Collector Wind Farm

Wind Turbine Micrositing Assessment

May 2019

Rev 2

Contents

1. BACKGROUND – GENERAL DESIGN PROCESS

The typical development process for the design of a wind farm consists of a number of steps to progress from concept to detailed design. These steps are summarised below, illustrating the increasing level of detail, complexity and resourcing required to finalise a design that is then ready for construction.

Stage 1: Concept
Purpose: to develop overall project concept and assess potential feasibility. Focus largely on maximising resource, accounting for 'big ticket' constraints
Design role: developer, desk-top
Data source: large-scale, regional, publically-available information
Output: indicative layout, to provide the basis for progressing to approvals stage

Stage 2: Preliminary Design
Purpose: to develop a project design that responds to key planning and environmental considerations, which remains commercially feasible; and provides a layout suitable for progressing through approvals processes
Design role: developer, advised by key technical consultants; largely desk-top with some supporting site work
Data source: publically-available information, supported by some site-specific data, particularly from ecological surveys and other site walkovers
Output: preliminary layout, responding to critical site-specific constraints, used as the layout for planning and other approvals

Stage 3: Detailed Deign
Purpose: to develop detailed design, in sufficient detail to deliver on all pre-construction approval conditions, and to optimise the project delivery schedule and associated costings
Design role: engineering contractor, post-tender, using increasing amounts of site-specific data with specialist resources such as civil, electrical and mechanical engineers, geologists, GIS and engineering draftsmen, etc
Data source: a range of site-specific data including detailed digital contour mapping, geotechnical studies, focused aerial photography; along with regular site walkovers
Output: detailed design that provides data required to comply with relevant consent conditions, and that forms the basis for the project delivery allowing for completion of the final design

Stage 4: Final Design
Purpose: to finalise the design to enable preparation of 'for construction' engineering drawings
Design role: engineering contractor, using specialist engineering resources
Data source: full suite of site-specific data, providing as much data as can cost-effectively be obtained
Output: final design, with full suite of engineering drawings for construction, and final project delivery schedule.

From a design point of view, the key step is from Stage 2 to Stage 3 – a project proponent will not commit to the level of design in Stage 3 until there is much greater level of certainty of the project proceeding, due to the extent of site-specific studies and the engineering resources required to prepare it.

2. BACKGROUND – APPROVED LAYOUT

The Collector Wind Farm Environmental Assessment (EA) submitted in Jun 2012 provided design details of the proposed wind farm and the design iteration from original concept to the preliminary layout of 68 WTGs that formed the basis of the planning application.

Consistent with the development process summarised in Section 1, much of the layout and preliminary design work was undertaken by the developer with specialist technical support on a 'desktop' basis, using a combination of regional publically-available data and more limited site-specific data.

As a result of the assessment and determination process through 2012/2013, the Collector Wind Farm was approved with a layout of 55 WTGs, in accordance with the GPS coordinates specified in the original EA.

In a subsequent project approval issued in Jul 2016, following modification 1 application, the GPS coordinates of the WTGs were incorporated as an attachment to the approval, linked to a specific micro-siting condition:

Micro-siting Restrictions
A8B The Proponent may micro-site the wind turbines and ancillary infrastructure without further approval provided:
(a) no wind turbine or ancillary infrastructure is moved more than 100 metres from the locations shown on the figures and table in Attachment 2;
(b) turbine 45 is not moved any closer to residence FF;
(c) all feasible and reasonable effort is made to locate wind turbines at least 60 metres from existing hollow-bearing trees which have the potential to provide roost or nesting habitat for bird and bat species identified to be at risk of rotor collision during turbine operation, unless the Secretary agrees otherwise; and
(d) the revised location of the wind turbine and/or ancillary infrastructure would not increase the impact of the project when compared to the approved locations and would not result in any non-compliance with the conditions of this approval.

Note: In considering a request for micro-siting of turbines within 60 m of existing hollow-bearing trees, the Secretary will consider safety concerns, the constructability of the turbine, and/or whether the micro-siting would materially increase biodiversity impacts.

3. DESIGN REFINEMENT

Following the approval of the modification 1 application, Ratch has worked with its EPC contractor to develop the project design that would ultimately progress to the "Issued for Construction" design drawings. This work by the EPC contractor, with extensive experience in the detailed design and construction of wind farms, comprised three key aspects:

- Sourcing & analysing site-specific information, such as:
    - Extensive site walkovers by engineering specialists: civil, electrical and structural engineers, and geologists;
    - Undertaking further geotechnical investigation works, to provide more detailed data on subsurface conditions

  - Detailed review and mapping of environmental and other planning constraints, to inform the design iteration process

- Committing sufficient experienced resources with the right knowledge and expertise to undertake the design;

- Combining the resources and information to undertake design on all parts of the layout (WTGs, hardstands, access roads, etc) rather than selected sections for use of 'whole site' assumptions.

In addition, Ratch contracted NGH to undertake a comprehensive survey of hollow-bearing trees across the site in areas where wind farm infrastructure is proposed. This survey not only identified presence of HBTs but also provided classification of habitat value, with data provided to the design contractor to incorporate into the design process – with a focus to minimise potential impacts on HBTs, and particularly to avoid impacts on HBTs of 'high' habitat value.

The mapping and reporting from that HBT work is provided as Appendix A to this Assessment Report (ref: *CWF_HBT_risk_assessment_v1, Apr 2016).*.

The outcome of this iteration of the detailed design work identified a number of WTGs requiring micrositing, due to engineering, planning and / or environmental constraints. These micrositing changes are summarised in the following table.

The full design layout map, showing the proposed locations of wind farm infrastructure (including microsited wind turbines, is provided as Appendix B to this Micrositing Assessment Report (ref. *COLWF-C-5300-1-OH, 16 May 19)*.

WTG #	Original Coordinates		New Coordinates		Distance m	Basis
	Easting	Northing	Easting	Northing		
T 01	718,433	6,143,522	718,469	6,143,531	37	WTG location moved east to avoid any infrastructure (foundation, hardstand) overlapping land lot / site boundary. New location ensures all infrastructure fully located within defined site boundary.
T 02	718,303	6,143,229	718,303	6,143,229	0	No change
T 03	718,143	6,142,944	718,143	6,142,944	0	No change
T 04	718,016	6,142,661	718,016	6,142,661	0	No change
T 05	717,920	6,142,333	717,945	6,142,326	26	WTG location moved east to avoid buffer zone around identified heritage item
T 06	717,869	6,142,028	717,959	6,142,028	90	WTG location moved east to minimise impacts on trees from installation of WTG infrastructure (turbine, access road, hardstand, cables), compared to approved location
T 07	717,778	6,141,753	717,778	6,141,753	0	No change
T 08	717,667	6,141,456	717,667	6,141,456	0	No change
T 09	717,737	6,141,127	717,737	6,141,127	0	No change
T 10	717,665	6,140,808	717,665	6,140,808	0	No change
T 11	717,307	6,140,667	717,307	6,140,667	0	No change
T 12	717,140	6,140,259	717,140	6,140,259	0	No change
T 13	716,368	6,140,791	716,368	6,140,791	0	No change
T 14	716,269	6,140,490	716,234	6,140,511	41	WTG location moved west to avoid impact on nearby identified hollow-bearing tree
T 15	716,134	6,140,091	716,134	6,140,091	0	No change
T 16	715,885	6,139,665			0	Removed

WTG #	Original Coordinates		New Coordinates		Distance	Basis
	Easting	Northing	Easting	Northing	m	
T 17	716,574	6,139,788	716,574	6,139,788	0	No change
T 18	718,978	6,143,004	718,978	6,143,004	0	No change
T 19	718,891	6,142,467	718,891	6,142,467	0	No change
T 20	718,960	6,142,121	718,983	6,142,183	67	WTG location moved north to ensure crane 'exclusion zone' does not overlap construction compound to avoid affecting other site construction activity.
T 21	718,935	6,141,776	718,935	6,141,776	0	No change
T 22	720,164	6,141,628	720,214	6,141,658	58	WTG location moved east to minimise impacts on trees from installation of WTG infrastructure (turbine, access road, hardstand, cables), compared to approved location
T 23	718,878	6,141,471	718,878	6,141,471	0	No change
T 24	718,785	6,141,111	718,785	6,141,111	0	No change
T 25	718,721	6,140,828	718,722	6,140,825	3	WTG location moved south to ensure minimum 2.5 x rotor diameter (~292m) spacing, as required by wind farm design standards
T 26	719,303	6,140,601	719,303	6,140,601	0	No change
T 27	718,632	6,140,529	718,632	6,140,529	0	No change
T 28	718,527	6,140,218	718,517	6,140,188	32	WTG location moved south to ensure all infrastructure located outside of boundaries of paper (Crown) road
T 29	718,256	6,140,030	718,256	6,140,030	0	No change
T 30	717,952	6,139,751	717,952	6,139,751	0	No change
T 31	717,751	6,139,480	717,751	6,139,480	0	No change

WTG #	Original Coordinates		New Coordinates		Distance m	Basis
	Easting	Northing	Easting	Northing		
T 32	718,184	6,139,157	718,185	6,139,187	30	WTG location moved north to ensure minimum 2.5 x rotor diameter (~292m) spacing, as required by wind farm design standards
T 33	718,539	6,139,389	718,566	6,139,341	55	WTG location moved south east to ensure hardstand and laydown area do not overlap land lot boundary (ie all infrastructure located within single land lot)
T 34	719,192	6,139,375	719,192	6,139,375	0	No change
T 35	718,149	6,138,894	718,149	6,138,894	0	No change
T 36	717,986	6,138,660	717,982	6,138,651	10	WTG location moved to ensure minimum 2.5 x rotor diameter (~292m) spacing, as required by wind farm design standards
T 37	718,135	6,138,349	718,124	6,138,374	27	WTG location moved south to avoid buffer zones around identified heritage items, and minimise impacts on nearby trees
T 38	718,725	6,138,734	718,725	6,138,734	0	No change
T 39	719,054	6,138,902	719,106	6,138,897	52	WTG location moved east to avoid turbine blade intrusion into identified radio / mobile communications path traversing site
T 40	717,678	6,137,581	717,678	6,137,581	0	No change
T 41	717,952	6,137,867	717,952	6,137,867	0	No change
T 42	717,564	6,137,136	717,564	6,137,136	0	No change
T 43	717,954	6,137,251	717,954	6,137,251	0	No change
T 44	717,848	6,136,663	717,848	6,136,663	0	No change
T 45	719,633	6,138,534	719,633	6,138,534	0	No change
T 46	719,531	6,138,241	719,531	6,138,241	0	No change
T 47	719,325	6,137,942	719,325	6,137,942	0	No change

WTG #	Original Coordinates		New Coordinates		Distance m	Basis
	Easting	Northing	Easting	Northing		
T 48	719,170	6,137,671	719,170	6,137,671	0	No change
T 49	718,708	6,137,467	718,670	6,137,468	38	WTG location moved north to avoid turbine blade intrusion into identified radio / mobile communications path traversing site
T 50	718,574	6,137,092	718,574	6,137,092	0	No change
T 51	718,443	6,136,785	718,443	6,136,785	0	No change
T 52	718,448	6,136,312	718,448	6,136,312	0	No change
T 61	719,646	6,136,708	719,646	6,136,708	0	No change
T 62	719,793	6,137,054	719,757	6,137,135	89	WTG location moved north-west to avoid buffer zone for identified heritage item and to minimise impact on trees compared to approved location
T 63	719,612	6,137,380	719,553	6,137,346	68	WTG location moved south-west to avoid proximity to buffer zone for identified heritage item and to minimise impact on trees compared to approved location

The details in the table above demonstrate compliance with parts (a) and (b) of condition A8B, namely:

(a) no wind turbine or ancillary infrastructure is moved more than 100 metres from the locations shown on the figures and table in Attachment 2;

No wind turbines have been microsited more than 100m from the locations detailed in the Attachment 2 of the Project Approval

(b) turbine 45 is not moved any closer to residence FF;

Turbine 45 has not been microsited.

4. MICROSITING ASSESSMENT

Assessment of the wind turbine micrositing against the requirements of parts (c) and (d) of condition A8B is presented in this section.

(c) all feasible and reasonable effort is made to locate wind turbines at least 60 metres from existing hollow-bearing trees which have the potential to provide roost or nesting habitat for bird and bat species identified to be at risk of rotor collision during turbine operation, unless the Secretary agrees otherwise; and

(d) the revised location of the wind turbine and/or ancillary infrastructure would not increase the impact of the project when compared to the approved locations and would not result in any non-compliance with the conditions of this consent.

Note: In considering a request for micro-siting of turbines within 60 m of existing hollow-bearing trees, the Secretary will consider safety concerns, the constructability of the turbine, and/or whether the micro-siting would materially increase biodiversity impacts.

4.1 WTG 1

Wind turbine moved 37m east to ensure no infrastructure overlaps the land lot / site boundary, and ensure that there is no development in land not defined within the project approval.

Key:

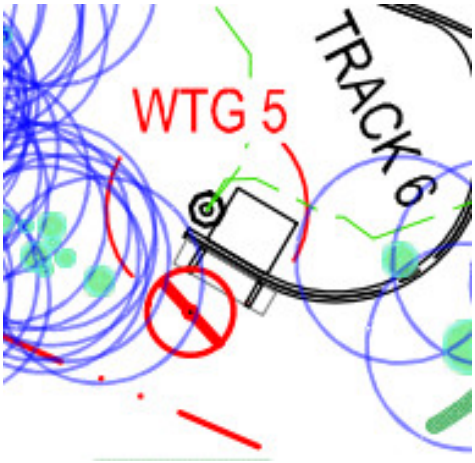
- *Black circle = WTG location*
- *Small red circle & label = survey point*
- *Green dotted line = site boundary*

Figure 1: WTG1 Alt Location

The revised location does not increase the impact of the project in any way, and the turbine remains more than 60m from any hollow bearing trees in the vicinity.

4.2 WTG 5

Wind turbine moved 26m east to ensure minimal infrastructure overlap of the preferred protective buffer zone around the identified Aboriginal heritage item (reference SU45/L1). This also moves the wind turbine location to be more than 60m from the nearest identified hollow bearing tree (HBT), compared to the original proposed location.



Key:

- *Black circle / hexagon = WTG centre point*
- *Small red circle = heritage item buffer*
- *Green dots = identified HBTs*
- *Blue circles = 60m tree protection zone (HBTs)*

Figure 2: WTG5 Alt Location

The revised location has a positive effect on the impact of the project, through increasing the distance from the identified heritage item to minimise risk of impact during construction, without affecting the preferred tree protection zone (TPZ) of the nearest HBTs.

4.3 WTG 6

Wind turbine moved 90m east to bring turbine onto higher ground above ground 'hollow' which was the originally approved location. This avoids the need for construction of specific access track, thereby reducing overall clearing of box gum woodland vegetation and avoiding potential tree clearance in that area.

The revised location does intrude into the 60m TPZ of several HBTs in the vicinity, but it is noted that the original approved location similarly affected the TPZ of several HBTs and hence there would be no additional HBT impact from the proposed move. It is also noted that the intention is to protect all the identified HBTs in the vicinity of WTG 6 during both construction and operation.

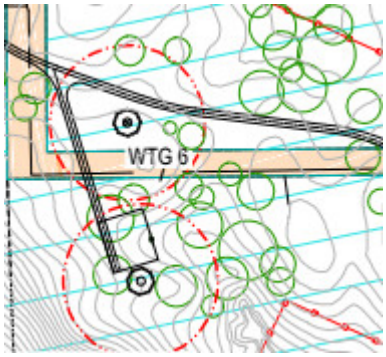


Figure 3a: WTG6 Location

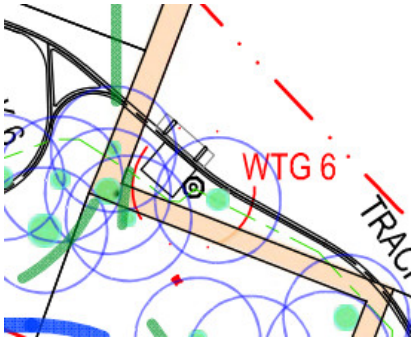


Figure 3b: WTG6 Alt Location

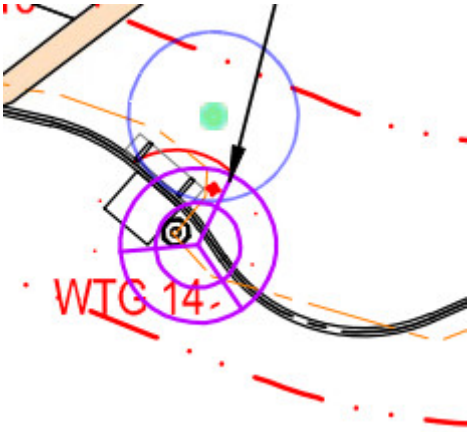
Key:

- *Black circle / hexagon = WTG location*
- *Green dots = identified HBTs*
- *Blue circles = 60m tree protection zone (HBTs)*
- *Green circles – identified trees (all)*

The revised location has a positive effect on the impact of the project, through decreasing the vegetation clearing required from removal of the dedicated turbine access track; with no additional effects on the TPZs of the HBTs in proximity.

4.4 WTG 14

Wind turbine moved 41m west to move the turbine to a location outside of the 60m TPZ for the nearby HBT.



Key:

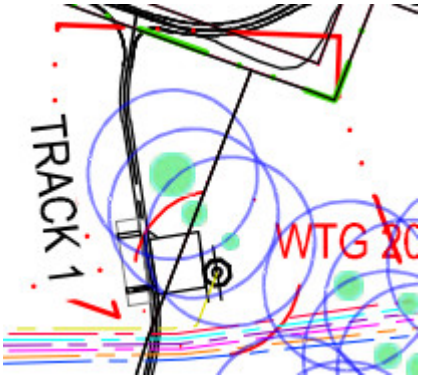
- *Black circle / hexagon = WTG location*
- *Green dots = identified HBTs*
- *Blue circles = 60m tree protection zone (HBTs)*
- *Purple lines – temporary wind mast location*

Figure 4: WTG14 Alt Location

The revised location has a positive effect on the impact of the project, through moving the turbine outside of the 60m TPZ of the only nearby HBT.

4.5 WTG 20

Wind turbine moved 66m to the north, following redesign of layout around the site access toward the construction compound. Basis is to remove 'safety clearance zone' from overhanging construction compound during crane erection activities for wind turbine.



Key:

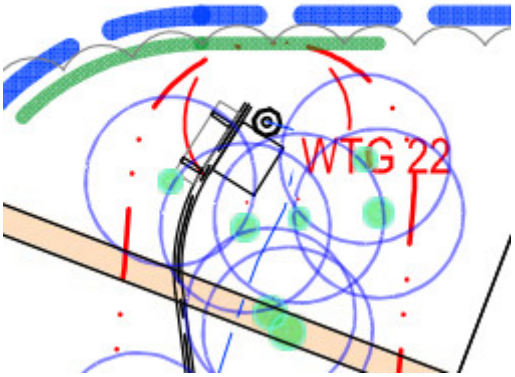
- *Black circle / hexagon = WTG location*
- *Green dots = identified HBTs*
- *Blue circles = 60m tree protection zone (HBTs)*

Figure 5: WTG20 Alt Location

The revised location does intrude into the 60m TPZ of several HBTs in the vicinity, but it is noted that the original approved location similarly affected the TPZ of several HBTs and hence there would be no additional HBT impact from the proposed move. It is also noted that the intention is to protect all the identified HBTs in the vicinity of WTG 20 during both construction and operation.

4.6 WTG 22

Wind turbine moved 58m east to take turbine location further away from identified HBTs in proximity of approved turbine location, to minimise risk of impact on HBTs during construction.



Key:

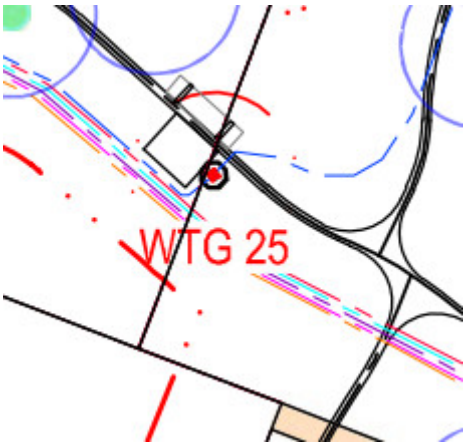
- *Black circle / hexagon = WTG location*
- *Green dots = identified HBTs*
- *Blue circles = 60m tree protection zone (HBTs)*

Figure 6: WTG22 Alt Location

Revised location is outside of the extent of the TPZs of the nearby HBTs, reducing potential impact on nearby HBTs.

4.7 WTG 25

Wind turbine moved 3m north to be consistent with the wind turbine spacing design requirement of 2.5 times blade diameter separation between turbines.



Key:

- *Black circle / hexagon = WTG location*
- *Green dots = identified HBTs*
- *Blue circles = 60m tree protection zone (HBTs)*

Figure 7: WTG25 Alt Location

The revised location has no effect on the current impacts of the project.

4.8 WTG 28

Wind turbine moved 32m south to move all turbine infrastructure outside of the paper (Crown) road located in that area of the site. This is in response to the Department of Lands requirement to ensure there is no permanent infrastructure that could physically 'block' passage along the paper road. It is noted that the project has secured licences from the Department to allow for roads and cables installation across paper roads, and for turbine blades to overfly paper roads.

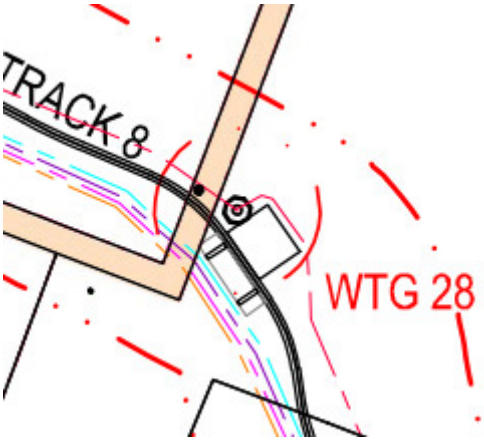


Figure 8: WTG28 Alt Location

The revised location has no effect on the current impacts of the project.

4.9 WTG 32

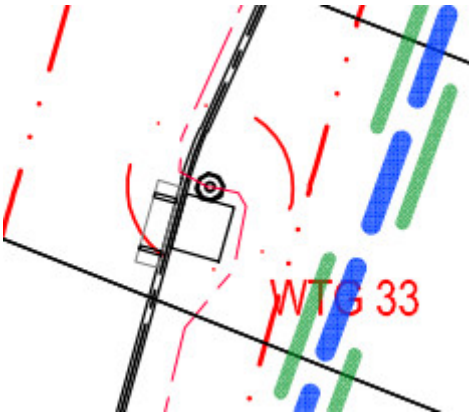
Wind turbine moved 30m north to be consistent with the wind turbine spacing design requirement of 2.5 times blade diameter separation between turbines.

Figure 9: WTG32 Alt Location

The revised location has no effect on the current impacts of the project.

4.10 WTG 33

Wind turbine moved 55m east to avoid installation of any permanent wind turbine infrastructure overlapping the boundary of the land lot, representing the boundary between two separate landholdings.



Key:

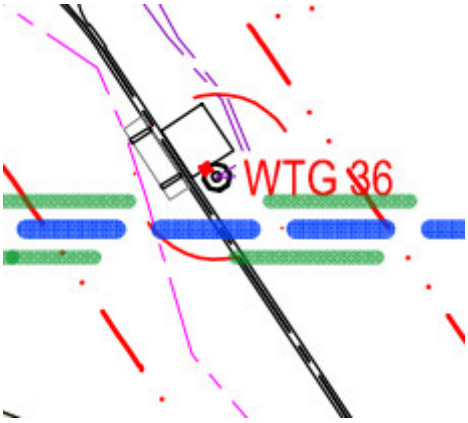
- *Black circle / hexagon = WTG location*
- *Black line = landholding boundary*

Figure 10: WTG33 Alt Location

The revised location has no effect on the current impacts of the project.

4.11 WTG 36

Wind turbine moved 10m south to be consistent with the wind turbine spacing design requirement of 2.5 times blade diameter separation between turbines.



Key:

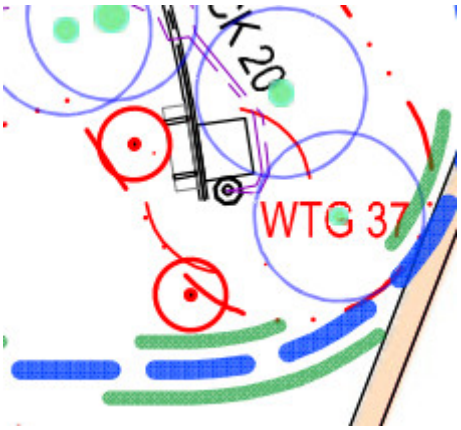
- *Black circle / hexagon = WTG location*

Figure 11: WTG36 Alt Location

The revised location has no effect on the current impacts of the project.

4.12 WTG 37

Wind turbine moved 27m north to be located outside of the TPZs of the HBTs with associated infrastructure avoiding the preferred protection buffer for the identified adjacent Aboriginal heritage items (SU1/T1 & SU1/T2).



Key:

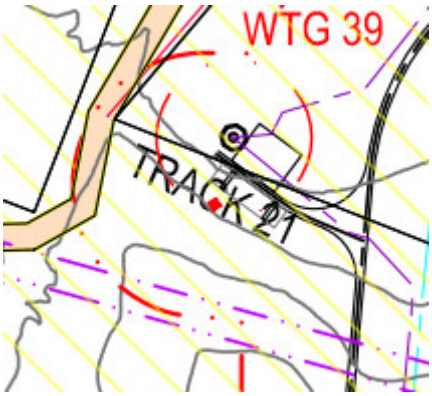
- *Black circle / hexagon = WTG location*
- *Small red circle = heritage item buffer*
- *Green dots = identified HBTs*
- *Blue circles = 60m tree protection zone (HBTs)*

Figure 12: WTG37 Alt Location

The revised location reduces the potential impact of the project, with the move of the turbine location outside of the TPZ of the HBTs.

4.13 WTG 39

Wind turbine moved 52m east to ensure that the turbine blades do not intrude into identified radio communications paths crossing the site, with edge of blade overhang outside the boundary of the identified comms links zone.



Key:

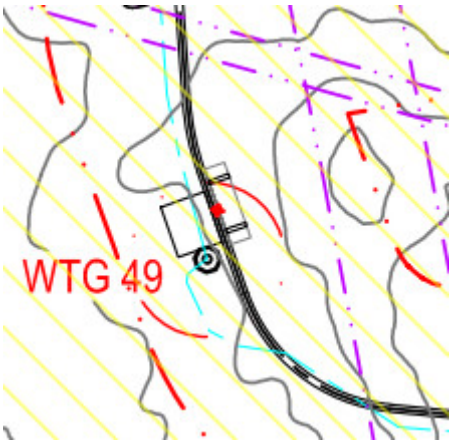
- *Black circle / hexagon = WTG location*
- *Purple dotted lines = comms link zone*

Figure 13: WTG39 Alt Location

The revised location has no effect on the current impacts of the project.

4.14 WTG 49

Wind turbine moved 38m east to ensure that the turbine blades do not intrude into identified radio communications paths crossing the site, with edge of blade overhang outside the boundary of the identified comms links zone.



Key:

- *Black circle / hexagon = WTG location*
- *Purple dotted lines = comms link zones*

Figure 14: WTG49 Alt Location

The revised location has no effect on the current impacts of the project.

4.15 WTG 62

Wind turbine moved 89m north-west to move the turbine away from the approved location which is in close proximity to the identified Aboriginal heritage item (ref SU37/L1). The move also takes the turbine out of a number of TPZs for HBTs in close proximity, reducing the number of TPZs potentially affected by the turbine infrastructure.

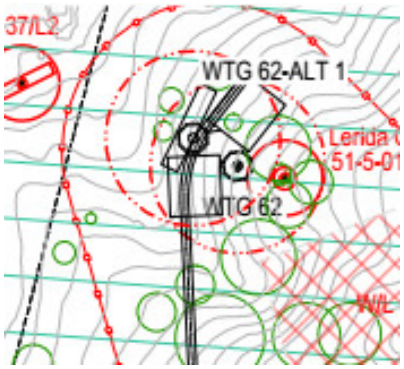


Figure 15a: WTG62 Location

Figure 15b: WTG62 Alt Location

Key:

- *Black circle / hexagon = WTG location*
- *Small red circle = heritage item buffer zone*
- *Green dots = identified HBTs*
- *Blue circles = 60m tree protection zone (HBTs)*
- *Green circles – identified trees (all)*

The revised location has a positive effect on the impact of the project, through removing the turbine from proximity to the preferred protection zone for the heritage item, and reducing the number of TPZs affected in comparison to the approved turbine location.

4.16 WTG 63

Wind turbine moved 68m south-west to move the turbine away from the approved location that is in close proximity to the identified Aboriginal heritage item (ref SU54/L1). The move also takes the turbine out of the TPZ for the HBT in close proximity.

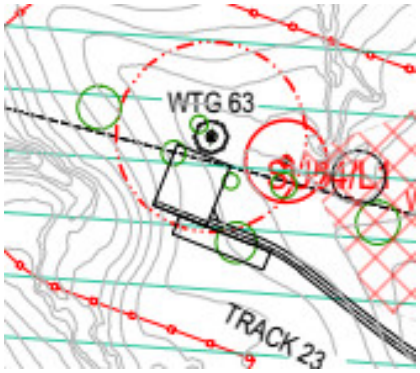


Figure 11a: WTG63 Location

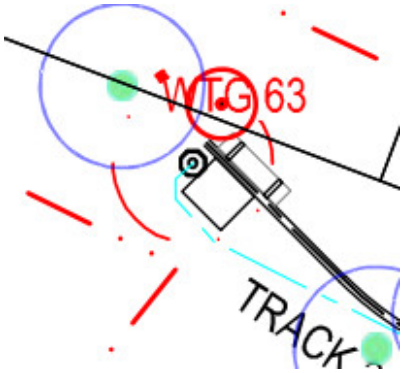


Figure 11b: WTG63 Alt Location

Key:

- *Black circle / hexagon = WTG location*
- *Small red circle = heritage item buffer zone*
- *Green dots = identified HBTs*
- *Blue circles = 60m tree protection zone (HBTs)*
- *Green circles – identified trees (all)*

The revised location has a positive effect on the impact of the project, through moving the turbine from such close proximity to the preferred protection buffer zone for the identified heritage item, and moving out of the identified TBZ for the HBT.

5. CONCLUSION

Assessment of the proposed wind turbine micrositing against the requirements of consent condition A8D has concluded that all the microsited locations have either a positive or neutral effect on the current impact of the wind farm project.

There are a limited number of microsited turbines that remain within the 60m TPZ of identified HBTs, but in all cases these are within either the same, or a reduced, number of TPZs compared to the approved locations, thereby having no effect on the overall impact of the project as originally proposed.

APPENDIX A: COLLECTOR WIND FARM – HBT ASSESSMENT

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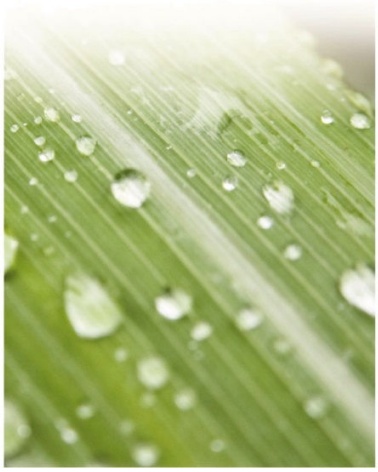
11 April 2016



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Dear Neil,

RE – Methods and results of hollow-bearing tree mapping and risk assessment at the proposed Collector Wind Farm site

In order to reduce risk of the Collector Wind Farm (CWF) development being compromised by clearing restrictions relating to the removal of hollow bearing trees (HBTs) it was recommended by NGH Environmental that a three phase strategy be implemented:

- Phase 1 - Identification of hollow bearing trees
- Phase 2 - Assessment of trees requiring removal
- Phase 3 - Risk Reduction and Management

This letter documents the methods employed and results of Phase 1. The results provided will facilitate the progression of Phase 2 to be completed by Ratch.

If you have any further questions regarding the information presented herein, please do not hesitate to contact me on the details below or Senior Ecologist Dave Maynard on 02 6492 8311.

Kind regards

Nick Graham-Higgs
Director
0427 260 819
NGH Environmental Pty Ltd

OBJECTIVES AND METHODOLOGY

The primary objectives of Phase 1 was to identify all HBTs that occur within the micrositing corridor for the development (as detailed in the Submissions report for the project). The entire micrositing corridor was traversed either on foot or in more open areas, by vehicle. Each tree within the micrositing corridor was inspected from all sides to determine if the tree supported hollows and comprised a HBT. Trees were identified as a HBT only if hollows were able to be verified from the ground as having depth or if the tree contained structures that were considered likely to be hollow-bearing based on positive identification of hollows in other HBTs of the same species, age and condition.

For each HBT identified, the following specific features and characteristics were recorded:

1. Location, recorded with a handheld GPS with an accuracy of 3-4m.
2. Species, diameter at breast height (DBH) and vertical height.
3. Size and number of hollows (as defined below).
4. Any active use of hollows in relation to any species observed (including European bees), and any evidence of use (ie. sign and type of sign eg. wear/scratch/beak marks).
5. An assessment of potential likely habitat value of HBTs to threatened species (low, moderate or high as defined below).
6. Identification of threatened species with potential to utilise hollows present (see below).
7. An image of each HBT.

Data were collected on a GPS enabled iPad running Garafa GIS Pro mapping software. The data were later linked to the locations recorded with the more accurate stand-alone handheld GPS to ensure the most accurate locations were mapped.

CATEGORISATION OF HOLLOWS

Hollows recorded were put into three main categories:

- Trunk hollows – hollows that were formed in trunks and major limbs that had an opening more or less flush with the side of the trunk or limb. Hollows were also identified as trunk hollows if they occurred in the end of the main trunk e.g. broken stags.
- Limb hollows – hollows that were generally formed in the ends of limbs or flush against the sides of smaller branches
- Fissures – cracks or splits in any part of the tree

Hollows were categorised by the size of the opening as small (<10cm), medium (10 – 20cm) or large (>20cm).

HABITAT VALUE OF HBTS

Each identified HBT was assigned a habitat value of high, moderate or low based on the following criteria:

- High – HBT that is living and contains hollows that provide habitat suitable for multiple threatened species or contains hollows that may provide an important nesting or roosting site for a particular threatened species. Hollows are generally well positioned, provide good access (such as alighting or perching opportunities) and are sheltered from exposure to elements such as rain. If low numbers of hollows are present then there is evidence of use.
- Moderate – HBTs that is living and contains one or more hollows that may provide habitat for a threatened species or HBTs that are dead and provide good quality habitat for a threatened species. Hollows are generally well positioned and may or may not show signs of use. Hollows likely to provide habitat for more common species.
- Low – HBTs (living or dead) that have only a few small hollows or hollows that are poorly positioned e.g. upward facing, exposed entrances. Trees may be utilised by threatened or common species but would be unlikely to be preferred habitat.

THREATENED SPECIES WITH THE POTENTIAL TO UTILISE HOLLOWS

Table 1 below lists the hollow dependent species considered to occur or have the potential to occur within the project site (as determined in the Addendum to the Biodiversity Assessment, NGH Environmental 2015) and [possibly] utilise the hollows identified. The hollow size requirements of each species are specified. For each HBT identified during the survey, the potential for these species to utilise the hollows present was assessed.

Table 1: Hollow size requirements of threatened species likely, or known to occur on the site.

Threatened species requiring hollows	Hollow size requirement
Gang-Gang Cockatoo*	Large
Powerful Owl	Large
Brown Treecreeper*	Small/medium
Superb Parrot*	Small/medium
East Coast Freetail-bat*	Small/medium
Yellow-bellied Sheathtail-bat*	Small/medium and large
Large-footed Myotis*	Small/medium and large

* Recorded on-site

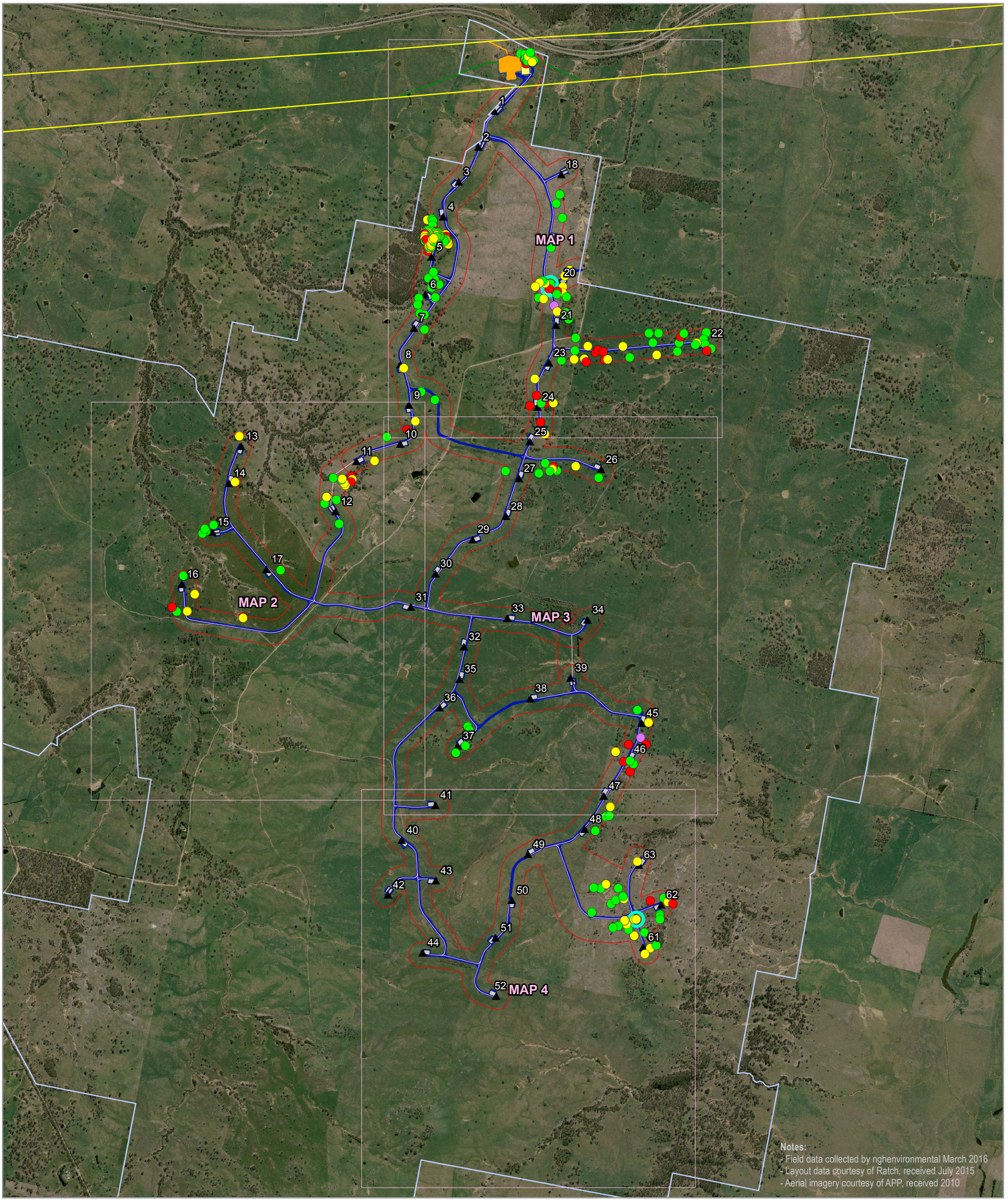
RESULTS

A total of 229 HBTs were recorded during the survey. An additional two trees that were not hollow-bearing but contained nests that may be utilised by raptors were also recorded. The locations of all HBTs and nest trees recorded during the surveys are mapped in Attachment 1. The data collected for each HBT and nest tree recorded during the survey is presented in Attachment 2.

It was identified during the surveys that one of the HBTs previously recorded at the site and documented within the Biodiversity Assessment Addendum (NGH Environmental September 2015), had fallen down in the intervening time. This HBT was located to the north of Turbine 61 and in between HBT201 and HBT 204 in the current data. This tree (shown in Figure 1 below) has not been included within the current data as it no longer provides habitat as a HBT.

Figure 1 The tree previously identified as hollow-bearing which is no longer standing

ATTACHMENT 1 - MAPS



HOLLOW-BEARING TREE MAPPING - INDEX TO DETAILED MAPS

Collector Wind Farm

- Site Boundary
- Existing transmission lines

Proposed infrastructure

- Turbine locations
- Micrositing corridor
- Cabling trench
- Road layout
- New HV line
- Coms cable trench
- Turbine hardstands
- Switching station
- Transgrid laydown area
- O&M Compound
- Temporary construction compound

Hollow-bearing trees

Habitat value

- High
- Moderate
- Low

Nest trees

- Hollow-bearing tree with nest
- Nest tree only (not hollow-bearing)

0 250 500 Meters

A3 @ 1:30000
Ref: 5541 - HBTs
Author: DM

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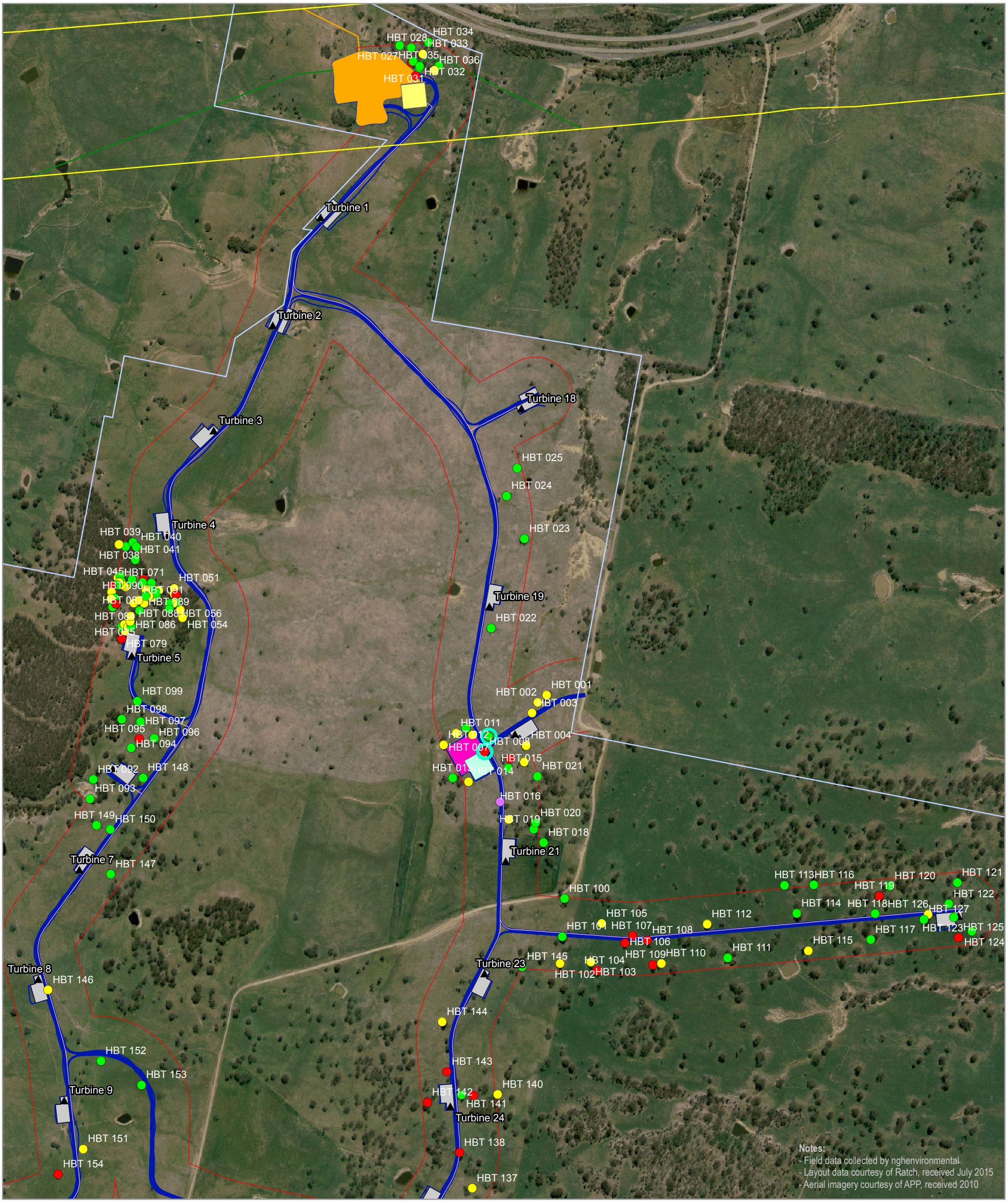

HOLLOW-BEARING TREE MAPPING MAP 1

Collector Wind Farm

- Site Boundary
- Existing transmission lines

Proposed infrastructure

- Turbine locations
- Micrositing corridor
- Cabling trench
- Road layout
- New HV line
- Coms cable trench
- Turbine hardstands
- Switching station
- Transgrid laydown area
- O&M Compound
- Temporary construction compound

Hollow-bearing trees

Habitat value

- High
- Moderate
- Low

Nest trees

- Hollow-bearing tree with nest
- Nest tree only (not hollow-bearing)

0 100 200 Meters

A3 @ 1:10000
Ref: 5541 - HBTs
Author: DM

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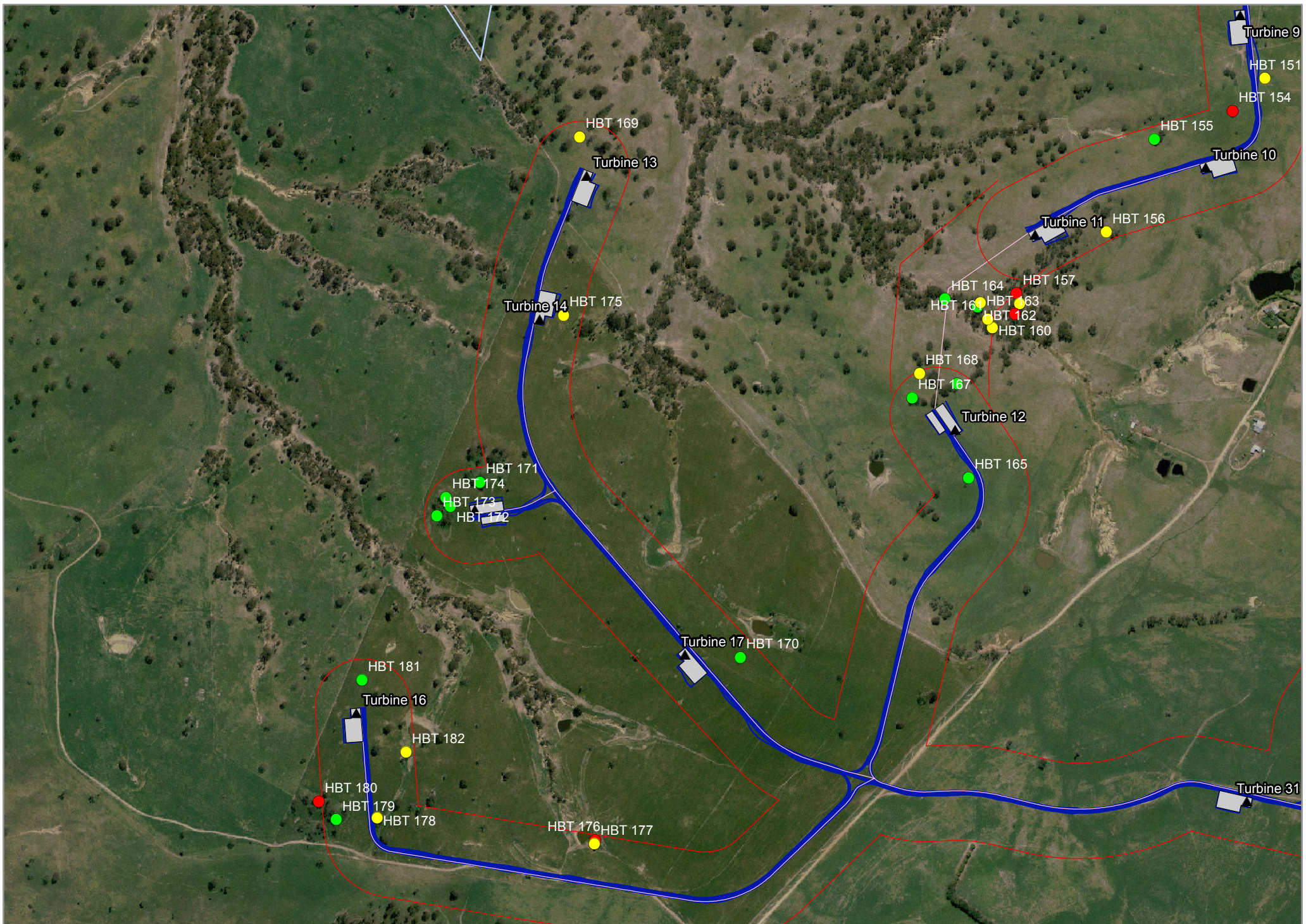

HOLLOW-BEARING TREE MAPPING MAP 2

Collector Wind Farm

- Site Boundary
- Existing transmission lines
- Proposed infrastructure
  - ▲ Turbine locations
  - Micrositing corridor
  - Cabling trench
  - Road layout
- New HV line
- Coms cable trench
- Turbine hardstands
- Switching station
- Transgrid laydown area
- O&M Compound
- Temporary construction compound

Hollow-bearing trees

Habitat value
- High
- Moderate
- Low

Nest trees
- Hollow-bearing tree with nest
- Nest tree only (not hollow-bearing)

0 100 200 Meters

A3 @ 1:10000
Ref: 5541 - HBTs
Author: DM

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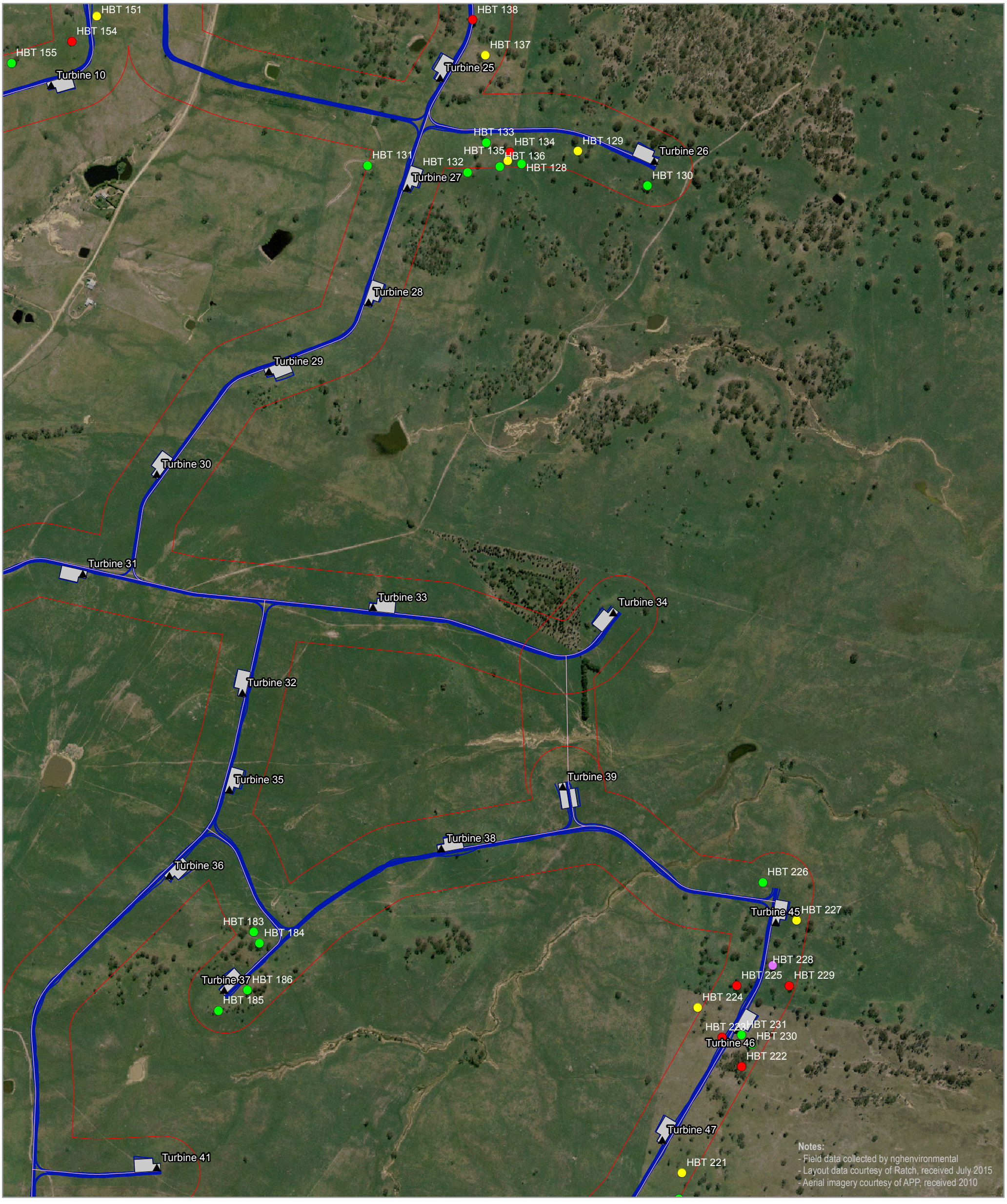

HOLLOW-BEARING TREE MAPPING MAP 3

Collector Wind Farm

- Site Boundary
- Existing transmission lines
- Proposed infrastructure
  - Turbine locations
  - Micrositing corridor
  - Cabling trench
  - Road layout
- New HV line
- Coms cable trench
- Turbine hardstands
- Switching station
- Transgrid laydown area
- O&M Compound
- Temporary construction compound

Hollow-bearing trees

Habitat value
- High
- Moderate
- Low

Nest trees
- Hollow-bearing tree with nest
- Nest tree only (not hollow-bearing)

0 100 200 Meters

A3 @ 1:10000
Ref: 5541 - HBTs
Author: DM

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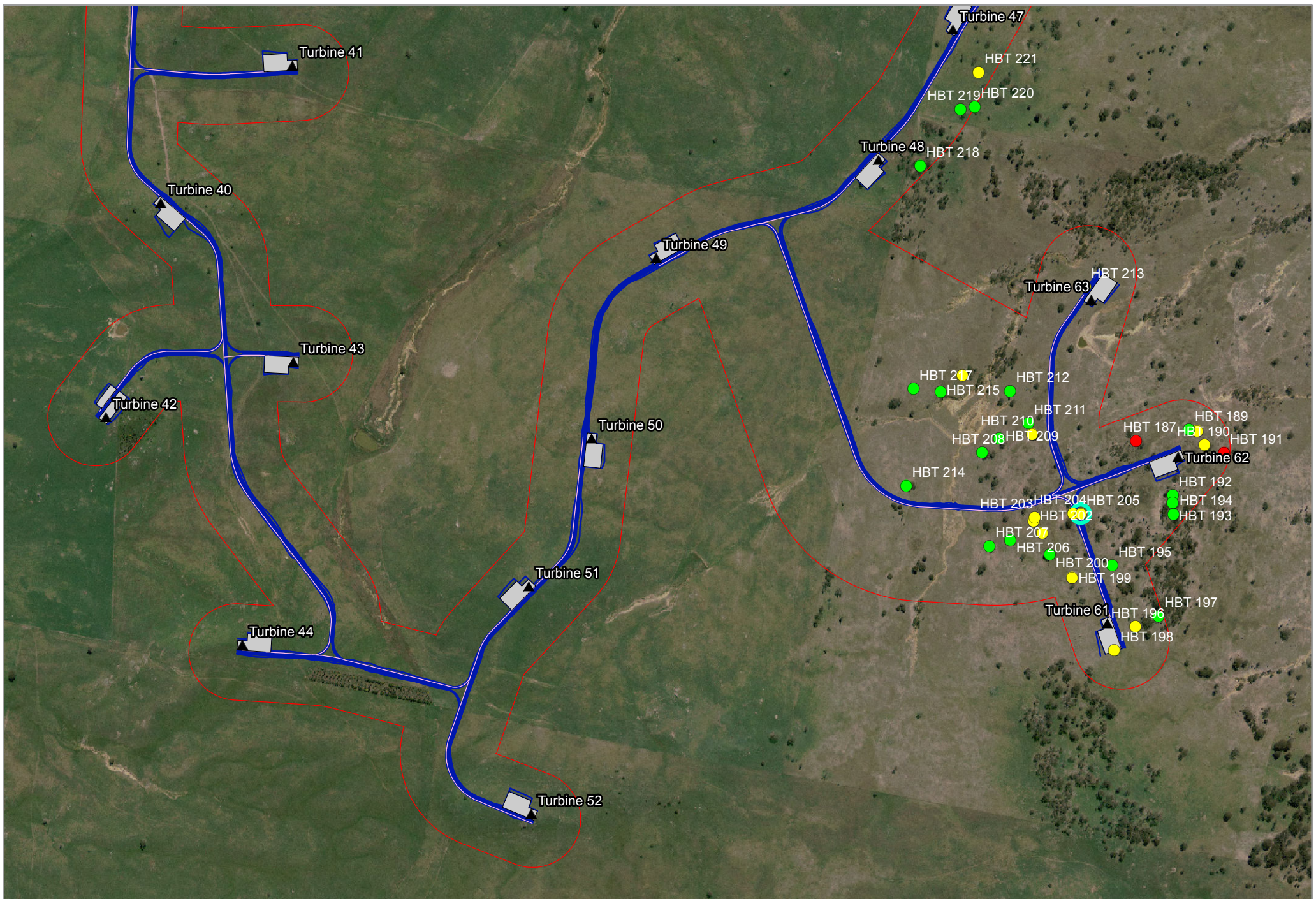

HOLLOW-BEARING TREE MAPPING MAP 4

Collector Wind Farm

- Site Boundary
- Existing transmission lines
- Proposed infrastructure
  - ▲ Turbine locations
  - Micrositing corridor
  - Cabling trench
  - Road layout
- New HV line
- Coms cable trench
- Turbine hardstands
- Switching station
- Transgrid laydown area
- O&M Compound
- Temporary construction compound
- Hollow-bearing trees
  - Habitat value
    - High
    - Moderate
    - Low
- Nest trees
  - Hollow-bearing tree with nest
  - Nest tree only (not hollow-bearing)

0 100 200 Meters

A3 @ 1:10000
Ref: 5541 - HBTs
Author: DM

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ATTACHMENT 2 - HOLLOW BEARING TREE DATA

										Hollows (small <10cm, medium 1—20cm, large >20cm)													
Tree identity	Latitude	Longitude	Northing	Easting	Altitude	Type	Species	DBH (cm)	Height (m)	Small trunk	Medium trunk	Large trunk	Small limb	Medium limb	Large limb	Small fissure	Medium fissure	Large fissure	Evidence of use?	Potential threatened species	Habitat value	Comments	Associated image
HBT 001	-34.838707	149.395527	6142226.7	719046.2	738.7	HBT	Eucalyptus viminalis	160	15	0	0	0	1	0	0	0	0	0		Microbats	Moderate	Low hollow approximately 1.8m above the ground	shpimg_131.jpg
HBT 002	-34.838891	149.395267	6142206.8	719022.0	770.9	HBT	Stag	65	7	0	0	0	0	2	2	0	0	0		Microbats	Moderate		shpimg_132.jpg
HBT 003	-34.839153	149.395108	6142178.1	719006.7	772.7	HBT	Stag	40	7	0	0	0	0	1	0	0	0	0		Microbats	Moderate		shpimg_133.jpg
HBT 004	-34.839951	149.394956	6142089.9	718990.7	774.0	HBT	Eucalyptus macrorhyncha	80	9	1	0	0	0	0	0	0	0	0			Moderate		shpimg_134.jpg
HBT 005	-34.840354	149.394911	6142045.3	718985.5	776.0	HBT	Eucalyptus macrorhyncha	55	6	0	0	0	1	0	0	0	0	0			Moderate		shpimg_135.jpg
HBT 006	-34.840286	149.394488	6142053.8	718947.0	777.2	HBT	Eucalyptus macrorhyncha	70	9	1	1	0	1	0	0	0	0	0	Chewed entrance on small trunk hollow, scratching around medium hollow, both on main trunk	Brown Treecreeper	High		shpimg_136.jpg
HBT 007	-34.839751	149.393845	6142114.5	718889.6	776.3	HBT/Nest tree	Eucalyptus macrorhyncha	95	9	1	0	0	0	0	0	0	0	0	Stick nest		Low		shpimg_137.jpg
HBT 008	-34.840128	149.393734	6142072.9	718878.5	777.1	HBT/Nest tree	Eucalyptus viminalis	95	12	0	1	0	2	1	0	0	0	0	Stick nest, excavation from medium trunk hollow-lots of woody debris on ground	Brown	High		shpimg_138.jpg
HBT 009	-34.839722	149.393362	6142118.8	718845.5	778.5	HBT	Eucalyptus macrorhyncha	40	7	0	0	0	0	0	0	1	0	0		Brown Treecreeper, Superb Parrot	Moderate		shpimg_139.jpg
HBT 010	-34.839567	149.393162	6142136.4	718827.7	776.6	HBT	Stag	80	8	0	0	1	0	0	0	0	0	0		Microbats	Low	Hollow trunk open at top	shpimg_140.jpg
HBT 011	-34.839692	149.392874	6142123.2	718801.0	777.8	HBT	Eucalyptus macrorhyncha	70	8	0	0	0	1	0	0	0	0	0		Microbats	Moderate		shpimg_141.jpg
HBT 012	-34.839986	149.392511	6142091.4	718767.0	780.4	HBT	Eucalyptus viminalis	80	14	1	1	0	1	0	0	0	0	0		Brown Treecreeper, Superb Parrot	Moderate		shpimg_142.jpg
HBT 013	-34.840788	149.392809	6142001.8	718792.1	782.5	HBT	Stag	45	7	1	0	0	1	0	0	0	0	0		Microbats	Low		shpimg_144.jpg
HBT 014	-34.840871	149.393275	6141991.5	718834.5	781.1	HBT	Eucalyptus macrorhyncha	85	7	1	0	0	0	0	0	0	0	0		Brown Treecreeper	Moderate		shpimg_145.jpg
HBT 015	-34.840514	149.394446	6142028.6	718942.6	783.3	HBT	Eucalyptus macrorhyncha	80	9	0	0	0	1	0	0	0	0	0		Microbats	Low		shpimg_146.jpg
HBT 016	-34.841347	149.394221	6141936.7	718919.8	784.9	Nest tree	Eucalyptus macrorhyncha	65	11	0	0	0	0	0	0	0	0	0	Stick nest	Little eagle?	N/A	Stick nest	shpimg_147.jpg
HBT 017	-34.841764	149.394495	6141889.8	718943.7	788.5	HBT	Eucalyptus macrorhyncha	45	8	0	0	0	0	1	0	0	0	0	Potential old chew marks at hollow entrance	Brown Treecreeper, Superb Parrot	Moderate		shpimg_148.jpg
HBT 018	-34.842312	149.395541	6141826.7	719037.9	795.1	HBT	Eucalyptus melliodora	70	13	0	0	0	1	0	0	0	0	0	Potential old wearing of hollow entrance		Low		shpimg_149.jpg
HBT 019	-34.841993	149.395242	6141862.8	719011.5	789.2	HBT	Eucalyptus macrorhyncha	40	4	0	1	0	0	0	0	0	0	0			Low	Hollow open at top	shpimg_150.jpg
HBT 020	-34.841838	149.395292	6141879.9	719016.4	791.0	HBT	Stag	50	10	3	0	0	0	0	0	0	0	0			Low		shpimg_151.jpg
HBT 021	-34.840696	149.395312	6142006.5	719021.3	786.5	HBT	Eucalyptus macrorhyncha	30	4	1	0	0	0	0	0	0	0	0			Low	Hollow approx. 2m above ground	shpimg_152.jpg
HBT 022	-34.837104	149.393836	6142408.2	718895.8	781.1	HBT	Stag	65	9	2	0	0	0	0	0	0	0	0			Low		shpimg_153.jpg
HBT 023	-34.834901	149.394761	6142650.5	718986.3	776.0	HBT	Eucalyptus viminalis	150	14	0	0	0	0	2	0	0	0	0		Microbats	Low	Two spouts upward pointing	shpimg_154.jpg
HBT 024	-34.833860	149.394201	6142767.2	718937.8	777.4	HBT	Eucalyptus dives	40	7	0	0	0	0	0	0	0	1	0		Microbats	Low		shpimg_155.jpg

								Hollows (small <10cm, medium 1—20cm, large >20cm)														
Tree identity	Latitude	Longitude	Northing	Easting	Altitude	Type	Species	DBH (cm)	Height (m)	Small trunk	Medium trunk	Large trunk	Small limb	Medium limb	Large limb	Small fissure	Medium fissure	Large fissure	Evidence of use?	Potential threatened species	Habitat value	Comments	Associated image
HBT 025	-34.833176	149.394494	6142842.5	718966.4	779.1	HBT	Stag	30	5	0	0	0	0	1	0	0	0	0		Microbats	Low	Main trunk hollow and open at top	shpimg_156.jpg
HBT 026	-34.823645	149.391203	6143906.9	718690.6	786.2	HBT	Stag	45	7	1	1	0	0	0	0	0	0	0	Worn entrance on medium hollow, not recent	Superb Parrot	High		shpimg_159.jpg
HBT 027	-34.822914	149.390708	6143989.0	718647.3	774.9	HBT	Eucalyptus macrorhyncha	45	7	0	1	0	0	0	0	0	0	0			Low	Several openings, exposed	shpimg_157.jpg
HBT 028	-34.822965	149.391056	6143982.6	718679.0	778.1	HBT	Eucalyptus macrorhyncha	50	11	0	0	0	1	0	0	0	0	0		Microbats	Low		shpimg_158.jpg
HBT 029	-34.823327	149.391069	6143942.4	718679.2	782.8	HBT	Stag	45	8	3	0	0	0	0	0	0	0	0	One hollow shows evidence of scratching around entrance	Brown Treecreeper, Superb Parrot	High	Hollows just under 10cm	shpimg_160.jpg
HBT 030	-34.823291	149.391120	6143946.3	718684.0	782.2	HBT	Eucalyptus macrorhyncha	35	8	0	0	0	0	0	1	0	0	0			Low	Upward pointing spout	shpimg_161.jpg
HBT 031	-34.823448	149.391304	6143928.5	718700.4	783.6	HBT	Eucalyptus macrorhyncha	50	7	0	0	0	1	0	0	0	0	0		Microbats	Low		shpimg_162.jpg
HBT 032	-34.823411	149.391316	6143932.6	718701.6	783.1	HBT	Eucalyptus macrorhyncha	70	7	1	0	0	0	0	0	0	0	0			Low	Exposed from openings above	shpimg_163.jpg
HBT 033	-34.823106	149.391400	6143966.2	718710.1	780.2	HBT	Stag	80	7	0	0	0	0	1	1	0	0	0			Moderate	Large limb upward pointing, medium limb exposed, hollows deep	shpimg_164.jpg
HBT 034	-34.822816	149.391558	6143998.1	718725.3	776.2	HBT	Eucalyptus macrorhyncha	30	8	0	0	0	1	0	0	0	0	0		Microbats	Low		shpimg_165.jpg
HBT 035	-34.823388	149.391888	6143933.9	718754.0	783.7	HBT	Stag	45	8	1	0	0	0	0	0	0	0	0		Microbats	Low		shpimg_166.jpg
HBT 036	-34.823503	149.391759	6143921.4	718741.8	784.9	HBT	Eucalyptus macrorhyncha	40	7	0	1	0	0	0	0	0	0	0		Brown Treecreeper, Superb Parrot	Moderate		shpimg_167.jpg
HBT 037	-34.835322	149.382942	6142629.6	717904.2	809.8	HBT	Eucalyptus rossii	25	14	0	1	0	0	0	0	0	0	0			Low	Entrance upward pointing	shpimg_168.jpg
HBT 038	-34.835276	149.382742	6142635.1	717886.0	808.6	HBT	Eucalyptus macrorhyncha	50	12	1	1	0	0	0	0	0	0	0		Brown Treecreeper, Superb Parrot	Moderate	Scratching and possible urine staining around small hollow. Small hollow just under 10cm	shpimg_169.jpg
HBT 039	-34.835216	149.383148	6142640.9	717923.3	812.3	HBT	Eucalyptus mannifera	45	12	0	0	0	2	0	0	0	0	0		Microbats	Low		shpimg_170.jpg
HBT 040	-34.835325	149.383250	6142628.6	717932.3	812.9	HBT	Eucalyptus mannifera	55	14	1	0	0	1	0	0	0	0	0			Low	Small trunk hollow approximately 1.5m above the ground	shpimg_171.jpg
HBT 041	-34.835643	149.383231	6142593.3	717929.7	815.1	HBT	Eucalyptus mannifera	35	8	0	0	0	1	0	0	0	0	0		Microbats	Low		shpimg_172.jpg
HBT 042	-34.836107	149.383488	6142541.3	717952.0	820.6	HBT	Eucalyptus mannifera	90	13	1	2	1	1	1	0	0	0	0		Powerful Owl, Gang-gang Cockatoo, Superb Parrot, Microbats	High		shpimg_173.jpg
HBT 043	-34.836091	149.382732	6142544.7	717882.9	814.2	HBT	Eucalyptus rossii	45	12	0	0	0	1	3	0	0	0	0		Microbats	Moderate		shpimg_174.jpg
HBT 044	-34.836053	149.382801	6142548.8	717889.3	814.3	HBT	Eucalyptus rossii	30	7	0	1	0	0	0	0	0	0	0			Low	In main trunk pointing upward	shpimg_175.jpg
HBT 045	-34.836183	149.382838	6142534.3	717892.4	816.6	HBT	Stag	60	9	0	1	0	0	0	0	0	0	0		Microbats	Low	Hollow entrance exposed	shpimg_176.jpg
HBT 046	-34.836268	149.383020	6142524.5	717908.8	818.3	HBT	Eucalyptus rossii	35	6	0	0	1	0	0	0	0	0	0			Low	Hollow in main truck open at the top	shpimg_177.jpg
HBT 047	-34.836127	149.383148	6142539.8	717920.9	818.7	HBT	Eucalyptus mannifera	45	14	0	1	0	0	0	0	0	0	0		Brown Treecreeper, Superb Parrot	Low	May be exposed through openings above	shpimg_178.jpg
HBT 048	-34.836197	149.383465	6142531.4	717949.7	821.4	HBT	Eucalyptus rossii	35	11	0	0	0	0	1	0	0	0	0			Low	Hollow pointing upwards	shpimg_179.jpg
HBT 049	-34.836200	149.383725	6142530.5	717973.5	820.4	HBT	Eucalyptus mannifera	50	12	1	0	0	1	0	0	0	0	0			Low		shpimg_180.jpg

								Hollows (small <10cm, medium 1—20cm, large >20cm)														
Tree identity	Latitude	Longitude	Northing	Easting	Altitude	Type	Species	DBH (cm)	Height (m)	Small trunk	Medium trunk	Large trunk	Small limb	Medium limb	Large limb	Small fissure	Medium fissure	Large fissure	Evidence of use?	Potential threatened species	Habitat value	Comments	Associated image
HBT 050	-34.836373	149.383954	6142510.8	717993.9	818.4	HBT	Eucalyptus mannifera	35	13	0	1	0	0	0	0	0	0	0			Moderate	Scratch marks around hollow, suitable for possums	shpimg_181.jpg
HBT 051	-34.836317	149.384411	6142516.0	718035.9	814.8	HBT	Eucalyptus mannifera	35	10	1	0	0	0	0	0	0	0	0			Moderate	Scratches around hollow, suitable for possums	shpimg_182.jpg
HBT 052	-34.836446	149.384411	6142501.7	718035.5	813.3	HBT	Eucalyptus mannifera	50	15	0	0	0	0	0	0	0	0	0			Moderate	Large stick nest	shpimg_183.jpg
HBT 053	-34.836470	149.384470	6142498.9	718040.9	812.6	HBT	Eucalyptus mannifera	70	11	3	2	0	2	0	0	0	0	0		Brown Treecreeper, Superb Parrot, Microbats	High	Some scratches around medium trunk hollow. Potential limb hollows, suitable for bats	shpimg_184.jpg
HBT 054	-34.837025	149.384678	6142436.9	718058.4	808.4	HBT	Eucalyptus mannifera	45	15	2	1	0	0	0	0	0	0	0		Microbats	Moderate		shpimg_185.jpg
HBT 055	-34.836839	149.384612	6142457.7	718052.9	811.4	HBT	Eucalyptus mannifera	25	7	0	1	0	0	0	0	0	0	0		Microbats	Moderate	Scratches around hollow and on branch	shpimg_186.jpg
HBT 056	-34.836667	149.384485	6142477.0	718041.7	811.9	HBT	Eucalyptus mannifera	50	13	1	0	0	0	0	0	0	0	0			Low		shpimg_187.jpg
HBT 057	-34.836682	149.384400	6142475.5	718033.9	813.1	HBT	Eucalyptus mannifera	35	14	0	0	0	1	1	0	0	0	0		Microbats	Moderate	Hollow entrances pointing upwards but likely to be deep	shpimg_188.jpg
HBT 058	-34.836691	149.384273	6142474.8	718022.3	815.5	HBT	Eucalyptus macrorhyncha	50	12	0	1	0	0	0	0	0	0	0		Brown Treecreeper	Low		shpimg_189.jpg
HBT 059	-34.836826	149.384284	6142459.8	718022.9	815.2	HBT	Eucalyptus mannifera	40	14	0	0	0	0	1	0	0	0	0			Low	Upwards facing entrance	shpimg_190.jpg
HBT 060	-34.836543	149.383797	6142492.3	717979.1	821.3	HBT	Eucalyptus mannifera	35	13	0	0	1	0	1	0	0	0	0		Brown Treecreeper, Superb Parrot, Microbats	Moderate	Scratches around hollow	shpimg_191.jpg
HBT 061	-34.836470	149.383827	6142500.3	717982.1	822.8	HBT	Eucalyptus mannifera	30	9	0	0	0	1	0	0	0	0	0			Low	Entrance facing upward	shpimg_192.jpg
HBT 062	-34.836501	149.383883	6142496.7	717987.1	822.0	HBT	Eucalyptus rossii	20	11	1	0	0	0	0	0	0	0	0			Low	Low hollow at 1.2m above the ground	shpimg_193.jpg
HBT 063	-34.836430	149.383870	6142504.7	717986.1	821.4	HBT	Eucalyptus rossii	65	8	0	1	1	0	0	0	0	0	0			Low	Hollow in main trunk open at top	shpimg_194.jpg
HBT 064	-34.836343	149.383678	6142514.7	717968.8	824.1	HBT	Eucalyptus rossii	35	7	1	0	0	0	0	0	0	0	0			Low	Exposed through openings below	shpimg_195.jpg
HBT 065	-34.836361	149.383562	6142513.0	717958.1	824.7	HBT	Eucalyptus mannifera	65	10	0	0	0	0	1	0	0	0	0		Microbats	Moderate	Evidence of scratches	shpimg_196.jpg
HBT 066	-34.836403	149.383576	6142508.3	717959.3	824.8	HBT	Eucalyptus mannifera	40	12	0	1	0	0	0	0	0	0	0		Brown Treecreeper, Superb Parrot	Moderate		shpimg_197.jpg
HBT 067	-34.836520	149.383666	6142495.1	717967.2	825.7	HBT	Eucalyptus mannifera	35	13	0	1	0	0	0	0	0	0	0		Brown Treecreeper, Superb Parrot	Moderate	Scratches and worn around hollow	shpimg_198.jpg
HBT 068	-34.836308	149.382967	6142520.2	717903.8	822.0	HBT	Eucalyptus mannifera	30	11	0	0	0	0	1	0	0	0	0		Microbats	Moderate		N/A
HBT 069	-34.836288	149.382916	6142522.5	717899.2	821.6	HBT	Eucalyptus rossii	45	12	0	2	0	0	0	0	0	0	0	Scratches around entrance of one hollow	Brown Treecreeper, Superb Parrot, Microbats	Moderate		shpimg_199.jpg
HBT 070	-34.836257	149.382863	6142526.0	717894.5	818.7	HBT	Eucalyptus mannifera	30	13	0	1	0	0	0	0	0	0	0		Brown Treecreeper, Superb Parrot	Moderate		shpimg_200.jpg
HBT 071	-34.836211	149.382778	6142531.3	717886.8	817.7	HBT	Eucalyptus mannifera	40	9	0	0	1	0	0	1	0	0	0		Microbats	Moderate	Trunk hollow, upwards facing entrance	shpimg_201.jpg
HBT 072	-34.836267	149.382719	6142525.2	717881.3	818.6	HBT	Eucalyptus mannifera	35	13	0	1	0	0	0	0	0	0	0			Low	Upward facing entrance	shpimg_202.jpg

								Hollows (small <10cm, medium 1—20cm, large >20cm)														
Tree identity	Latitude	Longitude	Northing	Easting	Altitude	Type	Species	DBH (cm)	Height (m)	Small trunk	Medium trunk	Large trunk	Small limb	Medium limb	Large limb	Small fissure	Medium fissure	Large fissure	Evidence of use?	Potential threatened species	Habitat value	Comments	Associated image
HBT 073	-34.836311	149.382561	6142520.7	717866.7	818.5	HBT	Eucalyptus mannifera	45	14	0	0	1	0	1	1	0	0	0	Bees resident	Gang-gang Cockatoo, Superb Parrot, Brown Treecreeper, Microbats	High		shpimg_203.jpg
HBT 074	-34.836444	149.382553	6142506.0	717865.6	818.6	HBT	Eucalyptus mannifera	50	14	1	2	0	0	0	0	0	0	0	Scratches around one of the hollows	Brown Treecreeper, Superb Parrot	Moderate		shpimg_204.jpg
HBT 075	-34.836595	149.382658	6142489.0	717874.8	820.7	HBT	Eucalyptus mannifera	25	8	1	0	0	0	0	0	0	0	0			Low		shpimg_205.jpg
HBT 076	-34.836605	149.382541	6142488.1	717864.1	818.3	HBT	Stag	30	2.5	0	1	0	0	0	0	0	0	0	Feather caught at opening		Moderate		shpimg_206.jpg
HBT 077	-34.836809	149.382592	6142465.4	717868.2	819.2	HBT	Stag	35	9	1	0	0	0	1	0	0	0	0			Low		shpimg_207.jpg
HBT 078	-34.836730	149.382690	6142473.9	717877.4	819.5	HBT	Eucalyptus macrorhyncha	50	11	0	0	1	0	0	0	0	0	0	Wear around entrance	Gang-gang Cockatoo, Superb Parrot, Brown Treecreeper, Microbats	High		shpimg_208.jpg
HBT 079	-34.837578	149.382884	6142379.5	717892.9	820.0	HBT	Eucalyptus mannifera	70	14	0	1	1	0	1	0	0	0	0		Powerful Owl, Gang-gang Cockatoo, Superb Parrot, Microbats	High		shpimg_209.jpg
HBT 080	-34.837383	149.382979	6142400.9	717902.1	823.0	HBT	Eucalyptus mannifera	40	12	1	0	0	0	0	0	0	0	0		Brown Treecreeper, Microbats	Moderate		shpimg_210.jpg
HBT 081	-34.837283	149.382883	6142412.2	717893.6	821.2	HBT	Eucalyptus mannifera	35	9	1	0	0	0	0	0	0	0	0			Low		shpimg_211.jpg
HBT 082	-34.837227	149.382952	6142418.2	717900.0	822.8	HBT	Stag	70	11	0	0	0	3	1	0	0	0	0		Microbats	Moderate		N/A
HBT 083	-34.837299	149.383060	6142410.0	717909.7	823.2	HBT	Eucalyptus rossii	30	9	0	1	0	0	0	0	0	0	0	Scratches around entrance		Moderate		shpimg_212.jpg
HBT 084	-34.837278	149.383161	6142412.1	717919.0	822.3	HBT	Eucalyptus mannifera	60	12	0	0	1	0	0	0	0	0	0			Low	Hollow trunk with upward facing entry	shpimg_213.jpg
HBT 085	-34.837148	149.383128	6142426.6	717916.3	822.1	HBT	Eucalyptus mannifera	30	7	0	1	0	0	1	0	1	0	0		Microbats	Moderate		shpimg_214.jpg
HBT 086	-34.837019	149.383134	6142440.9	717917.2	821.6	HBT	Eucalyptus mannifera	50	12	0	1	0	0	1	1	0	0	0			Moderate	Hollows relatively exposed	shpimg_216.jpg
HBT 087	-34.836883	149.383393	6142455.4	717941.3	821.8	HBT	Eucalyptus mannifera	40	10	0	1	0	0	0	0	0	0	0			Low		shpimg_217.jpg
HBT 088	-34.836696	149.383221	6142476.6	717926.0	820.6	HBT	Eucalyptus rossii	60	8	1	1	0	0	0	0	0	0	0		Microbats	Moderate		shpimg_218.jpg
HBT 089	-34.836698	149.383524	6142475.7	717953.8	822.4	HBT	Eucalyptus mannifera	35	11	0	1	0	0	0	0	0	0	0	Scratches around hollow		Moderate		shpimg_219.jpg
HBT 090	-34.836519	149.383570	6142495.4	717958.4	821.5	HBT	Eucalyptus mannifera	45	12	0	1	0	0	0	0	0	0	0			Low	Vertical hollow with 2 opposite openings 2m above the ground	shpimg_220.jpg
HBT 091	-34.836630	149.383358	6142483.6	717938.8	822.5	HBT	Eucalyptus mannifera	55	12	2	0	0	0	0	0	0	0	0		Microbats	Moderate		shpimg_221.jpg
HBT 092	-34.841033	149.382140	6141997.8	717815.7	793.8	HBT	Eucalyptus macrorhyncha	70	13	0	0	0	1	0	0	0	0	0		Microbats	Low	Adjacent to what appears to be erosion control/dam although no standing water present	shpimg_222.jpg
HBT 093	-34.841508	149.382062	6141945.3	717807.4	798.1	HBT	Eucalyptus melliodora	90	14	0	1	0	1	0	0	0	0	0			Low	Entrance upward facing	shpimg_223.jpg
HBT 094	-34.840240	149.383246	6142083.4	717919.0	802.8	HBT	Eucalyptus dives	55	6	0	0	0	0	1	0	1	0	0		Microbats	Low	Hollow in dead main limb, entrance upward facing	shpimg_224.jpg

								Hollows (small <10cm, medium 1—20cm, large >20cm)														
Tree identity	Latitude	Longitude	Northing	Easting	Altitude	Type	Species	DBH (cm)	Height (m)	Small trunk	Medium trunk	Large trunk	Small limb	Medium limb	Large limb	Small fissure	Medium fissure	Large fissure	Evidence of use?	Potential threatened species	Habitat value	Comments	Associated image
HBT 095	-34.840016	149.383477	6142107.7	717940.7	804.1	HBT	Eucalyptus melliodora	100	17	0	2	0	0	3	2	0	0	0	Scratches/beak marks at top of hollow	Gang-gang Cockatoo, Superb Parrot, Brown Treecreeper, Microbats	High		shpimg_225.jpg
HBT 096	-34.839993	149.383921	6142109.3	717981.4	802.0	HBT	Stag	55	7	1	0	0	0	1	0	0	0	0		Microbats	Low	Hollow entrance slightly obscured by dead wood	shpimg_226.jpg
HBT 097	-34.839591	149.383500	6142154.8	717943.9	806.4	HBT	Eucalyptus melliodora	70	9	0	0	0	1	0	0	0	0	0			Low	Hollow obscured by vegetation	shpimg_227.jpg
HBT 098	-34.839550	149.382948	6142160.6	717893.6	809.4	HBT	Eucalyptus mannifera	130	20	0	0	0	1	0	0	0	0	0			Low	Existing hollow not very deep, numerous remains of dead branches likely to become hollow bearing	shpimg_228.jpg
HBT 099	-34.839096	149.383397	6142210.0	717935.8	810.5	HBT	Stag	80	13	0	1	0	0	0	0	0	0	0			Low	Entrance facing upwards	shpimg_229.jpg
HBT 100	-34.843668	149.396205	6141674.9	719095.1	786.3	HBT	Eucalyptus melliodora	95	18	0	0	0	1	0	0	0	0	0		Microbats	Low	Spout	shpimg_230.jpg
HBT 101	-34.844601	149.396162	6141571.5	719088.7	778.7	HBT	Stag	100	0	0	0	0	1	0	0	0	0	0			Low	Hollow entrance upward facing	shpimg_231.jpg
HBT 102	-34.845262	149.396115	6141498.2	719082.6	788.5	HBT	Eucalyptus melliodora	120	19	0	1	0	0	1	0	0	0	0		Superb Parrot, Brown Treecreeper, Microbats	Moderate		shpimg_232.jpg
HBT 103	-34.845202	149.397025	6141502.9	719166.0	776.8	HBT	Eucalyptus melliodora	90	0	0	0	0	2	2	0	0	0	0		Superb Parrot, Brown Treecreeper, Microbats	Moderate		shpimg_233.jpg
HBT 104	-34.845413	149.397223	6141479.1	719183.5	776.2	HBT	Eucalyptus viminalis	150	0	2	2	0	2	2	0	0	0	0	Scratches		High		shpimg_234.jpg
HBT 105	-34.844259	149.397322	6141606.9	719195.7	777.6	HBT	Stag	130	0	3	2	0	0	0	0	0	0	0		Brown Treecreeper, Microbats	Moderate	Main trunk open above	shpimg_235.jpg
HBT 106	-34.844723	149.398028	6141553.8	719259.0	774.6	HBT	Eucalyptus viminalis	100	0	0	0	0	1	1	0	1	0	0		Gang-gang Cockatoo, Superb Parrot, Brown Treecreeper, Microbats	High		shpimg_236.jpg
HBT 107	-34.844540	149.398249	6141573.7	719279.7	774.7	HBT	Eucalyptus viminalis	150	0	1	1	1	1	1	1	0	0	0	Feather caught at opening	Superb Parrot, Brown Treecreeper, Microbats	High		shpimg_237.jpg
HBT 108	-34.844641	149.398693	6141561.5	719320.0	774.6	HBT	Stag	120	0	0	0	0	2	2	0	0	0	0		Microbats	High	High quality for bats only	shpimg_238.jpg
HBT 109	-34.845239	149.398869	6141494.8	719334.5	774.8	HBT	Eucalyptus viminalis	160	20	0	0	1	0	2	1	0	0	0		Powerful Owl, Gang-gang Cockatoo, Superb Parrot, Microbats	High		shpimg_239.jpg
HBT 110	-34.845201	149.399120	6141498.4	719357.6	775.0	HBT	Eucalyptus viminalis	160	18	1	0	2	1	0	1	0	0	0		Gang-gang Cockatoo, Microbats	Moderate	Large hollows but with upward facing entrances	shpimg_240.jpg
HBT 111	-34.845024	149.401087	6141513.8	719537.9	771.0	HBT	Eucalyptus dalrympleana	140	0	0	0	0	1	1	0	0	0	0		Brown Treecreeper	Low		shpimg_241.jpg
HBT 112	-34.844215	149.400453	6141604.9	719482.1	771.2	HBT	Eucalyptus rubida	140	0	0	1	0	0	0	0	0	0	0		Microbats	Moderate		shpimg_242.jpg
HBT 113	-34.843215	149.402721	6141710.8	719692.2	775.1	HBT	Stag	90	8	0	0	1	0	0	0	0	0	0			Low	Large opening but exposed	shpimg_243.jpg

								Hollows (small <10cm, medium 1—20cm, large >20cm)														
Tree identity	Latitude	Longitude	Northing	Easting	Altitude	Type	Species	DBH (cm)	Height (m)	Small trunk	Medium trunk	Large trunk	Small limb	Medium limb	Large limb	Small fissure	Medium fissure	Large fissure	Evidence of use?	Potential threatened species	Habitat value	Comments	Associated image
HBT 114	-34.843897	149.403101	6141634.4	719725.1	769.2	HBT	Eucalyptus dalrympleana	170	17	0	1	0	3	0	0	0	0	0			Low	Hollows unlikely to be very deep	shpimg_244.jpg
HBT 115	-34.844802	149.403470	6141533.2	719756.5	767.1	HBT	Stag	150	16	0	1	0	1	1	0	0	0	0		Microbats	Moderate		shpimg_245.jpg
HBT 116	-34.843190	149.403588	6141711.7	719771.5	774.6	HBT	Eucalyptus macrorhyncha	70	8	0	0	0	1	0	0	0	0	0			Low		shpimg_246.jpg
HBT 117	-34.844497	149.405315	6141562.9	719926.0	766.5	HBT	Eucalyptus macrorhyncha	140	12	0	0	0	3	0	0	0	0	0			Low		shpimg_247.jpg
HBT 118	-34.843858	149.405431	6141633.6	719938.3	768.3	HBT	Eucalyptus blakelyi	75	14	0	1	0	0	0	0	0	0	0			Low	Hollow shallow	shpimg_248.jpg
HBT 119	-34.843422	149.405538	6141681.7	719949.3	770.5	HBT	Eucalyptus blakelyi	150	16	1	0	2	1	1	0	0	0	0		Gang-gang Cockatoo	High		shpimg_249.jpg
HBT 120	-34.843171	149.405845	6141708.9	719978.0	766.6	HBT	Eucalyptus macrorhyncha	90	9	0	0	0	1	1	0	0	0	0			Low		shpimg_250.jpg
HBT 121	-34.843049	149.407841	6141718.0	720160.9	768.0	HBT	Stag	65	8	0	0	0	0	1	0	0	0	0			Low	Upward facing entrance	shpimg_251.jpg
HBT 122	-34.843578	149.407603	6141659.9	720137.7	773.2	HBT	Stag	75	7	0	0	0	1	1	0	0	0	0		Microbats	Low	Upward facing entrances	shpimg_252.jpg
HBT 123	-34.843900	149.407757	6141623.8	720150.9	772.9	HBT	Stag	60	9	1	0	0	1	1	0	0	0	0			Low	Some potential for microbats but not considered to be good habitat	shpimg_253.jpg
HBT 124	-34.844235	149.408307	6141585.4	720200.3	771.1	HBT	Stag	70	9	2	0	0	1	0	0	0	0	0		Microbats	Low		shpimg_254.jpg
HBT 125	-34.844390	149.407917	6141569.1	720164.3	767.8	HBT	Eucalyptus macrorhyncha	85	10	0	0	0	1	2	0	1	0	0		Microbats	High	Fissure leads into hollow main trunk	shpimg_255.jpg
HBT 126	-34.843842	149.406998	6141631.9	720081.7	771.3	HBT	Stag	95	14	1	0	0	0	1	0	0	0	0	Scratches around hollow	Microbats	Moderate		shpimg_256.jpg
HBT 127	-34.843974	149.406877	6141617.5	720070.3	770.3	HBT	Eucalyptus macrorhyncha	100	13	1	0	0	1	1	0	0	0	0			Low		shpimg_257.jpg
HBT 128	-34.853443	149.394821	6140593.6	718942.6	805.8	HBT	Eucalyptus melliodora	110	0	0	0	0	1	0	0	0	0	0			Low	Numerous dead branches, majority not hollow bearing	shpimg_258.jpg
HBT 129	-34.853093	149.396487	6140628.8	719095.9	798.8	HBT	Eucalyptus melliodora	100	16	0	0	0	0	0	1	0	0	0		Microbats	Moderate		shpimg_259.jpg
HBT 130	-34.853899	149.398578	6140534.8	719284.9	786.2	HBT	Eucalyptus melliodora	110	13	0	1	0	0	0	0	0	0	0			Low	Hollow entrance pointing upwards	shpimg_260.jpg
HBT 131	-34.853573	149.390250	6140589.1	718524.3	792.3	HBT	Stag	45	7	0	1	0	0	0	0	0	0	0		Microbats	Low	Vertically elongated and exposed entrance	shpimg_261.jpg
HBT 132	-34.853681	149.393226	6140570.7	718796.1	803.3	HBT	Eucalyptus bridgesiana	100	14	1	0	0	0	0	0	0	0	0		Microbats	Low	Vertically elongated, two openings in main branch	N/A
HBT 133	-34.852940	149.393759	6140651.7	718846.8	804.4	HBT	Eucalyptus melliodora	95	7	0	1	0	0	1	0	0	0	0			Low	Amounts of decaying timber present in hollow providing a degree of obstruction	shpimg_262.jpg
HBT 134	-34.853158	149.394462	6140626.0	718910.5	801.3	HBT	Stag	45	5	0	0	0	0	3	2	0	0	0		Microbats	High		shpimg_263.jpg
HBT 135	-34.853375	149.394411	6140602.0	718905.3	804.2	HBT	Eucalyptus bridgesiana	100	9	0	0	1	0	0	0	0	0	0		Powerful Owl, Gang-gang Cockatoo, Superb Parrot, Microbats	Moderate	Hollow 2.5m above the ground	shpimg_264.jpg
HBT 136	-34.853517	149.394181	6140586.8	718883.9	805.8	HBT	Stag	65	9	0	1	0	2	0	0	0	0	0			Low	Medium limb hollow upwards facing, other hollows somewhat exposed	shpimg_265.jpg
HBT 137	-34.850799	149.393670	6140889.4	718844.4	794.6	HBT	Stag	65	9	0	1	0	5	0	0	0	0	0		Microbats	Moderate		shpimg_266.jpg
HBT 138	-34.849937	149.393271	6140985.9	718810.1	795.2	HBT	Eucalyptus melliodora	100	16	0	1	0	1	1	0	0	0	0		Superb Parrot, Brown Treecreeper, Microbats	High		shpimg_267.jpg
HBT 139	-34.848538	149.393650	6141140.2	718848.5	786.2	HBT	Eucalyptus melliodora	100	17	0	1	1	1	0	0	0	0	0	Potentially used by Galahs	Gang-gang Cockatoo, Superb Parrot	High		shpimg_268.jpg

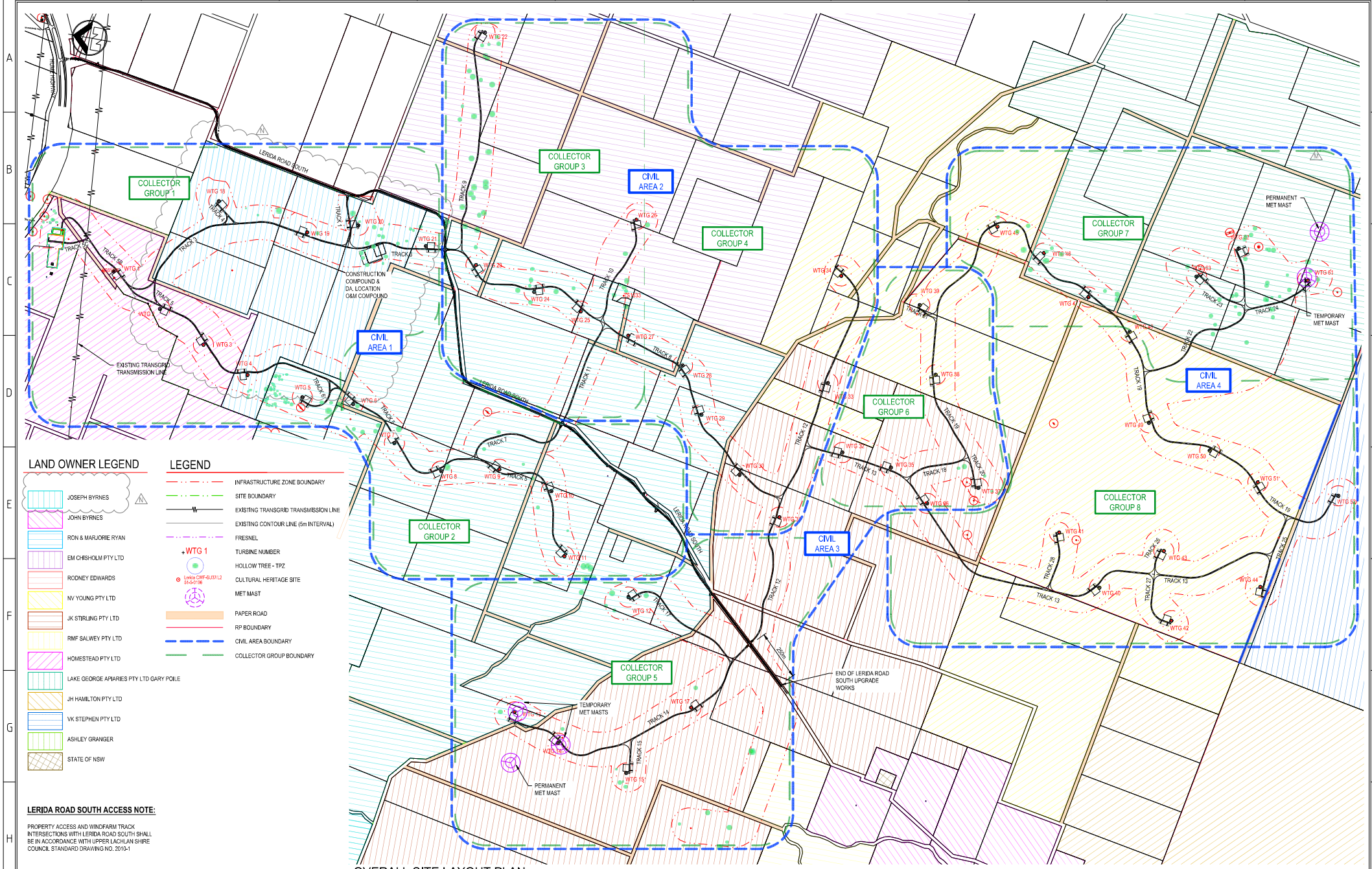
								Hollows (small <10cm, medium 1—20cm, large >20cm)														
Tree identity	Latitude	Longitude	Northing	Easting	Altitude	Type	Species	DBH (cm)	Height (m)	Small trunk	Medium trunk	Large trunk	Small limb	Medium limb	Large limb	Small fissure	Medium fissure	Large fissure	Evidence of use?	Potential threatened species	Habitat value	Comments	Associated image
HBT 140	-34.848495	149.394358	6141143.5	718913.4	785.5	HBT	Stag	80	11	0	0	0	0	1	0	0	0	0		Microbats	Moderate		shpimg_270.jpg
HBT 141	-34.848529	149.393285	6141142.0	718815.2	787.8	HBT	Eucalyptus blakelyi	70	14	0	1	0	0	1	0	0	0	0	Bees resident		Low	Upward facing entrance	shpimg_271.jpg
HBT 142	-34.848730	149.392280	6141121.9	718722.7	789.8	HBT	Eucalyptus blakelyi	90	14	0	1	1	0	0	1	0	0	0		Powerful Owl, Gang-gang Cockatoo, Superb Parrot, Microbats	High		shpimg_272.jpg
HBT 143	-34.847972	149.392841	6141204.8	718776.0	785.2	HBT	Stag	110	16	2	1	1	1	1	0	0	0	0		Microbats	High		shpimg_273.jpg
HBT 144	-34.846754	149.392665	6141340.3	718763.2	789.1	HBT	Eucalyptus blakelyi	20	18	0	1	0	0	0	0	0	0	0		Superb Parrot, Brown Treecreeper	Moderate		shpimg_274.jpg
HBT 145	-34.845361	149.394996	6141489.7	718980.0	786.9	HBT	Stag	75	12	1	0	0	0	0	0	0	1	0			Low	Hollows relatively exposed	shpimg_275.jpg
HBT 146	-34.846206	149.380952	6141426.6	717693.5	806.3	HBT	Eucalyptus dalrympleana	140	10	0	0	0	0	3	0	0	0	0		Microbats	Moderate		shpimg_276.jpg
HBT 147	-34.843337	149.382728	6141741.0	717863.4	798.0	HBT	Stag	120	15	0	0	0	0	1	0	0	0	0		Microbats	Low		shpimg_277.jpg
HBT 148	-34.840960	149.383618	6142002.7	717951.1	794.7	HBT	Eucalyptus macrorhyncha	80	10	1	0	0	0	0	0	0	0	0			Low	Entrance somewhat obstructed by remnant decaying wood	shpimg_278.jpg
HBT 149	-34.842152	149.382272	6141873.4	717824.9	796.4	HBT	Stag	90	15	0	1	0	0	0	0	0	0	0		Superb Parrot, Brown Treecreeper	Low	Vertically elongated exposed entrance	shpimg_279.jpg
HBT 150	-34.842245	149.382683	6141862.2	717862.2	795.5	HBT	Eucalyptus macrorhyncha	95	14	2	0	0	0	0	0	0	0	0		Brown Treecreeper	Low		shpimg_280.jpg
HBT 151	-34.850070	149.382104	6140995.5	717788.6	797.2	HBT	Eucalyptus ?blakelyi	55	9	0	1	0	1	1	1	0	0	0		Superb Parrot, Brown Treecreeper, Microbats	Moderate	Tree species identity not confirmed	shpimg_281.jpg
HBT 152	-34.847908	149.382566	6141234.3	717836.6	801.0	HBT	Eucalyptus bridgesiana	65	7	0	0	0	1	0	0	0	0	0			Low		shpimg_282.jpg
HBT 153	-34.848475	149.383789	6141168.7	717946.9	792.1	HBT	Eucalyptus bridgesiana	75	11	1	0	0	0	0	0	0	0	0			Low	Narrow entry, upward facing	shpimg_283.jpg
HBT 154	-34.850704	149.381384	6140926.7	717721.1	803.4	HBT	Eucalyptus mannifera	65	8	2	1	0	1	0	0	0	0	0	Bird dropping, chewing	Superb Parrot, Brown Treecreeper	High		shpimg_284.jpg
HBT 155	-34.851270	149.379609	6140867.8	717557.3	789.1	HBT	Stag	75	8	1	0	0	0	0	0	0	0	0			Low	Obstructed by internal wood and exposed	shpimg_285.jpg
HBT 156	-34.853048	149.378560	6140672.8	717456.7	786.1	HBT	Eucalyptus dives	40	8	1	1	0	0	0	0	0	1	0		Superb Parrot, Brown Treecreeper	Moderate		shpimg_286.jpg
HBT 157	-34.854243	149.376539	6140544.6	717268.8	768.8	HBT	Eucalyptus dalrympleana	200	16	1	1	0	0	1	0	0	0	0		Superb Parrot, Brown Treecreeper	High	Also contains structures with the potential to form other hollows in the future	shpimg_287.jpg
HBT 158	-34.854437	149.376610	6140523.0	717274.7	766.8	HBT	Eucalyptus dalrympleana	230	14	0	1	0	0	0	0	0	0	0		Superb Parrot, Brown Treecreeper, Microbats	Moderate		shpimg_288.jpg
HBT 159	-34.854629	149.376506	6140501.9	717264.7	762.2	HBT	Eucalyptus dalrympleana	160	17	0	2	1	0	0	0	0	0	0	Chewing around large hollow	Gang-gang Cockatoo, Superb Parrot	High		shpimg_289.jpg
HBT 160	-34.854899	149.376003	6140473.0	717218.0	759.3	HBT	Eucalyptus viminalis	65	20	0	1	0	0	0	0	0	0	0			Moderate		shpimg_290.jpg

								Hollows (small <10cm, medium 1—20cm, large >20cm)														
Tree identity	Latitude	Longitude	Northing	Easting	Altitude	Type	Species	DBH (cm)	Height (m)	Small trunk	Medium trunk	Large trunk	Small limb	Medium limb	Large limb	Small fissure	Medium fissure	Large fissure	Evidence of use?	Potential threatened species	Habitat value	Comments	Associated image
HBT 161	-34.854742	149.375891	6140490.7	717208.2	758.9	HBT	Eucalyptus viminalis	75	19	1	0	0	0	1	0	0	0	0	Beak marks	Superb Parrot, Brown Treecreeper	Moderate		shpimg_291.jpg
HBT 162	-34.854511	149.375651	6140516.8	717186.8	757.9	HBT	Eucalyptus viminalis	90	19	1	0	0	0	0	0	0	0	0			Low		shpimg_292.jpg
HBT 163	-34.854437	149.375714	6140524.9	717192.8	758.8	HBT	Eucalyptus dalrympleana	120	20	0	1	0	0	1	0	0	0	0		Microbats	Moderate	Potentially other hollows present not confirmed from the ground	shpimg_293.jpg
HBT 164	-34.854383	149.374906	6140532.6	717119.1	754.0	HBT	Stag	95	0	0	0	0	2	0	0	0	0	0			Low		shpimg_294.jpg
HBT 165	-34.857743	149.375537	6140158.6	717167.9	789.7	HBT	Stag	100	13	1	1	0	0	0	0	0	0	0			Low	Entrances somewhat obscured by internal wood	shpimg_295.jpg
HBT 166	-34.855972	149.375227	6140355.7	717144.2	778.7	HBT	Eucalyptus melliodora	110	0	0	0	0	1	1	0	0	0	0		Microbats	Low	Hollow entrances largely pointing upwards	shpimg_296.jpg
HBT 167	-34.856260	149.374204	6140326.0	717049.9	784.5	HBT	Eucalyptus melliodora	80	17	0	0	0	1	0	0	0	0	0			Low	Entrance pointing upwards	shpimg_297.jpg
HBT 168	-34.855796	149.374359	6140377.1	717065.3	776.0	HBT	Stag	70	8	1	0	0	0	0	2	0	0	0		Microbats	Moderate		shpimg_298.jpg
HBT 169	-34.851482	149.366449	6140872.7	716353.4	759.4	HBT	Eucalyptus macrorhyncha	95	14	0	1	0	1	1	0	0	0	0		Superb Parrot, Brown Treecreeper, Microbats	Moderate		shpimg_299.jpg
HBT 170	-34.861237	149.370410	6139782.1	716690.0	792.1	HBT	Stag	90	10	0	0	0	3	2	0	0	0	0		Microbats	Low	Most limb hollows oriented upwards. Not possible to confirm small limb hollows, but likely	shpimg_300.jpg
HBT 171	-34.858045	149.364352	6140149.3	716144.4	786.5	HBT	Stag	40	7	0	1	0	0	0	0	0	0	0			Low	Hollow in main trunk open at top	shpimg_301.jpg
HBT 172	-34.858514	149.363690	6140098.7	716082.7	781.3	HBT	Stag	30	6	0	0	0	0	0	0	0	0	0			Low		shpimg_302.jpg
HBT 173	-34.858698	149.363386	6140078.9	716054.4	780.2	HBT	Stag	70	8	0	1	0	0	0	0	0	0	0			Low	Entrance partially obscured by internal dead wood	shpimg_303.jpg
HBT 174	-34.858348	149.363586	6140117.3	716073.6	784.6	HBT	Eucalyptus melliodora	90	12	0	0	0	1	0	0	0	0	0			Low	Very small entrance <5cm	shpimg_304.jpg
HBT 175	-34.854857	149.366176	6140499.0	716319.5	765.2	HBT	Eucalyptus macrorhyncha	70	14	0	1	0	0	1	0	0	0	0		Superb Parrot, Brown Treecreeper, Microbats	Moderate		shpimg_305.jpg
HBT 176	-34.864751	149.367187	6139399.3	716386.1	772.4	HBT	Eucalyptus ?dalrympleana	150	18	0	0	0	1	3	0	0	0	0		Microbats	High	Adjacent to semi permanent dam. Tree species identity not confirmed	shpimg_306.jpg
HBT 177	-34.864817	149.367171	6139392.0	716384.4	771.4	HBT	Stag	130	10	1	0	0	0	2	0	0	0	0		Microbats	Moderate		shpimg_307.jpg
HBT 178	-34.864427	149.362181	6139446.0	715929.2	776.7	HBT	Stag	110	18	1	0	0	1	1	0	0	0	0		Microbats	Moderate	Potentially other hollows present not confirmed from the ground	shpimg_308.jpg
HBT 179	-34.864474	149.361247	6139442.8	715843.7	787.8	HBT	Eucalyptus melliodora	70	16	0	0	0	0	1	0	0	0	0			Low	Upward facing entrance	shpimg_309.jpg
HBT 180	-34.864145	149.360835	6139480.2	715806.9	789.0	HBT	Eucalyptus melliodora	120	14	0	0	0	1	2	0	0	0	0			High	Potentially other hollows present not confirmed from the ground	shpimg_310.jpg
HBT 181	-34.861832	149.361760	6139734.8	715897.5	775.5	HBT	Eucalyptus macrorhyncha	60	11	0	0	0	1	0	0	0	0	0			Low		shpimg_311.jpg
HBT 182	-34.863172	149.362807	6139583.9	715989.7	771.9	HBT	Eucalyptus melliodora	110	19	0	0	0	0	1	0	0	0	0		Microbats	Moderate		shpimg_312.jpg
HBT 183	-34.872398	149.387413	6138507.1	718215.1	801.2	HBT	Eucalyptus bridgesiana	70	14	0	0	0	1	1	0	0	0	0		Microbats	Low		shpimg_313.jpg
HBT 184	-34.872669	149.387590	6138476.7	718230.5	801.4	HBT	Eucalyptus bridgesiana	95	13	0	1	0	0	0	0	0	0	0			Low	Hollow unlikely to be very deep	shpimg_314.jpg

								Hollows (small <10cm, medium 1—20cm, large >20cm)														
Tree identity	Latitude	Longitude	Northing	Easting	Altitude	Type	Species	DBH (cm)	Height (m)	Small trunk	Medium trunk	Large trunk	Small limb	Medium limb	Large limb	Small fissure	Medium fissure	Large fissure	Evidence of use?	Potential threatened species	Habitat value	Comments	Associated image
HBT 185	-34.874344	149.386420	6138293.4	718119.2	804.2	HBT	Stag	45	6	0	1	0	0	1	0	0	0	0			Low	Medium limb pointing upwards, trunk hollow with debris inside	shpimg_315.jpg
HBT 186	-34.873823	149.387269	6138349.4	718198.2	806.9	HBT	Eucalyptus melliodora	70	12	0	0	0	1	0	0	0	0	0		Microbats	Low		shpimg_316.jpg
HBT 187	-34.884873	149.404078	6137086.8	719705.4	784.3	HBT	Eucalyptus macrorhyncha	90	15	0	1	0	1	1	0	0	0	0		Superb Parrot, Brown Treecreeper, Microbats	High		shpimg_317.jpg
HBT 188	-34.884659	149.405465	6137107.5	719832.7	786.1	HBT	Eucalyptus macrorhyncha	75	14	0	1	0	0	0	0	0	0	0	Worn around entrance, possible urine staining (possum?)		Moderate		shpimg_318.jpg
HBT 189	-34.884637	149.405275	6137110.4	719815.4	786.3	HBT	Eucalyptus macrorhyncha	75	11	2	0	0	0	1	0	0	0	0		Microbats	Low	Entrances obscured by vegetation	shpimg_319.jpg
HBT 190	-34.884918	149.405636	6137078.4	719847.7	787.6	HBT	Eucalyptus macrorhyncha	80	14	1	0	0	0	0	0	0	0	0	Beak marks around edge of hollow	Brown Treecreeper	Moderate	Hollow just under 10cm	shpimg_320.jpg
HBT 191	-34.885055	149.406084	6137062.2	719888.3	787.1	HBT	Eucalyptus macrorhyncha	95	13	2	1	0	0	0	0	0	0	0		Superb Parrot, Brown Treecreeper, Microbats	High	Hollows in main limbs	shpimg_321.jpg
HBT 192	-34.885875	149.404942	6136973.8	719781.7	797.3	HBT	Eucalyptus macrorhyncha	70	13	0	0	0	0	1	0	0	0	0	Bees		Low		shpimg_322.jpg
HBT 193	-34.886013	149.404941	6136958.5	719781.2	797.1	HBT	Eucalyptus macrorhyncha	80	15	0	0	0	0	1	0	0	0	0		Microbats	Low	Upward facing entrance	shpimg_323.jpg
HBT 194	-34.886224	149.404970	6136935.0	719783.3	799.0	HBT	Eucalyptus bridgesiana	110	14	0	1	0	0	0	0	0	0	0			Low	Partially obstructed by internal dead wood	shpimg_324.jpg
HBT 195	-34.887210	149.403611	6136828.6	719656.5	807.2	HBT	Stag	60	4	2	0	0	0	0	0	0	0	0			Low	Hollow trunk open at top with 2 small entrances at side	shpimg_325.jpg
HBT 196	-34.888347	149.404165	6136701.3	719704.1	810.5	HBT	Eucalyptus macrorhyncha	80	10	0	0	0	0	2	0	0	1	0		Microbats	Moderate	High quality for bats only. Leaning and partially uprooted	shpimg_326.jpg
HBT 197	-34.888140	149.404684	6136723.1	719752.1	809.4	HBT	Stag	110	11	0	1	0	0	0	0	0	0	0			Low	Entrance open at the top	shpimg_327.jpg
HBT 198	-34.888801	149.403696	6136652.0	719660.0	816.7	HBT	Eucalyptus macrorhyncha	90	14	1	0	0	0	1	1	0	0	0	Small trunk hollow worn around entrance	Brown Treecreeper, Microbats	Moderate		shpimg_328.jpg
HBT 199	-34.887462	149.402701	6136802.7	719572.6	806.4	HBT	Eucalyptus macrorhyncha	85	7	0	0	1	0	1	0	0	0	0		Microbats	Moderate	Trunk hollow in main trunk and open at the top	shpimg_329.jpg
HBT 200	-34.887039	149.402176	6136850.7	719525.8	805.3	HBT	Stag	60	0	0	0	0	2	2	0	0	0	0			Low	Limbs mostly upward pointing or openings within leafy vegetation	shpimg_330.jpg
HBT 201	-34.886641	149.401999	6136895.3	719510.7	804.1	HBT	Stag	60	0	0	0	0	2	0	0	0	0	0		Microbats	Moderate		shpimg_331.jpg
HBT 202	-34.886419	149.401793	6136920.4	719492.4	802.4	HBT	Eucalyptus macrorhyncha	80	0	0	1	0	0	0	0	0	0	0	Worn around edges	Superb Parrot, Brown Treecreeper	Moderate		shpimg_332.jpg
HBT 203	-34.886348	149.401817	6136928.2	719494.8	801.9	HBT	Eucalyptus macrorhyncha	100	0	0	0	0	3	0	0	0	0	0	Beak marks	Brown Treecreeper	Moderate		shpimg_333.jpg
HBT 204	-34.886259	149.402687	6136936.1	719574.6	803.1	HBT	Eucalyptus macrorhyncha	75	0	0	1	0	1	0	0	0	0	0		Brown Treecreeper	Moderate		shpimg_335.jpg
HBT 205	-34.886265	149.402859	6136935.1	719590.3	803.5	HBT/Nest tree	Eucalyptus macrorhyncha	90	0	0	1	0	0	0	0	0	0	0	Stick nest, worn around hollow entrance	Brown Treecreeper	Moderate		shpimg_336.jpg
HBT 206	-34.886785	149.401275	6136880.9	719444.1	801.6	HBT	Eucalyptus bridgesiana	95	0	0	1	0	2	0	0	0	0	0			Low		shpimg_337.jpg
HBT 207	-34.886908	149.400806	6136868.3	719400.9	801.2	HBT	Eucalyptus bridgesiana	85	0	1	0	0	1	0	0	0	0	0			Low	Hollow not appearing to be very deep	shpimg_338.jpg
HBT 208	-34.885159	149.400587	6137062.8	719385.5	796.6	HBT	Eucalyptus macrorhyncha	95	0	0	0	0	2	1	0	0	0	0			Low	Narrow hollow entrances	shpimg_339.jpg
HBT 209	-34.884887	149.400971	6137092.1	719421.4	797.1	HBT	Eucalyptus macrorhyncha	60	0	0	0	0	2	0	0	0	0	0			Low		shpimg_341.jpg

								Hollows (small <10cm, medium 1—20cm, large >20cm)														
Tree identity	Latitude	Longitude	Northing	Easting	Altitude	Type	Species	DBH (cm)	Height (m)	Small trunk	Medium trunk	Large trunk	Small limb	Medium limb	Large limb	Small fissure	Medium fissure	Large fissure	Evidence of use?	Potential threatened species	Habitat value	Comments	Associated image
HBT 210	-34.884795	149.401712	6137100.7	719489.3	795.1	HBT	Eucalyptus macrorhyncha	90	0	0	1	0	0	0	0	0	0	0	Old beak marks	Brown Treecreeper	Moderate		shpimg_342.jpg
HBT 211	-34.884589	149.401617	6137123.7	719481.2	790.6	HBT	Eucalyptus macrorhyncha	90	11	0	0	0	2	0	0	0	0	0			Low	Hollows may not be very deep	shpimg_343.jpg
HBT 212	-34.883998	149.401190	6137190.2	719443.7	787.8	HBT	Eucalyptus macrorhyncha	85	14	0	0	0	1	0	0	0	0	0		Microbats	Low	Entrance upward facing	shpimg_344.jpg
HBT 213	-34.882011	149.402839	6137407.0	719599.8	781.5	HBT	Eucalyptus macrorhyncha	85	11	0	1	0	0	0	0	0	0	0	Wear around hollow	Superb Parrot, Brown Treecreeper	Moderate		shpimg_345.jpg
HBT 214	-34.885818	149.398881	6136993.4	719227.8	800.6	HBT	Eucalyptus macrorhyncha	90	0	1	0	0	1	0	0	0	0	0			Low		shpimg_346.jpg
HBT 215	-34.884040	149.399614	6137189.0	719299.6	787.9	HBT	Eucalyptus macrorhyncha	70	13	1	0	0	1	0	0	0	0	0			Low	Entrances <5cm	shpimg_347.jpg
HBT 216	-34.883722	149.400102	6137223.2	719345.0	786.5	HBT	Stag	85	12	0	0	0	1	1	0	0	0	0		Microbats	Moderate		shpimg_348.jpg
HBT 217	-34.883998	149.398989	6137195.1	719242.5	795.9	HBT	Stag	85	0	0	0	0	1	0	0	0	0	0			Low		shpimg_349.jpg
HBT 218	-34.879823	149.399025	6137658.1	719256.9	805.9	HBT	Eucalyptus blakelyi	90	14	1	1	0	0	0	0	0	0	0		Microbats	Low	One hollow very small, other low to ground	N/A
HBT 219	-34.878743	149.399908	6137776.0	719340.5	803.6	HBT	Eucalyptus mannifera	110	12	1	0	0	1	0	0	0	0	0			Low	Hollows likely to be shallow	shpimg_350.jpg
HBT 220	-34.878686	149.400231	6137781.6	719370.2	804.6	HBT	Eucalyptus bridgesiana	105	14	1	0	0	0	0	0	0	0	0			Low	Hollow in large limb, very small entrance	shpimg_351.jpg
HBT 221	-34.878042	149.400300	6137852.9	719378.2	800.1	HBT	Stag	70	7	0	0	0	1	1	0	0	0	0		Microbats	Moderate		shpimg_352.jpg
HBT 222	-34.875406	149.401999	6138141.6	719540.5	785.8	HBT	Eucalyptus bridgesiana	95	14	0	0	1	0	2	0	0	0	0		Powerful Owl, Gang-gang Cockatoo, Superb Parrot, Microbats	High		shpimg_353.jpg
HBT 223	-34.874700	149.401402	6138221.2	719487.8	790.0	HBT	Eucalyptus bridgesiana	180	17	0	1	0	0	1	1	0	0	0		Superb Parrot, Brown Treecreeper, Microbats	High	Potential small limb hollows	shpimg_354.jpg
HBT 224	-34.873991	149.400655	6138301.5	719421.4	787.1	HBT	Eucalyptus macrorhyncha	95	7	0	0	0	0	1	0	0	0	0		Microbats	Moderate	Limb hollow leading into hollow main trunk	shpimg_355.jpg
HBT 225	-34.873428	149.401798	6138361.4	719527.4	780.7	HBT	Eucalyptus melliodora	140	18	0	1	0	0	0	0	0	0	0		Superb Parrot, Brown Treecreeper	High	Also numerous structures that will potentially be hollow bearing in the future	shpimg_356.jpg
HBT 226	-34.870887	149.402500	6138641.7	719598.4	770.0	HBT	Eucalyptus macrorhyncha	5	7	1	0	0	0	0	0	0	0	0	Worn on lower edge (old)	Brown Treecreeper, Microbats	Low		shpimg_357.jpg
HBT 227	-34.871793	149.403529	6138539.0	719690.0	772.4	HBT	Eucalyptus macrorhyncha	70	8	1	1	0	1	1	0	0	0	0			Moderate		shpimg_358.jpg
HBT 228	-34.872912	149.402850	6138416.3	719625.0	780.0	Nest tree	Eucalyptus melliodora	95	20	0	0	0	0	0	0	0	0	0	Stick nest		Low		shpimg_359.jpg
HBT 229	-34.873402	149.403358	6138360.9	719670.1	781.4	HBT	Eucalyptus melliodora	90	18	1	1	0	0	0	1	0	0	0		Superb Parrot, Brown Treecreeper, Microbats	High		shpimg_360.jpg
HBT 230	-34.874858	149.402286	6138201.7	719568.2	790.0	HBT	Eucalyptus macrorhyncha	70	11	0	0	0	0	0	0	1	1	0		Microbats	Low	Mostly dead tree, fissures shallow with internal woody debris present	shpimg_361.jpg
HBT 231	-34.874634	149.401976	6138227.2	719540.5	791.5	HBT	Eucalyptus macrorhyncha	55	7	0	0	0	0	1	0	0	0	0			Low	Upward pointing entrance	shpimg_362.jpg

APPENDIX B: COLLECTOR WIND FARM – LAYOUT DESIGN (MAY 2019)



LAND OWNER LEGEND

- JOSEPH BYRNES
- JOHN BYRNES
- RON & MARJORIE RYAN
- EM CHISHOLM PTY LTD
- RODNEY EDWARDS
- NV YOUNG PTY LTD
- JK STIRLING PTY LTD
- RMF SALWEY PTY LTD
- HOMESTEAD PTY LTD
- LAKE GEORGE APIARIES PTY LTD GARY POILE
- JH HAMILTON PTY LTD
- VK STEPHEN PTY LTD
- ASHLEY GRANGER
- STATE OF NSW

LEGEND

- INFRASTRUCTURE ZONE BOUNDARY
- SITE BOUNDARY
- EXISTING TRANSGRID TRANSMISSION LINE
- EXISTING CONTOUR LINE (5m INTERVAL)
- FRESNEL
- WTG 1 — TURBINE NUMBER
- HOLLOW TREE - TPZ
- CULTURAL HERITAGE SITE
- MET MAST
- PAPER ROAD
- RP BOUNDARY
- CIVIL AREA BOUNDARY
- COLLECTOR GROUP BOUNDARY

LERIDA ROAD SOUTH ACCESS NOTE:

PROPERTY ACCESS AND WINDFARM TRACK INTERSECTIONS WITH LERIDA ROAD SOUTH SHALL BE IN ACCORDANCE WITH UPPER LACHLAN SHIRE COUNCIL STANDARD DRAWING NO. 2010-1

OVERALL SITE LAYOUT PLAN

SCALE 1:10,000

REV	DETAIL	DRN	CHK	APP	DATE
N	LANDOWNERS UPDATED	B.P.	J.M.	N.C.	16.04.2019
M	LAYOUT UPDATED	B.P.	J.M.	N.C.	09.04.2019
L	FOR APPROVAL	B.P.	B.P.	N.C.	08.03.2019
K	LAYOUT UPDATED ASSIST PADS ADDED	B.P.	B.P.	N.C.	20.02.2019
J	DISTURBANCE CORRIDOR UPDATED	J.M.	B.P.	N.C.	12.10.2018

REVISIONS AND APPROVALS

i³ consulting pty ltd
engineering consultants
innovation, ingenuity, inclusion

Vestas

CIVILEX

PROJECT	COLLECTOR WIND FARM
TITLE	OVERALL SITE LAYOUT PLAN
DRAWING STATUS	FOR APPROVAL
PROJECT No.	13-175
SCALE	AS SHOWN
SIZE	A1
DRAWING No.	COLWF-C-5300-1
REV.	N