

## ***Cumberland Ecology Analysis of EPBC Act listed Threatened Ecological Communities***

### **A.1. Site Conditions**

The vegetation on the Property has been impacted by a complex history of land use. Historical aerial imagery from 1943 to 1982 shows clearing over large sections of the Property for agricultural and orchard uses. Based on aerial imagery some historically cleared areas appear to have been allowed to naturally regenerate rather than be utilised for further agricultural purposes. Currently, the Property is largely vegetated and comprises a mix of remnant/regrowth bushland and planted/landscaped areas within or adjacent to the former (now demolished) business park.

Studies to date within the Property have determined that the majority of the remnant/old regrowth vegetation and some areas of regrowth within the Property conform to two threatened ecological communities (TECs), namely Blue Gum High Forest of the Sydney Basin Bioregion (BGHF) and Sydney Turpentine Ironbark Forest of the Sydney Basin Bioregion (STIF). Both BGHF and STIF are listed as Critically Endangered Ecological Communities (CEECs) under the NSW BC Act and the EPBC Act. Other vegetation communities recorded within the Property include exotic grasslands from historic agricultural/orchard uses, landscaped plantings for the former business park and younger regrowth on modified soils from former land uses.

### **A.2. Plant Community Types**

In accordance with the NSW Biodiversity Assessment Method (BAM), native vegetation has been allocated to a Plant Community Type (PCT). **Table 1** below provides a summary of the mapped vegetation communities/PCTs as per the Keystone BDARs (Keystone Ecological 2021b, a, 2022).

**Table 1 Vegetation Communities of the Property**

<b>Keystone Vegetation Mapping Unit</b>	<b>Keystone Vegetation Type</b>	<b>Allocated PCT (as per BDAR)</b>	<b>BC Act status (as per BDAR)</b>	<b>EPBC Act status (as per BDAR and 2021 Referral)</b>
1a	Cleared Land	n/a	n/a	n/a
1b	Cleared Land	n/a	n/a	n/a
2a	Basins and Dams	n/a	n/a	n/a
2b	Basins and Dams	n/a	n/a	n/a
3a	Highly Modified Edges	PCT 1237	not a TEC	not a TEC
4a	Landscaped Gardens	n/a	n/a	n/a
5a	BGHF	PCT 1237	CEEC	not a TEC
5b	BGHF	PCT 1237	CEEC	CEEC
5c	BGHF	PCT 1237	CEEC	CEEC
6a	STIF	PCT 1281	CEEC	CEEC
6b	STIF	PCT 1281	CEEC	CEEC

It should be noted that based on field surveys conducted, Cumberland Ecology does not agree with Keystone Ecological mapping in regard to the splitting of some areas of PCT 1237 into VZ3a and VZ5a. It is the opinion of Cumberland Ecology staff that these two vegetation zones should comprise a single vegetation class (VZ5a) that comprises BGHF under the BC Act. It should also be noted that the Council conditions of consent for both the Demolition DA and Concept Masterplan DA required retirement of PCT 1237 credits that conformed to the Blue Gum High Forest TEC for impacts to areas mapped as VZ3a, VZ5a, VZ5b and VZ5c.

### A.3. Onsite Distribution of PCT 1237/Blue Gum High Forest

In the Property, PCT 1237 or BGHF generally occurs on deeper shale soils at higher elevation. The condition of the community in the Property is variable; some areas contain relatively high-quality examples of this community while some occurrences only consist of native canopy trees over dense weed infestations.

Within the Concept Masterplan BDAR, areas of Blue Gum High Forest or PCT 1237 have been mapped in the following four condition states by Keystone:

- VZ 3a Highly Modified Edges - Located on non-natural substrate such as battered slopes around dams and roadways, or areas of spoil. While some planting has occurred in Vegetation Zone 3a as part of the landscaping for the IBM development, these areas are generally regarded to be outside of the garden areas and have been allocated to the PCT as it does not fulfil the criteria to be regarded as planted vegetation.
- VZ 5a Regrowth BGHF - Located in the northern end of the site on very steep slopes and is highly modified in both floristic composition and structure. The historical aerial photography in this part of the site is somewhat ambiguous, but it indicates that this area may have been cleared and regenerated subsequently sometime post 1943 and / or 1961.
- VZ 5b Even-aged regrowth BGHF - Occurs in a small patch to the south of the perimeter road. The historical aerial photography shows that this area was clear of woody vegetation in 1970 -presumably for an expansion of the orchard – but was instead allowed to regrow.
- VZ 5c Remnant / old regrowth BGHF - Occurs on the protected slopes above the creek line similar to the position occupied by VZ 5b, but there is no evidence of clearing or alterations to the ground in this area within at least the last 80 years.

The higher quality occurrences of this community in the Property (VZ5b and VZ5c) contain a canopy of *Eucalyptus saligna* (Sydney Blue Gum), *Eucalyptus pilularis* (Blackbutt), *Syncarpia glomulifera* (Turpentine) and to a lesser extent *Angophora costata* (Sydney Red Gum). The sub-canopy includes *Pittosporum undulatum* (Sweet Pittosporum), *Elaeocarpus reticulatus* (Blue-berry Ash), *Acacia implexa* (Hickory Wattle) and *Allocasuarina torulosa* (Forest Sheoak). The shrub stratum includes *Polyscias sambucifolia* (Elderberry Panax), *Pittosporum revolutum* (Rough-fruit Pittosporum), *Breynia oblongifolia* (Coffee Bush), *Leucopogon juniperinus* (Prickly Beard-heath), *Ozothamnus diosmifolius* (Dogwood), *Notelaea longifolia* (Large Mock-olive), *Trema tomentosa* (Poison Peach) and *Denhamia silvestris* (Narrow-leaved Orangebark) as well as regenerating canopy species. Exotic shrubs include *Ligustrum lucidum* (Large-leaved Privet), *L. sinense* (Small-leaved Privet), *Lantana camara* (Lantana) and *Ochna serrulata* (Mickey Mouse Plant). Native groundcover species include *Oplismenus aemulus* (Basket Grass), *O. imbecillis* (Creeping Beard Grass), *Entolasia marginata* (Wiry Panic), *Pseuderanthemum variabile* (Pastel Flower) and *Imperata cylindrica* var. *major* (Blady Grass). Common

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exotic groundcovers include *Ehrharta erecta* (Panic Veldtgrass). Native climbers present include *Pandorea pandorana* (Wonga Wonga Vine), *Sarcopetalum harveyanum* (Pearl Vine), *Parsonsia straminea* (Common Silkpod) and *Gynochthodes jasminoides* (Sweet Morinda).

The lower quality occurrences of BGHF (VZ3a and VZ5a) are largely limited to a canopy of *Eucalyptus saligna* (Blue Gum) over dense infestations of Lantana and/or Privet. In these locations, the understorey layer contains 1 – 2 scattered individuals of native species, but also large infestations of exotic species. Native species present include *Pittosporum undulatum*, *Notelaea longifolia*, *Alphitonia excelsa*, *Dianella caerulea*, *Dichondra repens* and *Oplismenus aemulus*. Exotic species include *Lantana camara* (Lantana), *Ligustrum lucidum*, *Ligustrum sinense*, *Ochna serrulata* (Mickey Mouse Plant), and *Phoenix canariensis* (Phoenix Palm).

Examples of the high quality form of this community within the Property is shown in **Photograph 1** while examples of the low quality forms are shown in **Photograph 2** and **Photograph 3**.

**Photograph 1 High quality BGHF in the Property (VZ5c)**





**Photograph 2 BGHF canopy trees over mix of native understorey and significant weed infestations (VZ 5b)**



**Photograph 3 Dense weed infestation under BHGF canopy trees in northern parts of the Property (Remapped areas of VZ5a)**





Photograph 4 Dense weed infestation under BHGF canopy trees in northern parts of the Property (VZ5a/VZ3a areas)



#### A.4. Assessment of Threatened Ecological Community under EPBC Act

BGHF is listed as a Critically Endangered Ecological Community (CEEC) – Blue Gum High Forest of the Sydney Basin Bioregion - under the EPBC Act. The Blue Gum High Forest ecological community listed under the EPBC Act is generally narrower in scope than the listing under the NSW BC Act as the listing under the EPBC Act includes only remnant patches that meet specific patch size and canopy cover criteria (Department of the Environment 2023a)

##### A.4.1. Legal Descriptions

The Threatened Species Scientific Community (TSSC) Listing Advice for Blue Gum High Forest (TSSC 2005) states the following:

*“Remnants of the Blue Gum High Forest of the Sydney Basin Bioregion ecological community will typically have components representing the characteristic native species of all structural layers. The ecological community includes occurrences of the Blue Gum High Forest of the Sydney Basin Bioregion ecological community with a canopy cover greater than 10% and a size greater than one ha. These areas have the greatest conservation value. The high quality and size of these patches makes them most resilient to disturbance. Their total area covers approximately 136 ha.*

*Additionally, occurrences with less than 10% canopy cover are also considered part of the listed Blue Gum High Forest of the Sydney Basin Bioregion ecological community if the fragments are greater than one ha in size and occur in areas of native vegetation in excess of 5 ha . These areas enhance the potential for connectivity and viability of the ecological community. They support flora and fauna species through the facilitation of gene flow and act as buffer against disturbance. These areas total approximately 4 ha.*

The five largest high-quality remnants of the Blue Gum High Forest of the Sydney Basin Bioregion ecological community are the Dalrymple-Hay Nature Reserve, Sheldon Forest, occurrences near Fox Valley Road and Burns Road in the Local Government Area of Ku-ring-

gai, and an occurrence that is part of the Cumberland State Forest in Baulkham Hills. The Local Government Area of Ku-ring-gai also contains two occurrences of the threatened ecological community within larger areas of native vegetation as described above. These are located near Burns Road (between Finchley and McRae Place) and south of Mount Pleasant Avenue (between Mt Pleasant and Browns Road).

Single isolated trees or *stands of trees, characteristic of the canopy of Blue Gum High Forest of the Sydney Basin Bioregion, without a native understorey are considered important as biodiversity reservoirs. However, due to having been severely modified, these areas fall outside the definition of this ecological community and therefore do not form part of this listing.*

The Conservation Advice for Blue Gum High Forest (2014) states the following:

*“Occurrences of the Blue Gum High Forest of the Sydney Basin Bioregion ecological community are considered to be part of the nationally listed ecological community if they are greater than one hectare in size and:*

- have a canopy cover greater than 10%; or*
- have a canopy cover less than 10% and occur in areas of native vegetation in excess of five hectares (TSSC, 2005).”*

It is noted that the Conservation Advice document (2014) does not include any requirement to have representative species in all structural layers.

#### A.4.2. Status of onsite occurrences

The areas of PCT 1237 within the Property comprise part of a large patch of vegetation that extends into the adjacent Cumberland State Forest. Therefore, all areas of PCT 1237 meet the patch size/connectivity requirements (i.e patch >1ha and canopy cover >10% or canopy cover <10% but vegetation occurs in an area of native vegetation in excess of 5 ha) described in the Listing Advice (TSSC 2005) and Conservation Advice (2014).

The Listing Advice (2005) also includes a requirement for *components representing the characteristic native species of all structural layers* to be present.

The higher quality conditions of the onsite occurrences of PCT 1237, comprising VZ5b and VZ5c as mapped by Keystone, meet both criteria of the Listing Advice (TSSC 2005) under the EPBC Act (DoEE 2005) as all strata contain a significant proportion of native species.

While Listing Advice and/or Conservation Advice documentation for several TECs in the Sydney region have defined values of requisite native cover (generally >30% perennial native understorey) in order to meet EPBC thresholds, it is noted that no such defined value exists for BGHF. Due to the lack of a defined threshold native understorey cover in the Listing Advice (2005), a precautionary approach has been taken and the degraded forms of PCT 1237, comprising VZ3a and VZ5a as mapped by Keystone, are considered to comprise BGHF under the EPBC Act, despite the high levels of weed infestation and lack of native species (<1% cover) in the understorey. Areas mapped by Cumberland Ecology as BGHF – Low and BGHF – Scattered Trees (see Attachment Figure 4: Current Vegetation Mapping of the Property) - are also considered to conform to the EPBC listing.

The distribution of both the high quality (VZ5b & VZ5c) and low quality forms (VZ3a & VZ5a) of PCT 1237/BGHF within the Property are shown in Attachment: *Figure 5 Threatened Ecological Communities within the Property*.

It is noted that the majority of the BGHF that conforms to the EPBC Act listing is located within areas that are either proposed to be dedicated to the NSW Government and managed by Forestry NSW or to be retained and managed under a Vegetation Management Plan (VMP).

### A.5. Sydney Turpentine - Ironbark Forest

In the Property, STIF generally occurs on shallower shale soils at lower elevation. The condition of the community in the Property is variable; some areas contain relatively high-quality examples of this community while some occurrences only consist of native canopy trees over dense weed infestations.

Within the Concept Masterplan BDAR, areas of STIF (also referred to as PCT 1281) have been mapped in the following two condition states by Keystone:

- VZ6a – Regrowth Forest
- VZ6b – Remnant/Old Regrowth

High quality examples of STIF contain a canopy of *Syncarpia glomulifera* (Turpentine), *Eucalyptus paniculata* (Grey Ironbark), *Eucalyptus pilularis* (Blackbutt), *Angophora costata* (Sydney Red Gum) and *Eucalyptus resinifera* (Red Mahogany). The sub-canopy includes *Pittosporum undulatum* (Sweet Pittosporum) and *Syncarpia glomulifera* (Turpentine). The shrub stratum includes *Polyscias sambucifolia* (Elderberry Panax), *Pittosporum revolutum* (Rough-fruit Pittosporum), *Breynia oblongifolia* (Coffee Bush), *Leucopogon juniperinus* (Prickly Beard-heath), *Ozothamnus diosmifolius* (Dogwood), *Notelaea longifolia* (Large Mock-olive) and *Denhamia silvestris* (Narrow-leaved Orangebark). Exotic shrubs include *Ligustrum sinense* (Small-leaved Privet), *Lantana camara* (Lantana) and *Ochna serrulata* (Mickey Mouse Plant). Native groundcover species include *Lomandra longifolia* (Spiny-headed Mat-rush), *Lobelia purpurascens* (Whiteroot), *Lepidosperma laterale*, *Entolasia marginata* (Wiry Panic) and *Pseuderanthemum variabile* (Pastel Flower). Native climbers present include *Eustrephus latifolius* (Wombat Berry), *Pandorea pandorana* (Wonga Wonga Vine), *Sarcopetalum harveyanum* (Pearl Vine), *Parsonsia straminea* (Common Silkpod) and *Gynochthodes jasminoides* (Sweet Morinda).

Lower quality areas of this community have a generally intact canopy, though the understorey and ground layer are in poor condition, with the shrub layer frequently dominated by dense occurrences of exotic shrub species, often shading out the ground layer. The shrub layer in these areas is frequently heavily dominated by exotic species, which include *Lantana camara* (Lantana), *Ligustrum sinense* (Small-leaved Pittosporum), *Ochna serrulata* (Mickey Mouse Plant), and *Ligustrum lucidum*. Native species where they are present include *Pittosporum undulatum*, *Polyscias sambucifolia* subsp. Long Leaflets (Elderberry Panax), and *Pittosporum revolutum* (Rough Fruit Pittosporum).

Examples of the high quality and degraded forms of this community within the Property are shown in **Photograph 4** and **Photograph 5** respectively.



**Photograph 4 High quality STIF within the Property**



**Photograph 5 Weedy condition STIF within the Property**



**A.i. Assessment of MNES**

STIF is listed as a CEEC – Turpentine Ironbark Forest of the Sydney Basin Bioregion - under the EPBC Act. The STIF ecological community listed under the EPBC Act is narrower in scope than the listing



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under the NSW *Biodiversity Conservation Act 2016* (BC Act). The listing under the EPBC Act includes only remnant patches that meet specific patch size and canopy cover criteria (Department of the Environment 2023b)

All occurrences of this community in the Property as mapped by Keystone (VZ6a and VZ6b) and Cumberland Ecology (STIF – Moderate and STIF -weedy – see Attachment Figure 4: Current Vegetation Mapping of the Property) conform to the community listing under the EPBC Act (Department of the Environment 2023b). Although some areas have a high proportion of exotic species in the understorey in some areas, these areas still contain some characteristic natives in all strata. Furthermore patches with lower canopy cover are contiguous with large areas of BGHF and STIF in the adjoining Cumberland State Forest, and would therefore meet the condition criteria of having a canopy of less than 10% and being part of a patch greater than 1 ha, as outlined in the Conservation Advice for the federal listed community (DoE 2014b, Department of the Environment 2023b).

It is noted that the majority of the STIF that conforms to the EPBC Act listing is located within areas that are either proposed to be dedicated to the NSW Government and managed by Forestry NSW or to be retained and managed as part of the Concept Masterplan approvals.