APPENDIX A: SEVEN PART TESTS

CONSIDERATION UNDER SECTION 5A OF THE *EP&A ACT 1979*

Considerations of the effects of the proposed development under the guidelines of Section 5A of the *EP&A Act 1979* for the concerned threatened species/populations/ecological communities are given below.

The majority of information used for the assessment has been sourced from NSW NPWS Threatened Species Information and Environmental Impact Assessment Guidelines, NPWS Atlas of NSW Wildlife, RPS HSO HEZ records and other published or widely available literature sources such as scientific journals and reports.

Twenty-six threatened species and two endangered ecological communities have been identified as occurring on the site or as having at least a moderate probability of being affected by development of the site. As such, seven-part tests for these species / communities have been undertaken under the guidelines of Section 5A of the *EP&A Act 1979* (see Appendix A). These species / community include:

Threatened flora species:

Acacia bynoeana
Callistemon linearifolius
Eucalyptus glaucina
Eucalyptus parramattensis subsp. *decadens*
Grevillea parviflora subsp. *parviflora*
Rutidosis heterogama

Threatened fauna species:

Litoria brevipalmata	Green-thighed Frog
Calyptorhynchus lathami	Glossy Black-Cockatoo
Climacteris picumnus victoriae	Brown Treecreeper
Pomatostomus temporalis temporalis	Grey-crowned Babbler
Chthonicola sagittata	Speckled Warbler
Lathamus discolor	Swift Parrot
Neophema pulchella	Turquoise Parrot
Tyto novaehollandiae	Masked Owl
Ninox strenua	Powerful Owl
Xanthomyza phrygia	Regent Honeyeater
Stagonopleura guttata	Diamond Firetail
Lophoictinia isura	Square-tailed Kite
Melithreptus gularis gularis	Black-chinned Honeyeater
Petaurus australis	Yellow-bellied Glider
Petaurus norfolcensis	Squirrel Glider
Falsistrellus tasmaniensis	Eastern Falsistrelle
Miniopterus australis	Little Bentwing-bat
Miniopterus schreibersii	Eastern Bentwing-Bat
Mormopterus norfolkensis	East-coast Freetail-bat
Scoteanax rueppellii	Greater Broad-nosed Bat

Endangered Ecological Communities:

Lower Hunter Spotted Gum – Ironbark Forest
Kurri Sand Swamp Woodland

Seven Part Test assessments, as shown in the following pages, have concluded no significant impacts to threatened species or endangered ecological communities are expected as a consequence of the proposal.

For the purposes of the *EP&A Act 1979* and, in particular, in the administration of Sections 78, 79 and 112, the following factors have been taken into account in deciding whether there is likely to be a significant effect on threatened species, populations or ecological communities, or their habitats:

Acacia bynoeana

a) In the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction;

A. bynoeana is a small shrub to 1m high which grows prostrate. Golden yellow flowers are apparent from September until March and seed pods mature from November to January.

The determination of *Acacia bynoeana* as an endangered species under the TSC Act 1995 states that most populations comprise 1-5 individuals, with perhaps 300-500 plants within the State. However, these estimates are almost certainly not based on field assessment, as recent studies have confirmed that most populations in the northern parts of the known range comprise at least 200 plants, occasionally up to 2000 plants (Bell & Driscoll in review). While detailed counts of the Cessnock populations have yet to be done, it is likely that similar trends will be apparent.

Field surveys within the HEZ Study Area have located 4 populations containing at least 250 plants, including one population within the 4(h) zone. The population within the 4(h) zone has been protected as a deferred conservation area (No.7) under the DECC Assumed Concurrence. The Station Street extension has been positioned approximately 150 m north y of this area, and no individual plants of this species will be removed.

Targeted searches to verify the ECMP data in November 2007 failed to locate any additional individuals.

Given the above mentioned factors, with particular reference to the issue of an assumed concurrence by DECC in March 2005 (which states that an adequate level of protection for threatened species / endangered ecological communities has been achieved based on the fulfilment of a number of conditions – see Appendix B), it is considered that the removal of one individual for the proposal is unlikely to place the local population(s) of this species at risk of extinction.

b) In the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction;

No populations of any of the species considered for this assessment (that are relevant to this locality) have been identified under Part 2 of Schedule 1 of the *TSC Act*.

c) In the case of a critically endangered or EEC, whether the action proposed:

(i) Is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction; or

(ii) Is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction;

Not applicable to threatened species.

d) In relation to the habitat of a threatened species, population or ecological community:

(i) The extent to which habitat is likely to be removed or modified as a result of the action proposed;

No individual will be removed however approximately 0.89 ha of potential habitat (Kurri Sand Swamp Woodland) will be removed by the proposal.

(i) Whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action;

The proposal will create a cleared linear easement through the HEZ lands. However sections of the site are positioned along existing cleared land thus reducing clearing and impacts. A section of habitat for habitat (Kurri Sand Swamp) in the northern portion of the site lying to the east of Hebbern Dam will be fragmented to some degree. It may be that the existing trails and cleared easements are not one of the greatest limiting factors in determining the occurrence and distribution of *A. bynoeana* within the site. Roads and similar clearings are likely to be within the dispersal capabilities of the majority of this threatened flora species (including potential pollinators / vectors).

Therefore whilst the proposal must be considered as fragmenting an area of habitat for this species, it is not likely to cause significant isolation. However, it could be regarded that the proposal, as part of the HEZ proposal may be leading to the fragmentation and isolation of habitat within the wider locality.

(ii) The importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality;

The results of the ECMP data have been used to achieve adequate conservation outcomes for threatened species, including *A. bynoeana* within the HEZ Study Area, which culminated in the DECC issuing an assumed concurrence for the development of the HEZ, in March 2004. The habitat to be removed can therefore be considered as not important to the long-term survival of the species in the locality.

e) Whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly);

None of the site has been designated 'critical habitat' under Part 3 of the *TSC Act.*

f) Whether the proposed action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan;

No recovery plan or threat abatement plan is associated with this threatened species.

***g)* Whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.**

KTP's are listed in Schedule 3 of the *TSC Act*. The KTP's most applicable to the current proposal are discussed in detail in Section 4.4. Those most applicable to this species (both directly and indirectly) would appear to be:

- Clearing of Native Vegetation;
- Invasion of native plant communities by exotic perennial grasses; and
- Infection of native plants by *Phytophthora cinnamomi*.

However, the DECC Assumed Concurrence has adequately assessed all relevant ecological matters, and the proposal does not contravene any specific aspect of the Assumed Concurrence.

Callistemon linearifolius

a) In the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction;

Callistemon linearifolius is a shrub 3-4 m high, which grows in dry sclerophyll forest on the coast and adjacent ranges. The species has apparently disappeared from a number of formerly known locations, primarily due to urban development. There is also high risk of further local extinctions due to low population numbers.

Difficulty in differentiating between this species and the closely related *Callistemon rigidus* (Stiff Bottlebrush) and *C. pinifolius* (including conflicting identification results from the Royal Botanic Gardens Identification Service) has complicated mapping of occurrence within the study area and hence made assessment of impact difficult.

Field surveys have located approximately 4805 individual *C. linearifolius* plants across the HEZ study area. It is considered likely that other undetected populations exist in other parts of the HEZ (such as in areas that had been recently burnt at the time of field surveys).

The current proposal will possibly affect 1 individual of this species, and other areas of potential habitat. The Assumed Concurrence issued by the DECC, set aside two areas (Parcel No. 5 and No. 6) to protect large population(s) of this species within the 4(h) zone.

Therefore, it is considered unlikely that the proposal will place the local population(s) of the species at the risk of extinction.

b) In the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction;

No populations of any of the species considered for this assessment (that are relevant to this locality) have been identified under Part 2 of Schedule 1 of the *TSC Act*.

c) In the case of a critically endangered or EEC, whether the action proposed:

(i) Is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction; or

(ii) Is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction;

Not applicable to threatened species.

d) In relation to the habitat of a threatened species, population or ecological community:

(i) The extent to which habitat is likely to be removed or modified as a result of the action proposed;

Those areas containing LHSGIF can be considered as potential habitat for *C. linearifolius*. Therefore, approximately 0.41 ha of potential habitat as well as on one individual plant will be affected by the proposed road extension.

(ii) Whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action;

The proposal will create a cleared linear easement through the HEZ lands. However sections of the Station Street extension are positioned along existing cleared land thus reducing clearing and impacts.

It may be that the existing trails and cleared easements are not one of the greatest limiting factors in determining the occurrence and distribution of *C. linearifolius* within the site. Roads and similar clearings are likely to be within the dispersal capabilities of the majority of this threatened flora species (including potential pollinators / vectors).

Therefore whilst the proposal must be considered as fragmenting an area of habitat for this species, it is not likely to cause significant isolation. However, it could be regarded that the proposal, as part of the HEZ proposal may be leading to the fragmentation and isolation of habitat within the wider locality.

(iii) The importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality;

The results of the ECMP data have been used to achieve adequate conservation outcomes for threatened species, including *C. linearifolius* within the HEZ Study Area, which culminated in the DECC issuing an assumed concurrence for the development of the HEZ, in March 2004. The habitat to be removed can therefore be considered as not important to the long-term survival of the species in the locality.

e) Whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly);

None of the site has been designated 'critical habitat' under Part 3 of the *TSC Act.*

f) Whether the proposed action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan;

No recovery plan or threat abatement plan is associated with this threatened species.

***g)* Whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.**

KTP's are listed in Schedule 3 of the *TSC Act*. The KTP's most applicable to the current proposal are discussed in detail in Section 4.4. Those most applicable to this species (both directly and indirectly) would appear to be:

- Clearing of Native Vegetation; and
- Infection of native plants by *Phytophthora cinnamomi*.

However, the DECC Assumed Concurrence has adequately assessed all relevant ecological matters, and the proposal does not contravene any specific aspect of the Assumed Concurrence.

Eucalyptus glaucina

a) In the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction;

E. glaucina is a tree to 30m in height, locally frequent but sporadic in grassy woodland on deep moderately fertile and well-watered soils near Casino and from Taree to Broke. Within the HEZ, scattered individuals of *E. glaucina* were recorded along the powerline easement in the 7(b) corridor, around Hebburn Dam, and near the "horse paddock" (DP1037092).

The current proposal will traverse through approximately 1.3ha of habitat (within LHSGIF and KSSW). No trees are actually located within the road alignment, although at least three are located within the 20 m buffer. These trees within the buffer are unlikely to be affected by the proposal.

The Assumed Concurrence issued by the DECC, set aside one large area (Parcel No. 1) to protect a significant proportion of HLRF and potential habitat / population(s) of this species within the 4(h) zone. Therefore, it is considered unlikely that the proposal will place the local population(s) of the species at the risk of extinction.

b) In the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction;

No populations of any of the species considered for this assessment (that are relevant to this locality) have been identified under Part 2 of Schedule 1 of the *TSC Act*.

c) In the case of a critically endangered or EEC, whether the action proposed:

(i) Is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction; or

(ii) Is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction;

Not applicable to threatened species.

d) In relation to the habitat of a threatened species, population or ecological community:

(i) The extent to which habitat is likely to be removed or modified as a result of the action proposed;

Approximately 1.3ha of habitat will be affected by the proposal as well as three individual trees.

(ii) Whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action;

The proposal will create a cleared linear easement through the HEZ lands. However sections of the Station Street extension are positioned along existing cleared land thus reducing clearing and impacts.

It may be that the existing trails and cleared easements are not one of the greatest limiting factors in determining the occurrence and distribution of *E. glaucina* within the site. Roads

and similar clearings are likely to be within the dispersal capabilities of the majority of this threatened flora species (including potential pollinators / vectors).

Therefore whilst the proposal must be considered as fragmenting an area of habitat for this species, it is not likely to cause significant isolation. However, it could be regarded that the proposal, as part of the HEZ proposal may be leading to the fragmentation and isolation of habitat within the wider locality.

(iii) The importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality;

The results of the ECMP data have been used to achieve adequate conservation outcomes for threatened species, including *E. glaucina* within the HEZ Study Area, which culminated in the DECC issuing an assumed concurrence for the development of the HEZ, in March 2004. The habitat to be removed can therefore be considered as not important to the long-term survival of the species in the locality.

e) Whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly);

None of the site has been designated 'critical habitat' under Part 3 of the *TSC Act.*

f) Whether the proposed action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan;

No recovery plan or threat abatement plan is associated with this threatened species.

***g)* Whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.**

KTP's are listed in Schedule 3 of the *TSC Act*. The KTP's most applicable to the current proposal are discussed in detail in Section 4.4. Those most applicable to this species (both directly and indirectly) would appear to be:

- Clearing of Native Vegetation; and
- Infection of native plants by *Phytophthora cinnamomi*.

However, the DECC Assumed Concurrence has adequately assessed all relevant ecological matters, and the proposal does not contravene any specific aspect of the Assumed Concurrence.

Eucalyptus parramattensis* subsp. *decadens

a) In the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction;

Eucalyptus parramattensis subsp. *decadens* is a small to medium sized tree that occurs in dry sclerophyll woodland on sandy soils, often in low and moist sites. This sub-species has a restricted range from Kurri Kurri to Tomago.

This species has been recorded in the HEZ study area in a number of locations (Ecotone 1999; Ecotone 2000; present survey). Ecotone (2000) states that this species "is primarily restricted to the Woodland community (Kurri Sand Swamp Woodland) both within the development and conservation areas of the site". A total of 47 individual of *E. parramattensis* subsp. *decadens* have been recorded within the proposed road footprint. This would represent a relatively small incremental loss in terms of the population outside of the site. Adequate conservation outcomes (populations) for this species are maintained within the conservation zones of the HEZ and in the majority of the DECC Deferred Conservation Areas.

A suitable conservation outcome exists for this species locally, with large populations secured within Werakata National Park, conservation areas of HEZ and the buffer lands of the aluminium refinery north of Kurri Kurri. Many examples can also be found in the immediate locality of healthy specimens of *E. parramattensis* subsp. *decadens* occurring along road fringes and in manicured parkland environments (e.g. roadsides edges in Neath, Abermain, Weston). Therefore, it is considered unlikely that the proposal will place the local population(s) of the species at the risk of extinction.

b) In the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction;

No populations of any of the species considered for this assessment (that are relevant to this locality) have been identified under Part 2 of Schedule 1 of the *TSC Act*.

c) In the case of a critically endangered or EEC, whether the action proposed:

(i) Is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction; or

(ii) Is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction;

Not applicable to threatened species.

d) In relation to the habitat of a threatened species, population or ecological community:

(i) The extent to which habitat is likely to be removed or modified as a result of the action proposed;

Those areas containing KSSW can be considered as potential habitat for *E. parramattensis* subsp. *decadens*. Therefore, approximately 0.89ha of potential habitat will be removed by the proposal.

(ii) Whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action;

The proposal will create a cleared linear easement through the HEZ lands. However sections of the Station Street extension are positioned along existing cleared land thus reducing clearing and impacts.

It may be that the existing trails and cleared easements are not one of the greatest limiting factors in determining the occurrence and distribution of *E. parramattensis* subsp. *decadens* within the site. Roads and similar clearings are likely to be within the dispersal capabilities of the majority of this threatened flora species (including potential pollinators / vectors).

Therefore whilst the proposal must be considered as fragmenting an area of habitat for this species, it is not likely to cause significant isolation. However, it could be regarded that the proposal, as part of the HEZ proposal may be leading to the fragmentation and isolation of habitat within the wider locality.

(iii) The importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality;

The results of the ECMP data have been used to achieve adequate conservation outcomes for threatened species, including *E. parramattensis* subsp. *decadens* within the HEZ Study Area, which culminated in the DECC issuing an assumed concurrence for the development of the HEZ, in March 2004. The habitat to be removed can therefore be considered as not important to the long-term survival of the species in the locality.

e) Whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly);

None of the site has been designated 'critical habitat' under Part 3 of the *TSC Act.*

f) Whether the proposed action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan;

No recovery plan or threat abatement plan is associated with this threatened species.

***g)* Whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.**

KTP's are listed in Schedule 3 of the *TSC Act*. The KTP's most applicable to the current proposal are discussed in detail in Section 4.4. Those most applicable to this species (both directly and indirectly) would appear to be:

- Clearing of Native Vegetation; and
- Infection of native plants by *Phytophthora cinnamomi*.

However, the DECC Assumed Concurrence has adequately assessed all relevant ecological matters, and the proposal does not contravene any specific aspect of the Assumed Concurrence.

Grevillea parviflora* subsp. *parviflora

a) In the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction;

G. parviflora subsp. *parviflora* is a low open to erect shrub that occurs in light clayey soils in woodlands from Prospect to Camden and Appin, with disjunct northern populations near Putty, Cessnock and Cooranbong. Most plants appear capable of suckering from a rootstock.

Estimates of population sizes have been made for the entire HEZ site of over 3 million above ground stems (HSO 2002). A rhizome study carried out by RPS HSO during clearing operations of the HEZ Spine Road (Ch700-2100m) involved the excavation of 12 plants, resulting in an average of three above ground stems per plant and ranging between two and eight stems. Research currently in progress is attempting to clarify the taxonomic position of *G. parviflora* within the *G. linearifolia* complex in the lower Hunter Valley and Central Coast (Driscoll & Bell *in prep*.). Numerous forms of what is currently described as *G. parviflora* have been examined, and it is likely that several new taxa within this group may be recognised. Whilst the results of these studies are not known at this stage, it would be prudent to treat all *G. parviflora* specimens on the site as the threatened taxa.

Targeted surveys to date have not recorded any above ground stems of this species within the site. Notwithstanding, there is potential for its occurrence within the site. Adequate conservation outcomes (populations) for this species are maintained within the conservation zones of the HEZ and in the majority of the DECC Deferred Conservation Areas. Therefore, it is considered unlikely that the proposal will have an adverse effect on the life cycle of the species such that a viable local population of this species is likely to be placed at the risk of extinction.

b) In the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction;

No populations of any of the species considered for this assessment (that are relevant to this locality) have been identified under Part 2 of Schedule 1 of the *TSC Act*.

c) In the case of a critically endangered or EEC, whether the action proposed:

(i) Is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction; or

(ii) Is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction;

Not applicable to threatened species.

d) In relation to the habitat of a threatened species, population or ecological community:

(i) The extent to which habitat is likely to be removed or modified as a result of the action proposed;

Approximately 0.41ha of potential habitat are to be removed by the proposal. Although its occurrence within the study site has not been recorded during targeted surveys.

(ii) Whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action;

The proposal will create a cleared linear easement through the HEZ lands. However sections of the Station Street extension are positioned along existing cleared land thus reducing clearing and impacts.

It may be that the existing trails and cleared easements are not one of the greatest limiting factors in determining the occurrence and distribution of *G. p. parviflora* within the site. Roads and similar clearings are likely to be within the dispersal capabilities of the majority of this threatened flora species (including potential pollinators / vectors).

Therefore whilst the proposal must be considered as fragmenting an area of habitat for this species, it is not likely to cause significant isolation. However, it could be regarded that the proposal, as part of the HEZ proposal may be leading to the fragmentation and isolation of habitat within the wider locality.

(iii) The importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality;

This species tends to occur in a clustered distribution, and was predominately found within the LHSGIF vegetation community, however in this case the high densities occur within the Kurri Sand Swamp Woodland. The results of the ECMP data have been used to achieve adequate conservation outcomes for threatened species, including *G. parviflora* subsp. *parviflora* within the HEZ Study Area, which culminated in the DECC issuing an assumed concurrence for the development of the HEZ, in March 2004. The habitat to be removed can therefore be considered as not important to the long-term survival of the species in the locality.

e) Whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly);

None of the site has been designated 'critical habitat' under Part 3 of the *TSC Act.*

f) Whether the proposed action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan;

No recovery plan or threat abatement plan is associated with this threatened species.

g) **Whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.**

KTP's are listed in Schedule 3 of the *TSC Act*. The KTP's most applicable to the current proposal are discussed in detail in Section 4.4. Those most applicable to this species (both directly and indirectly) would appear to be:

- Clearing of Native Vegetation;
- Invasion of native plant communities by exotic perennial grasses; and
- Infection of native plants by *Phytophthora cinnamomi*.

However, the DECC Assumed Concurrence has adequately assessed all relevant ecological matters, and the proposal does not contravene any specific aspect of the Assumed Concurrence.

Rutidosis heterogama

a) In the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction;

On current knowledge, the eastern half of the HEZ study area, including the 4(h) development, 7(b) conservation zone, and 8(a) Werakata National Park (Tomalpin section), appears to be the major stronghold for the species within the Hunter Region (RPS HSO pers. obs.; Stephen Bell *pers. comm.*). The majority of the population (67% of the area of occupancy) occurs within the 4(h) lands. While many plants were evident in recently burnt sites where additional light was available, the species was still present in unburnt areas with moderate shrub cover. It also occurs well distant from established trails in undisturbed areas.

Due to sporadic occurrence and difficulty to locate individuals outside of its flowering season, the species is likely to occur elsewhere within both the development and conservation zones in the eastern portions of the HEZ and further surveys may be required (such as within recently burnt sections of Werakata National Park) before accurate inferences regarding its distribution can be made. This will enable more statistically robust population estimates to be made with the result that more accurate assessments of potential impacts can be generated. Notwithstanding, current estimates have placed over 20,000 individuals recorded to date within the HEZ.

Within the site, no individuals have been recorded, although the majority of the road corridor would appear to offer seemingly potential habitat, and due to the species ecology, it may sporadically occur at particular points in time (such as after a fire event).

The DECC Assumed Concurrence which set aside a large area (Parcel No. 4) to protect this species within the 4(h) zone, it is therefore considered that the proposal would be unlikely to place the local population(s) of this species at risk of extinction.

b) In the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction;

No populations of any of the species considered for this assessment (that are relevant to this locality) have been identified under Part 2 of Schedule 1 of the *TSC Act*.

c) In the case of a critically endangered or EEC, whether the action proposed:

(i) Is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction; or

(ii) Is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction;

Not applicable to threatened species.

d) In relation to the habitat of a threatened species, population or ecological community:

(i) The extent to which habitat is likely to be removed or modified as a result of the action proposed;

No individuals of this species were found within the Lower Hunter Spotted Gum Ironbark Forest on site and approximately 0.41ha of potential habitat will be removed by the proposal.

(ii) Whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action;

The proposal will create a cleared linear easement through the HEZ lands. However sections of the Station Street extension are positioned along existing cleared land thus reducing clearing and impacts.

It may be that the existing trails and cleared easements are not one of the greatest limiting factors in determining the occurrence and distribution of *R.heterogama* within the site. Roads and similar clearings are likely to be within the dispersal capabilities of the majority of this threatened flora species (including potential pollinators / vectors).

Therefore whilst the proposal must be considered as fragmenting an area of habitat for this species, it is not likely to cause significant isolation. However, it could be regarded that the proposal, as part of the HEZ proposal may be leading to the fragmentation and isolation of habitat within the wider locality.

(iii) The importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality;

The results of the ECMP data have been used to achieve adequate conservation outcomes for threatened species, including *R. heterogama* within the HEZ Study Area, which culminated in the DECC issuing an assumed concurrence for the development of the HEZ, in March 2004. The habitat to be removed can therefore be considered as not important to the long-term survival of the species in the locality.

e) Whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly);

None of the site has been designated 'critical habitat' under Part 3 of the *TSC Act.*

f) Whether the proposed action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan;

No recovery plan or threat abatement plan is associated with this threatened species.

g) **Whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.**

KTP's are listed in Schedule 3 of the *TSC Act*. The KTP's most applicable to the current proposal are discussed in detail in Section 4.4. Those most applicable to this species (both directly and indirectly) would appear to be:

- Clearing of Native Vegetation;
- Invasion of native plant communities by exotic perennial grasses; and
- Infection of native plants by *Phytophthora cinnamomi*.

However, the DECC Assumed Concurrence has adequately assessed all relevant ecological matters, and the proposal does not contravene any specific aspect of the Assumed Concurrence.

***Litoria brevipalmata* (Green-thighed Frog)**

a) In the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction;

The Green-thighed Frog occurs in isolated localities from the NSW Central coast to south-east Queensland. They occur in a range of habitats from rainforest and moist Eucalypt forest to dry Eucalypt forest and heath (NPWS 2000b).

The species is one of only a handful of eastern temperate Australian frog species that exhibit "explosive" breeding (Lemckert and Slatyer, in prep). Breeding occurs following heavy rainfall events in late spring and summer, with frogs congregating around large, temporary pools where males generally only call for one or two nights. Breeding may occur just once or twice per year or not at all and breeding success may be highly variable (Lemckert *et al*. 1997). How these frogs use forested environments during non-breeding times has not been documented (Lemckert and Slatyer, in press), although it is suspected that they forage in leaf litter and dense groundcover vegetation. Although the species breeding sites have not been determined, it is considered likely that any creekline and/or low lying area capable of holding water for extended periods may provide potential habitat for this species.

Two juveniles of this species (with Snout-Vent Lengths of 17.5mm and 18.2mm respectively) were recorded in two creeklines within the 7(b) lands to the immediate south-west of the site. The size of these individuals suggests that they were approximately 1-2 months old, with the population likely to have bred with the heavy rains that occurred during late summer (January – February 2002). These sightings represent the first record of the species in the catchment of the Hunter River. Therefore, the extant population is likely to be of a high regional and state significance.

Whilst this species has not been recorded within the proposed Station Street extension, it will traverse through areas of potential habitat in the for this species, however, it has been positioned in part along existing cleared land and degraded habitat land thus reducing clearing and impacts

More significant habitats for this species occur immediately south of Stage 2(a) within the 7(b) corridor and within the DECC Deferred Conservation Area No.1. Stage 2(a) has been positioned and designed to minimise any potential impacts to this area.

As part of the Concept Plan HEZ has prepared a Water Cycle Management Strategy, which will ensure that the potential impacts to creekline environs are minimised through the construction of erosion controls and stormwater detention basins.

Given these factors it is considered that the proposal would be unlikely to place any local population(s) of this species at risk of extinction.

b) In the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction;

No populations of any of the species considered for this assessment (that are relevant to this locality) have been identified under Part 2 of Schedule 1 of the *TSC Act*.

c) In the case of a critically endangered or EEC, whether the action proposed:

(i) Is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction; or

(ii) Is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction;

Not applicable to threatened species.

d) In relation to the habitat of a threatened species, population or ecological community:

(i) The extent to which habitat is likely to be removed or modified as a result of the action proposed;

As little is known of how the Green-thighed Frog uses forested environments during non-breeding times, it is difficult to ascertain the possible extent of habitat that may be affected by the proposal. For the purpose of this assessment, it is assumed that the most important habitat for this species would be associated with any creekline and/or low lying area capable of holding water for extended periods.

Habitat within the southern portion of the site is a mix of cleared land, LHSGIF, and cleared swampland. Whilst existing pools may represent 'low' habitat quality, this area can still be regarded as potential foraging and sheltering habitat for the Green-thighed Frog.

The proposal has the potential to indirectly modify habitat for this species through changed water regimes if sound water management practises are not adhered to during the construction and operational phases of the current proposal.

(ii) Whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action;

This species has been recorded along Chinamans Hollow Creek and habitat mapping conducted to date indicates that high quality habitat for the species is also mainly located upstream of the road alignment. Whilst some specialised habitat for the species occurs downstream, surveys to date have failed to detect any further populations.

It is expected that through the protection of sensitive habitats in the immediate vicinity of the road corridor through the 7(b) zone and other measures to minimise potential impacts to this species, it is considered that the proposal will not isolate areas of known habitat. However, it could be regarded that the proposal, as part of the HEZ proposal may be leading to the fragmentation and isolation of habitat within the wider locality.

(iii) The importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality;

The results of the ECMP data have been used to achieve adequate conservation outcomes for threatened species, including the Green-thighed Frog, within the HEZ Study Area, which culminated in the DECC issuing an assumed concurrence for the development of the HEZ, in March 2004. The habitat to be removed can therefore be considered as not important to the long-term survival of the species in the locality.

e) Whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly);

None of the site has been designated 'critical habitat' under Part 3 of the *TSC Act.*

f) Whether the proposed action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan;

No recovery plan or threat abatement plan is associated with this threatened species.

***g)* Whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.**

KTP's are listed in Schedule 3 of the *TSC Act*. The KTP's most applicable to the current proposal are discussed in detail in Section 4.4. Those most applicable to this species (both directly and indirectly) would appear to be:

- Clearing of Native Vegetation;
- Alteration to the natural flow regimes of rivers, streams, floodplains & wetlands

However, the DECC Assumed Concurrence has adequately assessed all relevant ecological matters, and the proposal does not contravene any specific aspect of the Assumed Concurrence.

***Calyptorhynchus lathami* (Glossy Black-Cockatoo)**

a) In the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction;

Glossy Black-Cockatoos occur in Eucalypt woodlands and forests where there is a sub-canopy or understorey of *Allocasuarina* or *Casuarina* species. Birds nest in live or dead tree hollows. Burning of fire sensitive species of *Casuarinas* can render feeding habitat unsuitable for several years. Fragmentation of habitat leads to increases in competitor species (Garnett & Crowley 2000).

No potential feed tree for this species have been recorded occurring in the site, although the Glossy Black- Cockatoo appears to be an irregular visitor to the HEZ, probably due to the general paucity of large areas containing a reliable food source (in the form of *Allocasuarina* trees). Since no individuals or secondary indications of this species were found to be present along the length of the site, the significance of site for this species in the locality is considered to be low. This species generally nests within close proximity to foraging areas and given the low likely significance of the proposed road extension as foraging habitat, it follows that the area is unlikely to be utilised as nesting habitat. More suitable habitat occurs along the slopes of the Tomalpin Hill section of Werakata National Park where *A. torulosa* (Forest Oak) occurs in greater densities.

The conservation zones within the HEZ LEP and additional conservation areas set aside by the DECC assumed concurrence are likely to have produced adequate conservation outcomes for this species. When these factors are taken into consideration, it is considered that the proposal is unlikely to place the local population(s) of these species at further risk of extinction.

b) In the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction;

No populations of any of the species considered for this assessment (that are relevant to this locality) have been identified under Part 2 of Schedule 1 of the *TSC Act*.

c) In the case of a critically endangered or EEC, whether the action proposed:

(i) Is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction; or

(ii) Is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction;

Not applicable to threatened species.

d) In relation to the habitat of a threatened species, population or ecological community:

(i) The extent to which habitat is likely to be removed or modified as a result of the action proposed;

The proposal will not remove any potential foraging habitat (habitat occupied by *Allocasuarina sp.*) for this species.

(ii) Whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action;

The construction of the Station Street extension is not regarded as contributing to the fragmentation of habitat used by this species, within the HEZ, and due to the high mobility of this species, it is unlikely to become isolated from other areas of habitat.

(iii) The importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality;

The results of the ECMP data have been used to achieve adequate conservation outcomes for threatened species, including the Glossy Black-Cockatoo, within the HEZ Study Area, which culminated in the DECC issuing an assumed concurrence for the development of the HEZ, in March 2004. The habitat to be removed can therefore be considered as not important to the long-term survival of the species in the locality.

e) Whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly);

None of the site has been designated 'critical habitat' under Part 3 of the *TSC Act.*

f) Whether the proposed action is consistent with the objectives or actions of a recovery plan or threat abatement plan;

No recovery plan or threat abatement plan is associated with this threatened species.

***g)* Whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.**

KTP's are listed in Schedule 3 of the *TSC Act*. The KTP's most applicable to the current proposal are discussed in detail in Section 4.4. Those most applicable to this species (both directly and indirectly) would appear to be:

- Clearing of Native Vegetation; and
- Removal of dead wood and dead trees.

However, the DECC Assumed Concurrence has adequately assessed all relevant ecological matters, and the proposal does not contravene any specific aspect of the Assumed Concurrence.

Forest Owls - *Tyto novaehollandiae* (Masked Owl) and *Ninox strenua* (Powerful Owl)

a) In the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction;

Powerful Owls are sedentary within home ranges of about 1000ha within open Eucalypt, *Casuarina* or *Callitris* pine forests and woodlands. Principal prey includes medium-sized mammals, particularly possums and gliders. Birds, flying foxes, rats and insects are also taken. They nest in mature Eucalypts containing large tree hollows (Garnett & Crowley 2000).

Masked Owls occupy home ranges of 5 –10km^2 within a diverse range of wooded habitats that provide large hollow bearing trees for roosting and nesting and nearby open areas for foraging. Prey is principally terrestrial mammals although possums, gliders, bats, birds, lizards and rabbits may be taken opportunistically (Garnett & Crowley 2000).

The Powerful Owl has been recorded by RPS HSO on three occasions as roosting individuals within densely vegetated creekline habitats. Each of these records has been from 7(b) conservation zones. Other recorded locations of the species are from Atlas of NSW Wildlife data within 8(a) and 4(h) lands.

It is likely that a local population of this species is using the HEZ as part or the whole of a foraging home range and it is considered that the entire HEZ could provide foraging habitat for this species. Furthermore, suitable prey species have been widely recorded in the study area. It is also considered likely that the species uses the area for nesting purposes as a significant number of potential nesting sites occur within the larger tree hollows within the study area.

The Masked Owl has not been recorded from the HEZ during formal fauna surveys, with the only recorded locations being from Atlas of NSW Wildlife data. The study area may represent a foraging home range (or part thereof) for one or more pairs of the species (which are known to be greater than 1000ha in size). It is considered likely that the entire HEZ study area constitutes potential habitat for this species, including areas containing suitable roosting and nesting habitat.

The proposal will result in the loss of mainly hunting habitat (1.3ha) for these species. Moreover, it will result in the loss of vegetation within an area relatively proximate to where Powerful Owls have been recorded roosting previously. No hollows large enough to meet the nesting requirements of these species occur within the road footprint.

It is considered that the proposal would not place any population of the Powerful Owl or Masked Owl at the risk of extinction. The conservation zones of HEZ LEP area, with supplementary habitats within the DECC deferred conservation areas, are likely to provide adequate conservation outcomes for this species.

b) In the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction;

No populations of any of the species considered for this assessment (that are relevant to this locality) have been identified under Part 2 of Schedule 1 of the *TSC Act*.

c) In the case of a critically endangered or EEC, whether the action proposed:

(i) Is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction; or

(ii) Is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction;

Not applicable to threatened species.

d) In relation to the habitat of a threatened species, population or ecological community:

(i) The extent to which habitat is likely to be removed or modified as a result of the action proposed;

The proposal will remove approximately 1.3ha of potential foraging habitat for these owl species.

(ii) Whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action;

The construction of the Station Street Extension must be regarded as contributing to the fragmentation of habitat used by these owl species, within the HEZ. However, due to the high mobility of these species, it is itself unlikely to become isolated from other areas of habitat.

(iii) The importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality;

The results of the ECMP data have been used to achieve adequate conservation outcomes for threatened species, including the Masked Owl and Powerful Owl, within the HEZ Study Area, which culminated in the DECC issuing an assumed concurrence for the development of the HEZ, in March 2004. The habitat to be removed can therefore be considered as not important to the long-term survival of the species in the locality.

e) Whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly);

None of the site has been designated 'critical habitat' under Part 3 of the *TSC Act.*

f) Whether the proposed action is consistent with the objectives or actions of a recovery plan or threat abatement plan;

1. To minimise further loss and fragmentation of habitat outside conservation reserves and State Forests by protection and management of significant owl habitat (including protection of individual nest sites).

The proposal will involve the removal of approximately 1.3ha of foraging habitat for both the Masked Owl and Powerful Owl. The proposal could therefore not be considered to be consistent with this objective. No potential nest sites will be removed.

2. To minimise the impacts of development activities on large forest owls and their habitats outside conservation reserves and State Forests.

The Cessnock LEP (Amendment 60) rezoned approximately 855ha of land at the HEZ as 7(b) Habitat Protection and a further 1273 ha as 8(a) National Park. These conservation zones within the HEZ LEP and some 89ha of additional conservation areas set aside by the DECC Assumed Concurrence are likely to have produced adequate conservation outcomes for each of these species. The setting aside of these areas are considered to have minimised the impacts of development activities on these owl species and their habitats.

3. To assess the distribution and amount of high quality habitat for each owl species across public and private lands to get an estimate of the number and proportion of occupied territories of each species that are, and are not protected.

The Ecological Constraints Master Plan (ECMP) (HSO 2004) project aimed to obtain detailed ecological data for superior strategic planning, development sequencing and conservation decisions for HEZ. The mapping aimed to provide the accurate identification of flora and fauna (and their habitats) on the HEZ site. This work has culminated in a significant ecological database which forms the basis of on-going environmental management strategies.

Whilst the ECMP data is generally limited to the 4(h) zoned lands of the HEZ, within this area it can be used to assess the distribution and quality of habitat for these owl species. In regard to the Powerful Owl, habitat characteristics, particularly hollow trees for nest sites and hollows and tree species potentially used by prey species, give a strong indication of habitat quality. Any sightings or evidence of Owls, or their prey is also included in this data set, which is regularly updated.

4. To monitor trends in population parameters (number, distribution, territory fidelity and breeding success) across the range of the species and across different land tenures and disturbance history.

No detailed monitoring studies identifying trends in population parameters have been conducted as part of the proposal or as part of the wider HEZ.

5. To assess the implementation and effectiveness for forest management prescriptions designed to mitigate the impact of timber-harvesting operations on the owl species and, (if necessary), to use this information to refine the prescriptions so that forestry activities in State Forests are not resulting in adverse changes in species abundance and breeding success.

This objective is not relevant to the current proposal.

6. To improve the recovery and management of the large forest owls based on an improved understanding of key areas of their biology and ecology.

Whilst a large portion of potential habitat for these species has been reserved within the HEZ study area, the current proposal cannot be regarded as improving the recovery and management of the Powerful Owl or Masked Owl.

7. To raise awareness of the conservation requirements of the three large forest owls amongst the broader community, to involve the community in owl conservation efforts and in so doing increase the information base owl habitats and biology.

No schemes, in relation to this proposal, have been put in place that are considered to raise awareness of the conservation requirements of these owl species or involve the community in owl conservation efforts.

8. To coordinate the implementation of the recovery plan and continually seek to integrate actions in this plan with actions in other recovery plans or conservation initiatives.

The DECC co-ordinates the implementation of the actions in this recovery plan and carries out a review of the plan in its final year.

g) **Whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.**

KTP's are listed in Schedule 3 of the *TSC Act*. The KTP's most applicable to the current proposal are discussed in detail in Section 4.4. Those most applicable to these species (both directly and indirectly) would appear to be:

- Clearing of Native Vegetation; and
- Removal of dead wood and dead trees.

However, the DECC Assumed Concurrence has adequately assessed all relevant ecological matters, and the proposal does not contravene any specific aspect of the Assumed Concurrence.

***Callocephalon fimbriatum* (Gang-gang Cockatoo)**

a) In the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction;

The Gang-gang Cockatoo is a seasonal / nomadic visitor to the HEZ lands, having been recorded on a number of occasions, predominantly feeding on the capsules of Grey Gums (*Eucalyptus punctata & E. canaliculata*) within both the 7(b) and 4(h) lands. There are also a number of records of the species from Werakata National Park and elsewhere from the Cessnock LGA. The majority of records are from areas in close vicinity to the Watagan Range, such as Bow Wow Gorge, Congewai Valley and Laguna (Hunter Bird Observers Club records).

The HEZ zoning configuration is considered to provide adequate conservation representation and biodiversity outcomes within the HEZ LEP area, including for such wide-ranging species as the Gang-gang Cockatoo. Recent correspondence from DECC (letter sent 5th September 2005) states that the HEZ LEP and assumed concurrence provisions provide adequate protection for the Gang-gang Cockatoo.

Given these factors and the small amount of potential habitat to be removed, it is considered highly unlikely that the proposal would be unlikely to place any local population(s) of this species at risk of extinction.

b) In the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction;

No populations of any of the species considered for this assessment (that are relevant to this locality) have been identified under Part 2 of Schedule 1 of the *TSC Act*.

c) In the case of a critically endangered or EEC, whether the action proposed:

(i) Is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction; or

(ii) Is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction;

Not applicable to threatened species.

d) In relation to the habitat of a threatened species, population or ecological community:

(i) The extent to which habitat is likely to be removed or modified as a result of the action proposed;

The proposal will remove approximately 1.3ha of potential foraging habitat for this species.

(ii) Whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action;

The construction of the Station Street road must be regarded as contributing to the fragmentation of habitat used by this species, within the HEZ. However, due to the high mobility of this species, it is itself unlikely to become isolated from other areas of habitat.

(iii) The importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality;

The results of the ECMP data have been used to achieve adequate conservation outcomes for threatened species, including the Gang-gang Cockatoo, within the HEZ Study Area, which culminated in the DECC issuing an assumed concurrence for the development of the HEZ, in March 2004. The habitat to be removed can therefore be considered as not important to the long-term survival of the species in the locality.

e) Whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly);

None of the site has been designated 'critical habitat' under Part 3 of the *TSC Act.*

f) Whether the proposed action is consistent with the objectives or actions of a recovery plan or threat abatement plan;

No recovery plan or threat abatement plan is associated with this threatened species.

***g)* Whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.**

KTP's are listed in Schedule 3 of the *TSC Act*. The KTP's most applicable to the current proposal are discussed in detail in Section 4.4. Those most applicable to this species (both directly and indirectly) would appear to be:

- Clearing of Native Vegetation; and
- Removal of dead wood and dead trees.

However, the DECC Assumed Concurrence has adequately assessed all relevant ecological matters, and the proposal does not contravene any specific aspect of the Assumed Concurrence.

'Woodland Birds' - *Climacteris picumnus victoriae* (Brown Treecreeper), *Melithreptus gularis gularis* (Black-chinned Honeyeater), *Pomatostomus temporalis temporalis* (Grey-crowned Babbler), *Chthonicola sagittata* (Speckled Warbler).

a) In the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction;

The Brown Treecreeper is a medium-sized insectivorous bird that occupies Eucalypt woodlands, particularly open woodland lacking a dense understorey. It is sedentary and nests in tree hollows within permanent territories, breeding in pairs or communally in small groups. Birds forage on tree trunks and on the ground amongst leaf litter and on fallen logs for ants, beetles and larvae.

The Black-chinned Honeyeater is found predominantly west of the Great Dividing Range, although they are also known from drier coastal woodlands of the Cumberland Plain, Western Sydney and in the Hunter, Richmond and Clarence Valleys. The species builds compact, cup-shaped nests and feeds on arthropods, nectar and lerp from Eucalypt foliage and bark.

The Grey-crowned Babbler occupies open woodlands dominated by mature Eucalypts, with regenerating trees, tall shrubs, and an intact ground cover of grass and forbs. The species builds conspicuous dome-shaped nests and breeds co-operatively in sedentary family groups of 2-13 birds. Grey-crowned Babblers are insectivorous and forage in leaf litter and on bark of trees.

All three species are threatened by clearance and the fragmentation of woodland habitats, including the removal of dead timber. Reductions in remnant habitat size leads to the isolation of populations, which increases their vulnerability to extinction from stochastic events and decreases their genetic viability in the long term. Habitat fragmentation also increases competition with aggressive species and levels of nest predation. All three species generally do not persist in remnants less than 200ha in area.

These species have each been recorded fairly regularly within the HEZ. Brown Treecreepers have been observed attending nests in tree hollows at two separate parts of the 4(h) zone. These could represent the eastern-most known breeding sites for this species in the region. The HEZ study area also appears to hold a significant population (possibly a stronghold) of Black-chinned Honeyeaters within the lower Hunter region (RPS HSO ecologists *pers. obs.*).

The current proposal will remove areas of known and potential habitat for Brown Treecreepers, Black-chinned Honeyeaters and Grey-crowned Babblers. There have been no sighting recorded for any of these four threatened woodland birds within the site. However there are two records of the black-chinned Honeyeater approximately 135 m of the site. Grey-crowned Babblers appear able to persist in slightly disturbed habitats in the locality at a greater capacity to the other three bird species addressed (RPS HSO ecologists *pers. obs.*).

Brown Treecreepers and Black-chinned Honeyeaters are more likely to be affected adversely by the proposal, given their noted widespread occurrence within the HEZ and susceptibility to habitat fragmentation and disturbance.

However, the conservation zones within the HEZ LEP and additional conservation areas set aside by the DECC assumed concurrence are likely to have produced adequate conservation outcomes for all of these species. When these factors are taken into

consideration, it is considered that the proposal is unlikely to place the local population(s) of these species at further risk of extinction.

b) In the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction;

No populations of any of the species considered for this assessment (that are relevant to this locality) have been identified under Part 2 of Schedule 1 of the *TSC Act*.

c) In the case of a critically endangered or EEC, whether the action proposed:

(i) Is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction; or

(ii) Is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction;

Not applicable to these threatened species.

d) In relation to the habitat of a threatened species, population or ecological community:

(i) The extent to which habitat is likely to be removed or modified as a result of the action proposed;

The proposal will remove approximately 1.3ha of potential habitat for these woodland birds.

(ii) Whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action;

The construction of the Station Street extension must be regarded as contributing to the fragmentation of habitat used by these woodland birds, within the HEZ. However, due to the high mobility of these species, it is itself unlikely to become isolated from other areas of habitat.

(iii) The importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality;

The results of the ECMP data have been used to achieve adequate conservation outcomes for threatened species, including these woodland birds, within the HEZ Study Area, which culminated in the DECC issuing an assumed concurrence for the development of the HEZ, in March 2004. The habitat to be removed can therefore be considered as not important to the long-term survival of the species in the locality.

e) Whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly);

None of the site has been designated 'critical habitat' under Part 3 of the *TSC Act.*

f) Whether the proposed action is consistent with the objectives or actions of a recovery plan or threat abatement plan;

No recovery plan or threat abatement plan is associated with these threatened species.

g) **Whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.**

KTP's are listed in Schedule 3 of the *TSC Act*. The KTP's most applicable to the current proposal are discussed in detail in Section 4.4. Those most applicable to this species (both directly and indirectly) would appear to be:

- Clearing of Native Vegetation;
- Invasion of native plant communities by exotic perennial grasses; and
- Removal of dead wood and dead trees.

However, the DECC Assumed Concurrence has adequately assessed all relevant ecological matters, and the proposal does not contravene any specific aspect of the Assumed Concurrence.

***Lathamus discolor* (Swift Parrot)**

a) In the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction;

Swift Parrots breed only in Tasmania and most birds migrate to the mainland in autumn and over-winter along the Great Dividing Range, where the species lives in Eucalypt forests and woodlands and feeds primarily on nectar and lerp. The sites used on the mainland vary from year to year, in response to nectar availability (Garnett and Crowley 2000).

This species has not been recorded during recent targeted surveys across the study area, which was to be expected given that there was a lack of flowering trees in the locality at the time of surveys. In recent years, both Swift Parrots and Regent Honeyeaters have favoured the coastal Swamp Mahogany Forests, which were more heavily in flower.

Given the nomadic nature of these species, potential impacts can be somewhat difficult to quantify. However, large numbers of this species were recorded in the locality during 2000. Subsequent targeted surveys / habitat assessments were conducted in this area (including the HEZ study area) by the Swift Parrot Recovery Team in 2002. The results of these investigations concluded that the Spotted Gum / Ironbark forests of the Lower Hunter are of significance to the national population of the species. Evidence suggests that such habitats within the Lower Hunter area have always been utilised by the species regularly (Saunders 2002). Such habitat dominates the vegetation of the HEZ and represents a significant habitat resource for this species.

The current proposal will remove approximately 1.3ha of potential habitat for the species, including 1 keystone mature tree (winter flowering eucalypt). Several areas within the 4(h) zone were set aside to protect habitat for this species by the DECC Assumed Concurrence (eg. Parcel No. 1 and 2).

Given that the species breeds only in Tasmania and that the extent of occurrence of the single population is around 860,000km^2 (Garnett and Crowley 2000), the removal of habitat as a result of this proposal is unlikely to place the population at risk of extinction. However, any habitat removal within an area identified as potentially important to the national population of this species, must be regarded as incrementally impacting upon the Swift Parrot.

b) In the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction;

No populations of any of the species considered for this assessment (that are relevant to this locality) have been identified under Part 2 of Schedule 1 of the *TSC Act*.

c) In the case of a critically endangered or EEC, whether the action proposed:

(i) Is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction; or

(ii) Is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction;

Not applicable to threatened species.

d) In relation to the habitat of a threatened species, population or ecological community:

(i) The extent to which habitat is likely to be removed or modified as a result of the action proposed;

The proposal will remove approximately 1.3ha of potential foraging habitat for this species.

(ii) Whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action;

The construction of the Station Street extension must be regarded as minor factor contributing to the fragmentation of habitat used by this species, within the HEZ. However, due to the high mobility of this species, it is itself unlikely to become isolated from other areas of habitat.

(iii) The importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality;

The results of the ECMP data have been used to achieve adequate conservation outcomes for threatened species, including the Swift Parrot, within the HEZ Study Area, which culminated in the DECC issuing an assumed concurrence for the development of the HEZ, in March 2004. The habitat to be removed can therefore be considered as not important to the long-term survival of the species in the locality.

e) Whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly);

None of the site has been designated 'critical habitat' under Part 3 of the *TSC Act.* ***Whether the proposed action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan;***

No recovery plan or threat abatement plan is associated with this threatened species.

***g)* Whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.**

KTP's are listed in Schedule 3 of the *TSC Act*. The KTP's most applicable to the current proposal are discussed in detail in Section 4.4. Those most applicable to this species (both directly and indirectly) would appear to be:

- Clearing of Native Vegetation;

However, the DECC Assumed Concurrence has adequately assessed all relevant ecological matters, and the proposal does not contravene any specific aspect of the Assumed Concurrence.

***Neophema pulchella* (Turquoise Parrot)**

a) In the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction;

Turquoise Parrots live in the foothills of the Great Dividing Range in open Eucalypt woodlands and forests that have a grassy or sparsely shrubby understorey. Eggs are laid in the hollows of trees, stumps or even fence posts (Garnett and Crowley 2000).

This species has not been recorded from the HEZ during any formal fauna surveys, with the only records being from Atlas of NSW Wildlife data (records which span 10 years). It is considered possible that this species is resident within the HEZ, although the habitats within HEZ are not typical of preferred habitat noted from other locations within the region. It is also possible that the records of the species from the HEZ are from vagrant or nomadic birds in transit, or that the species has declined in recent years.

Given the paucity of ongoing records of the species within the study area and the unlikelihood of a resident population, the removal of habitat within the site and any other indirect impacts are considered unlikely to place any local population(s), if extant, at the risk of extinction.

b) In the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction;

No populations of any of the species considered for this assessment (that are relevant to this locality) have been identified under Part 2 of Schedule 1 of the *TSC Act*.

c) In the case of a critically endangered or EEC, whether the action proposed:

(i) Is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction; or

(ii) Is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction;

Not applicable to threatened species.

d) In relation to the habitat of a threatened species, population or ecological community:

(i) The extent to which habitat is likely to be removed or modified as a result of the action proposed;

The proposal will remove approximately 0.41ha of potential foraging habitat for this species.

(ii) Whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action;

The construction of the Station Street extension must be regarded as contributing to the fragmentation of habitat used by this species, within the HEZ. However, due to the high mobility of this species, it is itself unlikely to become isolated from other areas of habitat.

(iii) The importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality;

The results of the ECMP data have been used to achieve adequate conservation outcomes for threatened species, including the Turquoise Parrot, within the HEZ Study Area, which culminated in the DECC issuing an assumed concurrence for the development of the HEZ, in March 2004. The habitat to be removed can therefore be considered as not important to the long-term survival of the species in the locality.

e) Whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly);

None of the site has been designated 'critical habitat' under Part 3 of the *TSC Act.*

f) Whether the proposed action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan;

No recovery plan or threat abatement plan is associated with this threatened species.

***g)* Whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.**

KTP's are listed in Schedule 3 of the *TSC Act*. The KTP's most applicable to the current proposal are discussed in detail in Section 4.4. Those most applicable to this species (both directly and indirectly) would appear to be:

- Clearing of Native Vegetation; and
- Removal of dead wood and dead trees.

However, the DECC Assumed Concurrence has adequately assessed all relevant ecological matters, and the proposal does not contravene any specific aspect of the Assumed Concurrence.

***Xanthomyza phrygia* (Regent Honeyeater)**

a) In the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction;

The Regent Honeyeater occurs throughout south-eastern Australia and in NSW breeds in several areas along the western slopes of the Great Dividing Range. Movements outside of the breeding season are poorly understood, and numbers fluctuate greatly between years and sites. The species is mostly recorded in box-ironbark Eucalypt associations although birds will also use other woodland types and wet lowland coastal forest dominated by Swamp Mahogany or Spotted Gum (Garnett and Crowley 2000).

This species has not been recorded from the HEZ during formal fauna surveys, although an incidental record was noted during Swift Parrot surveys conducted in July 2005. This record was of a single bird within a Spotted Gum tree in an ecotonal area between KSSW to LHSGIF in the north-eastern corner of the 4(h) zone, within DECC Deferred Conservation Area No.7. Furthermore, two Atlas of NSW Wildlife recorded locations for this species exist within the HEZ, both within the 4(h) zone in the northern section. It appears that the species has been recorded several times in this area between 1993 and 2000, in numbers of up to 15 individuals. It is considered likely that this species is an irregular visitor to the HEZ during appropriate periods (such as the winter flowering of tree species such as Spotted Gums). No nesting records exist from the HEZ, although nesting attempts have been made by the species in the Quorrobolong area, to the south of the study area.

Potential habitat for this species exists within the vegetation communities that contain winter-flowering Eucalypts. Within the HEZ these generally refer to the LHSGIF. Such habitat is widespread within the HEZ and it is likely to represent a significant habitat resource for this species on a regional scale.

The removal of approximately 0.41ha of potential habitat (LHSGIF) as a result of the current proposal is unlikely to place the local population at risk of extinction in isolation. However, any removal of habitat within an area identified as being potentially significant habitat on a local scale must be regarded as incrementally impacting upon the Regent Honeyeater.

b) In the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction;

No populations of any of the species considered for this assessment (that are relevant to this locality) have been identified under Part 2 of Schedule 1 of the *TSC Act*.

c) In the case of a critically endangered or EEC, whether the action proposed:

(i) Is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction; or

(ii) Is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction;

Not applicable to threatened species.

d) In relation to the habitat of a threatened species, population or ecological community:

(i) The extent to which habitat is likely to be removed or modified as a result of the action proposed;

The proposal will remove approximately 0.41ha of potential foraging habitat for this species.

(ii) Whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action;

The construction of the Station Street extension must be regarded as a minor faction contributing to the fragmentation of habitat used by this species, within the HEZ. However, due to the high mobility of this species, it is itself unlikely to become isolated from other areas of habitat.

(iii) The importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality;

The results of the ECMP data have been used to achieve adequate conservation outcomes for threatened species, including the Regent Honeyeater, within the HEZ Study Area, which culminated in the DECC issuing an assumed concurrence for the development of the HEZ, in March 2004. The habitat to be removed can therefore be considered as not important to the long-term survival of the species in the locality.

e) Whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly);

None of the site has been designated 'critical habitat' under Part 3 of the *TSC Act.*

f) Whether the proposed action is consistent with the objectives or actions of a recovery plan or threat abatement plan;

No recovery plan or threat abatement plan is associated with this threatened species.

***g)* Whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.**

KTP's are listed in Schedule 3 of the *TSC Act*. The KTP's most applicable to the current proposal are discussed in detail in Section 4.4. Those most applicable to this species (both directly and indirectly) would appear to be:

- Clearing of Native Vegetation;

However, the DECC Assumed Concurrence has adequately assessed all relevant ecological matters, and the proposal does not contravene any specific aspect of the Assumed Concurrence.

***Stagonopleura guttata* (Diamond Firetail)**

a) In the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction;

The Diamond Firetail ranges in Eastern Australia from the Eyre Peninsula, SA to Clermont, QLD. They live in a wide range of Eucalypt-dominated vegetation communities that have a grassy understorey, including woodland, open forests and mallee. Most occur on the inland slopes of the Great Dividing range, with only small pockets near the coast (Garnett *et al*, 2000). As with most Australian Finch species, Diamond Firetails are highly sociable birds. Members of a breeding colony feed in open areas next to their nests, mostly eating ripe and half ripe grass seeds, and occasionally insects. They drink frequently throughout the day and are generally found near water.

Diamond Firetails breed from August to January. The birds build a bulky, bottle shaped nest of long grass blades and stems. Both parents incubate the four to seven eggs, the young hatch within 12-15 days and leave the nest about 25 days later (Frith, 1977).

Much of the Diamond Firetail habitat has been cleared, and remaining fragments are gradually becoming unstable. Factors that have been postulated to be adversely affecting this species includes the loss of key plants and habitats as a result of the invasion of exotic grasses that are more suitable for flock-foraging species (Garnett *et al,* 2000). The noted expansion of the more commonly occurring flock foraging species Red-browed Firetails (*Neochmia temporalis*) due this factor has disadvantaged the threatened Diamond Firetails in some areas (Read, 1994) due to competition.

This species is threatened by clearance and the fragmentation of woodland habitats. Reductions in remnant habitat size leads to the isolation of populations, which increases their vulnerability to extinction from stochastic events and decreases their genetic viability in the long term. Habitat fragmentation also increases competition with aggressive species and levels of nest predation.

Diamond Firetails generally do not persist in remnants less than 200ha in area. Recent records (early November 2006) of Diamond Firetails in the HEZ consist of two birds seen on two separate occasions by members of the HBOC. The observations were made in the general vicinity of the deferred conservation lands to the west of Kurri Kurri Hospital. Habitat where the birds were observed consisted of Kurri Sand Swamp Woodland exhibiting some components of Lower Hunter Spotted Gum Ironbark Forest. The understorey is diverse and moderately dense.

The current proposal will remove areas of potentially occasionally used habitat for these species. Given the relatively small size of the subject site and the large parcels of similar woodland habitats within close proximity, including Werakata National Park and HEZ conservation areas, it is considered that the proposal is unlikely to disrupt the life cycle of any local population of the Diamond Firetail such that a local extinction would occur.

b) In the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction;

No populations of any of the species considered for this assessment (that are relevant to this locality) have been identified under Part 2 of Schedule 1 of the *TSC Act*.

c) In the case of a critically endangered or endangered ecological community, whether the action proposed:

(i) Is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction; or

(ii) Is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction;

Not applicable to these threatened species.

d) In relation to the habitat of a threatened species, population or ecological community:

(i) The extent to which habitat is likely to be removed or modified as a result of the action proposed;

The proposal will modify approximately 1.3 ha of potential habitat.

(ii) Whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action;

The current proposal will not fragment or isolate an area of habitat for this species. However, it could be regarded that the proposal, as part of the HEZ proposal may be leading to the fragmentation and isolation of habitat within the wider locality. Notwithstanding, due to the high mobility of these species, they are themselves unlikely to become isolated from other areas of habitat.

(iii) The importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality;

The results of the ECMP data have been used to achieve adequate conservation outcomes for threatened species, including birds such as Diamond Firetail, within the HEZ Study Area. This culminated in the DECC issuing an assumed concurrence for the development of the HEZ, in March 2005. The habitat to be removed can therefore be considered as not important to the long-term survival of the species in the locality.

e) Whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly);

None of the site has been designated 'critical habitat' under Part 3 of the *TSC Act.*

f) Whether the proposed action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan;

No recovery plan or threat abatement plan is associated with these threatened species.

g) Whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.

KTP's are listed in Schedule 3 of the *TSC Act*. Those most applicable to this species (both directly and indirectly) would appear to be:

- Clearing of Native Vegetation;

- Invasion of native plant communities by exotic perennial grasses; and
- Removal of dead wood and dead trees.

However, the DECC Assumed Concurrence has adequately assessed all relevant ecological matters, and the proposal does not contravene any specific aspect of the Assumed Concurrence.

***Lophoictinia isura* (Square-tailed Kite)**

a) In the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction;

The Square-tailed Kite is endemic to Australia and is widespread throughout the mainland (absent from Tasmania). It is recorded mainly in coastal and subcoastal regions, although it has been observed inland. The species is migratory throughout its range and is a spring-summer breeding migrant to south-eastern, southern and south-western Australia. The Square-tailed Kite inhabits open forests and woodlands, particularly those on fertile soils with abundant passerines. They may also range in nearby open habitats but not into extensive treeless regions. This species is notably absent from alpine regions and small isolated remnant woodlands in large open areas. Within N.S.W. the species has been recorded in ridge and gully forests dominated by Woollybutt (*Eucalyptus longifolia*), River Peppermint (*E. elata*), Blackbutt Peppermint (*E. smithii*) and Spotted Gum (*Corymbia maculata*), as well as in forests of *Angophora* and *Callitris* with shrubby understorey.

The Square-tailed Kite hunts mostly passerines and foliage insects, though it is also known to take mammals and lizards. Most prey is taken from the canopy and rarely from shrubs or in the air. Breeding occurs from July to February with an average clutch size of 3 eggs. Nests are built as a platform or bowl of sticks lined with green *Eucalyptus* leaves in forks or large horizontal branches of Eucalypts, *Angophora* or *Melaleuca* trees and may be used in successive years.

Except when breeding this tends to be a solitary bird, usually seen hunting alone high in, or just above the tree canopy in coastal or sub-coastal rainforest, forest or woodland. Nests have been reported in *Eucalyptus* spp., *Angophora* spp. and native pine forests. Prey taken has included fledging birds, insects, rabbits and lizards.

This species is threatened by clearance and the fragmentation of woodland habitats. Reductions in remnant habitat size leads to the isolation of populations, which increases their vulnerability to extinction from stochastic events and decreases their genetic viability in the long term. Habitat fragmentation also increases competition with aggressive species and levels of nest predation.

Square-tailed Kites appear to occupy large hunting ranges of more than 100km^2. The status of the Square-tailed Kite within the HEZ is largely unknown due to the low number of observations. However, the forests and woodlands making up the HEZ are significant in their extent and the diversity of hunting habitats that they offer this species coupled with its regular sitings within the vicinity of the HEZ suggest that this species is likely to occur there at least intermittently during late summer and Autumn. The closest known breeding records are at Coopernook, in the Hunter Region's north, with young birds at Coopernook generally leaving the nest during December. If this breeding timetable is the general rule for birds in the region, then it is possible that the Weston / HEZ sitings are of birds dispersing after breeding.

The current proposal will remove areas of potential occasionally used habitat for this species. Given the relatively small size of the subject site and the large parcels of similar woodland habitats within close proximity, including Werakata National Park and HEZ conservation areas, it is considered that the proposal is unlikely to disrupt the life cycle of any local population of the Square-tailed Kite such that a local extinction would occur.

b) In the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the

endangered population such that a viable local population of the species is likely to be placed at risk of extinction;

No populations of any of the species considered for this assessment (that are relevant to this locality) have been identified under Part 2 of Schedule 1 of the *TSC Act*.

c) In the case of a critically endangered or endangered ecological community, whether the action proposed:

(i) Is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction; or

(ii) Is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction;

Not applicable to these threatened species.

d) In relation to the habitat of a threatened species, population or ecological community:

(i) The extent to which habitat is likely to be removed or modified as a result of the action proposed;

The proposal will modify approximately 1.3 ha of potential habitat.

(ii) Whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action;

The current proposal will not fragment or isolate an area of habitat for this species. However, it could be regarded that the proposal, as part of the HEZ proposal may be leading to the fragmentation and isolation of habitat within the wider locality. Notwithstanding, due to the high mobility of these species, they are themselves unlikely to become isolated from other areas of habitat.

(iii) The importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality;

The results of the ECMP data have been used to achieve adequate conservation outcomes for threatened species, including birds such as the Square-tailed Kite, within the HEZ Study Area. This culminated in the DEC issuing an assumed concurrence for the development of the HEZ, in March 2005. The habitat to be removed can therefore be considered as not important to the long-term survival of the species in the locality.

e) Whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly);

None of the site has been designated 'critical habitat' under Part 3 of the *TSC Act.*

f) Whether the proposed action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan;

No recovery plan or threat abatement plan is associated with these threatened species.

g) Whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.

KTP's are listed in Schedule 3 of the *TSC Act*. Those most applicable to this species (both directly and indirectly) would appear to be:

- Clearing of Native Vegetation;
- Invasion of native plant communities by exotic perennial grasses; and
- Removal of dead wood and dead trees.

However, the DEC Assumed Concurrence has adequately assessed all relevant ecological matters, and the proposal does not contravene any specific aspect of the Assumed Concurrence.

***Petaurus australis* (Yellow-bellied Glider)**

a) In the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction;

Yellow-bellied Gliders are usually associated with tall, mature wet Eucalypt forests, although the species is also known from mature dry open forests and woodlands. The species requires tree hollows for nesting and has territories of around 60ha.

This species has been recorded from several parts of the HEZ, primarily from secondary indications of the presence of individuals (such as feeding scars, mostly on Grey Gums). The majority of records have been from within the western half of the 4(h) development zone, the central 7(b) conservation corridor, and on the slopes of Tomalpin Hill (Werakata National Park). It appears that the HEZ supports a viable population(s) of this species. It is likely that records within the HEZ represent the most significant occurrence of this species on the floor of the lower Hunter Valley (RPS HSO ecologists pers obs).

Potential habitat exists for this species primarily within those areas containing Forest Red Gums and Grey Gums, which is predominantly within the HLRF and some parts of the LHSGIF. Within the 4(h) development zone / 7(b) conservation corridor, there is a positive correlation between the occurrence of these animals and the distribution of mature feed trees and density of hollow-bearing trees (RPS HSO ecologists pers. obs).

This species has not recorded within the site, but has been recorded in the proximate area. Whilst the proposed road extension will further fragment potential habitat by the removal of 1.3ha of habitat, the site of the proposed easement is positioned along existing partially cleared and degraded habitats thus reducing the extent of vegetation clearing.

However, the conservation zones within the HEZ LEP and additional conservation areas set-aside by the DECC assumed concurrence produced adequate conservation outcome for this species. Therefore the proposal is unlikely to place the local population(s) of these species at risk of extinction.

b) In the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction;

No populations of any of the species considered for this assessment (that are relevant to this locality) have been identified under Part 2 of Schedule 1 of the *TSC Act*.

c) In the case of a critically endangered or EEC, whether the action proposed:

(i) Is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction; or

(ii) Is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction;

Not applicable to threatened species.

d) In relation to the habitat of a threatened species, population or ecological community:

(i) The extent to which habitat is likely to be removed or modified as a result of the action proposed:

The proposal will remove approximately 1.3ha of potential habitat for this species.

(ii) Whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action:

The Yellow-bellied Glider has been regularly recorded within the 4(h) lands and 7(b) corridor. Whilst the easement is unlikely to isolate areas of potential habitat, it may result in a small increase in mortality from individuals being hit by vehicles or being more susceptible to predation. The majority of the known and potential habitat for this species will be maintained within the HEZ conservation zones to the south of site, therefore this potential fragmentation is considered unlikely to significantly impact upon the local population.

(iii) The importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality:

The results of the ECMP data have been used to achieve adequate conservation outcomes for threatened species, including the Yellow-bellied Glider, within the HEZ Study Area, which culminated in the DECC issuing an assumed concurrence for the development of the HEZ, in March 2004. The habitat to be removed can therefore be considered as not important to the long-term survival of the species in the locality.

e) Whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly);

None of the site has been designated 'critical habitat' under Part 3 of the *TSC Act.*

f) Whether the proposed action is consistent with the objectives or actions of a recovery plan or threat abatement plan;

Recovery Plan *Petaurus australis* (Yellow-bellied Glider)

1. To co-ordinate the recovery of the Yellow-bellied Glider in NSW.

The DECC will co-ordinate the implementation of the actions outlined in this Recovery Plan.

2. To encourage and assist in improving the protection and management of the Yellow-bellied Glider and its habitat.

The Cessnock LEP (Amendment 60) rezoned approximately 855ha of land at the HEZ as 7(b) Habitat Protection and a further 1273 ha as 8(a) National Park. These conservation zones within the HEZ LEP and some 89ha of additional conservation areas set aside by the DECC assumed concurrence must be considered to assist in improving the protection and management of the Yellow-bellied Glider and its habitat.

Notwithstanding, as the current proposal will involve the removal of the majority of vegetation within the site, the proposal cannot be regarded as meeting this objective.

3. To identify and monitor significant populations of the species.

A 'significant population' is defined in the Recovery Plan as one that is essential to the ongoing viability and diversity of a larger regional population. Whilst a specific list of significant populations has not been produced by DECC, it is likely that records within the

HEZ represent the most significant occurrence of this species on the floor of the Lower Hunter Valley (RPS HSO *pers. obs*). This species is generally associated with tall mature eucalypt forest in regions of high rainfall, however, within HEZ, this species is associated with dry forests and has also been recorded in the KSSW. This occurrence could therefore be considered to significantly contribute to the diversity and viability of the species.

Whilst the ECMP data collected for the HEZ site records individual sightings of Yellow-bellied Gliders, as well as indications of their presence and habitat attributes, no ongoing monitoring program is conducted in relation to this proposal.

4. To facilitate strategic research into the ecology of the Yellow-bellied Glider that is relevant to its conservation.

No strategic research into the ecology of the Yellow-bellied Glider has been undertaken in relation to the proposal. Detailed data collected as part of the ECMP has improved knowledge of the species, including preferred feed tree species and preference for certain habitat types in the locality.

5. To increase community awareness of the Yellow-bellied Glider and encourage community involvement in its conservation.

No schemes, in relation to this proposal, have been put in place that is considered to increase community awareness of the Yellow-bellied Glider or encourage community involvement.

g) **Whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.**

KTP's are listed in Schedule 3 of the *TSC Act*. The KTP's most applicable to the current proposal are discussed in detail in Section 4.4. Those most applicable to this species (both directly and indirectly) would appear to be:

- Clearing of Native Vegetation; and
- Removal of dead wood and dead trees.

However, the DECC Assumed Concurrence has adequately assessed all relevant ecological matters, and the proposal does not contravene any specific aspect of the Assumed Concurrence.

***Petaurus norfolcensis* (Squirrel Glider)**

a) In the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction;

Squirrel Gliders occur in dry open forests and woodlands, moist gullies and coastal forests and they require tree hollows for nesting. The species has home ranges of around 6-13 ha and movements of up to one kilometre have been reported. They feed on Eucalypt sap, nectar, pollen, fruit and invertebrates.

One record of this species within the HEZ study area exists on the western slope of Tomalpin Hill within Werakata National Park. Additional records of the species occur within the immediate vicinity including in the Kurri Kurri area and within the study area for the HEZ Link Road (RPS HSO *pers. obs.*). The latest record of this species (December 2005) is from the north of the HEZ study area, near Hospital Road (RPS HSO *pers. obs*). These recorded locations of the species will not be impacted upon by the current proposal. Various fieldworks undertaken across the HEZ development zone indicates that it is generally dominated by *P. breviceps* (Sugar Glider) (authors *pers. obs.*), however, these two species are known to exist within close proximity to each other.

Potential habitat for this species within the study area can be stated as occurring within the open forested communities that contain higher densities of hollow-bearing trees and understorey nectar-producing plants.

Given the unlikelihood of a significant resident population, the removal of a relatively small area of potential habitat, including five suitably sized hollow-bearing trees, is considered unlikely to place a local population at the risk of extinction.

b) In the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction;

No populations of any of the species considered for this assessment (that are relevant to this locality) have been identified under Part 2 of Schedule 1 of the *TSC Act*.

c) In the case of a critically endangered or EEC, whether the action proposed:

(i) Is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction; or

(ii) Is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction;

Not applicable to this threatened species.

d) In relation to the habitat of a threatened species, population or ecological community:

(i) The extent to which habitat is likely to be removed or modified as a result of the action proposed:

The proposal will remove approximately 1.3ha of potential habitat for this species.

(ii) Whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action:

The Squirrel Glider has been recorded in relatively low numbers throughout the HEZ. Whilst the easement is unlikely to isolate areas of known habitat, it may result in a small increase in mortality from individuals being hit by vehicles or being more susceptible to predation. Adequate amounts of potential habitat for this species will be maintained within the HEZ conservation zones to the south of the site, therefore this potential fragmentation is considered unlikely to significantly impact upon the local population.

(iii) The importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality:

The results of the ECMP data have been used to achieve adequate conservation outcomes for threatened species, including the Squirrel Glider, within the HEZ Study Area, which culminated in the DECC issuing an assumed concurrence for the development of the HEZ in March 2004. The habitat to be removed can therefore be considered as not important to the long-term survival of the species in the locality.

e) Whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly);

None of the site has been designated 'critical habitat' under Part 3 of the *TSC Act.*

f) Whether the proposed action is consistent with the objectives or actions of a recovery plan or threat abatement plan;

No recovery plan or threat abatement plan is associated with this threatened species.

***g)* Whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.**

KTP's are listed in Schedule 3 of the *TSC Act*. The KTP's most applicable to the current proposal are discussed in detail in Section 4.4. Those most applicable to this species (both directly and indirectly) would appear to be:

- Clearing of Native Vegetation; and
- Removal of dead wood and dead trees.

However, the DECC Assumed Concurrence has adequately assessed all relevant ecological matters, and the proposal does not contravene any specific aspect of the Assumed Concurrence.

Micro-bats - *Falsistrellus tasmaniensis* (Eastern Falsistrelle), *Miniopterus australis* (Little Bentwing-bat), *M. schreibersii* (Eastern Bentwing-Bat), *Mormopterus norfolkensis* (East-coast Freetail-bat), and *Scoteanax rueppellii* (Greater Broad-nosed Bat)

a) In the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction;

These micro-bats share similar foraging habitat requirements in that they forage in Eucalypt woodlands and forests. The Eastern Falsistrelle, East-coast Freetail-bat and Greater Broad-nosed Bat roost in tree hollows. The Little and Eastern Bentwing-Bats roost in caves, mines and other man made structures, although the former two of these species are also known to occasionally roost in tree hollows.

Foraging habitat occurs for all of these species is widespread within the HEZ. Roosting habitat exists in abundance for those species that roost in tree hollows. Previous mining activity within the study area may have left a number of abandoned shafts and tunnels / adits scattered within the study area. Although these locations have not been located or surveyed for the presence of bats, it is possible that a number of cave-roosting species (such as the Bentwing-bats) may utilise these structures. None of these structures occur within the site.

It appears that only the Eastern Bentwing-Bat occupies the HEZ within a resident population as each of the other species have been evidenced via either few or potentially dubious records.

The Bentwing-bats are also unlikely to be significantly affected by the proposal given the lack of preferred roosting habitat, generalist foraging habitat requirements and the failure to locate a significant local population of Little Bentwing-bat in any case. A small increased level of impact is likely upon the Eastern Falsistrelle, East-coast Freetail-bat and the Greater Broad-nosed Bat, given that some potential roosting habitat, in the form of 2 hollow-bearing trees would be removed. However, in saying this, neither have been confirmed within the study area and the level of impact upon these species is also unlikely to be significant.

Therefore it can be stated that the current proposal would be highly unlikely to place any local population(s) of these species at risk of extinction.

b) In the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction;

No populations of any of the species considered for this assessment (that are relevant to this locality) have been identified under Part 2 of Schedule 1 of the *TSC Act*.

c) In the case of a critically endangered or EEC, whether the action proposed:

(i) Is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction; or

(ii) Is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction;

Not applicable to threatened species.

d) In relation to the habitat of a threatened species, population or ecological community:

(i) The extent to which habitat is likely to be removed or modified as a result of the action proposed:

The proposal will remove approximately 1.3ha of potential foraging habitat and roosting habitat (with the exception of the Bentwing-bats) for these species.

(ii) Whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action:

The construction of the Station Street extension must be regarded as contributing to the fragmentation of habitat used by these bat species, within the HEZ. However, due to the high mobility of this species, it is itself unlikely to become isolated from other areas of habitat.

(iii) The importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality:

The results of the ECMP data have been used to achieve adequate conservation outcomes for threatened species, including these bat species, within the HEZ Study Area, which culminated in the DECC issuing an assumed concurrence for the development of the HEZ in March 2004. The habitat to be removed can therefore be considered as not important to the long-term survival of the species in the locality.

e) Whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly);

None of the site has been designated 'critical habitat' under Part 3 of the *TSC Act.*

f) Whether the proposed action is consistent with the objectives or actions of a recovery plan or threat abatement plan;

No recovery plan or threat abatement plan is associated with these threatened species.

***g)* Whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.**

KTP's are listed in Schedule 3 of the *TSC Act*. The KTP's most applicable to the current proposal are discussed in detail in Section 4.4. Those most applicable to these species (both directly and indirectly) would appear to be:

- Clearing of Native Vegetation; and
- Removal of dead wood and dead trees.

However, the DECC Assumed Concurrence has adequately assessed all relevant ecological matters, and the proposal does not contravene any specific aspect of the Assumed Concurrence.

Lower Hunter Spotted Gum - Ironbark Forest

a) In the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction;

Not applicable to Endangered Ecological Communities.

b) In the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction;

Not applicable to Endangered Ecological Communities.

c) In the case of a critically endangered or EEC, whether the action proposed:

(i) Is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction; or

(ii) Is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction;

The current proposal will involve the removal of approximately 0.41ha of LHSGIF.

Within the HEZ LEP area, a total of approximately 1,840ha of this vegetation community has been mapped. Of this, approximately 1,105ha (i.e. 60% of occurrence) occurs within zones created and managed for conservation purposes i.e 7(b) 'Habitat Protection' and 8(a) 'National Park'. A further 68ha (3.7% of occurrence) is also currently reserved within the DECC Deferred Conservation Areas.

Following the listing of LHSGIF as an EEC, the DECC issued a revised assumed concurrence that states that an adequate conservation outcome for this community has been achieved within the HEZ LEP area.

Therefore it can be stated that the proposal will not have an adverse effect on the extent of the LHSGIF such that the local occurrence is likely to be placed at risk of extinction.

d) In relation to the habitat of a threatened species, population or ecological community:

(i) The extent to which habitat is likely to be removed or modified as a result of the action proposed, and

Approximately 0.41ha of LHSGIF is proposed to be affected.

(ii) Whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and

The proposal will involve the removal of approximately 0.41ha and cause a number of indirect / edge effects to adjoining areas.

However, the conservation zones within the HEZ LEP and additional conservation areas set aside by the DECC assumed concurrence are likely to have produced an adequate

conservation outcome for this community. As such it can be stated that areas of known and proximate habitat for the community will be maintained within the HEZ LEP Study Area and not isolated by the current proposal.

(iii) The importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality;

The results of the ECMP data have been used to achieve adequate conservation outcomes for EEC's, including LHSGIF, within the HEZ Study Area, which culminated in the DECC issuing an assumed concurrence for the development of the HEZ in March 2004. The habitat to be removed can therefore be considered as not important to the long-term survival of the EEC in the locality.

e) Whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly);

None of the site has been designated 'critical habitat' under Part 3 of the *TSC Act.*

f) Whether the proposed action is consistent with the objectives or actions of a recovery plan or threat abatement plan;

No recovery plan or threat abatement plan is associated with this EEC.

***g)* Whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.**

KTP's are listed in Schedule 3 of the *TSC Act*. The KTP's most applicable to the current proposal are discussed in detail in Section 4.4. Those most applicable to this EEC (both directly and indirectly) would appear to be:

- Clearing of Native Vegetation;
- Removal of dead wood and dead trees;
- Removal of hollow-bearing trees
- Invasion of native plant communities by exotic perennial grasses.
- Alteration to the Natural Flow Regimes of Rivers, Streams, Floodplains & Wetlands
- Infection of Native Plants by *Phytophthora cinnamomi*

However, the DECC Assumed Concurrence has adequately assessed all relevant ecological matters, and the proposal does not contravene any specific aspect of the Assumed Concurrence.

Kurri Sand Swamp Woodland

a) In the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction;

Not applicable to Endangered Ecological Communities.

b) In the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction;

Not applicable to Endangered Ecological Communities.

c) In the case of a critically endangered or EEC, whether the action proposed:

(i) Is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction; or

(ii) Is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction;

Within the HEZ Study Area, 703ha of KSSW have been mapped (Bell 2004), including disturbed remnants. The current proposal will involve the removal of approximately 0.89ha.

However, the conservation zones within the HEZ LEP are likely to have produced an adequate conservation outcome for this community. Therefore it can be stated that the proposal will not have an adverse effect on the extent of the KSSW such that the local occurrence is likely to be placed at risk of extinction.

d) In relation to the habitat of a threatened species, population or ecological community:

(i) The extent to which habitat is likely to be removed or modified as a result of the action proposed, and

Approximately 0.89ha of KSSW is proposed to be affected.

(ii) Whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and

The proposal will involve the removal of approximately 0.89ha and cause a number of indirect / edge effects to adjoining areas.

However, the conservation zones within the HEZ LEP and additional conservation areas set aside by the DECC assumed concurrence are likely to have produced an adequate conservation outcome for this community. As such it can be stated that areas of known and proximate habitat for the community will be maintained within the HEZ LEP Study Area and not isolated by the current proposal.

(iii) The importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality;

The results of the ECMP data have been used to achieve adequate conservation outcomes for EEC's, including KSSW, within the HEZ Study Area, which culminated in the DECC issuing an assumed concurrence for the development of the HEZ in March 2004. The habitat to be removed can therefore be considered as not important to the long-term survival of the EEC in the locality.

e) Whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly);

None of the site has been designated 'critical habitat' under Part 3 of the *TSC Act.*

f) Whether the proposed action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan;

No recovery plan or threat abatement plan is associated with this EEC.

***g)* Whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.**

KTP's are listed in Schedule 3 of the *TSC Act*. The KTP's most applicable to the current proposal are discussed in detail in Section 4.4. Those most applicable to this EEC (both directly and indirectly) would appear to be:

- Clearing of Native Vegetation;
- Removal of dead wood and dead trees;
- Removal of hollow-bearing trees
- Invasion of native plant communities by exotic perennial grasses.
- Alteration to the Natural Flow Regimes of Rivers, Streams, Floodplains & Wetlands
- Infection of Native Plants by *Phytophthora cinnamomi*

However, the DECC Assumed Concurrence has adequately assessed all relevant ecological matters, and the proposal does not contravene any specific aspect of the Assumed Concurrence.