4.3.2 Habitat Survey

4.3.2.1 Flora Habitats

The vegetation communities present throughout the study area offer a number of suitable habitat types for an array of native flora species. The study area is known to provide habitat for several threatened species, ROTAP species and other regionally significant flora species.

The two dominant vegetation communities within the study area are of at least regional or state significance. KSSW, which is listed as an Endangered Ecological Community (EEC) under the *TSC Act 1995*, occurs throughout the majority of the study area. LHSGIF, which makes up the vast majority of the remainder of the study area, has had a Preliminary Determination by the Scientific Committee to be listed as an EEC. The third forested community, GGSGF, is a difficult assemblage to quantify in terms of significance, although due to the lack of corresponding LHCCREMS communities (NPWS 2000a; House 2003) and potential alliance to KSSW, it must at least be regarded as 'noteworthy'.

The habitats have been subjected to a number of disturbances and degradation regimes over a number of decades, the evidence of which is visible in the floristic and structural components of the communities present. For example, the majority of the LHSGIF contains sparse and simplistic understorey vegetation whilst the canopy species are subjected to ongoing removal for firewood collection, with relatively few mature trees (DBH >50cm) present (as a proportion of actual trees present therein).

4.3.2.2 Fauna Habitats

The three delineated forested vegetation communities generally equate to Woodland and Open Forest habitat types. Low-lying areas containing wetland / creekline associations provide a third habitat type on the site. The cleared areas, including the paddock adjacent to John Renshaw Drive, are believed to be insignificant in terms of providing habitat for native fauna species aside from providing an ecotone along the edge of the forested areas (such as for hunting bats).

Terrestrial Mammals

The Open Forest and Woodland communities provide suitable habitat for a number of terrestrial mammals. Habitat quality is dependent upon the amount of available groundcover, density and floristic diversity of shrubs and grasses and land use history (eg. selective logging, firewood collection, frequent fires, rubbish dumping, mining activity etc).

The generally sparse understorey and occurrence of suitable grasses within the two main vegetation communities could provide suitable habitat for several species of Macropods. The creekline, wetland and associated riparian zones provide areas of dense understorey vegetation, shelter, as well as drought / heat refuge for a number of species.

Arboreal Mammals

The Open Forest and Woodland communities contain potential foraging resources such as foliage, pollen, nectar and invertebrates for Possums, Gliders and Koalas. However, the general paucity of hollow-bearing trees within the LHSGIF due to logging, firewood collection and frequent fires has reduced the amount of critical habitat resources available for hollow dependent arboreal mammals in these areas. Several 'fire-scar' hollows at the base of burnt trees were found within the LHSGIF, although such hollows do not appear to be readily used

by arboreal mammals. A higher density of tree hollows was observed within the KSSW, mainly within mature *E. p. decadens*, which appear not to have been removed for firewood to the extent of other Eucalypt species such as Ironbarks. Nonetheless, hollow use within *E. p. decadens* has not been previously recorded during extensive surveys within this study area and on adjacent HEZ lands (authors pers. obs.). Furthermore, the vast majority of tree hollows recorded within the *E. p. decadens* trees were found to be relatively close to the ground (i.e. less than 8m), and as such may be limited in their value to arboreal mammals.

Bats

The diversity of habitats in the study area, ranging from open forests, woodlands, cleared area ecotones, creeklines and a small wetland provide suitable roosting and foraging resources for a number of bat species. Species reliant on tree hollows for roosting are limited by the availability of suitable hollows, which due to previous land-use practices have been substantially reduced and occur primarily within the KSSW.

Frogs

Frog habitats are generally restricted to the creekline(s), the small wetland area and associated riparian vegetation. The major creekline that traverses the study area is a second order stream characterised by pools dissected by overland flow channels, and off-stream ephemeral soaks. The creekline provides potential habitat for the threatened *Litoria brevipalmata* (Green-thighed Frog), which has been recorded in the upper reaches of the creek within the adjacent HEZ. The small wetland areas provide an additional area of more permanent water and the larger wetland contains emergent aquatic vegetation that could provide habitat for amphibious species. Areas containing suitable surface soils, such as the KSSW, also provide potential habitat for a number of burrowing species.

Reptiles

There is a relative diversity of habitats for reptiles within the study area, including open forests and woodlands containing fallen timber and ground debris (including dumped rubbish), creeklines, wetlands and associated riparian zones. A number of limiting factors to population densities and distributions include previous and ongoing land-uses including logging, firewood collection and a frequent fire history.

In degraded areas where there is a general sparsity of groundcover, including fallen timber, areas of dumped rubbish including car bodies and corrugated iron sheets appear to provide a habitat resource for a number of reptiles. Targeted searches within areas of dumped refuse identified potential burrows and shelter locations for reptiles. Areas containing dense groundcover including riparian zones and the KSSW are likely to provide the most valuable reptile habitats in the study area.

Avifauna

The open forest and woodland communities provide suitable foraging resources (eg. diversity of nectar/flowering species) and nesting and roosting opportunities for a variety of sedentary and migratory birds. Hollow bearing trees may provide nesting habitat for hollow dependant birds such as Owls, Treecreepers, Parrots, Kingfishers and Woodswallows.

The presence of dense shrubs within the lower stratum of the woodland may be suitable for shrub-dwelling species, although this may be limited by the occurrence of introduced predators and other disturbance regimes. The LHSGIF contains two winter-flowering Eucalypt species (*Coymbia maculata* and *Eucalyptus agglomerata*) that may provide

important habitat resources for subject species such as the Swift Parrot and Regent Honeyeater.

4.3.3 Fauna Survey

The results of previous studies and recent fauna survey work carried out on the study area are provided herein. A comprehensive list of species recorded during all surveys undertaken on the study area is presented in Appendix E. Additional species recorded from the Atlas of NSW Wildlife as well as species recorded during the various surveys within the HEZ lands are also provided therein.

4.3.3.1 Terrestrial Mammals

A relatively diverse array of terrestrial mammals was recorded in the study area. Elliott trapping revealed the presence of four (4) native mammals including *Antechinus flavipes* (Yellow-footed Antechinus), *A. stuartii* (Brown Antechinus), *Sminthopsis murina* (Common Dunnart), *Pseudomys novaehollandiae* (New Holland Mouse), and one (1) introduced species, namely *Rattus norvegicus* (Brown Rat). A further small native terrestrial mammal was recorded via hair-tube analysis, being *R. lutreolus* (Swamp Rat).

Several larger terrestrial mammals were recorded through direct observation or by secondary indications. Macropods observed included *Macropus giganteus* (Eastern Grey Kangaroo) and *Wallabia bicolor* (Swamp Wallaby). The latter of these species was also confirmed via hair-tube analysis. Introduced species recorded included *Canis familiaris* (Dog), *Vulpes vulpes* (Fox), *Equus caballus* (Horse) and *Oryctolagus cuniculus* (Rabbit).

Of particular note is the recording of the two species of Antechinus, namely *A. flavipes* and *A. stuartii*. This potentially indicates that study area contains a transition zone from populations of *A. flavipes* that are extant further to the west, and populations of *A. stuartii* which occur within more coastal districts in the region (authors, pers. obs.; C. Dickman, pers. comm.)

4.3.3.2 Arboreal Mammals

Four (4) species of arboreal mammal have been recorded within the study area. Arboreal 'Elliott B' trapping recorded the occurrence of *Petaurus breviceps* (Sugar Glider) within an area of Kurri Sand Swamp Woodland. A captured individual was observed returning to a tree hollow within an *Angophora bakeri*. Spotlighting during the September 2002 surveys recorded an individual *Pseudocheirus peregrinus* (Common Ringtail Possum). Recent spotlighting revealed several *Trichosurus vulpecula* (Common Brushtail Possum) and a single *Petaurus norfolcensis* (Squirrel Glider). *P. norfolcensis* is listed as a Vulnerable species under the *TSC Act 1995*.

This animal was observed approximately 10m above ground level within an *E. punctata* tree within the Grey Gum / Scribbly Gum Open Forest and was positively identified from the following features by two ecologists using binoculars and spotlights:

- Size – The animal was quite large, even for a *P. norfolcensis* and was well outside the upper size limits for *P. breviceps.*
- Snout Features – The snout was long and pointed, being consistent with that of a *P. norfolcensis* animal.
- Tail Features – The tail was very bushy, particularly at the base.

4.3.3.3 Bats

Four (4) species of bat were recorded by Anabat detection during the September 2002 field surveys. Species detected include *Chalinolobus gouldii* (Gould's Wattled Bat), *C. morio* (Chocolate Wattled Bat), and *Vespadelus vulturnus* (Little Forest Bat). The audible calls of *Nyctinomus australis* (White-striped Freetail-bat) were also noted in several locations throughout the site. Each of the species recorded roost predominantly in tree hollows and forage in forested habitats and as such the study area and surrounding forests provide large areas of suitable habitat. The relatively small number of tree hollows found along the proposed road alignment limits the number of potential roost sites within this part of the study area.

Recent surveys revealed three species of bats, being *Mormopterus planiceps* (Southern Freetail Bat, long penis form), *M.* sp. 2 (Little Freetail Bat) and *Chalinobolus gouldii* (Gould's Wattled Bat). *M. planiceps* is commonly found on the western slopes and plains of NSW. Within the Hunter Region it is a species usually associated with more westerly habitats, such as around Muswellbrook. This record represents one of the most easterly records of this species within the region (G. Hoye pers. comm.). As such, this species could be regarded as being locally significant.

4.3.3.4 Avifauna

The birds recorded on the site were typical of the Open Forest and Woodland communities present, with sixty five (65) species recorded during the recent survey period. This represents a moderate diversity of species. Surveys in the adjacent HEZ have recorded a total of over one hundred and fifty (150+) species, and it is considered that a number of additional species recorded within the HEZ lands would be likely to occur within the study area.

No threatened bird species were recorded within the study area during the any formal surveys. One (1) threatened bird species was recorded as part of the earlier surveys in the study area, namely *Chthonicola sagittata* (Speckled Warbler).

4.3.3.5 Amphibians

Five (5) species of amphibians were recorded during the September 2002 survey, including *Crinia signifera* (Common Eastern Froglet), *Uperoleia laevigata* (Smooth Toadlet), *Litoria fallax* (Dwarf Tree Frog), *Litoria latopalmata* (Broad-palmed Frog) and *Litoria peronii* (Peron's Tree Frog). Two additional species were recorded during recent fieldwork, being *Limnodynastes ornatus* (Ornate Burrowing Frog) and *L. tasmaniensis* (Spotted Marsh Frog).

4.3.3.6 Reptiles

Eight (8) reptile species were identified on the study area during the September 2002 survey. Snakes recorded included *Demansia psammophis* (Yellow-faced Whip Snake), *Dendralaphis punctulata* (Green Tree Snake), *Pseudechis porphyriacus* (Red-bellied Black Snake), and *Pseudonaja textiles* (Eastern Brown Snake). Several species were observed in creekline / wetland habitats including *Chelodina longicollis* (Eastern Snake-necked Tortoise) and *Physignathus lesuerii* (Eastern Water Dragon). In drier habitats, species including *Amphibolurus muricatus* (Jacky Lizard) and *Lampropholis delicata* (Grass Skink) were also observed. Several other Skinks were briefly observed but could not be positively identified. No additional reptile species were observed during recent surveys.

4.3.3.7 Threatened / Significant Fauna Species

Field surveys have revealed two (2) threatened fauna species recorded within the study area, being *Chthonicola sagittata* (Speckled Warbler) and *Petaurus norfolcensis* (Squirrel Glider). Several other threatened fauna species have been recorded immediately adjacent to the study area within the HEZ lands and are considered to be likely to occur within the study area. These species include *Melithreptus gularis* (Black-chinned Honeyeater), *Pomatostomus temporalis* (Grey-crowned Babbler), *Climacterus picumnus* (Brown Treecreeper), *Ninox strenua* (Powerful Owl), *Lathamus discolor* (Swift Parrot), *Xanthomyza phrygia* (Regent Honeyeater), *Litoria brevipalmata* (Green-thighed Frog), *Mormopterus norfolkensis* (Eastern Freetail-bat), *Miniopterus schreibersii* (Large Bentwing-bat), *M. australis* (Little Bentwing-bat) and *Scoteanax rueppellii* (Greater Broad-nosed Bat).

Species Recorded Within the Study Area

Two (2) threatened species have been recorded on site during fieldwork, being *Chthonicola sagittata* (Speckled Warbler) and *Petaurus norfolcensis* (Squirrel Glider). The location of where these species were recorded is provided in Figure 4-6.

Chthonicola sagittata* (Speckled Warbler) – Vulnerable *TSC Act 1995

An individual of this species was observed foraging in the understorey of LHSGIF along the edge of the railway embankment during the September 2002 survey. Subsequent targeted searches in the area failed to locate any further evidence of the species, although given its sedentary habits, it is considered likely that the species utilises the open forest and woodland habitats throughout the study area and surrounding lands.

Petaurus norfolcensis* (Squirrel Glider) – Vulnerable *TSC Act 1995

A single *P. norfolcensis* was observed during nocturnal fieldwork undertaken during recent surveys. This animal was located in the south-eastern corner of the study area within the GGSGF. Potential habitat exists for this species throughout the study area, although predominantly within the LHSGIF and GGSGF.

Species Likely to Occur Within the Study Area That May be Affected by the Proposal

Melithreptus gularis* (Black-chinned Honeyeater) – Vulnerable *TSC Act 1995

Although this species was not recorded on the study area, it has been widely recorded in the number of locations throughout the HEZ, with several records within 500 metres of the study area. Given that this species has been recorded within both Open Forest and Woodland communities within the HEZ and that such habitats are continuous with the study area (albeit dissected by Leggetts Drive), it is considered likely that this species would utilise the study area on what is likely to be an irregular basis.

Pomatostomus temporalis* (Grey-crowned Babbler) – Vulnerable *TSC Act 1995

Although this species was not recorded during any fieldwork undertaken on the study area, six individuals have been previously recorded (June 2001) along the roadside reserve of Leggetts Drive, off the south-west corner of the study area. A number of additional sightings of the species have been recorded within the HEZ lands and it is suspected that one or more

family groups occur within the area. It is considered likely that at least one of these group(s) would utilise the study area as part of their respective home range(s).

Climacteris picumnus* (Brown Treecreeper) – Vulnerable *TSC Act 1995

The Brown Treecreeper has been recorded in several locations within the HEZ study area, including evidence of breeding. This species, although not detected during any fieldwork undertaken on the subject study area, is most likely to utilise the LHSGIF community and possibly the KSSW community (as it has been recorded within KSSW on the HEZ study area).

Ninox strenua* (Powerful Owl) – Vulnerable *TSC Act 1995

Although this species was not recorded during any fieldwork undertaken on the subject study area, several records exist from the HEZ study area, including records noted during fieldwork undertaken as part of the Ecological Constraints Master Plan (ECMP) process (Harper Somers O'Sullivan 2004a). As potential hunting habitat is present within the study area, it is possible that a local pair of *N. strenua* would utilise the study area as part of a larger hunting home range.

Lathamus discolor* (Swift Parrot) – Endangered *TSC Act 1995* and *EPBC Act 1999

Although this species was not recorded on the study area (including surveys conducted when the species may be present in the region), it has been widely recorded in a number of locations throughout HEZ, with several records within close proximity to the study area, including a record from immediately south of Pelaw Main (in close proximity to the proposed alignment). The species occurrence appears to be associated with the winter-flowering of Eucalypts in the locality. Previous sightings in the broader locality have been of substantial numbers (100-200 individuals in 2000 and up to 120 individuals during 2005). Potential habitat for this species is largely restricted to the LHSGIF community.

Xanthomyza phrygia* (Regent Honeyeater) – Endangered *TSC Act 1995* and *EPBC Act 1999

Although this species was not recorded within the study area (including surveys conducted when the species may be present in the region), it has been recorded in a number of locations throughout HEZ, with several records within close proximity to the study area (and including one record from 2005). The species occurrence appears to be associated with the winter-flowering of Eucalypts in the locality and the availability of flowering trees elsewhere (particularly west of the divide). Previous sightings in the broader locality have been of substantial numbers (up to 75 individuals in 2000). Potential habitat for this species is largely restricted to the LHSGIF community, although it has been recorded from the ecotone of this community with KSSW (HSO ecologists pers. obs.).

Litoria brevipalmata* (Green-thighed Frog) – Vulnerable *TSC Act 1995

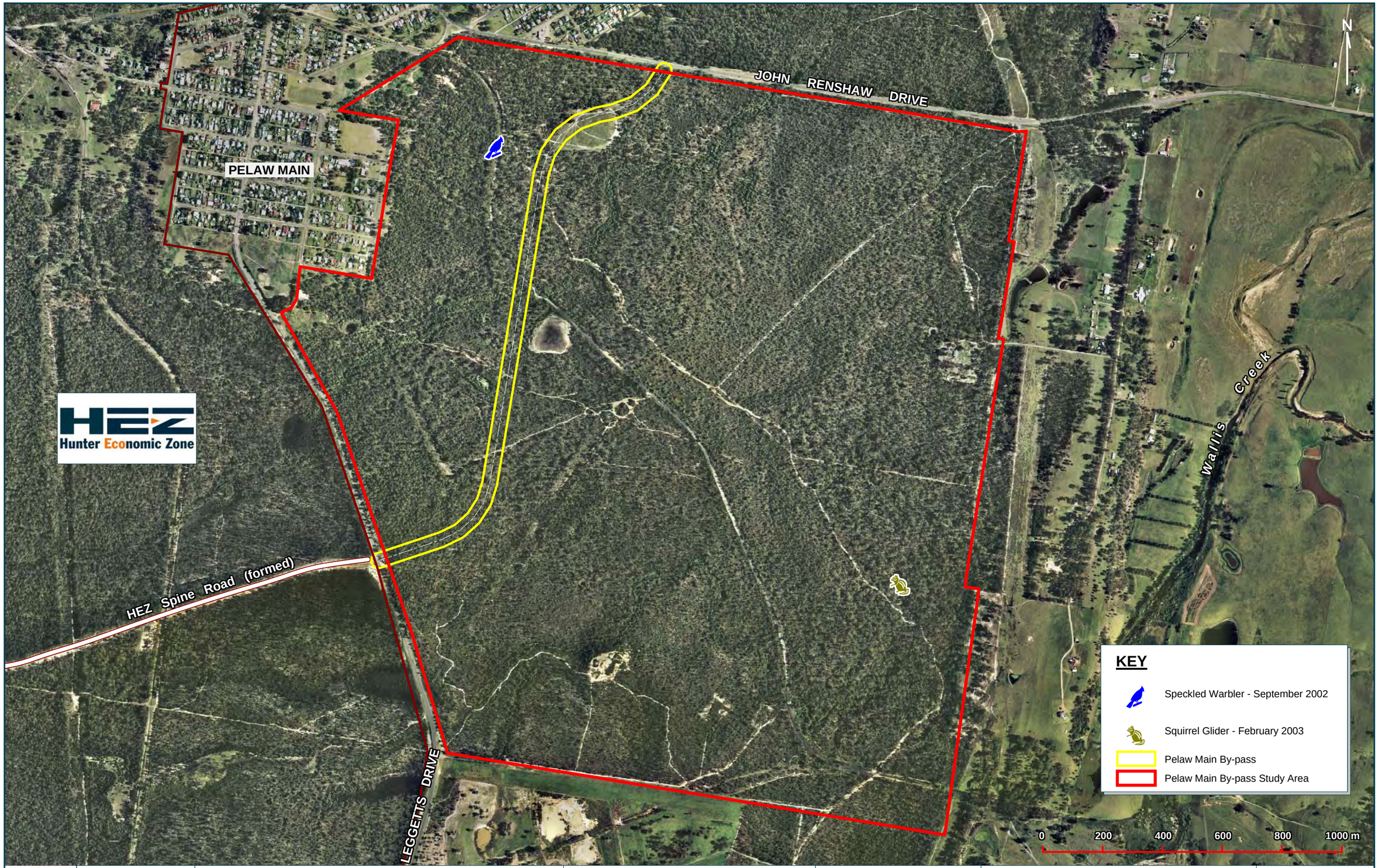
Although not recorded within the study area, this species has been previously recorded in two locations within the HEZ lands. One of these locations was within the same creekline (an unnamed tributary of Wallis Creek) that traverses through the site, approximately 1250 metres upstream of where the creekline enters the study area along Leggetts Drive.

This species is difficult to detect outside of breeding events where males congregate around ephemeral pools for several nights following heavy summer rainfalls. Creekline habitats within the study area are relatively intact and contain similar habitat features (i.e. riparian vegetation, soaks, ephemeral pools, overland flows, off-stream channels) to those where the

species was previously recorded on the HEZ study area. Given these factors, it is not unlikely that this species occurs within the study area.

***Mormopterus norfolkensis* (Eastern Freetail-bat), *Miniopterus australis* (Little Bentwing-bat), *M. schreibersii* (Large Bentwing-bat) and *Scoteanax rueppellii* (Greater Broad-nosed Bat).**

Although these bat species were not recorded during any fieldwork undertaken on the study area, they have been recorded in the adjacent HEZ lands. The HEZ lands are in close proximity to the study area and contains habitat generally congruous to those habitats found on the Pelaw Main By-pass study area. Therefore, as known populations exist on adjacent lands and potential habitat exists on the study area, there is potential for these species to occur within the study area.



HARPER SOMERS O'SULLIVAN

PLAN PRODUCED BY:
HARPER SOMERS O'SULLIVAN
241 DENISON STREET
BROADMEADOW NSW 2292
PO BOX 428
HAMILTON NSW 2303
T: 02 4961 6500
F: 02 4961 6794
E: survey@hso.com.au
W: www.hso.com.au
ABN 11 093 343 858

NOTES:

HEZ Hunter Economic Zone

SCALE: 1: 12000 at A3 Size
DATE: 11/11/2005
DRAWN: S. WATSON
PROJECTION: MGA Zone 56 (GDA 94)
LAYOUT REF: H:\HEZ\MAPINFO\20675 LINK - ROAD\2005 SIS NEW ALIGNMENT DOCUMENT FIGURES\20675-FIG 4-6 THREATENED FAUNA RECORDS-A-A3.WOR

SPECIES IMPACT STATEMENT
PELAW MAIN BY-PASS

FIGURE 4-6

THREATENED FAUNA SPECIES RECORDS

JOB REF: 20675