

LEGEND

	EPBC site perimeter
	Proposed wind turbine
	Proposed access track
	Proposed overhead powerline
	Alternative overhead powerline
	Proposed underground electrical reticulation
	Proposed overhead electrical reticulation
	Proposed substation
	Proposed switchyard
	Existing 132 kV transmission line
	Existing 330 kV transmission line
	GSM Observations
	0
	1-9
	10-49
	50+

EPURON	
PROJECT	Yass Valley Wind Farm
TITLE	Golden Sun Moth Survey Locations & Observations
SCALE	1:100,000 at A3
DATE	09/01/14
DRAWN	MK

Golden Sun Moth potential habitat map (extrapolated from field surveys)

Note:

The map provided above shows the general location where GSM were recorded and how many individuals were detected in each location. The species is generally known from grassland/woodland mosaics. As understorey varies and intergrades between exotic-dominated and native-dominated species composition, mapping potential habitat with accuracy is very difficult.

An additional map has been provided below which extrapolates from the site information to estimate potential habitat. It is based on the location of each GSM search point and the assessment of habitat provided in the survey data. We have extrapolated 100m radius from each search point, this seeming a reasonable distance given the variation in understorey condition. We have also shown the results of the nearby Conroys Gap proposal site, for context.

Legend:

- Low potential habitat: no records, very poor to poor potential habitat (94.2 ha)
- Moderate habitat: no records, poor – moderate potential habitat (131.9 ha)
- High potential habitat: confirmed habitat (91.1 ha)

LEGEND

- Proposed wind turbine
- Proposed substation
- Alternative substation
- Proposed switchyard
- Alternative switchyard
- Proposed overhead
- 330 kV powerline
- Alternative overhead
- 132 kV powerline
- Proposed access track
- Proposed underground reticulation (up to 33 kV)
- Proposed overhead reticulation (up to 33 kV)
- Proposed transmission communications tower
- Yass Valley Wind Farm (EPBC Referral 2013/7002)
- Conroy's Gap Wind Farm Stage 2
- Conroy's Gap Wind Farm (EPBC Referral 2013/6989)
- Conroy's Gap Wind Farm Stage 1
- Conroy's Gap Wind Farm (EPBC Referral 2006/2733)

Potential GSM Habitat

- Low
- Moderate
- High

Vegetation Type

- Box Gum Woodland
- Derived Grassland

Vegetation Condition

- Poor - Moderate
- Moderate
- Good

EPURON

PROJECT

Yass Valley & Conroy's Gap Wind Farms

TITLE

Project Infrastructure & Potential Golden Sun Moth Habitat

SCALE	DATE	DRAWN
1:45,000 at A1	07/04/14	MK



Appendix I – Rye Park Superb Parrot Survey Effort and Mapping



Superb Parrot surveys Rye Park (November 2013)

Extract from Rye Park Biodiversity Assessment (nghenvironmental 2014)

Methods

Superb Parrot surveys were undertaken between 4 and 9 November 2013. The primary objective of the survey was to capture the breeding season of the Superb Parrot to determine if the species was utilising hollows within or nearby proposed infrastructure for breeding, and to determine local movements and potential flight paths of the species. Damon Oliver of OEH (Senior Team Leader, Ecosystems and Threatened Species) was consulted during September 2013 to discuss survey effort and design of the Superb Parrot survey. Transect survey locations were proposed and reviewed by Damon Oliver before surveys were undertaken.

The following method was implemented:

Transect surveys

- Twenty-five transect surveys were conducted across the project area either within or nearby impact infrastructure (Appendix E.3). Two transects could not be surveyed due to access limitations (SP13 and SP16).
- The areas targeted for survey include both low and higher quality habitat. Site selection was prioritised to capture the following:
 - Prioritise typical Superb Parrot habitat (i.e. Box Gum Woodland, Derived Grassland and pasture with scattered tree habitat), while also surveying some 'atypical habitat' (i.e. dry grass forest);
 - Larger remnant habitat with good connectivity in proposed impact areas;
 - Areas where Superb Parrots have previously been recorded;
 - To stratify sites along the length of the wind farm, but also near turbines;
 - To select sites to the west of the wind farm near known records and in closer proximity to potential foraging grounds (cropping paddocks)
 - To allow some sites to be surveyed to the west and east of a turbine simultaneously.
- A 1 km transect line was walked in 1 hour, counting any Superb Parrots within 250m in front and perpendicular to the transect line as per the method requested by OEH (pers. comm. Damon Oliver, September 2013).
- All transect surveys were conducted from sunrise until no later than 10 am, except for two transects which were undertaken between 10 and 11am. Access limitations prevented these sites from being surveyed before 10am; however, weather was still considered suitable (not too hot) when these surveys were conducted and Superb Parrots were still observed flying and foraging throughout the day during the survey week. Due to cooler temperatures experienced at higher elevations such as Rye Park, bird activity on the wind farm site appears more prevalent when temperatures warm later in the morning (i.e. 8am to 11am).
- All other birds were also recorded by sight and vocalisations during the 1 km transect which increased bird survey effort substantially across the entire project area (i.e. 25 hours total transect time).

Mapping nest trees

- During transect surveys the areas parrots were identified were further investigated for evidence of breeding and presence of nest trees.
- Trees regularly used by the parrot were watched at dusk and dawn between 8 and 9 November 2013, and again on 21 and 22 November 2013.
- Nest trees were mapped and recorded by GPS. Trees that were unconfirmed as nest sites but appeared regularly visited by the parrot were mapped as potential nest trees.

Flight path mapping

- Flight path mapping was completed between 7 to 9 November 2013.
- Areas where Superb Parrots were regularly observed within the project area were targeted for flight path mapping. These areas were defined by reviewing all known records of the species, as well as locations the parrot was observed during transect surveys.
 - It became apparent during transect surveys that areas to the west of the project area, particularly along Rye Park Road, Frogmore Road, and Flakney Creek Road were regularly used by the parrot, as well as an area in the south of the project area.
- A team of eight to ten observers were stationed at independent locations in these higher activity areas at the same time to record movement and direction of flight of the parrot (Appendix E.3).
 - Some observers were stationed to the west of the proposed infrastructure, while other observers were stationed further east within the project area to determine if birds moved west to east over the higher ridge tops (i.e. across the location of proposed turbines). In particular, two observers were stationed at vantage points for viewing areas of 'highest activity' with a spotting telescope (i.e. on a proposed turbine location) to determine if parrots were moving across the ridgeline.
- Flight path mapping surveys were undertaken from sunrise until 10 am on three consecutive days, except for sites 1, 2, 9 and 10 which were surveyed for two consecutive days (these sites were considered lower activity areas or lower constraint areas).
- For each observation (i.e. individual bird or flock of birds) the time birds were observed, direction of movement, distance moved (if possible), flight height, habitat and general behaviour of observed parrots were recorded. Each flight path was plotted on aerial imagery in the field.
- Additionally, observations were made of birds throughout the survey week while driving to and from the site, driving between sites within the project area, and during other survey work. Particular attention was given to identify any observed parrot throughout the duration of the field week and note its flight path direction. These general observations provided a clear understanding of the locations Superb Parrots were utilising the most across the project area.

Table 0-1 Weather details during Superb Parrot field surveys.

Date	Temperature (min)	Temperature (max)	Cloud	Wind	Rain (mm)
4/11/2013	-0.5 degrees	21 degrees	30% cloud cover	Light wind	0
5/11/2013	1.0 degrees	23.5 degrees	20% cloud cover	Light wind	0
6/11/2013	1.0 degrees	28 degrees	10% cloud cover	Light wind	0
7/11/2013	5.0 degrees	31.5 degrees	30% cloud cover	Moderate wind	0
8/11/2013	10 degrees	25 degrees	80% cloud cover	Moderate wind	0
9/11/2013	6 degrees	24 degrees	100% cloud cover	Strong wind	0

Results

The Superb Parrot was regularly observed during November 2011 and November 2013 surveys, but primarily outside of the project area to the west of the site along Rye Park road, Flakney Creek Road, or other roads west of the project area. The area the species was commonly observed within the project area is located to the south between RYP_110 and RYP_120 within Box Gum Woodland or native pasture habitat.

Three nest trees were identified for this species: two north of RYP_120 within the same area birds were regularly recorded and the other nearby Flakney Creek Road along a proposed transmission line. Two potential nest trees were also identified north of RYP_120 in which individual birds were observed to be interested in a hollow, but did not appear to be nesting at the time.

The Superb Parrot was not observed during April 2012 or July 2013 indicating the parrot moves away from the inland slopes during winter.

Superb Parrot Transects

Superb Parrots were detected at five of the 25 transect surveys completed in November 2013. The areas the parrots were detected correspond with the areas birds were also observed during prior surveys in November 2011 (Table 5-6). Three of these transects in which parrots were observed lie outside the project area to the west (SP3, SP17, SP18). The other two sites (SP25 and SP26) are located within the project area at the southern end. All transects parrots were observed within support Box Gum Woodland or open grassy habitat supporting scattered trees. No parrots were observed within transects that were nearby or traversed Inland Scribbly Gum Forest.

Table 0-2 Transects Superb Parrots were observed during November 2013.

Transect ID	Date	Number and sex recorded m = male; f = female; j = juvenile	Habitat	Behaviour and flight height
SP3 (outside project area near Frogmore Rd)	4/11/2013	2 (m), 2 (f), 3 (juv)	Road reserve and paddock with scattered trees. Grass in groundlayer. Box Gum Woodland.	Stayed in general area, local movements below canopy (< 10m). Significant activity at HBT. Flying within canopy, perching, calling.
SP17 (outside project area near Flakney Ck Rd)	5/11/2013	1 (f)	Paddock with scattered trees. Grass in groundlayer.	Flew overhead landed in Yellow Box. Flying south toward Rye Park rd (<15m).
SP18 (outside project area near Flakney Ck Rd)	5/11/2013	3 (m), 2 (f)	Paddock with scattered trees. Grass in groundlayer.	3 in tree, 2 flying south toward Rye Park rd (< 10m)
SP25 (south of project area near RYP_120)	6/11/2013	2 (m), 1 (f), 4 (?)	Predominantly scattered trees in paddock with grass, no shrubs.	5 foraging in tree; 1 flying north (~ 15m), 1 flying south ~ 20 m)
SP26 (south of project area near RYP_120)	22/11/2013	5 (f), 3 (m), 4 (?)	Gully with Box Gum Woodland and scattered trees. Grassland. Dense Shrubs. Nest tree.	Flying locally (i.e. within 100m). Flying < 15m.

Flight Path Mapping

Superb Parrots were detected at six of the ten flight path mapping stations in which individual observers were stationed in November 2013. A total of 48 flight observations were recorded; one flight observation could consist of an individual bird, or group of birds moving in the same direction. Most observations of Superb Parrots were recorded within the vicinity of Site 1, 4 and 8 with 10, 24 and 18 flight observations recorded respectively (Table 5-7, Appendix E.3).

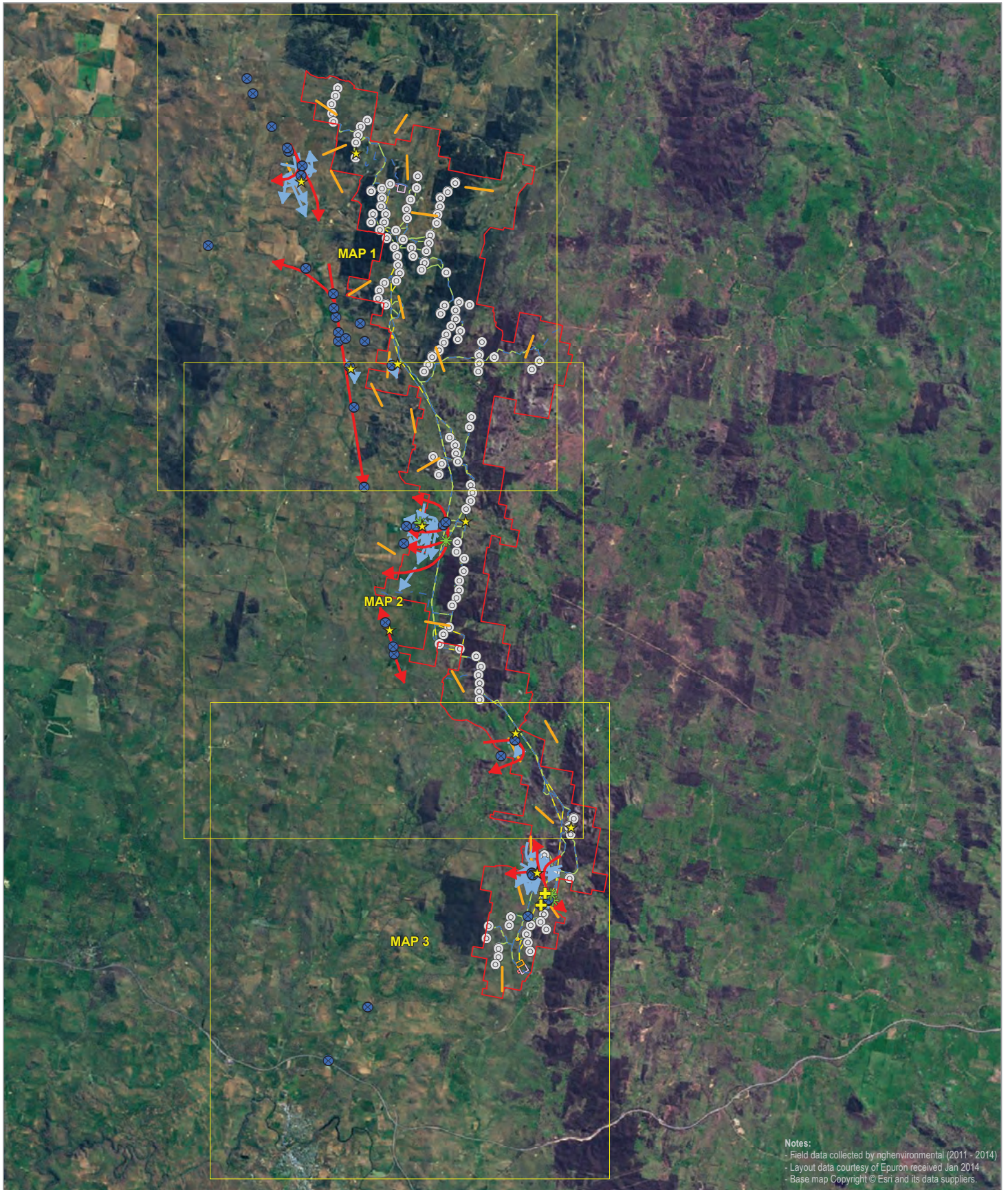
The majority of flights were localised to discrete patches where foraging habitat was available. The average flight height of the Superb Parrot was 20m and most observations were of the parrot making short movements within the tree canopy or flying low over paddocks hopping between scattered trees. The Superb Parrots flight height was below 30m at all sites, except for Site 8 where flight heights of 40 m and 50 m were recorded.

Appendix E.3 defines the primary flight path corridors where parrots were observed to regularly fly and is based on all the raw data from each individual flight path recorded. Appendix A.4 details the raw data for each individual flight observation.

The results of transect and flight path mapping for this species is discussed further within the impact assessment chapter of this report, refer Section 7.

Table 0-3 Flight path mapping viewing stations Superb Parrots were observed during November 2013

Viewing station ID	Date	Number of observations	Average and maximum flight height (m)	Habitat at site
Site 1	7-8 Nov 2013	10	20 average 30 maximum	Frogmore Road. Scattered trees in paddock.
Site 3	7-9 Nov 2013	1	20 maximum	Top of low ridge west of High Rock Rd. Within paddock with scattered trees.
Site 4	7-9 Nov 2013	24	11 average 20 maximum	Flakney Creek Road. Scattered trees in open paddock.
Site 6	7-9 Nov 2013	1	20 maximum	High Rock Road. Scattered trees in paddock. Adjacent treed road reserve.
Site 8	7-9 Nov 2013	17	30 average 50 maximum	Box Gum Woodland and scattered trees over pasture.
Site 10	9 Nov 2013	1	30 maximum	Rye Pk - Dalton Rd. Box Gum Woodland along road reserve with paddocks adjoining road.



Notes:
 - Field data collected by nghenvironmental (2011 - 2014)
 - Layout data courtesy of Epuron received Jan 2014
 - Base map Copyright © Esri and its data suppliers.

SUPERB PARROT SURVEY EFFORT AND RESULTS INDEX TO MAPS

Rye Park Wind Farm Biodiversity Assessment

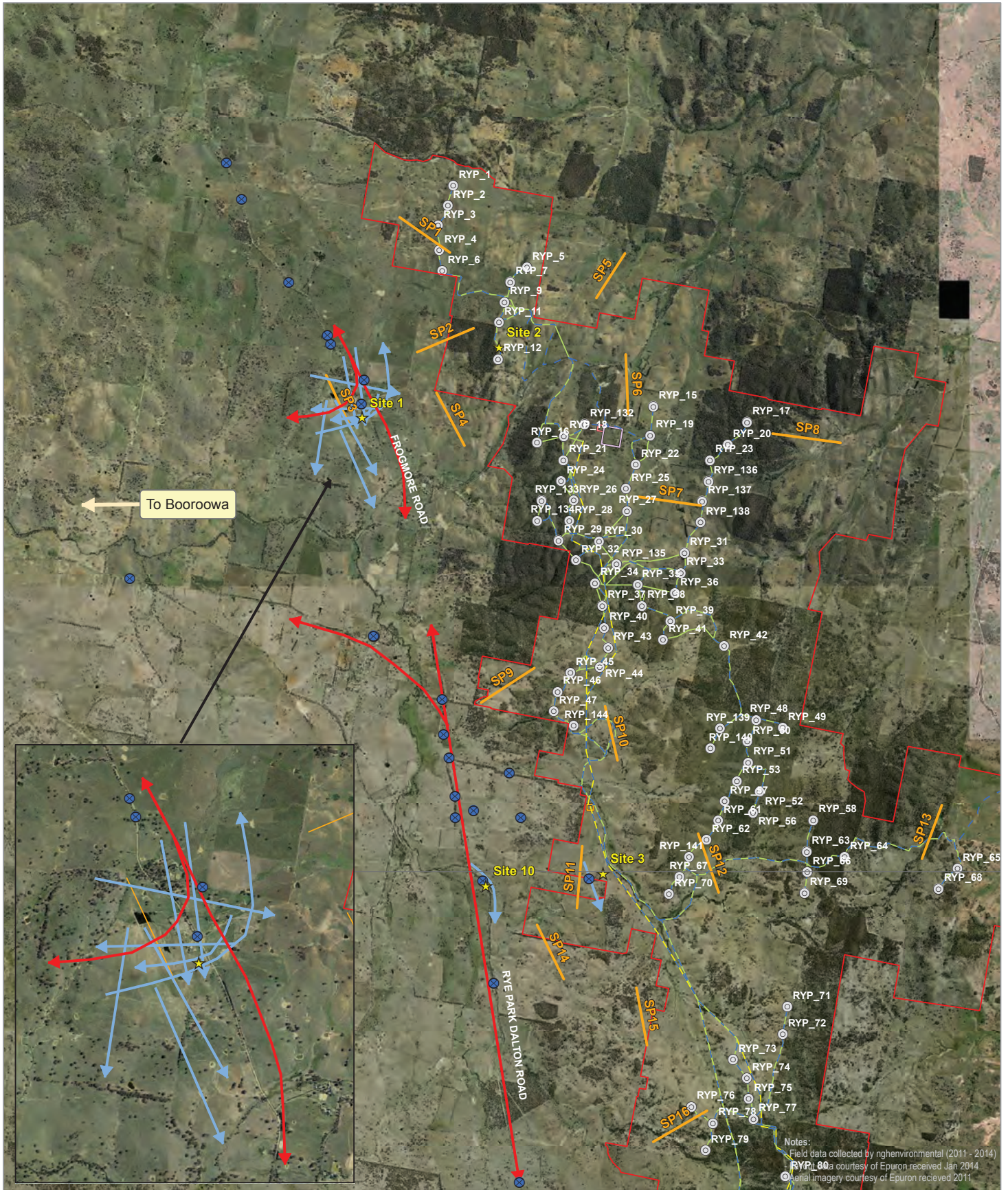
- | | | | |
|----------------------------|-------------------------|-----------------------------------|----------------------------|
| Site perimeter | Substation | Flight path viewing station | Primary movement corridors |
| Turbine location | Termination compound | Superb Parrot transect | Observed flight paths |
| Access track | O&M building | Superb Parrot observation | |
| Underground cabling | Construction compound | Superb Parrot nest | |
| Overhead transmission line | Concrete batching plant | Potential Superb Parrot nest tree | |

0 1 2 Kilometers

A3 @ 1:150000
 Ref: 5439 - 6
 Author: DM

ngh environmental

www.nghenvironmental.com.au



SUPERB PARROT SURVEY EFFORT AND RESULTS MAP 1

Rye Park Wind Farm Biodiversity Assessment

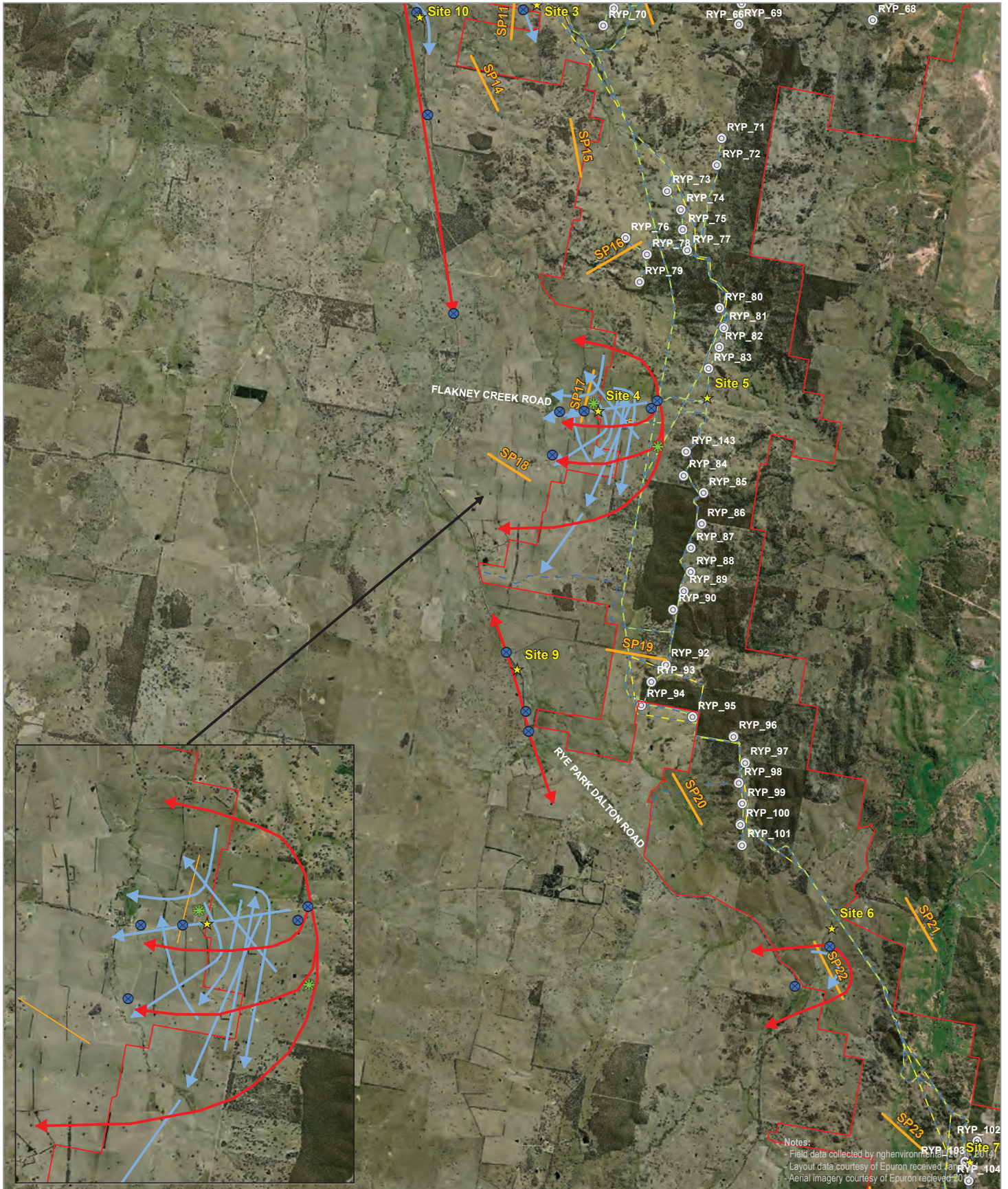
- | | | | |
|--|---|---|---|
| Site perimeter | Substation | ★ Flight path viewing station | ▶ Primary movement corridors |
| Turbine location | Termination compound | — Superb Parrot transect | ▶ Observed flight paths |
| — Access track | O&M building | x Superb Parrot observation | |
| — Underground cabling | Construction compound | ★ Superb Parrot nest | |
| — Overhead transmission line | Concrete batching plant | + Potential Superb Parrot nest tree | |

0 1 2 Kilometers

A3 @ 1:60000
Ref: 5439 - 6
Author: DM

ngh environmental

www.nghenvironmental.com.au



SUPERB PARROT SURVEY EFFORT AND RESULTS MAP 2

Rye Park Wind Farm Biodiversity Assessment

- | | | | |
|----------------------------|-------------------------|-----------------------------------|----------------------------|
| Site perimeter | Substation | Flight path viewing station | Primary movement corridors |
| Turbine location | Termination compound | Superb Parrot transect | Observed flight paths |
| Access track | O&M building | Superb Parrot observation | |
| Underground cabling | Construction compound | Superb Parrot nest | |
| Overhead transmission line | Concrete batching plant | Potential Superb Parrot nest tree | |

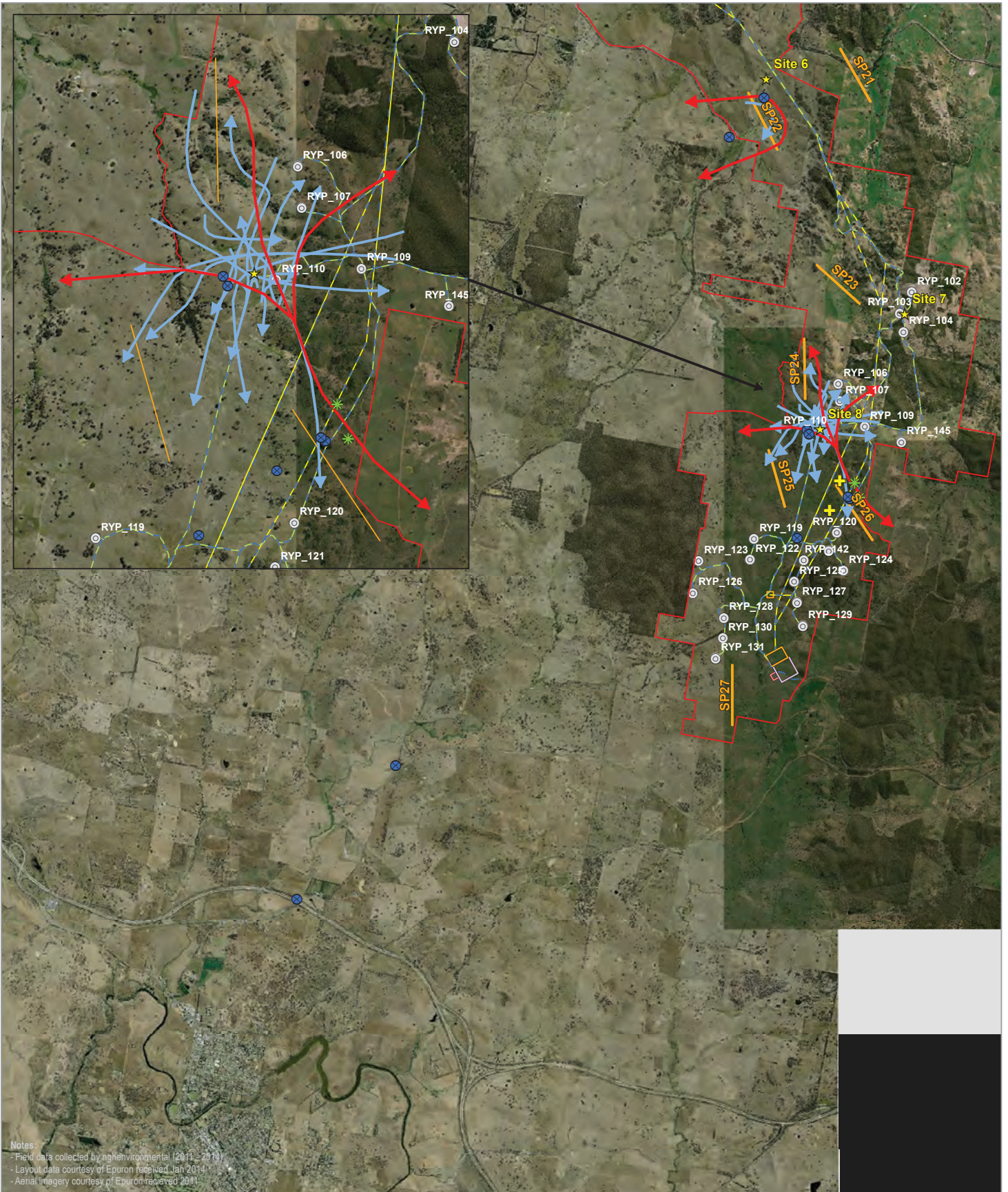
Notes:
 - Field data collected by nghenvironmental on 14/03/2019
 - Layout data courtesy of Epron received Jan 2019
 - Aerial imagery courtesy of Epron received 2019

0 1 2 Kilometers

A3 @ 1:60000
 Ref: 5439 - 6
 Author: DM

ngh environmental

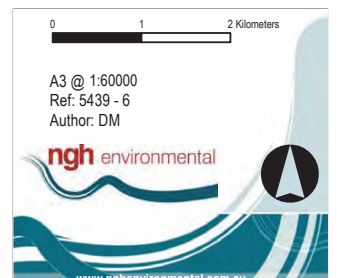
www.nghenvironmental.com.au



SUPERB PARROT SURVEY EFFORT AND RESULTS MAP 3

Rye Park Wind Farm Biodiversity Assessment

- | | | | |
|------------------------------|---------------------------|-------------------------------------|------------------------------|
| □ Site perimeter | □ Substation | ★ Flight path viewing station | ▶ Primary movement corridors |
| ⊙ Turbine location | □ Termination compound | — Superb Parrot transect | ▶ Observed flight paths |
| — Access track | □ O&M building | ● Superb Parrot observation | |
| — Underground cabling | □ Construction compound | ★ Superb Parrot nest | |
| — Overhead transmission line | □ Concrete batching plant | ✦ Potential Superb Parrot nest tree | |



Appendix J – Superb parrot, Swift Parrot, Regent Honeyeater Habitat Mapping

This includes:

Superb parrot, Swift Parrot, Regent Honeyeater *potential* foraging habitat (Box Gum Woodland – excludes derived pastures)

- a. Area within the project boundaries = 1497 ha
- b. Area within the development footprint (impact area) = 38.5 ha
- c. Area within 60m of a turbine = 14.4 ha
- d. Area within 500m of a turbine = 743 ha within the project boundary

Superb parrot, Swift Parrot, Regent Honeyeater *preferred* foraging and Superb Parrot *preferred* breeding habitat (Box Gum Woodland below 550m contour – excludes derived pastures)

- a. Area within the project boundaries = 831.3 ha
- b. Area within the development footprint (impact area) = 29.3 ha
- c. Area within 60m of a turbine = 4.0 ha
- d. Area within 500m of a turbine = 200.6 ha within the project boundary