4	H/U	Vines: Hand pull and remove. Runners: Roll up and hang to dry.	Stems: S&P (GU); Regrowth and seedlings: spray G200 or G200 + MM (ref 1).
72	Poaceae	Paspalum mandiocanum (broad leaf paspalum)	3	6	4	H/A	N/A	Spray G200 - resistant to weaker strength (ref 1).
73	Poaceae	Paspalum dilatatum (paspalum grass)	10	30	3.9	H/A	Hand pull or dig up	Spray G100 (ref 1).
74	Ruppiaceae	Ruppia maritima (sea tassel)	2	8	4	Ha/F	Hand pull or dig up	Spray G100 (ref 1).
75	Arecaceae	Syagrus romanzoffiana (queen palm)	47	10	3.9	T/O	Seedlings: Hand pull or crown; Trees: cut below growing point.	Trees: F/I (G1.5); Seedlings: spray G200 + MM (ref 1).
76	Poaceae	Hymenachne amplexicaulis cv. Olive (hymenachne)	17	1	4	Ha/A	A combined approach of different control methods including mechanical, chemical and biological with land management practices is most effective.	360 g/L Glyphosate (includes Roundup Biactive & Weedmaster Duo) - 1 L/100L water or 10 L/ha delivered by boom
77	Asteraceae	Senecio tamoides (Canary creeper)	3	8	4	V/O	Vines: Hand pull and remove. Runners: Roll up and hang to dry.	Stems: S&P (GU); Regrowth and seedlings: spray G200 or G200 + MM (ref 1).
78	Poaceae	Cenchrus ciliatus (buffel grass)	4	15	4.1	H/A	Hand or mechanical removal of young plants	Herbicide Control - Glyphosate 7mL/L water; Dichlobenil 600g/100m2; Fluazifop 50-100mL/10L water (ref 2).
79	Acanthaceae	Thunbergia grandiflora (thunbergia, blue thunbergia)	2	3	5?	V/O	N/A	CS&P (G1.5); spray G200 (ref 1).
80	Cactaceae	Opuntia tomentosa (velvet tree pear)	8	46	3.9	S/O	Hand removed, stem injected, or over sprayed with garlon	Spray: Basal Bark application: Injection: Triclopyr: 8L/60L diesel Picloram + Triclopyr: 1L/60L diesel Amitrole: 1mL/3cm (ref 3).
81	Euphorbiaceae	Ricinus communis (castor oil plant)	7	20	3.9	S/O	Seedlings: Hand pull	Shrubs: S: CS&P or F/I (G1.5); Seedlings: spray G200 (ref 1).
82	Asteraceae	Senecio madagascariensis (fire weed)	6	26	3.8	H/U	Hand pulled and bagged	Stems: S&P (GU); Regrowth and seedlings: spray G200 or G200 + MM (ref 1).
83	Cyperaceae	Cyperus involucreatus (African sedge)	6	15	3.8	Ha/OF	Each has to be dug out with a spade and the entire plant turned over exposing the root system while making sure all aerial parts of the plant are completely covered	Aquatic areas - Glyphosate-ipa Land-commercial/Industrial, rights of way - Glyphosate-ipa glyphosate-mas, mazapyr
84	Asteraceae	Tithonia diversifolia (Mexican sunflower)	5	11	3.9	H/O	N/A	Stems: CS&P (G1.5) or cut and spray regrowth and seedlings (G100 or MM) (ref 1).
85	Poaceae	Setaria sphaecalata (South African pigeon grass)	9	41	3.8	H/A	Hand pull or dig up	Spray G100 (ref 1).
86	Asclepiadaceae	Gomphocarpus physocarpus (balloon cotton bush)	10	132	3.7	S/O	Slash in winter and burn cuttings. Wandering Butterfly can also be used.	Spray: glyphosate @ 1.1000 with water, in spring before seeding (ref 3).
87	Poaceae	Digitaria didactyla (Queensland blue couch)	9	70	3.7	H/A	Hand pull or cultivation	Spot Spray: glyphosate or 2.2-DPA (ref 3).
88	Caesalpinaceae	Gleditsia triacanthos (honey locust)	7	12	3.8	T/O	For the control of dense infestations on grazing land, burning followed by spot spraying is an economical control method.	non-agricultural land fluoxypyr (Starane 200) @ 1.5 L - 75mL/100 L diesel
89	Poaceae	Paspalum notatum (bahia grass)	4	10	3.8	H/A	Hand pull or dig up	Spray G100 (ref 1).
90	Cactaceae	Opuntia monacantha (drooping tree pear, syn. O. vulgaris)	2	3	4	S/O	Hand removed, stem injected, or over sprayed with garlon	Spray: Basal Bark application: Injection: Triclopyr: 8L/60L diesel. Picloram + Triclopyr: 1L/60L diesel. Amitrole: 1mL/3cm (ref 3).
91	Poaceae	Paspalum conjugatum (paspalum grass)	7	36	3.8	H/A	Cut below crown.	Spot Spray: glyphosate or 2.2-DPA (ref 3).
92	Malvaceae	Hibiscus benghalensis (hibiscus)	3	5	4	S/V/O	Hand pull small infestations.	Seeds: Foliar spray of dicamba, fluoxypyr, and triclopyr/picloram. Larger plants cut stump application of fluoxypyr and triclopyr/picloram with diesel, glyphosate with water and picloram undiluted (ref 7).
93	Solanaceae	Solanum torvum (Devil's fig)	6	29	3.9	S/O	Seedlings: Hand pull	Shrubs: CS&P (G1.5) or F/I (G1.1.5); Seedlings: spray G200 (ref 1).
94	Caesalpinaceae	Caesalpinia decapetala (thorny poinciana)	4	20	3.9	S/V/O	Seed-heads: Bag and remove.	Stems: CS&P (G1.5); Seedlings: spray G200 or G200 + MM or MM (ref 1).
95	Poaceae	Pennisetum alopecuroides (swamp foxtail)	7	29	3.8	H/O	Hand Pull	Stems: CS&P (G1.5); Seedlings: spray G200 or G200 + MM or MM (ref 1).
96	Verbenaceae	Duranta erecta (duranta)	6	14	3.6	S/O	Shrubs: CS&P (1.1.5)	Spray G100 (ref 1).
97	Brassicaceae	Nasturtium officinale (Old use Rorippa nasturtium-aquaticum) (watercress)	7	19	3.7	Ha/FU	Manually grub and destroy.	Spray G100 and replace with local species (ref 1).
98	Polygonaceae	Acalypha sagittata (rambling dock)	4	18	3.7	V/U	Tubers: Dig up, bag and remove.	Tubers: Spray G200 or G200 + MM or MM (ref 1).
99	Poaceae	Cynodon dactylon (Bahama grass introduced cultivars)	10	45	3.6	H/OA	Hand pull small infestations, removing all roots or smother with mulch.	Spray: glyphosate @ 200mL/15L water. Follow up spray (ref 3).
100	Bignoniaceae	Tecoma stans (yellow bells)	4	16	3.6	S/O	N/A	Stems: CS&P (G1.5) or spray G200. Seeds: collect, bag and remove (ref 1).
101	Rosaceae	Rhaphiolepis indica (Indian Hawthorn)	3	10	3.5	S/O	Seedlings: Hand pull	Saplings: CS&P (G1.5); Trees: F/I (G1.5); Seedlings: spray G200 or G200 + MM or MM (ref 1).
102	Mimosaceae	Mimosa pudica (common sensitive plant)	4	12	3.7	S/A	N/A	Pastures - Fluoxypyr/Starane 200 @ 1.5 L/ha. Between cropping applications (conservation tillage) - Dicamba/Bayer 200 @ 0.8-1.4 L/ha
103	Comelinaceae	Callisia fragrans (purple succulent)	3	9	3.9	H/O	N/A	Spray F100 or G200 or G200 + MM. Collect and bag or roll and rake carefully. Dispose (ref 1).
104	Scrophulariaceae	Passiflora tomentosa (paivonia)	3	5	4	H/O	Seedlings: Hand pull	Saplings: CS&P (G1.5); Trees: F/I (G1.5); Seedlings: spray G200 (ref 1).
105	Comelinaceae	Tradescantia zebrina (zebrina)	3	12	3.7	H/O	N/A	Spray F100 or G200 or G200 + MM. Collect and bag or roll and rake carefully. Dispose (ref 1).
106	Acanthaceae	Ruellia malacosepala (ruellia)	5	16	3.8	H/O	N/A	Spray G200 + MM (ref 1).
107	Poaceae	Pennisetum clandestinum (kikuyu grass)	4	12	3.8	H/A	Hand Pull	Spot Spray: glyphosate or 2.2-DPA (ref 3).
108	Liliaceae	Lilium formosanum (Taiwan Lily)	5	10	3.8	H/O	Hand pull or crown and dispose	Spray G100 + MM or MM (ref 1).
109	Asteraceae	Sigesbeckia orientalis (Indian weed)	10	148	3.6	H/U	Hand pull or cultivation	Spray with 2.4-D amine or sodium, or MCPA + dicamba (ref 3).
110	Asteraceae	Bidens pilosa (Cobbler's pegs)	10	110	3.5	H/U	Hand pull or cultivation	Spray with 2.4-D amine or sodium, or MCPA + dicamba (ref 3).
111	Cactaceae	Opuntia stricta (common prickly pear)	7	67	3.6	S/O	Hand removed, stem injected, or over sprayed with garlon	Spray: Basal Bark application: Injection: Triclopyr: 8L/60L diesel. Picloram + Triclopyr: 1L/60L diesel. Amitrole: 1mL/3cm (ref 3).
112	Poaceae	Eleusine indica (Crowsfoot grass)	8	56	3.5	H/A	Pull and chip. Replant with native couch.	Spray: glyphosate or 2.2-DPA (ref 3).
113	Poaceae	Axonopus compressus (broad leaved carpet grass)	5	23	3.6	H/O	Cut stems from roots.	Spot spray with Glyphosate (ref 3).
114	Lamiaceae	Salvia coccinea (red salvia)	9	46	4	H/O	remove small areas by hand or machine	Aquatic areas (drains, channels, margins of streams, lakes and dams) - calcium dodecylbenzene sulphonate (AF-100) @ 1 part in 19 parts kerosene
115	Asteraceae	Ageratum houstonianum (blue billygoat weed)	8	81	3.8	H/U	N/A	Spray G100 or hand pull and spray regrowth G100 (ref 1).
116	Myrtaceae	Psidium guajava and P. guineense (yellow guava and West Indies guava)	4	7	3.7	ST/O	N/A	Shrubs: CS&P or F/I (G1.5) or spray G200 + MM or MM. Trunk basal bark F100 or G200 + MM (ref 1).
117	Rosaceae	Rubus bellobatus (kittatinny blackberry)	5	22	3.5	S/O	slashing hinders growth, giving some control if plants are slashed before they seed	Grazon DS picloram/triclopyr 1:200 parts water + wetting agent
118	Myrtaceae	Eugenia uniflora (Brazilian cherry)	4	19	3.5	ST/O	N/A	Stems: CS&P or F/I (G1.5); Bushes: spray or cut down and spray regrowth G100 or MM (ref 1).
119	Oleaceae	Olea europaea (olive)	2	6	47	T/A	Seedlings: Hand pull	Trees: F/I (G1.5); Seedlings: spray G200 or G200 + MM (ref 1).
120	Poaceae	Brachiaria decumbens (signal grass)	4	14	3.5	H/A	Grazing	Herbicide Control - Foliar application (Knapsack): glyphosate 360g/L @ 200mL/15L water; Foliar: glyphosate 360g/L @ 9L/ha; Handgun: glyphosate 360g/L @ 1.3L/100L water (ref 2).
121	Fabaceae	Stylosanthes scabra (shrubby stylo)	4	4	4.3?	H/A	N/A	Vines: CS&P (1.1.5) or spray G100 + MM or MM (ref 1).
122	Comelinaceae	Commelina benghalensis (wandering jew)	4	7	3.5	H/O	Collect and Bag	Spray G200 or G200 + MM (ref 1).
123	Poaceae	Pennisetum purpureum (elephant grass)	2	9	3.5	H/O	Grazing or mechanical removal	N/A (ref 2).
124	Zingiberaceae	Hedychium coronarium (wild ginger)	2	2	3.5	H/O	Small Plants: Hand pull and dispose	Small Plants: spray G200 or G200 + MM. Large Plants: cut and spray regrowth. If rhizomes are at ground level, cut stem and gouge rhizome - fill hole with G1.5 with injector kit or similar (ref 1).
125	Phytolaccaceae	Phytolacca octandra (inkweed)	10	50	3.4	H/O	Hand pull or crown	CS&P (G1.5) or C&P (G1.5); spray G100 (ref 1).
126	Asclepiadaceae	Asclepias curassavica (red cotton bush)	9	43	3.4	S/O	Hand pull; Slash	Slash and/or spray G100 (ref 1).
127	Solanaceae	Lycium ferocissimum (African boxthorn)	17	5	4.4?	S/O	N/A	Stems: C&P (G1.5); Regrowth: spray G200 + MM (ref 1).
128	Mimosaceae	Prosopis pallida (algaroba)	2	2	4	ST/O	When using mechanical control methods, it is important to remove the bud zone of the root system (about 30 cm below the ground surface) if this is not removed, re-shooting can occur.	Basal bark - triclopyr + picloram Access@ @ 1L/60L diesel. Cut stump - triclopyr + picloram Access@ @ 1L/60L diesel. Overall spray - triclopyr + picloram Grazon DS @ 350ml/100L water plus a wetting agent if plant is growing actively
129	Juncaceae	Juncus articulatus (jointed rush)	1	2	4	Ha/FO	Hand pull.	Spot spray with Glyphosate, 2.2-DPA or MCPA + dicamba (ref 3).
130	Cactaceae	Opuntia aurantiaca (tiger pear)	1	2	4	S/O	Hand removed, stem injected, or over sprayed with garlon	Spray: Basal Bark application: Injection: Triclopyr: 8L/60L diesel. Picloram + Triclopyr: 1L/60L diesel. Amitrole: 1mL/3cm (ref 3).
131	Poaceae	Arundo donax (giant reed)	1	4	3.8	H/O	Physical removal of small infestations.	Spot spray or cut stump and spray with Glyphosate (ref 5).
132	Cactaceae	Opuntia imbricata (rope pear)	1	1	4	H/O	Biological controls available: cactoblastis cactorum successful. Mechanical control difficult. Fire can be used.	Spray: Basal Bark application: Injection: Triclopyr: 8L/60L diesel. Picloram + Triclopyr: 1L/60L diesel. Amitrole: 1mL/3cm (ref 3).
133	Bignoniaceae	Pyrostegia venusta (flame vine)	1	1	4	V/O	N/A	CS&P (G1.5); spray G200 (ref 1).
134	Poaceae	Cortaderia selloana (pampas grass)	2	1	3.7	H/O	Small Plants: dig out by hand or machine	Stems: CS&P (G1.5) or cut back and slash and spray regrowth G100 (ref 1).
135	Solanaceae	Solanum hispidum (giant devil's fig)	5	23	3.6	S/O	Hand pull	Spray G100 (ref 1).
136	Agavaceae	Furcraea foetida (Cuban hemp)	3	4	4.3?	S/OA	Dig out by hand or machine	CS&P near ground or spray MM (ref 1).
137	Agavaceae	Furcraea selioa (hemp)	1	2	4?	S/OA	Dig out by hand or machine	CS&P near ground or spray MM (ref 1).
138	Agavaceae	Agave americana (century plant)	4	9	3.7	S/OA	Dig out by hand or machine	CS&P near ground or spray MM (ref 1).

saunders havill group
 Saunders Havill Group Pty Ltd ABN 24 144 972 949
 Brisbane • Emerald • Gladstone
 head office 9 Thompson St Bowen Hills Q 4006
 phone 1300 123 SHG web www.saundershavill.com
 • surveying • town planning • urban design • environmental management • landscape architecture

40 YEARS
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AMENDMENTS:

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A	13/11/2017	Preliminary Issue	MS

CLIENT: _____
 PROJECT: Spring Mountain Precinct
 SCALE: AS NOTED

landscape architecture

DRAWING: Area 4 Management Plan Weed Management Techniques

DATE: November 17 CHECKED: MS
 CLIENT REF.: 7243 DRAWN: TL
 DRAWING No.: 7243 L 415 WMP A

AREA 4 MANAGEMENT PLAN - WEED TREATMENT & REMOVAL STRATEGY

139	Rutaceae	Murraya paniculata cv. Exotica (murraya)	6	26	3.6	S/O	Seedlings: Hand pull	Shrubs: CS&P or F/I (G1.5); Seedlings: spray G200 (ref 1)
140	Rosaceae	Rubus discolor (R. fruticosus complex, a blackberry)	4	10	3.7	S/OA	slashing hinders growth, giving some control if plants are slashed before they seed	Grazon DS picloram/miflupyr 1:200 parts water + wetting agent. A variety of herbicides may be used to control this species including (ref 5)
141	Brassicaceae	Cakile edentula (American sea rocket)	4	24	3.7	H/U	Manually grub and destroy	Spray G100 and replace with local species (ref 1)
142	Balsaminaceae	Impatiens wateriana (balsam)	2	6	3.7	H/O	N/A	Spray G100 (ref 1)
143	Agavaceae	Agave sisalana (sisal)	2	4	3.7	S/OA	Dig out by hand or machine	CS&P near ground or spray MM (ref 1)
144	Agavaceae	Agave vivipara var. vivipara (sisal)	2	3	3.7	S/OA	Dig out by hand or machine	CS&P near ground or spray MM (ref 1)
145	Rosaceae	Prunus munsoniana (wild goose plum)	7	31	3.7	ST/A	Seedlings: Hand pull	Shrubs: CS&P or F/I (G1.5); Seedlings: spray G200 (ref 1)
146	Poaceae	Echinochloa crus-galli (barnyard grass)	6	34	3.7	H/A	Hand pull or dig out; small infestations	Spot spraying with Glyphosate or 2,2-DPA (ref 3)
147	Asteraceae	Solidago canadensis var. scabra (Canadian goldenrod)	7	15	4.7	H/O	Hand pull and hang to dry	Spray MM or G200 or G200 + MM if other weeds such as Lantana or Camphor Laurel are present (ref 1)
148	Fabaceae	Pueraria lobata (kudzu)	3	4	3.8	V.S/O	Slash, Diminish by shading site	CS&P (G1.5); spray G200 or MM (ref 1)
149	Alismataceae	Sagittaria graminea var. platyphylla (sagittaria arrowhead)	3	7	3.5	Ha/FO	Physical removal of small infestations	Spot Spray with Glyphosate at 1.0L/100L water (ref 5)
150	Nymphaeaceae	Nymphaea mexicana (yellow waterlily)	2	4	3.7	Ha/OF	Hand pull small infestations	Spray with or Diquat Glyphosate. Occurs in waterways, thus EPA should be notified before any herbicide use (ref 5)
151	Poaceae	Phyllostachys aurea (fishpole bamboo)	1	2	3.7	S/O	N/A	Stems: cut and fill segment (G1.5); Regrowth: spray G100 (ref 1)
152	Euphorbiaceae	Jatropha gossypifolia (cotton-leaf physic nut, belly ache bush)	1	1	3.7	S/O	Hand pull	Spray G100 (ref 1)
153	Makaceae	Sida rhombifolia (Paddy's lucerne)	9	69	3.6	S/U	Hand pull or dig out	Spray with 2,4-D amine or fluoxypyr (ref 3)
154	Poaceae	Themeda quadrivalvis (grader grass)	8	25	3.6	H/A	Hand pull or dig out; small infestations	Spot spraying with Glyphosate or 2,2-DPA (ref 3)
155	Poaceae	Andropogon virginicus (whisky grass)	6	14	3.6	H/A	Hand pull or dig out; small infestations	Spot spraying with Glyphosate or 2,2-DPA (ref 3)
156	Bignoniaceae	Jacaranda mimosifolia (jacaranda)	4	12	3.4	T/O	Seedlings: Hand pull	Saplings: CS&P (G1.5); Trees: F/I (G1.5); Seedlings: spray G200 (ref 1)
157	Acanthaceae	Justicia betonica (squirrel tail)	2	4	4	S/O	Hand pull small infestations. Can be controlled by planting competitive native species.	Glyphosate known to be effective. Species known to occur in waterways. DERM should be contacted before spraying in waterways (ref 4)
158	Mimosaceae	Acacia boliviana (Bolivian wattle)	1	1	4	T/O	Mechanical or chain removal	Basal Bark or cut stump application. Triclopyr 600g/L at 1.0L/120L diesel. Triclopyr + Picloram 240 g/l + 120 g/l at 1.0L/60L diesel. Picloram 45 g/kg undiluted (ref 5)
159	Simaroubaceae	Ailanthus altissima (tree of heaven)	1?	3	3.5	T/O	Seedlings: Hand pull	Seedlings: CS&P (G1.5); Trees: F/I (G1.5); Seedlings: spray G200 or MM (ref 1)
160	Poaceae	Echinochloa colona (awnless barnyard grass)	9	44	3.3	H/A	Hand or mechanical removal of small infestations	Spray: glyphosate @ 13mL/1L water (ref 2)
161	Cyperaceae	Cyperus brevifolius (Mullumbimby couch)	8	53	3.4	H/O	Each has to be dug out with a spade and the entire plant turned over, exposing the root system while making sure all aerial parts of the plant are completely covered.	Aquatic areas - Glyphosate-pa Land - commercial/industrial, rights of way - Glyphosate-pa, glyphosate-mas, imazapyr
162	Moraceae	Morus alba (white mulberry)	3	10	3.4	T/O	N/A	Trees: F/I (G1.5); stack cut branches above the ground to dry; Saplings: CS&P (G1.5); Seedlings: spray G200 (ref 1)
163	Arecaceae	Colocasia esculenta (taro)	3	4	3.4	H/AO	Hand pull	Cut at base and apply glyphosate or metsulfuron methyl. Plant often occurs in waterways so consult DERM prior to application (ref 6)
164	Cannaceae	Canna indica (canna lily)	3	9	3.3	H/O	Dig out entire plant	Cut/Slash and spray regrowth G200 or G200 + MM; Collect and bag seeds. Resistant to herbicide (ref 1)

165	Buddlejaceae	Buddleja madagascariensis (buddleja)	5	6	3.4	S.V/O	N/A	Stems: CS&P (1.1.5); Vines: spray or cut down and spray regrowth G200 (ref 1)
166	Bignoniaceae	Tecoma capensis (Cape honeysuckle)	3	8	4	ST/O	N/A	Stems: CS&P (G1.5) or spray G200; Seeds: collect, bag and remove (ref 1)
167	Cactaceae	Hamsia martinii (hamsia cactus)	2?	4	4	S/O	The use of the biological mealy-bug agent is recommended	Triclopyr + picloram at 1.0L/60L diesel. Dic chlorprop 600 g/l at 1.0L/60L water, metsulfuron methyl 600 g/l at 2.0L/100L water Ref 5)
168	Acanthaceae	Thunbergia laurifolia (laurel clock vine)	1	1	4	V/O	N/A	CS&P (G1.5); spray G200 (ref 1)
169	Fabaceae	Erythrina crista-galli (cockspur coral tree)	2?	4	3.5	T/O	N/A	F/I (G1.5) or C&P stumps. Cut and stack branches above ground to dry to prevent sprouting. F/I sprouted branches (G1.5) or spray regrowth G200 + MM or MM. Trial Tordon (ref 1)
170	Sapindaceae	Koelerutera elegans (Chinese rain tree)	1?	1	3.6?	T/O	Seedlings: Hand pull	Trees: F/I (G1.5) or C&P stumps (G1.5); Saplings: CS&P (G1); stack cut branches above ground to dry; Seedlings: spray (G200) (ref 1)
171	Zingiberaceae	Hedychium gardenianum (ginger lily)	1?	3	3.6	H/O	Small Plants: Hand pull and dispose	Small Plants: spray G200 or G200 + MM; Large Plants: cut and spray regrowth. If rhizomes are at ground level, cut stem and gouge rhizome - fill hole with G1.5 with injector kit or similar (ref 1)
172	Acanthaceae	Hypoestes phyllostachya (poika-dot plant)	3	5	3.5	H/O	Hand pull or crown and dispose	Spray G200 or G200 + MM (ref 1)
173	Caprifoliaceae	Sambucus canadensis (American elder)	3	7	3.4	ST/O	Vines and Runners: hand pull; roll up and hang to dry	Vines and Runners: CS&P (G1.5); Larger Stems, Roots and Nodes: spray G100 + MM or MM (ref 1)
174	Asteraceae	Conyza sumatrensis (tail feebane)	9	45	3.3	H/U	Hand or mechanical removal of small infestations	Seedlings: Altrazine or Chlorsulfuron in combination with competitive native species; Plants: Glyphosate and Tordon 75-D mix. Glyphosate ration depends on other weeds present (ref 2)
175	Fabaceae	Tipuana tipu (tipuana)	2	5	3.4	T/O	Seedlings: Hand pull	Saplings: CS&P (G1.5); Trees: F/I (G1.5); Seedlings: spray G200 (ref 1)
176	Asteraceae	Tagetes minuta (stinking roger)	8	32	3.3	H/U	Hand pull and hang to dry	Spray MM or G200 or G200 + MM if other weeds such as Lantana or Camphor Laurel are present (ref 1)
177	Caesalpiniaceae	Chamaecrista rotundifolia (round-leaf cassia)	6	14	3.3	ST/A	Seedlings: Hand pull	Shrubs: CS&P or F/I (G1.5); Seedlings: spray G200 or G200 + MM or MM; collect and bag seeds (ref 1)
178	Poaceae	Cenchrus echinatus (Mossman river grass)	8	43	3.3	H/A	Hand or mechanical removal of young plants	Herbicide Control - Glyphosate 7mL/L water; Dichlobenil 600g/100m2; Fluazifop 50-100mL/10L water (ref 2)
179	Asteraceae	Conyza canadensis (Canadian feebane)	10	55	3.3	H/U	Hand or mechanical removal of small infestations	Seedlings: Altrazine or Chlorsulfuron in combination with competitive native species; Plants: Glyphosate and Tordon 75-D mix. Glyphosate ration depends on other weeds present (ref 2)
180	Euphorbiaceae	Euphorbia cyathophora (painted spurge)	8	20	3.3	H/O	Hand pull	Spray G100 (ref 1)
181	Poaceae	Setaria palmifolia (palm leaf setaria)	5	13	3.3	H/O	Hand pull or dig up	Spray G100 (ref 1)
182	Euphorbiaceae	Euphorbia heterophylla (milk weed)	5	12	3.4	H/O?	Hand pull	Spray G100 (ref 1)
183	Fabaceae	Desmodium intortum (greenleaf desmodium)	4	11	3.3	H/A	Hand pull or crown and dispose	CS&P tuberous roots (G1.5); spray G200 or G200 + MM or MM; collect and bag seeds; Monitor regrowth over 2 - 3 years (ref 1)
184	Poaceae	Pennisetum setaceum (fountain grass)	3	11	3.3	H/O	Hand Pull	Spot Spray: glyphosate or 2,2-DPA (ref 3)
185	Asteraceae	Conyza bonariensis (flax-leaf feebane)	7	38	3.3	H/U	Hand or mechanical removal of small infestations	Seedlings: Altrazine or Chlorsulfuron in combination with competitive native species; Plants: Glyphosate and Tordon 75-D mix. Glyphosate ration depends on other weeds present (ref 2)
186	Solanaceae	Solanum elaeagnifolium (a tobacco bush)	7	19	3.2	S/O	Hand pull	Spray G100 (ref 1)
187	Poaceae	Slenotaphrum secundatum (buffalo grass)	3	23	3.2	H/AO	Hand or mechanical removal of small infestations	Spray: glyphosate @ 13mL/1L water (ref 2)

188	Apocynaceae	Cascabela thevetia (syn. Thevetia peruviana) (yellow oleander)	5	9	3.1	ST/O	Hand pull small infestations. Slashing can be used but should be followed up by herbicide application.	Basal bark application of fluoxypr (35mL/1L Diesel); Stem injection Glyphosate (1L/2L Water); Cut stump application of fluoxypr (1L/55L Diesel); Foliar Spray of fluoxypr 1:100 for larger plants. 1:200 for seedlings (ref 2)
189	Rubiaceae	Coffea arabica (coffee)	3	7	3.2	ST/A	Saplings: Hand pull	Shrubs: F/I (G1) between flower and fruit set; Saplings: CS&P (G1); Seedlings: spray G200 or G200 + MM (ref 1)
190	Bignoniaceae	Spathodea campanulata (African tulip tree)	17	1	3.4	T/O	N/A	Saplings: CS&P (G1.5); Trees: F/I (G1.5); Seedlings: spray G200 (ref 1)
191	Fabaceae	Macrotyloma axillare (perennial horse gram)	4	12	3.1	V.HA	N/A	Vines: CS&P (1.1.5) or spray G100 + MM or MM (ref 1)
192	Indiaceae	Watsonia meriana var. bulbifera (bulbil watsonia)	2	3	3.1	H/O	Dig up, bag and remove	Spray G200 + MM (ref 1)
193	Passifloraceae	Passiflora edulis (passion fruit)	6	12	3.2	V/AO	Hand Pull	CS&P (G1.5); spray G200 or G200 + MM (ref 1)
194	Asteraceae	Zinnia peruviana (wild zinnia)	6	33	3.1	H/O	Seedlings: Hand pull	Shrubs: CS&P or F/I (G1); Seedlings: CS&P (G1.5) or spray G200 (ref 1)
195	Dracaenaceae	Sansevieria trispiciata (sansevieria)	2?	7	3.1	H/O	Hand pull or dig up	Spray G100 + MM (ref 1)
196	Poaceae	Digitaria eriantha (pangola grass)	5	20	3.1	H/A	Hand pull or cultivation	Spot Spray: glyphosate or 2,2-DPA (ref 3)
197	Rosaceae	Enobotrya japonica (loquat)	3	5	3.1	T/O	Seedlings: Hand pull	Saplings: CS&P (G1.5); Trees: F/I (G1.5); Seedlings: spray G200 or G200 + MM or MM (ref 1)
198	Cactaceae	Acanthocereus tetragonus (sword pear)	1	1	3.3	S/O	Biological controls available; cactoblastis cactorum successful; Mechanical control difficult. Fire can be used.	Spray: Basal Bark application, Injection: Triclopyr: 8L/60L diesel, Picloram + Triclopyr: 1L/60L diesel, Amitrole: 1mL/3cm (ref 3)
199	Mimosaceae	Acacia nilotica subsp. indica (prickly acacia)	3	3	4.4?	T/A	Mechanical or chain removal	Basal Bark or cut stump application. Triclopyr 600g/L at 1.0L/120L diesel. Triclopyr + Picloram 240 g/l + 120 g/l at 1.0L/60L diesel. Picloram 45 g/kg undiluted (ref 5)
200	Mimosaceae	Acacia farnesiana (mimosa bush)	6	15	3.1	T/A	Mechanical removal of small plants	Basal Bark or cut stump application of Triclopyr + Picloram 240 g/l + 120 g/l at 1.0L/60L diesel. Foliar application of Clopyralid 300g/L at 500mL/1L water ref 5)

Explanatory notes:
 Sub-region: Number of the ten sub-regions of the Southeast Queensland bioregion (Young and Dillewaard 1999) within which species recorded
 Rec no.: Total number of records for species within study area, Queensland Herbarium CORVEG and HERBRECS data
 Scores: Based on panel data of invasiveness, 5 (highest) to 3 (moderate). ? indicate doubtful scores.
 Life forms: T-tree (woody plant >5m), ST-small tree (2-5m), S-shrub (woody <2m), H-herb (grasses & forbes), Ha-aquatic herbs.
 Source: A-agriculture, O-ornamental and landscaping, F-fish aquarium, U-unintentional introduction and/or contaminant.

Abbreviations: Control Methods
 CS&P = cut scrape and paint
 S&P = scrape and paint
 C&P = cut and paint
 F/I = frill or inject stem

Abbreviations: Herbicides
 G = Glyphosate, eg Roundup Biactive, Weedmaster Duo
 MM = Metsulfuron methyl, eg Brushoff
 F = Fluoxypyr, eg Stane

Abbreviations: Herbicide Dilution Rates for High Concentration Applications
 GU = Glyphosate undiluted
 G1 = 1 part water to 1 part glyphosate
 G1.5 = 1.5 parts water to 1 part glyphosate
 G4 = 4 parts water to 1 part glyphosate

Abbreviations: Herbicide Spray Concentrations
 G100 = 100mL glyphosate per 10L of water + surfactant, eg 20mL LI 700 per 10L
 G200 = 200mL glyphosate per 10L of water + surfactant, eg 50mL LI 700 per 10L
 G100 + MM = 100mL glyphosate + 1.5g metsulfuron methyl per 10L of water + wetting agent, eg 2mL Agral per 10L water
 G200 + MM = 200mL glyphosate + 1.5g metsulfuron methyl per 10L of water + wetting agent, eg 2mL Agral per 10L water
 MM = 1.5g metsulfuron methyl per 10L water + wetting agent, eg 2mL Agral per 10L water
 F100 = 100mL fluoxypyr per 10L water
 F150 = 150mL fluoxypyr per 10L water

Other Abbreviations
 # = Locally non-indigenous native species

Ref 1. Big Scrub Rainforest Landcare Group (2008). 'Common Weeds of Subtropical Rainforests of Eastern Australia: A practical manual on their
 Ref 2. Department of Primary Industries and Fisheries (QLD). 'Weeds and pest animals and ants'.
 Ref 3. Holland et al. (1996). 'Suburban Weeds', DPI QLD.
 Ref 4. Port Stephens Council (NSW). 'Weed Busters'.
 Ref 5. Department of Primary Industries (NSW). 'Noxious and Environmental Weed Handbook, 3rd Edition'.
 Ref 6. Department of Environment and Conservation, 'Florabase', (DEC: WA)
 Ref 7. Vitelli, J.S. and Madigan, B.A. and Van Haaren, P.E. and Setter, S. and Logan, P. (2009) Control of the invasive liana, Hiptage benghalensis. Weed Biology and Management, 9 (1), pp 54-62

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 Saunders Havill Group Pty Ltd ABN 24 144 972 949
 Brisbane • Emerald • Gladstone
 head office 9 Thompson St Bowen Hills Q 4006
 phone 1300 123 5HG web www.saundershavill.com
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40 YEARS
 1975 - 2015

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APPROVED COMPANY
 ISO 9001 Quality Management System
 APPROVED COMPANY
 ISO 14001 Environmental Management System

Issue	Date	Description	Checked
A	13/11/2017	Preliminary Issue	MS

AMENDMENTS:	Issue	Date	Description	Checked

CLIENT:
 PROJECT: Spring Mountain Precinct
 SCALE: AS NOTED

landscape architecture

DRAWING:
 Area 4 Management Plan
 Weed Management Techniques

DATE: November 17 CHECKED: MS
 CLIENT REF.: 7243 DRAWN: TL
 DRAWING No.: 7243 L 416 WMP A

Spring Mountain Precinct

AREA 4 MANAGEMENT PLAN - MONITORING & REPORTING

MONITORING & REPORTING

MONITORING AND REPORTING PROCEDURES

Monitoring and maintenance of the weed management and vegetation, both adjacent to proposed works and within the management area, is a vital component to the success of this management plan set.

An ongoing maintenance schedule, detailing the monitoring program, management intervals, methodologies, and corrective actions for contractors undertaking rehabilitation works within the ecological area is provided below. It is the responsibility of the rehabilitation landscape contractor to ensure the ongoing maintenance and monitoring schedule is actioned. Monitoring of the parkland weed management and revegetation works allows for:

- A review of the pre-established performance indicators for measuring the success of the weed removal and control;
- Ensure the level of protection for existing identified native vegetation inclusive of that which has naturally regenerated;
- Review the rate of spread or contraction of weed infestation within the control program;
- Monitor the rate of assisted regeneration and revegetation of desirable native species promoted in areas where weeds have been removed; and
- Identification of new weed threats or other factors which may be effecting areas designated for ecological rehabilitation.

Monitoring is required for weed eradication, revegetation and assisted regeneration.

MAINTENANCE ACTIONS AND METHODOLOGIES

Tree Retention - Construction Phase

- Ecologist / Arborist to assess tree exclusion zones are adhered to;
- Trees assessed for signs of stress or die back; and
- Implementation of VMP if retained tree roots Critical Root Zone (CRZ) is impacted upon.

Initial Establishment - Rehabilitation Planting

Initial 12 week establishment period applies to all rehabilitation planting works. During this period weekly maintenance is to occur that involves the following:

- Watering;
- Ongoing weed control;
- Fertilising; and
- Replacement of dead or damaged stock.

Ongoing Maintenance - Rehabilitation Planting

After this period, it is recommended that the ecological planting site be maintained on a monthly basis over a 5 year period to ensure that the planting has been successful. The following is to occur:

- Conduct weed spraying, plant watering, plant replacement of losses as necessary to maintain >95% survival rate;
- All other areas of non-use / limited access or steep terrain areas are to be hydro seeded to maintain a minimum 90% ground cover;
- All planting species will be disease free and supplied from an accredited nursery supplier;
- Assess condition of sediment control devices and replace if necessary; and
- Removal of excess sediment from erosion control devices as required.

MONITORING TIME FRAMES

For weed removal and revegetation three (3) Council determined timeframes form the anchor of the monitoring process. These include:

Council Pre-Start - On-site meeting prior to the initial commencement of work within each stage of weed management. Will involve Consultant, Contractor and Council to work through weed treatment areas and clarify works approved and appointed.

On-Maintenance - At the completion of the Primary Weed Removal Stage and Secondary weeding an On-Maintenance meeting will be held with Council to inspect the works on-site in relation to the approved plans and previously agreed on-maintenance criteria.

Off-Maintenance - At the completion of all site weeding works and the agreed maintenance timeframe a final inspection will be held by Council to determine if works have been completed to the required level for Council hand over.

REPORTING

Reporting to Ipswich City Council will occur on a yearly interval during the total period. Council will physically attend the Pre-Start, On-maintenance and Off-maintenance meetings. For this project it is recommended reporting include a short memo styled report responding to agreed criteria. As part of the monitoring a number of pre-determined transect and quadrant sampling sites have been allocated. At these locations a number of baseline studies have been completed and will be repeated post weed removal and maintenance to measure the success of the programmed works. It is also recommended this include a visual diary of imagery from selected locations at each inspection (Including the pre-start and monthly inspections). The imagery for the each period will be included with the report to Council.

In addition to the photo monitoring the biannual report to Council should include sufficient information on:

- Date, time and whether conditions at time of inspection
- Changes in weed extent populations (spreading / contracting)
- Changes in weed densities
- Health of existing vegetation protected by NRM provisions
- Rate of success for revegetation plantings
- Growth and PFC rate of assisted regeneration areas
- Occurrences of new weed infestations or species outbreaks
- Comments on any indirect changes to the area as a result of weed management (ie erosion / change in weed footprints / death to natives)
- Annual reporting is required to be sent to the Department of the Environment (DOE).

NOTES

MONITORING PARAMETERS

The monitoring should address the following issues:

- Maintained health and vigour of retained Remnant Trees adjacent to the corridor;
- Plant growth, percentage cover and survival rates;
- Plant losses through herbivores, disease, vandalism, storm damage or other factors;
- Weed re-growth and control measures;
- Plant replacement;
- Maintenance watering regime; and
- Erosion prevention.

It is also essential to keep an accurate photo record of the retained trees and progress of the rehabilitation planting by setting fixed photo monitoring points across the site. Photos should be taken by a digital camera and recorded in the project file by date and discrete photo monitoring point number. Photo monitoring point locations should be clearly marked on site and mapped by a surveyor or by GPS.

Corrective Actions

If trees adjacent to the sewer alignment disturbance are dying or impacted upon:

- Monitor construction activity;
- Educated construction team on tree retention measures;
- Review and / or respond to tree retention mitigation measures ie. exclusion zones;
- Review VMP for particular trees;
- Remove if necessary unsafe tree;
- Compensation by planting;
- If soil erosion is still occurring in planting zones the following is to occur:
- Review rehabilitation techniques conducted by contractor;
- Assess the potential for disturbance to occur;
- Assess other potential sources or causes of disturbances to occur; and
- Maintain planting regimes to a minimum of 95% survival rate.

If weed infestations occur in planting zones or in disturbed construction area, the following is to occur:

- Review weed removal and weed management techniques conducted by contractor;
- Assess the appropriate use and amounts of herbicides are being used;
- Assess the potential for weeds to occur; and
- Assess other potential sources or causes of weeds to occur.

If there is poor regeneration of plants occurring in ecological areas, the following is to occur:

- Review planting and direct seeding management techniques conducted by contractor;
- Assess the appropriate use and amounts of herbicides are being used in planting areas;
- Assess the potential for weeds to occur in ecological areas; and
- Assess other potential sources or causes of weeds or limited re-growth of native plants to occur, ie. plant pests and disease monitoring.

RESOURCES / ROLES & RESPONSIBILITIES

All resources required to implement this plan will be provided by the proponent (Lendlease). The following roles are applicable:

PROONENT

- Ensure all consultants, contractors, sub contractors or others utilizing the area are aware of the Weed Management Plan.
- Appoint appropriate consultants and contractors to undertake works as prescribed on the drawings and conditioned by Ipswich City Council.
- Cover the costs of all necessary resources to ensure works are completed as per the approved documents.

CONSULTANTS

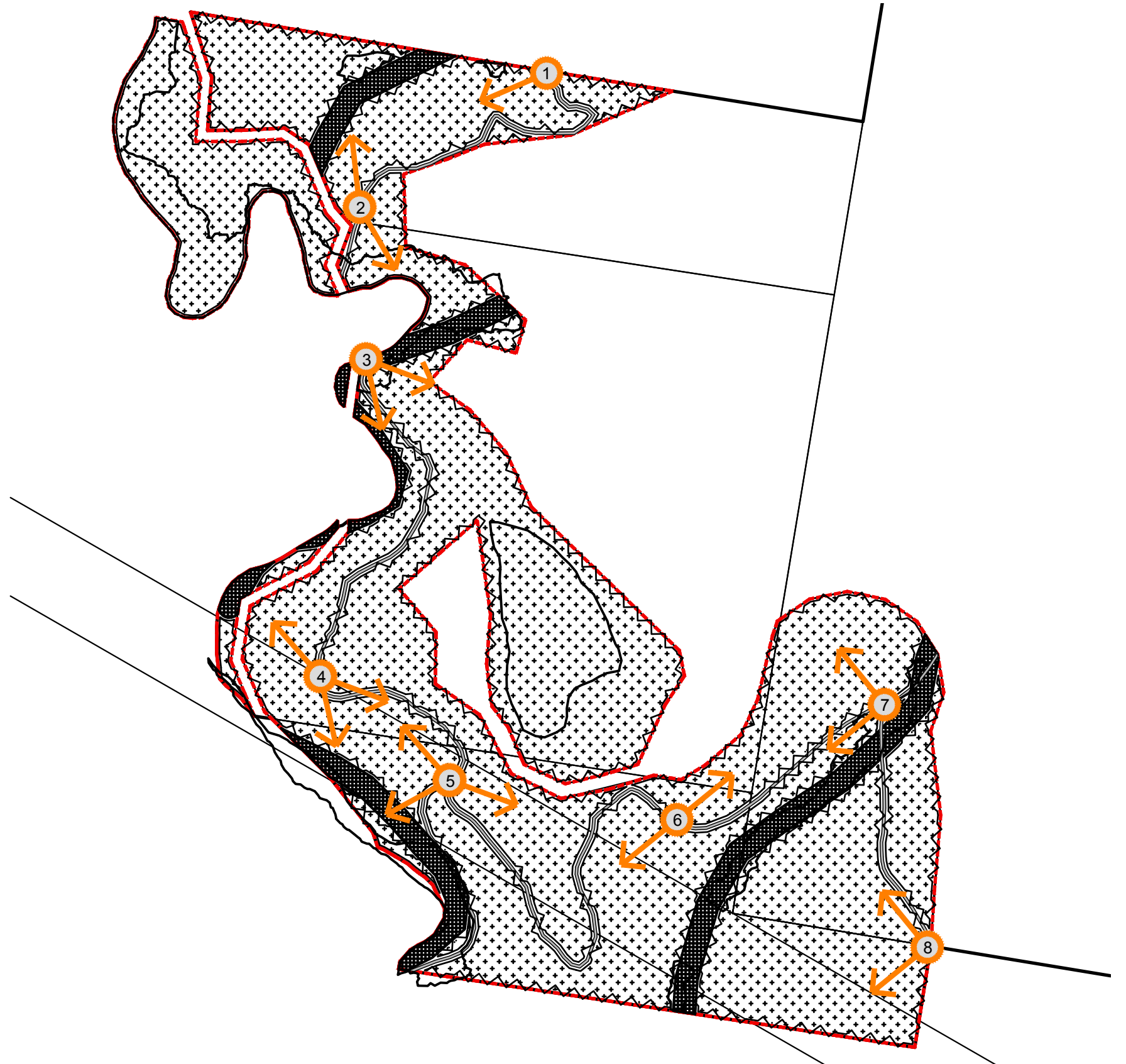
- Brief the proponent on their requirements in implementing and maintaining works as per the Weed Management Plan.
- Attend pre start, on maintenance and off maintenance meetings.
- Undertake monitoring and reporting to Ipswich City Council as set up by this document.
- Be available to respond to technical queries or departures to the approved documentation when on-site conditions require changes.
- Liaise with Council throughout all stages of approval, initial works and maintenance of works.

COUNCIL

- Provide technical expertise via commentary on the approval of documentation.
- Attend pre-start, on and off maintenance inspections.
- Undertake random inspections through the Secondary weed management and Maintenance weed management phases.
- Accept and review biannual reports as dictated in this document.

CONTRACTOR

- Complete works in strict accordance with the documentation.
- Recommend changes to the documentation when specific experience or on-site conditions require so.
- Attend pre-start, on and off maintenance inspections.



AMENDMENTS:			
Issue	Date	Description	Checked
A	13/11/2017	Preliminary Issue	MS

CLIENT:	
PROJECT:	Spring Mountain Precinct
SCALE:	NOT TO SCALE

Appendix N

Weed management progress results

Spring Mountain Precinct

CONSERVATION AREAS WEED MANAGEMENT - PROGRESS AREAS



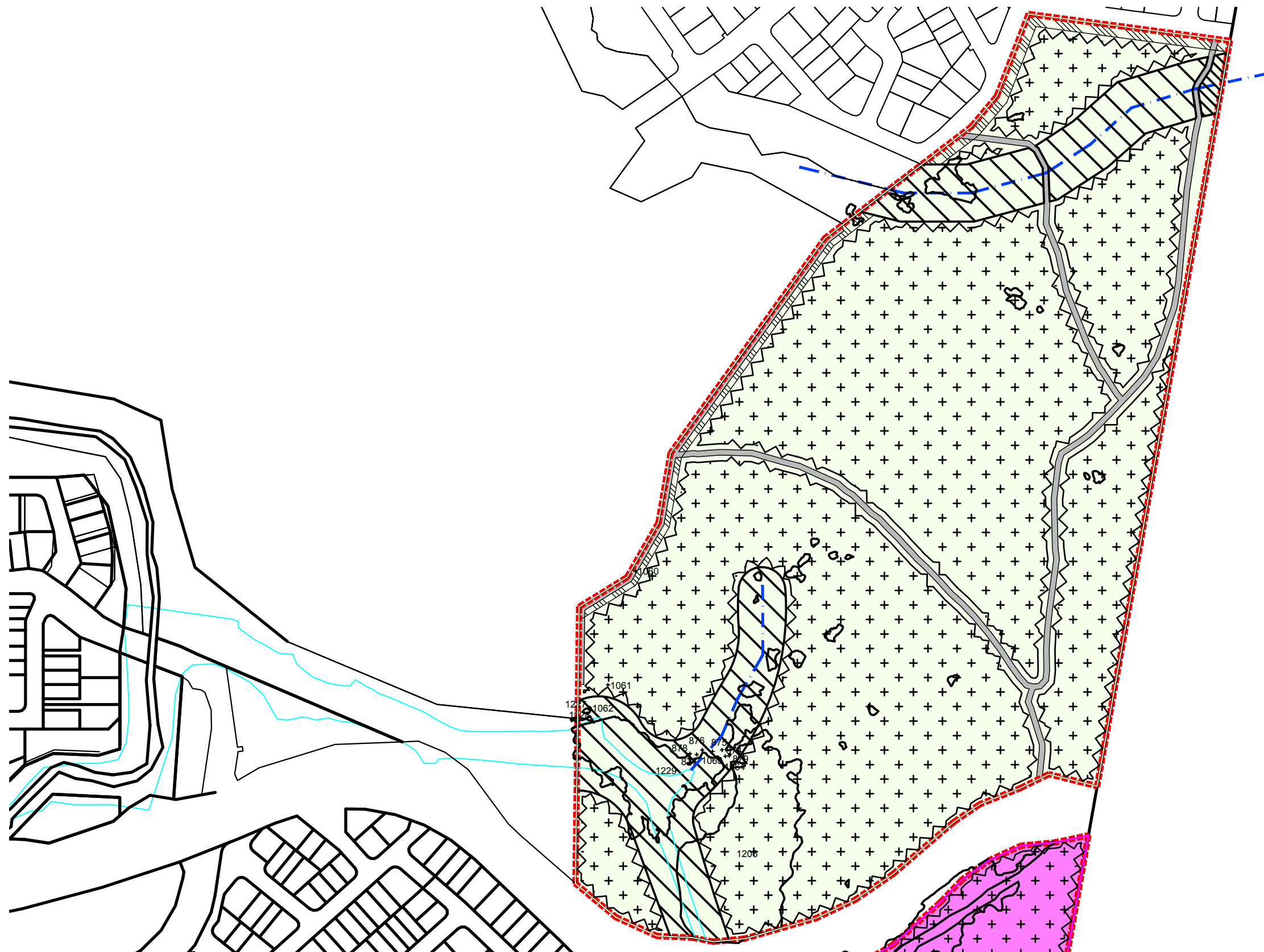
LEGEND

- August 2018 works
- September/October 2018 works
- November 2018 works
- December 2018 works
- January 2019 works
- February 2019 works
- March 2019 works

AMENDMENTS:			
Issue	Date	Description	Checked
A	06/02/2019	Preliminary Issue	MS

CLIENT:	
PROJECT:	Spring Mountain Precinct
SCALE:	AS NOTED

CONSERVATION AREAS WEED MANAGEMENT - PROGRESS AREAS

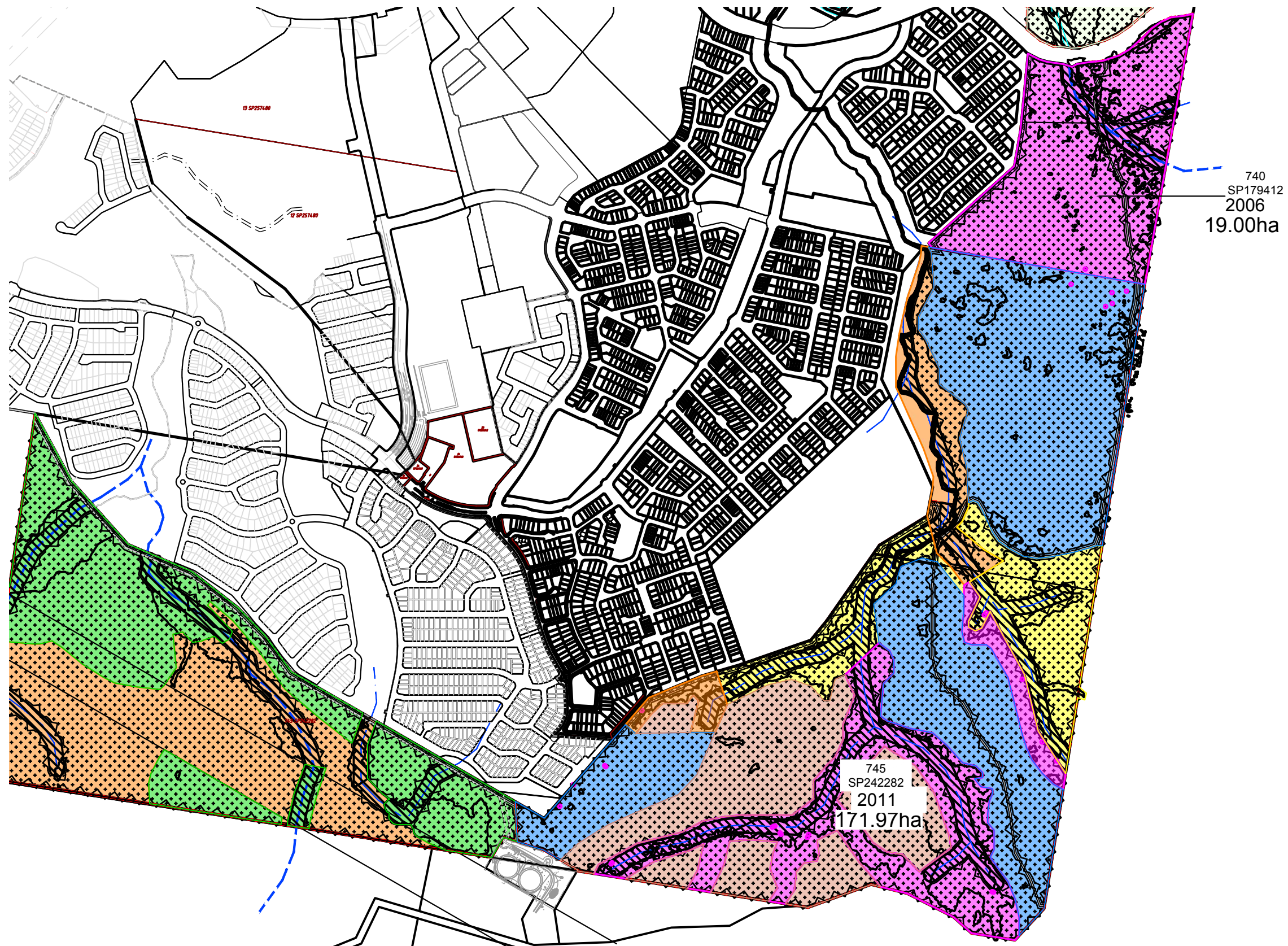


AMENDMENTS:			
Issue	Date	Description	Checked
A	06/02/2019	Preliminary Issue	MS

CLIENT:	
PROJECT:	Spring Mountain Precinct
SCALE:	AS NOTED

Spring Mountain Precinct

CONSERVATION AREAS WEED MANAGEMENT - PROGRESS AREAS

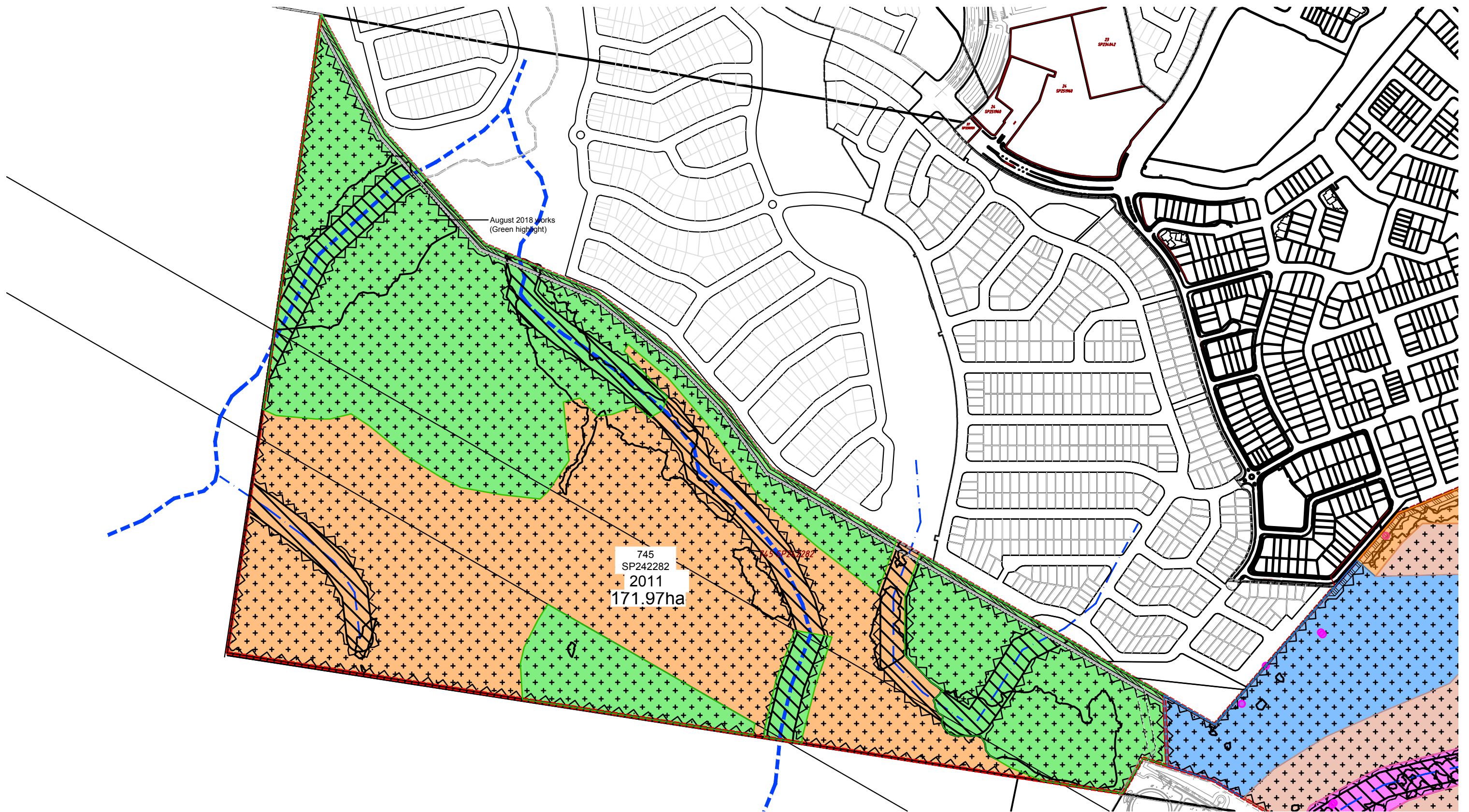


AMENDMENTS:			
Issue	Date	Description	Checked
A	06/02/2019	Preliminary Issue	MS

CLIENT:	
PROJECT:	Spring Mountain Precinct
SCALE:	AS NOTED

Spring Mountain Precinct

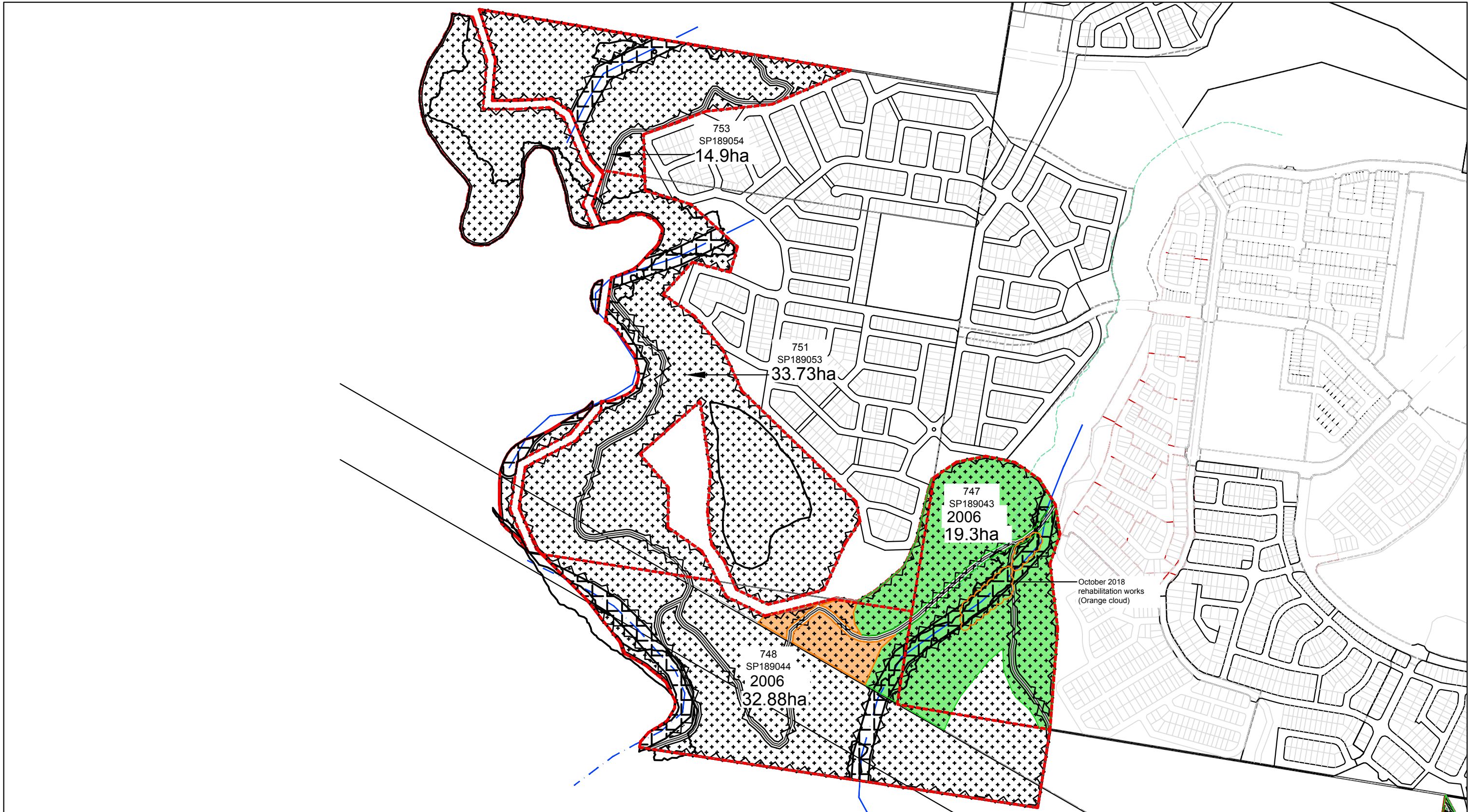
CONSERVATION AREAS WEED MANAGEMENT - PROGRESS AREAS



AMENDMENTS:			
Issue	Date	Description	Checked
A	06/02/2019	Preliminary Issue	MS

CLIENT:	
PROJECT:	Spring Mountain Precinct
SCALE:	AS NOTED

CONSERVATION AREAS WEED MANAGEMENT - PROGRESS AREAS



AMENDMENTS:			
Issue	Date	Description	Checked
A	06/02/2019	Preliminary Issue	MS

CLIENT:	
PROJECT:	Spring Mountain Precinct
SCALE:	AS NOTED

Appendix O

Weed management and rehabilitation photo monitoring

SH saunders
havill
group



i c w f -y y
P - w N -w
- vx W -

b- z -w -P - N w wf b z
D: A@
@_ : 89F

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n	i c w f -y y P - w N-w h- w w f c h-
R	D889 i w w x O - wz4i c w
c g	FACB
T	b- z -w-

m s

b	U	i S	T S
R w h-	: F&D6 89F	j b y	c w i w z-

m

j - w x-- - w-z • b- z -w- P - N wwf bz6iw z- Vw U
 yw wy- - x • w - • - wy- -y - • - x w z w 6

D

h- wz7 w x - w x- y z-z S - w c w w- - -
 -z y - 6



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		966	f - •h-		9:
		966	S vk f c i -		9:
A7	i f				:C
		:06	f c f N9u89		9B
		:66	f c f N9u8:		9F
		:@6	f c f N9u8@		:@
		:A6	f c f N9u8A		:D
		:B6	f c f N9u8B		@9
		:C6	f c f N9u8C		@B
		:D6	f c f N9u8D		@F
		:E6	f c f N9u8E		A@
		:F6	f c f N: u89		AD
		:086	f c f N: u8:		B9
		:096	f c f N: u8@		BB
		:0:6	f c f N: u8A		BF
		:0@6	f c f N: u8B		C@
		:0A6	f c f N: u8C		CD
		:0B6	f c f N: u8D		D9
		:0C6	f c f N: u8E		DB
		:0D6	f c f N: u8F		DF
		:0E6	f c f N@u89		E@
		:0F6	f c f N@u8:		ED
		:686	f c f N@u8@		F9
		:696	f c f N@u8A		FB
		:6:6	f c f N@u89		FF



I h

: 6 @6 f	c	f	NAu8:	98@
: 6 A6 f	c	f	NAu8@	98D
: 6 B6 f	c	f	NAu8A	999
: 6 C6 f	c	f	NAu8B	99B
: 6 D6 f	c	f	NAu8C	99F
: 6 E6 f	c	f	NAu8D	9: @
: 6 F6 f	c	f	NAu8E	9: D



O

- T -9 i -P -
- T -: f c f N9u89S 5Ow- -
- T -@ f c f N9u89S
- T -A f c f N9u89d 5Ow- -
- T -B f c f N9u89d
- T -C f c f N9u89i 5Ow- -
- T -D f c f N9u89i
- T -E f c f N9u89m 5Ow- -
- T -F f c f N9u89m
- T -98 f c f N9u8: S 5Ow- -
- T -99 f c f N9u8: S
- T -9: f c f N9u8: d 5Ow- -
- T -9@ f c f N9u8: d
- T -9A f c f N9u8: i 5Ow- -
- T -9B f c f N9u8: i
- T -9C f c f N9u8: m 5Ow- -
- T -9D f c f N9u8: m
- T -9E f c f N9u8@d 5Ow- -
- T -9F f c f N9u8@d
- T -:8 f c f N9u8@d 5Ow- -
- T -:9 f c f N9u8@d
- T -: : f c f N9u8@ 5Ow- -
- T -: @ f c f N9u8@
- T -: A f c f N9u8@ 5Ow- -
- T -: B f c f N9u8@m
- T -: C f c f N9u8AS 5Ow- -
- T -: D f c f N9u8AS
- T -: E f c f N9u8Ad 5Ow- -
- T -: F f c f N9u8Ad
- T -@8 f c f N9u8Ai 5Ow- -
- T -@9 f c f N9u8Ai
- T -@ f c f N9u8Am 5Ow- -
- T -@@ f c f N9u8Am
- T -@A f c f N9u8BS 5Ow- -
- T -@B f c f N9u8BS
- T -@C f c f N9u8Bd 5Ow- -
- T -@D f c f N9u8Bd
- T -@E f c f N9u8Bi 5Ow- -



I h

T -@f f c f N9u8Bi
T -A8 f c f N9u8Bm 50w- -
T -A9 f c f N9u8Bm
T -A: f c f N9u8CS 50w- -
T -A@ f c f N9u8CS
T -AA f c f N9u8Cd 50w- -
T -AB f c f N9u8Cd
T -AC f c f N9u8Ci 50w- -
T -AD f c f N9u8Ci
T -AE f c f N9u8Cm 50w- -
T -AF f c f N9u8Cm
T -B8 f c f N9u8DS 50w- -
T -B9 f c f N9u8DS
T -B: f c f N9u8Dd 50w- -
T -B@ f c f N9u8Dd
T -BA f c f N9u8Di 50w- -
T -BB f c f N9u8Di
T -BC f c f N9u8Dm 50w- -
T -BD f c f N9u8Dm
T -BE f c f N9u8ES 50w- -
T -BF f c f N9u8ES
T -C8 f c f N9u8Ed 50w- -
T -C9 f c f N9u8Ed
T -C: f c f N9u8Ei 50w- -
T -C@ f c f N9u8Ei
T -CA f c f N9u8Em 50w- -
T -CB f c f N9u8Em
T -CC f c f N: u89S 50w- -
T -CD f c f N: u89S
T -CE f c f N: u89d 50w- -
T -CF f c f N: u89d
T -D8 f c f N: u89i 50w- -
T -D9 f c f N: u89i
T -D: f c f N: u89m 50w- -
T -D@ f c f N: u89m
T -DA f c f N: u8: S 50w- -
T -DB f c f N: u8: S
T -DC f c f N: u8: d 50w- -
T -DD f c f N: u8: d
T -DE f c f N: u8: i 50w- -
T -DF f c f N: u8: i



I h

T	-E8	f c f N: u8: m 5Ow- -
T	-E9	f c f N: u8: m
T	-E:	f c f N: u8@S 5Ow- -
T	-E@	f c f N: u8@S
T	-EA	f c f N: u8@d 5Ow- -
T	-EB	f c f N: u8@d
T	-EC	f c f N: u8@ 5Ow- -
T	-ED	f c f N: u8@
T	-EE	f c f N: u8@m 5Ow- -
T	-EF	f c f N: u8@m
T	-F8	f c f N: u8AS 5Ow- -
T	-F9	f c f N: u8AS
T	-F:	f c f N: u8Ad 5Ow- -
T	-F@	f c f N: u8Ad
T	-FA	f c f N: u8Ai 5Ow- -
T	-FB	f c f N: u8Ai
T	-FC	f c f N: u8Am 5Ow- -
T	-FD	f c f N: u8Am
T	-FE	f c f N: u8BS Ow- -
T	-FF	f c f N: u8BS
T	-988	f c f N: u8Bd Ow- -
T	-989	f c f N: u8Bd
T	-98:	f c f N: u8Bi Ow- -
T	-98@	f c f N: u8Bi
T	-98A	f c f N: u8Bm Ow- -
T	-98B	f c f N: u8Bm
T	-98C	f c f N: u8CS 5Ow- -
T	-98D	f c f N: u8CS
T	-98E	f c f N: u8Cd 5Ow- -
T	-98F	f c f N: u8Cd
T	-998	f c f N: u8Ci 5Ow- -
T	-999	f c f N: u8Ci
T	-99:	f c f N: u8Cm 5Ow- -
T	-99@	f c f N: u8Cm
T	-99A	f c f N: u8DS 5Ow- -
T	-99B	f c f N: u8DS
T	-99C	f c f N: u8Dd 5Ow- -
T	-99D	f c f N: u8Dd
T	-99E	f c f N: u8Di 5Ow- -
T	-99F	f c f N: u8Di
T	-9: 8	f c f N: u8Dm 5Ow- -



I h

T	-9: 9	f c f N: u8Dm
T	-9: :	f c f N: u8ES 5Ow - -
T	-9: @	f c f N: u8ES
T	-9: A	f c f N: u8Ed 5Ow - -
T	-9: B	f c f N: u8Ed
T	-9: C	f c f N: u8Ei 5Ow - -
T	-9: D	f c f N: u8Ei
T	-9: E	f c f N: u8Em 5Ow - -
T	-9: F	f c f N: u8Em
T	-9@8	f c f N: u8FS 5Ow - -
T	-9@9	f c f N: u8FS
T	-9@a	f c f N: u8Fd 5Ow - -
T	-9@@	f c f N: u8Fd
T	-9@A	f c f N: u8Fi 5Ow - -
T	-9@B	f c f N: u8Fi
T	-9@C	f c f N: u8Fm 5Ow - -
T	-9@d	f c f N: u8Fm
T	-9@E	f c f N@u89S 5Ow - -
T	-9@F	f c f N@u89S
T	-9A8	f c f N@u89d 5Ow - -
T	-9A9	f c f N@u89d
T	-9A:	f c f N@u89i 5Ow - -
T	-9A@	f c f N@u89i
T	-9AA	f c f N@u89m 5Ow - -
T	-9AB	f c f N@u89m
T	-9AC	f c f N@u8: S 5Ow - -
T	-9AD	f c f N@u8: S
T	-9AE	f c f N@u8: d 5Ow - -
T	-9AF	f c f N@u8: d
T	-9B8	f c f N@u8: i 5Ow - -
T	-9B9	f c f N@u8: i
T	-9B:	f c f N@u8: m 5Ow - -
T	-9B@	f c f N@u8: m
T	-9BA	f c f N@u8@ 5Ow - -
T	-9BB	f c f N@u8@
T	-9BC	f c f N@u8@d 5Ow - -
T	-9BD	f c f N@u8@d
T	-9BE	f c f N@u8@ 5Ow - -
T	-9BF	f c f N@u8@
T	-9C8	f c f N@u8@m 5Ow - -
T	-9C9	f c f N@u8@m



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T	-9C:	f c f NAu8AS 5Ow - -
T	-9C@	f c f NAu8AS
T	-9CA	f c f NAu8Ad 5Ow - -
T	-9CB	f c f NAu8Ad
T	-9CC	f c f NAu8Ai 5Ow - -
T	-9CD	f c f NAu8Ai
T	-9CE	f c f NAu8Am 5Ow - -
T	-9CF	f c f NAu8Am
T	-9D8	f c f NAu89S 5Ow - -
T	-9D9	f c f NAu89S
T	-9D:	f c f NAu89d 5Ow - -
T	-9D@	f c f NAu89d
T	-9DA	f c f NAu89i 5Ow - -
T	-9DB	f c f NAu89i
T	-9DC	f c f NAu89m 5Ow - -
T	-9DD	f c f NAu89m
T	-9DE	f c f NAu8: S 5Ow - -
T	-9DF	f c f NAu8: S
T	-9E8	f c f NAu8: d 5Ow - -
T	-9E9	f c f NAu8: d
T	-9E:	f c f NAu8: i 5Ow - -
T	-9E@	f c f NAu8: i
T	-9EA	f c f NAu8: m 5Ow - -
T	-9EB	f c f NAu8: m
T	-9EC	f c f NAu8@S 5Ow - -
T	-9ED	f c f NAu8@S
T	-9EE	f c f NAu8@d 5Ow - -
T	-9EF	f c f NAu8@d
T	-9F8	f c f NAu8@i 5Ow - -
T	-9F9	f c f NAu8@i
T	-9F:	f c f NAu8@m 5Ow - -
T	-9F@	f c f NAu8@m
T	-9FA	f c f NAu8AS 5Ow - -
T	-9FB	f c f NAu8AS
T	-9FC	f c f NAu8Ad 5Ow - -
T	-9FD	f c f NAu8Ad
T	-9FE	f c f NAu8Ai 5Ow - -
T	-9FF	f c f NAu8Ai
T	-: 88	f c f NAu8Am 5Ow - -
T	-: 89	f c f NAu8Am
T	-: 8:	f c f NAu8BS 5Ow - -



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T -: 8@ f c f NAu8BS
 T -: 8A f c f NAu8Bd 5Ow- -
 T -: 8B f c f NAu8Bd
 T -: 8C f c f NAu8Bi 5Ow- -
 T -: 8D f c f NAu8Bi
 T -: 8E f c f NAu8Bm 5Ow- -
 T -: 8F f c f NAu8Bm
 T -: 98 f c f NAu8CS 5Ow- -
 T -: 99 f c f NAu8CS
 T -: 9: f c f NAu8Cd 5Ow- -
 T -: 9@ f c f NAu8Cd
 T -: 9A f c f NAu8Ci 5Ow- -
 T -: 9B f c f NAu8Ci
 T -: 9C f c f NAu8Cm 5Ow- -
 T -: 9D f c f NAu8Cm
 T -: 9E f c f NAu8DS 5Ow- -
 T -: 9F f c f NAu8DS
 T -:: 8 f c f NAu8Dd 5Ow- -
 T -:: 9 f c f NAu8Dd
 T -::: f c f NAu8Di 5Ow- -
 T -:::@ f c f NAu8Di
 T -:::A f c f NAu8Dm 5Ow- -
 T -:::B f c f NAu8Dm
 T -:::C f c f NAu8ES 5Ow- -
 T -:::D f c f NAu8ES
 T -:::E f c f NAu8Ed 5Ow- -
 T -:::F f c f NAu8Ed
 T -: @8 f c f NAu8Ei 5Ow- -
 T -: @9 f c f NAu8Ei
 T -: @ f c f NAu8Em 5Ow- -
 T -: @@ f c f NAu8Em

j wx -9G f - i w
 j wx -: G h- wx w c T

f w 9 l w -Ei •-z h -h- wx w f c b yw



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n :J i m

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R	@E8Vw
e _ R	W y P P y
V e o	S wyw w z

Æ m

P - w 4i c w z- - - yw-z - - •i •-z P- w4w w-
 9@ -w •W y P w z w w- :C - •O xw-P 6j - - x z--z
 x y -yw z-- - w z -z yw w •wy - w yw-z i •-z P- w -
 -w 4 w - z- w z-- - - -w w z w - - -w-z wy- • - - w z
 w yw-z m -h y 5 c w P - w S w- - 5 - 6j -z-- -
 - yw-z -U-w- i •-z z-- - w-wwz - 5 - - -z - •
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W : m T





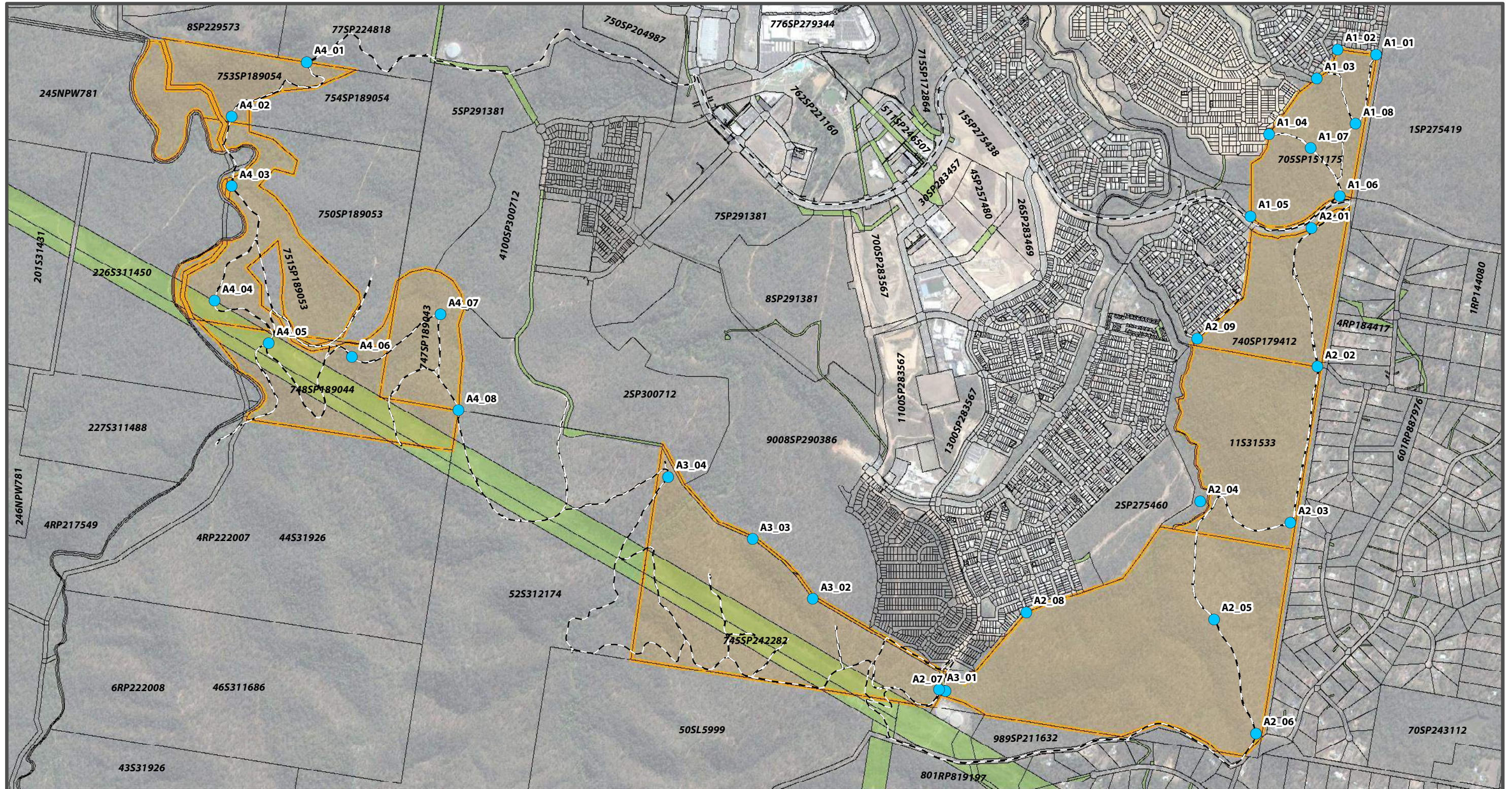
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Æ C

j - . - z- . - --z w w - - w z - w w
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 -y . - --z w w - - w z - w w w-w w- - -z z- zw- w z
 x - - - w w y - 6
 c w z - w w w-wy yw y - . w - w -y w . w w -z
 - - wy - yw -y . z--y x-- - - x-y - w - y x -
 y- . w z w - w w - - 6 4 wy - w z w w-z y - w z-
 z- - . x - - y z y-z - w-w w z- . -w- - .
 yy- w -z y-z - y- 6

Æ C n y

j - . - -y z--z - w w z - - w . - - -y z G
 Pw-- - -y - yw . - w x- - - w - . - -6
 P z- w - . - w - 4 - -wz -y 4 w - w - -
 y-w-w w w wj y-w- -y -w-wz - - w - - . - y- -7 x-y 6
 S w x- - - - w z w - x-y w - - -z . - 6
 W-w 4 -w i bh yw -w wB8 - w z . y . 6
 k - - w -yw -w - w - - .yw -w-wy - - w- 6
 N w w- - . - w - 4w z w - w - - 6
 c - w-wz w z - w z w- w - w - - .zw 6
 W- . - -y- w x- x- - 6
 j w-wy . - - w - - w z - y w- - -z .
 - - -y - y 6
 W-w 4 - -w-z w w z x- w- w - w - - -w 6
 h-- - . w z yw - - -y -z yw . - h- w w N -w 6



Legend

- QLD dcdb
- Offset area
- Easement
- Photopoint location
- Track

Ref	eastings	northings	longitude	latitude	Ref	eastings	northings	longitude	latitude	Ref	eastings	northings	longitude	latitude	Ref	eastings	northings	longitude	latitude
A1_01	492986	6938330	152.9290	-27.6792	A2_01	492691	6937540	152.9260	-27.6864	A3_01	490993	6935430	152.9090	-27.7054	A4_01	488107	6938300	152.8790	-27.6795
A1_02	492810	6938350	152.9270	-27.6790	A2_02	492718	6936910	152.9260	-27.6921	A3_02	490416	6935850	152.9030	-27.7016	A4_02	487765	6938050	152.8760	-27.6817
A1_03	492716	6938220	152.9260	-27.6802	A2_03	492596	6936190	152.9250	-27.6985	A3_03	490141	6936120	152.9000	-27.6992	A4_03	487765	6937730	152.8760	-27.6846
A1_04	492498	6937970	152.9240	-27.6825	A2_04	492184	6936290	152.9210	-27.6976	A3_04	489756	6936400	152.8960	-27.6966	A4_04	487686	6937210	152.8750	-27.6893
A1_06	492821	6937680	152.9270	-27.6850	A2_05	492247	6935750	152.9210	-27.7025						A4_05	487934	6937010	152.8780	-27.6911
A1_07	492687	6937900	152.9260	-27.6831	A2_06	492438	6935230	152.9230	-27.7072						A4_06	488313	6936950	152.8810	-27.6916
A1_08	492892	6938010	152.9280	-27.6821	A2_07	491022	6935430	152.9090	-27.7054						A4_07	488718	6937140	152.8860	-27.6899
A1_05	492413	6937590	152.9230	-27.6859	A2_08	491390	6935780	152.9130	-27.7022						A4_08	488799	6936710	152.8860	-27.6938
					A2_09	492171	6937040	152.9210	-27.6909										



CLIENT:

DISCLAIMER:

THESE PLANS HAVE BEEN PREPARED FOR THE EXCLUSIVE USE OF THE CLIENT. SAUNDERS HAVILL GROUP CANNOT ACCEPT RESPONSIBILITY FOR ANY USE OR RELIANCE UPON THE CONTENTS OF THESE DRAWING BY ANY THIRD PARTY. CONFIRM ALL DIMENSIONS ON SITE PRIOR TO CONSTRUCTION AND DO NOT SCALE FROM THE DRAWINGS. ALL DIMENSIONS ARE IN MILLIMETRES. ANY DISCREPANCIES SHOULD BE CLARIFIED IN WRITING WITH SAUNDERS HAVILL GROUP PRIOR TO THE COMMENCEMENT OF WORK. PRIOR TO ANY DEMOLITION, EXCAVATION OR CONSTRUCTION ON SITE, THE RELEVANT AUTHORITY SHOULD BE CONTACTED FOR FURTHER UNDER-GROUND SERVICES AND DETAILED LOCATIONS OF ALL SERVICES.

1:17,500 @ A3
GDA 1994 MGA Z56

Issue	Date	Description	Drawn - Checked
A	25 July 2018	Original issue	JB - TL

PROJECT:

Offset area, Spring Mountain Conservation Park

environmental management

TITLE:
OFFSET AREA PHOTOPPOINT LOCATIONS

DATE: 25 JULY 2018
 PROJECT REF: 7243 E PHOTOPPOINT LOCATIONS
 DRAWING No.: 7243 E Photopoint locationsA

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f- w- w-x-- - wx -z wy - -w w • -
 w - -P - w N-w6j - - - • x- z- w- -xw- -
 - y z w 4w - w - w -y 6Nzz w• - w-
 x- y z-z w -y - •-wy w - -y 6



I 00 y hFEF
W A i f i R: -9: V6S



W B i f i R: -9: V





W C i f i R: -9: g 6S



W D i f i R: -9: g





W E i f i R: -9: m6S



W F i f i R: -9: m





W G i f i R: -9: r 6S



W l i f i R: -9: r





I h

I C C y h F E I
W : 9 i f i R: -9AV6S



W :: i f i R: -9AV





W : A i f i R: -9Ag 6S



W : B i f i R: -9Ag





W : C i f i R: -9Am6S



W : D i f i R: -9Am





W : E i f i R: -9Ar 6S



W : F i f i R: -9Ar





I 0C y hFEM

W :G i f i R: -9BV6S



W :l i f i R: -9BV





W A9 i f i R: -9Bg 6S



W A: i f i R: -9Bg





W AA i f i R: -9Bm6S



W AB i f i R: -9Bm





W AC i f i R: -9Br 6S



W AD i f i R: -9Br





I h

I OC y hFEO
W AE i f i R: -9CV6S



W AF i f i R: -9CV





l h

W AG i f i R: -9Cg 6S



W AI i f i R: -9Cg





W B9 i f i R: -9Cm6S



W B: i f i R: -9Cm





W BA i f i R: -9Cr 6S



W BB i f i R: -9Cr





I h

I PC y hFEP
W BC i f i R: -9DV6S



W BD i f i R: -9DV





W BE i f i R: -9Dg 6S



W BF i f i R: -9Dg





W BG i f i R: -9Dm6S



W Bl i f i R: -9Dm





W C9 i f i R: -9Dr 6S



W C: i f i R: -9Dr





I h

I RC y hFER
W CA i f i R: -9EV6S



W CB i f i R: -9EV





W CC i f i R: -9Eg 6S



W CD i f i R: -9Eg





W CE i f i R: -9Em6S



W CF i f i R: -9Em





W CG i f i R: -9Er 6S



W CI i f i R: -9Er





I h

I SC y hFES
W D9 i f i R: -9FV6S



W D i f i R: -9FV





W DA i f i R: -9Fg 6S



W DB i f i R: -9Fg





W DC i f i R: -9Fm6S



W DD i f i R: -9Fm





W DE i f i R: -9Fr 6S



W DF i f i R: -9Fr





I h

I CC y hFET
W DG i f i R: -9GV6S



W D i f i R: -9GV





W E9 i f i R: -9Gg 6S



W E: i f i R: -9Gg





W EA i f i R: -9Gm6S



W EB i f i R: -9Gm





W EC if i R: -9Gr 6S



W ED if i R: -9Gr





l h

I C C y h l E F
W E E i f i RA-9: V6S



W E F i f i RA-9: V





W EG i f i RA-9: g 6S



W EI i f i RA-9: g





W F9 i f i RA-9: m6S



W F: i f i RA-9: m





W FA if i RA-9:r 6S



W FB if i RA-9:r





I h

I E C y h l E l
W F C i f i RA-9AV6S



W F D i f i RA-9AV





W FE if i RA-9Ag 6S



W FF if i RA-9Ag





W FG i f i RA-9Am6S



W FI i f i RA-9Am





W G i f i RA-9Ar 6S



W G i f i RA-9Ar



l h



I ~~EE~~ y hI EM
W GA if i RA-9BV6S



W GB if i RA-9BV



W GC i f i RA-9Bg 6S



W GD i f i RA-9Bg



W GE i f i RA-9Bm6S



W GF i f i RA-9Bm



W GG i f i RA-9Br 6S



W G i f i RA-9Br



l h

I & C y h l € O
W 19 i f i RA-9CV6S



W l: i f i RA-9CV





W IA if i RA-9Cg 6S



W IB if i RA-9Cg





W IC i f i RA-9Cm6S



W ID i f i RA-9Cm





W IE if i RA-9Cr 6S



W IF if i RA-9Cr





I h

I CVC y hI EP
W IG if i RA-9DV S



W II if i RA-9DV





W :99 i f i RA-9Dg S



W :9: i f i RA-9Dg





W : 9A i f i RA-9Dm S



W : 9B i f i RA-9Dm





W :9C i f i RA-9Dr S



W :9D i f i RA-9Dr





I 00 y hI ER

W :9E i f i RA-9EV6S



W :9F i f i RA-9EV





W :9G i f i RA-9Eg 6S



W :9I i f i RA-9Eg





W ::9 i f i RA-9Em6S



W ::: i f i RA-9Em





W :: A i f i RA-9Er 6S



W :: B i f i RA-9Er





l h

I PC y hI ES

W ::C if i RA-9FV6S



W ::D if i RA-9FV





W :: E i f i RA-9Fg 6S



W :: F i f i RA-9Fg





W :: G i f i RA-9Fm6S



W :: l i f i RA-9Fm





W : A9 i f i RA-9Fr 6S



W : A: i f i RA-9Fr





I h

IERC y hI ET

W : AA i f i RA-9GV6S



W : AB i f i RA-9GV





W : AC i f i RA-9Gg 6S



W : AD i f i RA-9Gg





W : AE i f i RA-9Gm6S



W : AF i f i RA-9Gm





W : AG i f i RA-9Gr 6S



W : AI i f i RA-9Gr





l h

I ESC y hI E_
W :B9 i f i RA-9I V6S



W :B: i f i RA-9I V





W : BA i f i RA-9l g 6S



W : BB i f i RA-9l g





W : BC i f i RA-9l m6S



W : BD i f i RA-9l m





W :BE i f i RA-9l r 6S



W :BF i f i RA-9l r





I h

I C y h M E F

W : BG i f i RB-9: V6S



W : Bl i f i RB-9: V





W :C9 i f i RB-9: g 6S



W :C: i f i RB-9: g





W : CA i f i RB-9: m6S



W : CB i f i RB-9: m





W :CC i f i RB-9:r 6S



W :CD i f i RB-9:r





I E C y h M E I
W : CE i f i RB-9AV6S



W : CF i f i RB-9AV





W : CG i f i RB-9Ag 6S



W : CI i f i RB-9Ag





W : D9 i f i RB-9Am6S



W : D: i f i RB-9Am





W : DA i f i RB-9Ar 6S



W : DB i f i RB-9Ar





I C E C y h M E M

W : DC i f i RB-9BV6S



W : DD i f i RB-9BV





W : DE i f i RB-9Bg 6S



W : DF i f i RB-9Bg





W : DG i f i RB-9Bm6S



W : DI i f i RB-9Bm





W :E9 i f i RB-9Br 6S



W :E: i f i RB-9Br





l h

l c c y h M E O

W : EA i f i RB-9CV6S



W : EB i f i RB-9CV





W : EC i f i RB-9Cg 6S



W : ED i f i RB-9Cg





W : EE i f i RB-9Cm6S



W : EF i f i RB-9Cm





W :EG i f i RB-9Cr 6S



W :EI i f i RB-9Cr





l h

I C I C y h O E F

W : F9 i f i RC-9: V6S



W : F: i f i RC-9: V





W : FA i f i RC-9: g 6S



W : FB i f i RC-9: g





W : FC i f i RC-9: m6S



W : FD i f i RC-9: m





W :FE i f i RC-9:r 6S



W :FF i f i RC-9:r





I h

I C MC y h O E I

W : FG i f i RC-9AV6S



W : FI i f i RC-9AV





W : G i f i RC-9Ag 6S



W : G i f i RC-9Ag





W : GA i f i RC-9Am6S



W : GB i f i RC-9Am





W : GC i f i RC-9Ar 6S



W : GD i f i RC-9Ar





l h

I C O C y h O E M

W : G E i f i R C - 9 B V 6 S



W : G F i f i R C - 9 B V





W : GG i f i RC-9Bg 6S



W : G i f i RC-9Bg





W :19 i f i RC-9Bm6S



W :1: i f i RC-9Bm





W :IA if i RC-9Br 6S



W :IB if i RC-9Br





l h

I CPC y hO EO

W :IC if i RC-9CV6S



W :ID if i RC-9CV



W :IE i f i RC-9Cg 6S



W :IF i f i RC-9Cg



W :IG i f i RC-9Cm6S



W :II i f i RC-9Cm



W A99 i f i RC-9Cr 6S



W A9: i f i RC-9Cr



I h

I RC y hO EP
W A9A i f i RC-9DV6S



W A9B i f i RC-9DV





W A9C i f i RC-9Dg 6S



W A9D i f i RC-9Dg





W A9E i f i RC-9Dm6S



W A9F i f i RC-9Dm





W A9G i f i RC-9Dr 6S



W A9I i f i RC-9Dr





I h

I SC y hO ER
W A: 9 i f i RC-9EV6S



W A: i f i RC-9EV





W A: A i f i RC-9Eg 6S



W A: B i f i RC-9Eg





W A: C i f i RC-9Em6S



W A: D i f i RC-9Em





W A: E i f i RC-9Er 6S



W A: F i f i RC-9Er





l h

I C T C y h O E S

W A: G i f i RC-9FV6S



W A: I i f i RC-9FV





W AA9 i f i RC-9Fg 6S



W AA: i f i RC-9Fg





W AAA i f i RC-9Fm6S



W AAB i f i RC-9Fm





W AAC i f i RC-9Fr 6S



W AAD i f i RC-9Fr





l h

I C _ C y h O E T
W AAE i f i RC-9GV6S



W AAF i f i RC-9GV





W AAG i f i RC-9Gg 6S



W AAI i f i RC-9Gg





W AB9 i f i RC-9Gm6S



W AB: i f i RC-9Gm





W ABA i f i RC-9Gr 6S



W ABB i f i RC-9Gr





l h

c T

h - w - wy- • - - wx w w-w - --z y 4 - y -y w z
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U 8 J	i - w-w • z-wz y -z x- - wy-z4 w - wy- - z
r J	e - w z --z y w -w - w z w - wy- - -6
f J	i - w-w • y w -w x- 4 - w z - - - z w -wz w -z4w - w w • -y- 6
W J	d -z •w w 6
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l h



i	J	d7N
f	J	mw- w - w y- wyy- x - w vZ
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T	J	d7N