Eastern Creek Business Hub Stage 3 EPBC Referral

Frasers Property Retail Holdings Pty Ltd

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DOCUMENT TRACKING

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Template 2.8.1

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1. Section 1 – Summary of Proposal Area

1.1 Project Industry Type

Commercial development.

1.2 Provide a detailed description of the proposed action, including all proposed activities

Frasers Property Retail Holdings Pty Limited (Frasers Property) are proposing the action. The proposed action relates to Lot 1 Section B DP8681, Lots 1 and 2 DP1258787, Lots 3 and 4 Section B DP8681 and Lot 3 DP830836 of the Eastern Creek Quarter site. The lot is proposed to be developed for a retail factory outlet centre with supporting food and beverage tenancies, and ancillary entertainment and recreation usages (similar to that proposed on Stages 1 and 2). This involves the removal of a patch of Cumberland Plain Woodland of approximately 0.73 ha. The remainder of the footprint would affect exotic pasture grass and cleared land.

1.3 What is the extent and location of your proposed action? Use the polygon tool on the map below to mark the location of your proposed action

For online portal.

1.4 Upload images of the proposed action area (including disturbance footprint, avoidance footprint (if relevant) and MNES habitat area/s) and if available, a compliant GIS file. The accepted file types are: zip, .kml, .kmz, .shp or .pdf.

For online portal.

1.5 Provide a brief physical description of the property on which the proposed action will take place and the location of the proposed action (e.g. proximity to major towns, or for off-shore actions, shortest distance to mainland)

The Eastern Creek Quarter site is situated to the north of the Great Western Highway between Rooty Hill Road South and the M7 Motorway. The site is located along Beggs Road, south of Church Street. The site forms part of Western Sydney Parklands and is located within the Blacktown Local Government Area.

Open space comprising part of the broader Western Sydney Parklands is located to the north, east and south of the site. To the west of the site, on the opposite side of Rooty Hill Road South, is the Eastern Creek Public School, Rural Fire Services site and low-density residential development.

1.6 What is the size of the proposed action area development footprint (or work area) including disturbance footprint and avoidance footprint (if relevant)?

The Eastern Creek Quarter is approximately 34 ha. The proposed action application relates to the lots described below of the Eastern Creek Quarter, which is approximately 7.29 ha (Figure 1).

1.7 Is the proposed action a street address or lot?

Lot.

1.7.1 Describe the lot number and title

- Lot 1 Section B DP8681
- Lot 1 DP1258787
- Lot 2 DP1258787
- Lot 3 Section B DP8681
- Lot 4 Section B DP8681
- Lot 3 DP830836 (Figure 1).

1.8 Primary Jurisdiction

New South Wales.

Figure 1: Location of the proposed development footprint (referral area)

Figure 2: Proposed development footprint and layout

Figure 3: Previous impacts assessed under EPBC 2012/6677

1.9 Has the person proposing to take the action received any Australian Government funding to undertake this project?

No.

1.10 Is the proposed action subject to local government planning approval?

The proposed action will be State Significant Development and therefore subject to approval from the delegate of the NSW Minister for Planning. A Biodiversity Development Assessment Report (BDAR) is currently being prepared in accordance with the NSW *Biodiversity Conservation Act 2016* (BC Act) to accompany the Eastern Creek Retail Outlet Centre SSD. If required, offsets would be obtained consistent with the Biodiversity Assessment Methodology (BAM).

1.10.1 Is there a local government area and council contact for the proposal?

No.

1.11 Provide an estimated start and estimated end date for the proposed action

The target for commencement onsite is June 2022 with the estimated completion date of January 2024.

1.12 Provide details of the context, planning framework and State and/or Local government requirements

A Concept Plan and Stage 1 (subdivision and early works) for the Eastern Creek Business Hub was initially approved as State Significant Development in January 2015. The Stage 3 area was proposed for bulky goods retail with retention of a small patch of Cumberland Plain Woodland. Detailed design, assessment and approval of the Stage 3 area would be a subsequent application.

During detailed design of Stage 3, it became apparent that a new layout would provide a significantly better outcome for the use of the site as a retail outlet. Stage 3 will be subject to a State Significant Development application and a modification to the Concept Plan (or potentially a new Concept Plan – subject to discussion with NSW Department of Planning, Industry and Environment. Secretary's Environmental Assessment Requirements (SEARs) have been requested for the Eastern Creek Retail Outlet Centre.

As State Significant Development, a Biodiversity Development Assessment Report will be prepared.

1.13 Describe any public consultation that has been, is being or will be undertaken, including with Indigenous stakeholders

None.

1.14 Describe any environmental impact assessments that have been or will be carried out under Commonwealth, State or Territory legislation including relevant impacts of the project

Ecological assessments were completed to accompany the original SSD for the Eastern Creek Business Hub (SSD 5175) and to inform the original EPBC Act referral and preliminary documentation (EPBC 2012

/ 6617). The assessments were completed for the site to determine the extent of ecological values and any impacts to matters of NES. The ecological assessment included:

- Ecological Assessment for the Eastern Creek Business Hub State Significant Development (ELA, 2012)
- Eastern Creek Business Hub, Sydney NSW EPBC Assessment Report (EPBC 2012 / 6617). (ELA 2014)

An overview of these methods and assessment are provided below. Updated assessments will be undertaken in accordance with the Biodiversity Assessment Method for submission of a Biodiversity Development Assessment Report with the Stage 3 State Significant Development application.

Field Survey Overview

Field survey occurred over nine days between the 4 of April and the 9 of May 2012, as well as several previous survey visits during 2009 for targeted species searches. The 2012 field survey focussed on validating vegetation communities, observational recording of flora and fauna species present, fauna habitat assessment and ultra-sonic microbat call detection (Anabat). Field survey was conducted by two ELA ecologists. An additional survey to determine the condition of the vegetation on site was completed in February 2020.

Flora and fauna survey were undertaken over approximately 22 person hours (4 and 19 April; 9 May 2012) and Anabat surveys were undertaken for 13 Anabat nights over a five night period (3, 4, 20, 21, 22 April 2012). During the survey period, traverses of the study area were undertaken, with survey effort focussing on areas where remnant vegetation and potential fauna habitat were present, to collect site-specific data pertaining to the vegetation communities and habitat values for threatened flora and fauna potentially occurring in the study area.

All visible vascular flora within survey plots and fauna traces / evidence of fauna species across the subject site were recorded. Notes on habitat were also taken, with observations made for areas directly adjacent to the study area to determine the fauna and flora that could potentially occur. Flora species were identified to the lowest taxonomic level possible. Hollow-bearing trees were recorded and four Biobanking plots undertaken across the site to assist in determining the type and condition of the vegetation present. Four Anabat recorders equipped with ZCAIM devices were set for a total of five nights, within the vegetated areas of the site. All four recorders were used for five nights with Anabats turned on to time-delayed recording from 6pm and left to record overnight until 6am.

Anabat data were analysed by ELA ecologists. Analysis assigned bat calls to four levels of confidence as per Mills *et al.* (1996): definite, probable, possible, and unknown. Definite calls were calls of bat species that were not in doubt, probable calls those calls of bat species with a low probability of confusion with species of similar calls, possible calls were calls of bat species with a medium to high probability of confusion with species of similar calls, and unknown calls were calls of bat species which could not be identified to even a species group.

Temperatures were warm during the field survey with some rain experienced during the overall survey period. Table 1 shows the weather conditions during and leading up to the survey periods.

Table 1: Weather observations at Quakers Hill Treatment Works (Station Number 067076) during the two days leading up to field survey and during field survey

Date	Minimum Temperature (°C)	Maximum Temperature (°C)	Wind Speed at 9 am (km/h)	Rain (mm)
3rd April	14.7	29.3	Calm	0
4th April	15.4	27.8	4 NNW	0
19th April	16.5	24.5	Calm	86.2
20th April	15.4	25.2	Calm	1.1
21st April	15.6	25.4	Calm	0
22nd April	14.0	23.0	Calm	0
9th May	8.0	24.9	4 NW	0

Field Survey Methodology

Vegetation Communities

Field survey targeted all locations of extant vegetation as well as cleared paddocks to determine condition and relative abundance of native flora species. Quadrats were surveyed following the DECCW Interim Vegetation Standard. Quadrat surveys were 0.04ha (20m x 20m) and recorded presence of all vascular flora species, along with cover and abundance for each species using a modified Braun-Blanquet scale (i.e. measures of cover and abundance to determine species dominating each stratum). Habitat features were determined over 0.1 ha survey (50m x 20m quadrat); measures including number of hollow bearing trees and length of fallen dead timber greater than 10 cm diameter. Within the 0.1 ha quadrats, projected foliage cover of each strata level and exotic flora was assessed along a 50m transect. Transect habitat assessments were also undertaken following the NSW Biobanking Methodology (DECC 2008) to provide sufficient information to undertake the "improve or maintain" test. Quadrats and transects were conducted in the following previously mapped vegetation units (NPWS 2002):

- Shale Plains Woodland (MU10) (listed as Cumberland Plain Shale Woodlands and Shale Gravel Transition Forest under the EPBC Act) (Figure 4).

A rapid field survey was completed in February 2020. This involved an assessment of the condition of Cumberland Plain Woodland within the development footprint. The dominant species in each structural layer, along with their cover as a percentage was noted.

Fauna

Targeted surveys for microbats were undertaken as well as call playback for Green and Golden Bell frog by ELA (2009). Requirements were met for all threatened fauna expected to occur in the study area, with the exception of GGBF, and compliance with the TBSA Guidelines (DEC 2004) are summarised in Table 2**.** GGBF surveys methods were modified on the basis that there had been a considerably long period of time since the species was last recorded in the general area of the site, as discussed below.

Avifauna

Survey for diurnal birds was opportunistic with observers moving through vegetation communities and grasslands supporting potential habitat for diurnal birds over the entire survey period. Previous observations had been made by ELA (2009).

Nocturnal bird survey focused on identifying potential roosting / nesting trees during the survey period, through the incidence of large hollow bearing trees, owl wash and faecal pellets. No stag watching was conducted as no large tree hollows or owl wash were observed during the survey period.

Mammals

Ground dwelling and arboreal mammals

Faunal habitat assessments were initially undertaken remotely using aerial photography, with waterbodies, woodland remnants, grasslands, rocky outcrops and man-made structures delineated to target survey accordingly. Additional habitat assessments and opportunistic surveys were undertaken continuously during daytime hours throughout the survey period whilst traversing suitable habitat within the study area. Any indirect evidence of fauna present was recorded including, fur, tracks, dens, scratches, and chew marks.

Microchiropteran bat species

Survey for microchiropteran (microbats) bat species included the use of ultrasonic Anabat detectors equipped with ZCAIM recording devices in 8 locations across the study area for two nights at each site in accordance with TBSA guidelines (DEC 2004) and DSEWPaC (2010). Survey locations focused on larger remnants of native vegetation, major watercourses and large hollow bearing trees. On each night of survey the Anabats were turned on at 1800 hours and then turned off the following morning between 0600 hours. Anabat calls were downloaded in the office and analysed by Peter Knock (Ecologist, Eco Logical Australia, Coffs Harbour).

Bat calls were analysed using the program AnalookW (Version 3.3q 03 October 2006, written by Chris Corben, www.hoarybat.com). Call identifications were made using regional based guides to the echolocation calls of microbats in New South Wales (Pennay *et al*. 2004); and south-east Queensland and north-east New South Wales (Reinhold et al. 2001) and the accompanying reference library of over 200 calls from north-eastern NSW (http://www.forest.nsw.gov.au/research/bats/default.asp). Bat calls are analysed using species-specific parameters of the call profile such as call shape, characteristic frequency, initial slope and time between calls (Reinhold *et al*. 2001). To ensure reliable and accurate results the following protocols (adapted from Lloyd *et. al*. 2006) were followed:

- recordings containing less than three pulses were not analysed (Law et al. 1999)
- only search phase calls were analysed (McKenzie et al. 2002)
- four categories of confidence in species identification were used (Mills et al. 1996):
    - definite – identity not in doubt
    - probable – low probability of confusion with species of similar calls
    - possible – medium to high probability of confusion with species with similar calls
    - unidentifiable – calls made by bats which cannot be identified to even a species group

Nyctophilus spp. are difficult to identify confidently from their calls and no attempt was made to identify *this genus to species level (Pennay et al. 2004).*

Amphibians

No threatened amphibians were known, likely or considered to potentially occur in the study area, though given the presence of potential habitat for Green and Golden Bell Frog at the site a precautionary survey was undertaken over one afternoon and one evening. Survey is documented in ELA (2009b) and summarised below. The methods employed for the survey were an adaptation of the GGBF EIA guidelines (NPWS 2003) and based on the extent of potential habitat known on the site. The methods were modified on the basis that there had been a considerably long period of time since the species was last recorded in the general area of the site (last record 1973). On 4 December 2009 a diurnal and nocturnal survey was undertaken to assess habitats available for the GGBF within the site. The diurnal survey provided an opportunity to search for tadpoles, basking adults and examine suitable ground cover and other potential shelter sites.

The nocturnal survey focused on the areas that appeared to have the best habitat attributes for the species that were identified as part of the diurnal survey. A reference site at Sydney Olympic Park, where the species is known to be regularly detected, was also checked for active individuals to ascertain the suitability of seasonal and climatic conditions for detection at the site. Nocturnal survey effort consisted of call play back, spotlight and headlamp searches of the best habitat areas for 2 hours, also on 4th December 2009. Additional opportunistic survey and call recognition was undertaken over 22 person hours during the 2012 survey period.

Reptiles

Opportunistic observations and habitat assessment for reptiles were undertaken throughout the survey period. The Atlas of NSW Wildlife provided no threatened reptile records within the study area and none were identified during the likelihood assessment as potentially occurring in the study area, as such no targeted searches were undertaken.

Invertebrates

Targeted survey for Cumberland Land Snail was undertaken on 25 November 2009, with potential habitat for the species on site occurring within the woodland areas (particularly in association with *E. tereticornis* and *E. moluccana* trees that have deep leaf/bark litter layers around their base), grass clumps in or near woodland areas, and dumped rubbish or sheet metal in or near woodland areas.

Additional survey effort will be undertaken in accordance with the BAM during the preparation of the BDAR to accompany the EIS for the Eastern Creek Retail Outlet Centre.

Table 2: Summary of field survey effort and compliance with NSW Threatened Biodiversity Survey and Assessment guidelines (DEC 2004)

Group	Target Species or Type	Threatened Biodiversity Survey and Assessment Guidelines DEC (2004) (Appropriate Survey Options)	Survey Effort (ELA 2009, 2012)	Sampling Satisfies DEC (2004) Guidelines
Avifauna - Diurnal	All species	Opportunistic sightings - time unspecified	Opportunistic sightings over 6 days (22 person hours ELA 2012; ELA 2009 unspecified survey effort)	Yes
Avifauna - Nocturnal	All nocturnal birds	Day habitat search - search habitat for pellets and likely hollows.	Opportunistic sightings	N/A
Mammals (excluding microbats)	All mammals	Search for scats and signs - 30 minutes searching each relevant habitat, including trees for scratch marks per stratification unit up to 50 hectares, plus an additional effort for every additional 100 hectares.	Opportunistic over ~20 ha study area over 6 days (~8ha vegetated)	Yes
Mammals (microbats)	All species	Anabats - Two Anabats utilised for the entire night (a minimum of four hours), starting at dusk for two nights per 100 hectares of stratification unit in October to March.	8 sites, 2 nights/site (total 13* nights), 12hrs/night (ELA 2012)	Yes
Reptiles	All species	Habitat Search - 30-minute search on two separate days targeting specific habitat per stratification unit up to 200 hectares	Diurnal searches, including rock-rolling, tree bark removal, displacement of fallen timber and opportunistic sightings over 6 days	Yes
Amphibians	Green and Golden Bell Frog	Combination of call surveys and day/night active searching.	- Opportunistic sightings, call recognition - Call play back, spotlight and headlamp searches over 2 hours	No**
Invertebrates	Cumberland Land Snail	Not specified	Targeted searches of potential habitat over one day (ELA 2009, person hours not specified)	N/A

Field survey results

No threatened flora or fauna species were identified in the site during targeted survey, and none are predicted as likely to occur. One threatened ecological community, Cumberland Plain Shale Woodlands and Shale Gravel Transition Forest was identified in the site during survey.

Amphibians

No GGBF were detected during the targeted surveys of the subject site and surrounding areas. This was despite good weather patterns and seasonality being suitable. A reference site at Sydney Olympic Park recorded activity at that site during the 3 weeks prior to and including the survey period at Eastern Creek (K. Darkovich, pers. Comm.). Previous records of the GGBF have been detected within the vicinity of the site (within 5km), where they have been recorded both upstream and downstream within Eastern Creek, in the vicinity of Prospect Reservoir and near Mt Druitt. Most of these records are from the 1960s and 1970s, prior to the broadscale urban development of the area. Only the records from the Mt Druitt area are more recent, recorded during the 1990s (Richard Wells pers comm.; DEC 2005). As such, no current or recent records of the GGBF are known from the locality of the site although historically the species would have inhabited the area. No GGBF were recorded on site during this survey or previous survey work despite survey along key potential habitat areas on site such as the drainage line, ephemeral drainage depressions, bunded areas receiving regular overland flows, stormwater structures and piles of debris. The non-detection of GGBF during the survey effort does not enable a conclusion that the species is absent from the site, though for the above reasons it is considered highly „unlikely" to be present. Recommendations have been provided to avoid „potential" habitat areas and incorporate them into the offset area in **Section 5** and **6**.

Avifauna

A pair of Latham's Snipe (*Gallinago hardwickii*) were recorded onsite during 2009 (ELA 2009). Cattle Egrets (*Ardea ibis*) were recorded during survey of 2012. The proposed action would not impact any habitat for these species and as such, they have not been assessed as part of this referral.

Microbats

Three threatened mammal species, *Miniopterus schreibersii oceanensis* (Eastern Bentwing Bat), *Mormopterus norfolkensis* (East Coast Free-tail Bat) and *Falsistrellus tasmaniensis* (Eastern False Pipistrelle), were recorded during the field survey through the use of Anabat recorders. Eastern Bentwing Bat, East Coast Freetail Bat and Eastern False Pipistrelle are listed as vulnerable species under the BC Act but not listed under the EPBC Act.

1.15 Is this action part of a staged development (or a component of a larger project)?

Yes. Stage 3 is the final stage of development on this site. Stages 1 and 2 have been constructed.

1.16 Is the proposed action related to other actions or proposals in the region?

No.

1.16.1 Identify the nature/scope and location of the related action (Including under the relevant legislation)

N/A

Figure 4: Cumberland Plain Woodland identified in the referral area

2. Section 2 – Matters of National Environmental Significance

2.1 Is the proposed action likely to impact on the values of any World Heritage properties?

No.

2.2 Is the proposed action likely to impact on the values of any National Heritage places?

No.

2.3 Is the proposed action likely to impact on the ecological character of a Ramsar wetland?

No.

2.4 Is the proposed action likely to have ANY direct or indirect impact on the members of any listed species or any threatened ecological community, or their habitat?

Portal Entry

Cumberland Plain Shale Woodlands and Shale Gravel Transition Forest (Cumberland Plain Woodland.

The proposed action will impact 0.73 ha of Cumberland Plain Woodland. This impact is considered significant.

This referral has been prepared to ensure that the Action is assessed accordingly and has reviewed previous survey and documentation prepared for the site to determine what Matters of NES are either known or likely to be present. The following Matters of NES have been assessed in this referral:

- Cumberland Plain Shale Woodland and Shale Gravel Transition Forest (Cumberland Plain Woodland)

Survey effort, where relevant, is described in Section 1.14 of this referral. For a detailed assessment please see attachment 1508 Eastern Creek BH referral v3 (section 2.4.1).

2.4.1 Impact table

Cumberland Plain Shale Woodlands and Shale Gravel Transition Forest

The proposed action may constitute a significant impact on Cumberland Plain Woodland.

Community Description

Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest (Cumberland Plain Woodland) is listed as critically endangered under the EPBC Act. The community complex represents occurrences of the coastal plain grassy eucalypt woodlands that are endemic to shale hills and plains of the Sydney Basin Bioregion and predominantly occupies the Cumberland Sub-region.

The ecological community is predominantly associated with clay soils that are derived from Wianamatta Shale geology. A part of the ecological community is also associated with shale soils with high

concentrations of iron-indurated gravel or overlain by Tertiary Alluvium and those sites are marked by the shale-gravel transition forest component of the ecological community (DEWHA 2010). The composition of the understorey (shrubby or grassy) can vary depending on the site's disturbance history, such as grazing or farming practices. Fire frequency is also known to affect the structure of associated plant species occurring within the community.

In NSW, Cumberland Plain Woodland is further defined as two sub-communities - Shale Hills and Shale Plains Woodland. The composition of these sub-communities is consistent with the EPBC Act listing definition of the community.

The original extent of Cumberland Plain Woodland has been significantly reduced since the introduction of agricultural and urban uses across the Cumberland Plain following European settlement. A field survey undertaken by Tozer (2003) coupled with detailed interpretation of colour aerial photography from between 1997 and 1998, determined that only 9% of the original extent (pre-1750) of the community remained with greater than 10% canopy cover, with a further 14% remaining as scattered trees across the landscape (NPWS, 2002).

A more recent study by the NSW Scientific Committee and Simpson (2008) re-assessed the status of the community in order to determine changes in distribution since November 1998. Comparing the 1997-1998 mapping undertaken by Tozer (2003) with ortho-rectified digital photography obtained in 2007, it was found that the remaining extent of the community had declined by approximately 442 ha or around 5.2% of its distribution nine years ago. Such clearing is likely to be a consequence of dispersed, small-scale clearing associated with urban development.

Cumberland Plain Shale Woodlands and Shale Gravel Transition Forest in the referral area

The Cumberland Plain Woodland in the referral area shows signs of indirect impacts associated with previous adjacent land uses, associated with agriculture. This has caused some fragmentation and weed invasion in the Cumberland Plain Woodland in the referral area. EPBC Act patches of the community were mapped by assessing the following:

- size of the patch (including proximity to another patch)
- percentage of native groundcover species present
- contiguity with another patch
- presence of trees with hollows, or large trees above the large tree benchmark.

A total of 3.73 ha of the community occurred within the original referral project area, which met the community condition criteria (for conditions classes A, B and C) established under the EPBC Act. The proposed action site contains 0.73 ha of the community which meets the condition criteria for condition class C (Table 3). The proposed action will remove 0.73 ha of condition C Cumberland Plain Woodland.

Table 3: Condition thresholds for Cumberland Plain Shale Woodlands and Shale Gravel Transition Forest

Category and Rationale	Thresholds
A. Core thresholds that apply under most circumstances: patches with an understorey dominated by natives and a minimum size that is	Minimum patch[1] size is ≥0.5ha; AND ≥50% of the perennial understorey vegetation cover[2] is made up of native species.

Category and Rationale	Thresholds
functional and consistent with the minimum mapping unit size applied in NSW.	
OR	
B. Larger patches which are inherently valuable due to their rarity.	The patch size is ≥5ha; **AND** ≥30% of the perennial understorey vegetation cover is made up of native species.
OR	
C. Patches with connectivity to other large native vegetation remnants in the landscape.	The patch size is ≥0.5 ha; **AND** ≥30% of the perennial understorey vegetation cover is made up of native species; **AND** The patch is contiguous[3] with a native vegetation remnant (any native vegetation where cover in each layer present is dominated by native species) that is ≥5ha in area.
OR	
D. Patches that have large mature trees or trees with hollows (habitat) that are very scarce on the Cumberland Plain.	The patch size is ≥0.5 ha in size; **AND** ≥30% of the perennial understorey vegetation cover is made up of native species; **AND** The patch has at least one tree with hollows per hectare or at least one large tree (≥80 cm dbh) per hectare from the upper tree layer species outlined in the Description and Appendix A.

[1] A *patch* is defined as a discrete and continuous area that comprises the ecological community, outlined in the Description. Patches should be assessed at a scale of 0.04 ha or equivalent (e.g. 20m x 20m plot). The number of plots (or quadrats or survey transects) per patch must take into consideration the size, shape and condition across the site. Permanent man-made structures, such as roads and buildings, are typically excluded from a patch but a patch may include small-scale disturbances, such as tracks or breaks or other small-scale variations in native vegetation that do not significantly alter the overall functionality of the ecological community, for instance the easy movement of wildlife or dispersal of spores, seeds and other plant propagules.

[2] Perennial understorey vegetation cover includes vascular plant species of the ground and shrub layers (as outlined in the Description and Appendix A) with a life-cycle of more than two growing seasons (Australian Biological Resources Study, 2007). Measurements of perennial understorey vegetation cover exclude annuals, cryptogams, leaf litter or exposed soil (although these are included in a patch of the ecological community when they do not alter functionality as per footnote 3 and the Description and Condition Thresholds are met).

3 Contiguous means the woodland patch is continuous with, or in close proximity (within 100 m), of another patch of vegetation that is dominated by native species in each vegetation layer present.

Table 4: Application of significant impact criteria to Cumberland Plain Shale Woodlands and Shale Gravel Transition Forest

Impact Assessment Criteria	Application
reduce the extent of an ecological community	The proposed action will reduce the extent of the ecological community by removing 0.73 ha of Cumberland Plain Woodland.
fragment or increase fragmentation of an ecological community, for example by clearing vegetation for roads or transmission lines	The proposed action will not cause fragmentation of any EPBC Act Cumberland Plain Woodland in the referral area. The proposed action will remove the entire patch of Cumberland Plain Woodland. The patch is already fragmented from other areas of Cumberland Plain Woodland by cleared land and development.
adversely affect habitat critical to the survival of an ecological community	No critical habitat has been declared for Cumberland Plain Woodland.
modify or destroy abiotic (non-living) factors (such as water, nutrients, or soil) necessary for an ecological community's	The proposed action will alter the ground level due to cut and fill, which may change surface water drainage patterns. No Cumberland Plain Woodland is proposed for retention.

Impact Assessment Criteria	Application
survival, including reduction of groundwater levels, or substantial alteration of surface water drainage patterns	
cause a substantial change in the species composition of an occurrence of an ecological community, including causing a decline or loss of functionally important species, for example through regular burning or flora or fauna harvesting	The proposed action will remove 0.73 ha of Cumberland Plain Woodland. The proposed action would remove a patch in moderate condition, which contains some level of species diversity and abundance.
cause a substantial reduction in the quality or integrity of an occurrence of an ecological community, but not limited to: assisting invasive species, that are harmful to the listed ecological community, to become established, or causing regular mobilisation of fertilisers, herbicides or other chemicals or pollutants into the ecological community which kill or inhibit the growth of species in the ecological community, or	The proposed action would remove the entire patch of Cumberland Plain Woodland. There is no Cumberland Plain Woodland in adjacent areas that would be affected by fertilisers or herbicides.
Interfere with the recovery of the ecological community	The proposed action will remove 0.73 ha of the community. The proposed action is likely to interfere with the recovery of the community.

The proposed action was also assessed against the recent bushfires of 2019 / 2020. This included assessing the extent of the fires within the Cumberland IBRA subregion against areas of previously mapped Cumberland Plain Woodland. Previous vegetation mapping (OEH 2016 and OEH 2013) was relied upon for this assessment. Some of the vegetation mapping used is > s7 years old and there is a risk that this vegetation which has been mapped as affected may have been previously removed. The assessment is therefore indicative only (Figure 5). A majority of the Cumberland Plain Woodland within the IBRA subregion was not burnt during the fires, however some small areas were affected (Table 5).

Table 5: Amount of Cumberland Plain Woodland indicatively affected by the 2019 / 2020 bushfires

Burn category	Area (ha)
Canopy unburnt	48.10
Canopy partially affected	7.90
Canopy fully affected	0
unassessed	14

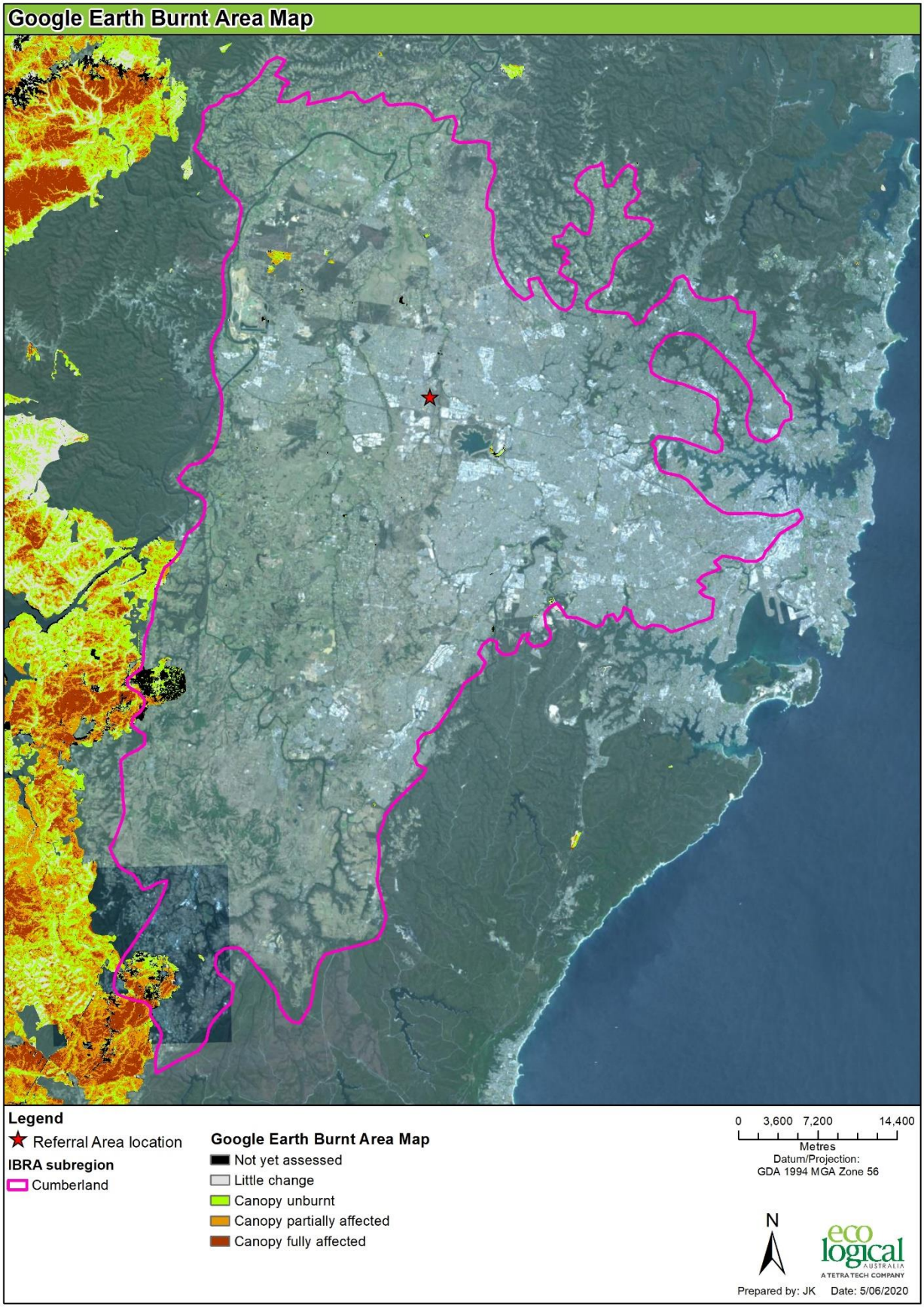

Figure 5: Areas within the Cumberland IBRA subregion affected by the 2019 / 2020 bushfire season

2.5 Is the proposed action likely to have ANY direct or indirect impact on the member of any listed migratory species, or their habitat?

No.

2.6 Is the proposed action to be undertaken in a marine environment (outside Commonwealth marine areas)?

No.

2.7 Is the proposed action to be taken on or near Commonwealth land?

No.

2.8 Is the proposed action taking place in the Great Barrier Reef Marine Park?

No.

2.9 Is the proposed action likely to have ANY direct or indirect impact on a water resource related to coal / gas / mining?

No.

2.10 Is the proposed action a nuclear action?

No.

2.11 Is the proposed action to be taken by the Commonwealth agency?

No.

2.12 Is the proposed action to be undertaken in a Commonwealth Heritage Place Overseas?

No.

2.13 Is the proposed action likely to impact on any part of the environment in the Commonwealth marine area?

No.

3. Section 3 – Description of the Proposal area

3.1 Describe the flora and fauna relevant to the Proposal area

The description below is based on the survey effort undertaken in 2012 and relates to the Eastern Creek Business Hub as a whole. Further survey will be undertaken in accordance with the BAM during the preparation of a BDAR to accompany the SSD for the Eastern Creek Retail Outlet Centre (i.e. just the proposal area).

Flora

A total of 82 flora species were identified within the subject site during field survey for the ecological assessment that accompanied SSD 5175. Forty-three (43) were native and 39 species were exotic or introduced. Twenty-nine (29) species characteristic of Cumberland Plain Woodland were recorded. No threatened flora species were observed during the field survey, and although there are a number of records in the broader locality, the subject site is unlikely to provide habitat for any of these threatened flora species due to the disturbed condition of the patches of remnant vegetation and changed hydrologic conditions on site.

Additional targeted flora survey will be undertaken in accordance with the BAM during the preparation of the BDAR.

Priority Weeds

Of the 39 exotic species recorded on site, 9 are listed as priority weeds in the Greater Sydney region under the *Biosecurity Act 2015.* Five of these priority weeds along with *Senecio madagascariensis* (Fireweed) are considered Weeds of National Significance (WONS) (AWC 2012). Details of the priority weeds present on site have been listed below in Table 6 together with whether the weed is listed on the Weeds of National Significance List.

Table 6: Priority weeds present in the subject site

Scientific name	Common name	WoNS[2]
Alternanthera philoxeroides	Alligator Weed	Yes
Asparagus asparagoides	Asparagus fern	Yes
Cortaderia selloana	Pampas Grass	-
Hypericum perforatum	St John Wort	-
Lantana camara	Lantana	Yes
Ligustrum sinense	Narrow-leaf Privet	-
Lycium ferocissimum	African Boxthorn	Yes
Opuntia stricta	Common Prickly Pear	Yes
Senecio madagascariensis	Fireweed	Yes
Xanthium sp.	Noogoora Burr	-

Threatened fauna

A total of 36 birds, three (3) non-flying mammals, eight (8) microbats, five (5) amphibians, one (1) reptile and one (1) fish species were recorded during the survey across the previous referral area (Appendix B, Appendix C). Of the birds, thirty-two were native species, including a potential sighting of one threatened species (Diamond Firetail) under the BC Act and two confirmed sightings of the migratory species (Latham's Snipe and Cattle Egret) listed under the EPBC Act (further discussed below). Four (4) bird species, three (3) mammals and the one (1) fish species recorded onsite are introduced species.

Threatened and migratory species

Table 9 shows those species considered to be 'known', 'likely' or 'potentially' to occur onsite from an assessment of Likelihood of Occurrence prior to survey, as well one species (Diamond Firetail) not previously 'known' from the locality (). Following survey, the Likelihood of Occurrence was revised with discussion of these changes provided below where considered appropriate.

Table 7: Revised 'likelihood' assessments of threatened and migratory fauna post survey

Scientific Name	Common Name	BC Act	EPBC Act	Likelihood of Occurrence	
				Before Surveys	Post Surveys
Amphibians					
Litoria aurea	Green and Golden Bell Frog	E	V	Unlikely	Unlikely
Aves					
Ardea alba	Great Egret	-	M	Potential	Unlikely
Ardea ibis	Cattle Egret	-	M	Potential	Known
Gallinago hardwickii	Latham's Snipe	-	M	Known	Known
Hieraaetus morphnoides	Little Eagle	V	-	Potential	Unlikely
Stagonopleura guttata	Diamond Firetail	V	-	No	Unlikely
Tyto novaehollandiae	Masked Owl	V	-	Unlikely	No
Invertebrata					
Meridolum corneovirens	Cumberland (Large) Land Snail	E	-	Unlikely	No
Mammalia (Chiroptera)					
Falsistrellus tasmaniensis	Eastern False Pipistrelle	V	-	Potential	Known
Miniopterus schreibersii oceanensis	Eastern Bent-wing Bat	V	-	Potential	Known
Mormopterus norfolkensis	East Coast Freetail Bat	V	-	Potential	Known

3.2 Describe the hydrology relevant to the Proposal area (including water flows)

The natural hydrological conditions on site have been severely modified by adjacent urban development activities and by drainage works carried out onsite.

Urban residential (and other) development on parts of the site and to the west of the site plus the M7 Motorway have increased the volume of stormwater in the area which has and continues to have an impact on the site's hydrology.

A grass-lined drainage channel was constructed at some point in the past to direct stormwater generated from residential development (west of the site) through the site and essentially discharges in the east of the site, adjacent to the action area. In the northern half of the site, stormwater generated offsite essentially flows through overland flow across the subject site and towards an old farm dam in the north east corner. Several culverts exist under the M7 Motorway; however, it appears that the levels of these culverts is causing significant blockage to the water moving off the site and compounding the water-logging which is currently impacting the CPW vegetation site.

The grassy lined drainage channel will be reformed, and its course slightly altered, however it will remain in the main a native grass lined channel, discharging through a series of water quality and quantity treatments which will become areas of semi-aquatic habitat.

3.3 Describe the soil and vegetation characteristics relevant to the Proposal area

The soils in the undisturbed sections of the site are typical of the clay and shale soils of the Cumberland Plain of Western Sydney. The soils have undergone chemical and structural modification associated with typical agricultural landuses. Trampling by livestock and machinery has caused localised areas of compaction in the northern portion of the site. It is likely that the site soils have higher than normal levels of nitrogen and phosphorous from the previous agricultural issues and the stormwater impacting the site, leading to favourable conditions for exotic plant species.

The high level of vegetation cover (though mostly exotic) and the low levels of exposed soils on site create a low potential for soil erosion across much of the site, however the urban stormwater through the channel and overland flow do bring some level of sediment into the site

ELA identified the following vegetation communities on site:

- Cumberland Plain Shale Woodlands and Shale Gravel Transition Forest – listed as critically endangered under the BC Act and EPBC Act
- *River Flat Eucalypt Forest in the Sydney Basin Bioregion* – listed as endangered under the BC Act. At the time of submission of the referral this community is not listed under the EPBC Act, however, it is noted that this community has been recommended for listing as an EEC under the EPBC Act.

3.4 Describe any outstanding natural features and/or any other important or unique values relevant to the Proposal area

There are no outstanding natural features or unique and important values relevant to the site.

3.5 Describe the status of native vegetation relevant to the project

ELA identified the following vegetation communities on site:

- Cumberland Plain Shale Woodlands and Shale Gravel Transition Forest – listed as critically endangered under the BC Act and EPBC Act
- *River Flat Eucalypt Forest in the Sydney Basin Bioregion* – listed as endangered under the BC Act. At the time of submission of the referral this community is not listed under the EPBC Act, however, it is noted that this community has been recommended for listing as an EEC under the EPBC Act.

Impacts on vegetation, taking into account the 30 m buffer, are detailed in Table 8.

Table 8: Impacts on Cumberland Plain Woodland

Vegetation community	Development footprint (ha)	Retained (ha)	Total (ha)
Cumberland Plain Woodland (EPBC Act)	0.73	0	0.73

3.6 Describe the gradient (or depth range if action is to be taken in a marine area relevant to the Proposal area

There is a very slight gradient on site, with the fall being from the west to the east of the site at less than 5°.

3.7 Describe the current condition of the environment relevant to the Proposal area

The site contains one remnant patch of Cumberland Plain Woodland. The remaining portions of the site contain cleared land which has been previously used for agricultural purposes.

3.8 Describe any Commonwealth Heritage Places or other places recognised as having heritage values relevant to the Proposal area

There are no Commonwealth Heritage Places or other places or heritage value in the site.

3.9 Describe any Indigenous heritage values relevant to the Proposal area

The Aboriginal Cultural Heritage Assessment (Kayandel 2012) identified seven discrete areas within subject area as sites of Potential Archaeological Deposits given the little to no disturbance in the area. The consultation undertaken for the assessment did not indicate any sites of cultural significance to the Aboriginal community. Due to the highly disturbed nature of the surface of much of the site, the archaeological significance of the subject areas was considered to be low to moderate.

3.10 Describe the tenure of the action area (e.g. freehold, leasehold) relevant to the Proposal area

The land is owned by the Western Sydney Parklands Trust. Frasers Property will be entering into a 90-year lease over the land.

3.11 Describe any existing or any proposed uses relevant to the Proposal area

The proposal area is currently undeveloped land and contains remnant native vegetation. As part of the original concept plan (SSD 5175) the proposal area was proposed as a retention area. The site is not currently used for any purposes and remains a patch of remnant native vegetation.

The eastern portion of the site contains stormwater infrastructure associated with the Eastern Creek Quarter development and protected vegetation. A single dual occupancy lot (Lot 2 of DP31130) is located at the Beggs Road and Rooty Hill Road South intersection which does not form part of the development site.

4. Section 4 – Measures to avoid or reduce impacts

4.1 Describe the measures you will undertake to avoid or reduce impact from your proposed action

The following mitigation measures are proposed to minimise the potential ecological impacts, address threatening processes and to create a positive ecological outcome for fauna, their habitats and endangered ecological communities. They include:

- pre-clearance habitat searches and relocation of any wildlife in affected habitat areas under the supervision of a fauna ecologist in accordance with a relocation protocol
- sediment erosion and control measures will be installed prior to the commencement of demolition, construction and earthworks
- installation of protective fencing around drip zone of trees that interface with the development site to be retained
- sediment will be effectively retained within the site to minimise deterioration of surface runoff during construction works
- sediment control measures will specifically target the restriction of migration of silt and sediment, embankments and soil mounds, and will be undertaken in accordance with the guidelines described in the Blue Book – Managing Urban Stormwater: Soils and Construction (Landcom 2004). Stabilisation measures will include open weave jute mesh
- sediment basins will be established to collect any sediment mobilised from the site.

Other measures include the installation of temporary and permanent protective fencing, implementation of disease control protocols for the handling of wildlife, procedures for the harvesting and control of pest species. An environmental induction will be prepared for the construction crews involved in the clearance for vegetation, habitat enrichment works, sediment and erosion control work and ongoing construction activities.

Further mitigation measures will be controlled through the imposition of conditions of consent for the SSDA relative to the proposed action.

A Construction Environmental Management Plan will be prepared for the project and will incorporate all mitigation measures required for retained vegetation and fauna habitat, including buffer zones and delineation fencing. The plan will span the project duration and be adaptive to subsequent building stages to allow for phased removal of vegetation where appropriate. This should draw on the requirements listed in *Soils and Construction (2004 – the Bluebook)* and should be submitted to council prior to the commencement of construction. These are to remain in place until the site is completely revegetated. Disturbed areas must be revegetated within seven days after the disturbance in accordance with the Bluebook.

Tree protection fencing will be placed around all trees to be retained within 5 m of the bulk earthworks area. High visibility orange safety mesh is to be used at a distance of 1 m radius from the trunk of the tree. Clear “No Go Area” signage will be attached to the fencing. Any threatened species (flora or fauna) discovered during vegetation clearance works will result in all work stopping immediately and the

Project Manager notified. Works will only recommence once the impact of the species has been assessed and appropriate control measures provided.

4.2 For matters protected by the EPBC Act that may be affected by the proposed action, describe the proposed environmental outcomes to be achieved

Impacts of the proposed action will be offset through the NSW Biodiversity Offsets Scheme (BOS). All biodiversity offsets will be secured through the retirement of biodiversity credits.

5. Section 5 – Conclusion on the likelihood of significant impacts

5.1.1 World Heritage Places
No.

5.1.2 National Heritage Places
No.

5.1.3 Wetlands of International Importance (declared Ramsar Wetlands)
No.

5.1.4 Listed threatened species or any threatened ecological community
Yes. Significant impacts are expected for Cumberland Plain Shale Woodlands and Shale Gravel Transition Forest.

5.1.5 Listed migratory species
No.

5.1.6 Commonwealth marine environment
No.

5.1.7 Protection of the environment from actions involving Commonwealth land
No.

5.1.8 Great Barrier Reef Marine Park
No.

5.1.9 A water resource, in relation to coal/gas/mining
No.

5.1.10 Protection of the environment from nuclear actions
No.

5.1.11 Protection of the environment from Commonwealth actions
No.

5.1.12 Commonwealth Heritage places overseas
No.

5.2 If no significant matters are identified, provide the key reasons why you think the proposed action is not likely to have a significant impact on a matter protected under the EPBC Act and therefore not a controlled action

Not applicable. The proposed action is considered likely to be a controlled action with respect to Cumberland Plain Shale Woodlands and Shale Gravel Transition Forest for the reasons listed in section 2 and 4.

6. Section 6 – Environmental record of the person proposing to take the action

6.1 Does the person taking the action have a satisfactory record of responsible environmental management? Please explain in further detail

Frasers Property have developed a sustainability strategy "A Different Way" which is committed to creating a safe, healthy and efficient places for people to work, live and play (Appendix D).

6.2 Provide details of any past or present proceedings under a Commonwealth, State or Territory law for the protection of the environment or the conservation and sustainable use of natural resources against either (a) the person proposing to take the action or, (b) if a permit has been applied for in relation to the action – the person making the application

N/A.

6.3 If it is a corporation undertaking the action will the action be taken in accordance with the corporation's environmental policy and framework?

Yes (Appendix D).

6.3.1 If the person taking the action is a corporation, please provide details of the corporation's environmental policy and planning framework

Yes (Appendix D). Frasers Property have developed a sustainability strategy "A Different Way" which is committed to creating a safe, healthy and efficient places for people to work, live and play. The sustainability sstrategy attempts to integrate smart design to minimise environmental harm, maximise the use of renewable resources whilst focusing on people (Appendix D).

6.4 Has the person taking the action previously referred an action under the EPBC Act, or been responsible for undertaking an action referred under the EPBC Act?

Yes. Western Sydney Parklands Trust (WSPT) originally sought approval of a superlot subdivision and early stage site establishment works at their Business Hub site at Eastern Creek, north-west Sydney. The proposal consolidated the existing landholdings, subdivided the site into 3 developable lots and one residue lot for environmental management, plus completed site establishment works including roads and stormwater drainage. As part of this approval, an action was referred to the Department in May 2012 to assess impacts to Cumberland Plain Woodland (EPBC 2012 / 6617). The action was determined a Controlled Action in December 2012 and a Preliminary Documentation (PD) assessment was subsequently completed (EPBC 2012 / 6617). The Controlled Action was approved with a condition requiring the purchase and retirement of biobanking credits to offset the impact to Cumberland Plan Woodland. These credits were purchased and retired.

7. Section 7 – Information sources

7.1 List references used in preparing the referral (please provide the reference source reliability and any uncertainties of source)

Department of the Environment (2013). *Matters of National Environmental Significance – Significant impact guidelines 1.1*. [Online] Available from: http://www.environment.gov.au/system/files/resources/42f84df4-720b-4dcf-b262-48679a3aba58/files/nes-guidelines_1.pdf

Department of the Environment and Energy (2019a). *Species Profile and Threats Database.* [Online] Available from: http://www.environment.gov.au/cgi-bin/sprat/public/sprat.pl

Department of Environment and Energy (2020b). Protected Matters Search Tool. Available from: https://www.environment.gov.au/epbc/protected-matters-search-tool

Department of Environment and Conservation (2004). Threatened Biodiversity Survey and Assessment: Guidelines for Developments and Activities. Working Draft. Available from https://www.environment.nsw.gov.au/resources/nature/TBSAGuidelinesDraft.pdf

Department of Sustainability, Environment, Water, Population and Communities (2011). *Survey Guidelines for Australia's Threatened Mammals*. Available at https://www.environment.gov.au/system/files/resources/b1c6b237-12d9-4071-a26e-ee816caa2b39/files/survey-guidelines-mammals.pdf

DEWHA (2010). Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest EPBC Act policy statement 3.31 (Department of the Environment, Water, Heritage and the Arts (DEWHA), 2010) [Admin Guideline]

New South Wales National Parks and Wildlife Service (2002). Interpretation Guidelines for the Native Vegetation Maps of the Cumberland Plain, Western Sydney, Final Edition. NSW NPWS, Hurstville.

NSW Office of Environment and Heritage 2020. eSpade NSW Soil and Land Information. Available from https://www.environment.nsw.gov.au/eSpade2Webapp

OEH (2020) NSW BioNet Atlas of NSW Wildlife online search tool. Available from: http://www.bionet.nsw.gov.au/

Tozer M (2003). The native vegetation of the Cumberland Plain, western Sydney: systematic classification and field identification of communities. *Cunninghamia* 8(1), 1–75.

Tozer MG, Turner K, Keith DA, Tindall D, Pennay C, Simpson C, MacKenzie B, Beukers P & Cox S (2010). Native vegetation of southeast NSW: a revised classification and map for the coast and eastern tablelands. Cunninghamia 11(3), 359–406.

Tozer,MG, Turner K, Simpson CC, Keith DA, Beukers P, Mackenzie B, Tindall D & Pennay C (2006). Native Vegetation of Southeast NSW: A Revised Classification and Map for the Coast and Eastern Tablelands. Version 1.0. Department of Environment & Conservation and Department of Natural Resources, Sydney.

8. Section 8 – Proposed alternatives

8.1 Provide a description of the feasible alternative?

The ecological assessment conducted by ELA (2009 – 2012) has been used to inform avoidance and minimisation of direct and indirect impacts to biodiversity values. These include:

- the layout design selection process must include consideration and analysis of the biodiversity constraints of the proposed action
- the lot layout should be located in areas where the native vegetation and threatened species habitat is in the poorest condition
- the project should be in areas which avoid threatened ecological communities
- the project should aim to minimise the amount of clearing or habitat loss
- the project should be located in areas that do not have native vegetation or require the least amount of clearing
-

The proposed action is the result of a series of redesigns based on the above measures and there are no alternatives to taking the proposed action.

8.2 Select the relevant alternatives related to your proposed action

There are no proposed alternatives.

8.3 Do you have another alternative?

No.

9. Section 9 – Contacts, signatures and declarations

9.1.1 Is the person proposing to take the action an organization or an individual?

Organisation

Organisation name: Frasers Property Retail Holdings Pty Limited

Organisation type: (Australian vs. International): Australian

ABN: 70 618 676 994

Primary address: Level 2, 1C Homebush Bay Drive, Rhodes NSW 2138

Phone no: (02) 9767 2000

Email: contactcentre@fraserspropery.com.au

9.1.2 I qualify for exemption from fees under section 520(4C)(e)(v)

No.

9.1.2.1 I would like to apply for a waiver of full or [partial fees under Schedule 1, 5.21A of the EPBC Regulations

No

9.1.3 Contact

Development Manager

Emelie

Watkinson

emelie.watkinson@fraserspropery.com.au

Level 2, 1C Homebush Bay Drive, Rhodes NSW 2138

Person proposing the action – Declaration

I, ..., declare that to the best of my knowledge the information I have given on, or attached to the EPBC Act Referral is complete, current and correct. I understand that giving false or misleading information is a serious offence. I declare that I am not taking the action on behalf of or for the benefit of any other person or entity.

Signature: ..... Date: .....

9.1.4 Is the proposed designated proponent a member of an organisation? *

9.1.4.1 Organisation

Organisation name: Frasers Property Retail Holdings Pty Limited

Organisation type: (Australian vs. International): Australian

ABN: 70 618 676 994

Primary address: Level 2, 1C Homebush Bay Drive, Rhodes NSW 2138

Phone no: (02) 9767 2000

Email: contactcentre@frasersproperty.com.au

9.1.4.2 Contact

Development Manager

Emelie

Watkinson

emelie.watkinson@frasersproperty.com.au

Level 2, 1C Homebush Bay Drive, Rhodes NSW 2138

Proposed designated proponent – Declaration

I, ..., declare that to the best of my knowledge the information I have given on, or attached to the EPBC Act Referral is complete, current and correct. I understand that giving false or misleading information is a serious offence. I declare that I am not taking the action on behalf of or for the benefit of any other person or entity.

Signature: ..... Date: .....

9.1.5 Is the referring party a member of an organization?

Organisation name: Eco Logical Australia

Organisation type: (Australian vs. International): Australian

ABN: (has search and validation tools): 87 096 512 088

Primary address: Level 3, 101 Sussex Street, Sydney NSW 2000

Phone no: 02 9279 3773

Email: alexg@ecoaus.com.au

Address: As above.

9.1.6 Contact

Ecologist

Alex

Gorey

alexg@ecoaus.com.au

Level 3, 101 Sussex Street, Sydney 2000

Appendix A - Western Sydney parklands – Bungarribee Precinct 2

Appendix B - Western Sydney Parklands Trust: Eastern Creek Business Hub Referral

Appendix C - Eastern Creek Business Hub, Sydney NSW EPBC Assessment Report (EPBC 2012/6617)

Appendix D - Frasers Property Sustainability Strategy

Appendix E - Ecological Assessment for the Eastern Creek Business Hub State Significant Development (ELA 2012)

Appendix F - Likelihood of occurrence table

Scientific name	Common name	BC Act	EPBC Act	Distribution and habitat	Habitat	Likelihood of occurrence	Impact Assessment Required
ECOLOGICAL COMMUNITIES							
Castlereagh Scribbly Gum and Agnes Banks Woodlands of the Sydney Basin Bioregion		E		"Sydney Basin Bioregion, mostly in the Cumberland IBRA sub-region, with small occurrences in the Sydney Cataract, Wollemi and Burragorang sub-regions. It occurs primarily in the Castlereagh area in the north-west of the Cumberland Plain with other known occurrences near Holsworthy, Kemps Creek and Longneck Lagoon. Occurs primarily on Tertiary sands and gravels of the Hawkesbury-Nepean river system. At Agnes Banks it primarily occurs on aeolian (wind-blown) sands overlying Tertiary alluvium. Found on flat or gently undulating terrain in rain shadow areas typically receiving 700–900 mm annual rainfall. The ecological community occurs primarily at low elevations up to 80 m above sea level (ASL), including old ridges, dunes and terraces.		No	No
Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest		**CE**		**Endemic to the shale hills and plains of the Sydney Basin Bioregion in NSW, occurring primarily in, but not limited to, the Cumberland Sub-region. Flat to undulating or hilly terrain, at elevations up to approximately 350 metres above sea level. Predominantly associated with clay soils, that are derived from Wianamatta Shale geology. Minor occurrences may be present on other soil groups, notably Holocene Alluvium and soils derived from the Mittagong Formation.**		**Yes**	**Yes**
Shale Sandstone Transition Forest of the Sydney Basin Bioregion		CE		Occurs at the edges of the Cumberland Plain in western Sydney, most now occurs in the Hawkesbury, Baulkham Hills, Liverpool, Parramatta, Penrith, Campbelltown and Wollondilly local government areas. Intergrade between clay soils from the shale rock and earthy and sandy soils from sandstone, or where shale caps overlay sandstone.		No	No
Western Sydney Dry Rainforest and Moist Woodland on Shale		CE		Cumberland Plain Sub-region of the Sydney Basin Bioregion. It generally occurs in rugged terrain and other patches may occur on undulating terrain, with dry rainforest patches typically occupying steep lower slopes and gullies, and moist woodland patches typically occupying upper sections of the slope Occurs almost exclusively on clay soils derived from Wiannamatta Group shales.		No	No
FAUNA							

Scientific name	Common name	BC Act	EPBC Act	Distribution and habitat	Habitat	Likelihood of occurrence	Impact Assessment Required
Actitis hypoleucos	Common Sandpiper		M	Summer migrant. In NSW, widespread along coastline and also occurs in many areas inland. Breeds in Eurasia, uncommon summer migrant to Australia (August to May). Some overwinter.		No	No
Anthochaera phrygia	Regent Honeyeater	E4A	CE	Inland slopes of south-east Australia, and less frequently in coastal areas. In NSW, most records are from the North-West Plains, North-West and South-West Slopes, Northern Tablelands, Central Tablelands and Southern Tablelands regions; also recorded in the Central Coast and Hunter Valley regions. Two of three known key breeding areas are in NSW: the Capertee Valley and Bundarra-Barraba region. The species breeds between July and January and usually nests in horizontal branches or forks in tall mature eucalypts and Sheoaks. The Regent Honeyeater primarily feeds on nectar from box and ironbark eucalypts and occasionally from banksias and mistletoes.		Unlikely – not identified during previous survey	No
Apus pacificus	Fork-tailed Swift		M	Recorded in all regions of NSW. Non-breeding visitor to all states and territories of Australia, arriving from its breeding grounds in Siberia around October, and departing in April. The species is thought to be highly mobile within Australia, moving across the country in search of food. They probably roost aerially.		No – no habitat available	No
Botaurus poiciloptilus	Australasian Bittern	E1	E	Found over most of NSW except for the far north-west. Feed mainly at night on frogs, fish, yabbies, spiders, insects and snails. Feeding platforms may be constructed over deeper water from reeds trampled by the bird. Breeding occurs in summer from October to January; nests are built in secluded places in densely-vegetated wetlands on a platform of reeds.		No – no habitat available	No
Calidris acuminata	Sharp-tailed Sandpiper		M	Summer migrant. Widespread in most regions of NSW, especially in coastal areas, but sparse in the south-central Western Plain and east Lower Western Regions. Breeds Arctic Siberia, summer migrant to Australia August-April. Some overwinter. Forage in wetlands or intertidal mudflats, inundated vegetation of saltmarsh, grass or sedges, sewage ponds. Roosting occurs at the edges of wetlands, on sandy beaches, stony shores or on rocks in water.		No – no habitat available	No
Calidris ferruginea	Curlew Sandpiper	E1	CE, M	Occurs along the entire coast of NSW, and sometimes in freshwater wetlands in the Murray-Darling Basin. It forages in or at the edge of shallow water, occasionally on exposed algal mats or waterweed, or on banks of beach-cast seagrass or seaweed. It roosts on shingle, shell or sand beaches; spits or islets on the coast or in wetlands; or sometimes in salt marsh, among beach-cast seaweed, or on rocky shores. Curlew Sandpipers are omnivorous, feeding on worms, molluscs, crustaceans, insects and some seeds.		No – no habitat available	No

Scientific name	Common name	BC Act	EPBC Act	Distribution and habitat	Habitat	Likelihood of occurrence	Impact Assessment Required
Calidris melanotos	Pectoral Sandpiper		M	Summer migrant to Australia. Widespread but scattered in NSW. East of the Great Divide, recorded from Casino and Ballina, south to Ulladulla. West of the Great Divide, widespread in the Riverina and Lower Western regions. Breeds in northern Russia and North America, migrates to non-breeding areas in South America. Recorded in Australia from September to June.		No – no habitat available	No
Chalinolobus dwyeri	Large-eared Pied Bat	V	V	Recorded from Rockhampton in Qld south to Ulladulla in NSW. Largest concentrations of populations occur in the sandstone escarpments of the Sydney basin and the NSW north-west slopes. Roosts in caves, rock overhangs and disused mine shafts and as such is usually associated with rock outcrops and cliff faces. It also possibly roosts in the hollows of trees. The species is thought to require roosting habitat that is adjacent to higher fertility sites which are used for foraging. This species probably forages for small, flying insects below the forest canopy. Likely to hibernate through the coolest months. It is uncertain whether mating occurs early in winter or in spring.		No – no roosting habitat available within the vicinity	No
Dasyurus maculatus	Spotted-tailed Quoll	V	E	Found on the east coast of NSW, Tasmania, eastern Victoria and north-eastern Qld. Mostly nocturnal, although will hunt during the day; spends most of the time on the ground, although also an excellent climber. Consumes gliders, possums, small wallabies, rats, birds, bandicoots, rabbits and insects; also eats carrion and takes domestic fowl. Females occupy home ranges up to about 750 hectares and males up to 3500 hectares; usually traverse their ranges along densely vegetated creeklines.		No – fragmented habitat throughout the landscape	No
Gallinago hardwickii	Latham's Snipe		M	Migrant to east coast of Australia, extending inland west of the Great Dividing Range in NSW. Non-breeding migrant to Australia, arriving between July-November from its breeding grounds in Japan and far-eastern Russia, and departing by late February. It feeds in mud or in very shallow water with low, dense vegetation. Roosting occurs on the ground near or in foraging areas beside or under clumps of vegetation, among dense tea-tree, in forests, in drainage ditches or plough marks, among boulders, or in shallow water if cover is unavailable.		No – no habitat available	No
Grantiella picta	Painted Honeyeater	V	V	Widely distributed in NSW, predominantly on the inland side of the Great Dividing Range but avoiding arid areas. A specialist feeder on the fruits of mistletoes growing on woodland eucalypts and acacias. Prefers mistletoes of the genus Amyema. Insects and nectar from mistletoe or eucalypts are occasionally eaten. Nest from spring to autumn in a small, delicate nest hanging within the outer canopy of drooping eucalypts, she-oak, paperbark or mistletoe branches.		Unlikely – highly fragmented habitat with no	No

Scientific name	Common name	BC Act	EPBC Act	Distribution and habitat	Habitat	Likelihood of occurrence	Impact Assessment Required
						records within 10 km of study area	
Haliaeetus leucogaster	White-bellied Sea-Eagle	V		Distributed along the coastline of mainland Australia and Tasmania, extending inland along some of the larger waterways, especially in eastern Australia. The breeding season extends from June to January (or sometimes February) in southern Australia. Breeding habitat is usually close to water, but may occur up to a kilometre away. Nests are mainly located in tall open forest or woodland, but sometimes in other habitats such as dense forest, closed scrub or in remnant trees on cleared land. The White-bellied Sea-Eagle feeds opportunistically on a variety of fish, birds, reptiles, mammals and crustaceans, and on carrion and offal.		Unlikely – highly fragmented habitat with no records within 10 km of study area	No
Heleioporus australiacus	Giant Burrowing Frog	V	V	South eastern NSW and Victoria, in two distinct populations: a northern population in the sandstone geology of the Sydney Basin as far south as Ulladulla, and a southern population occurring from north of Narooma through to Walhalla, Victoria. Breeding habitat of this species is generally soaks or pools within first or second order streams. They are also commonly recorded from 'hanging swamp' seepage lines and where small pools form from the collected water. This species breeds mainly in autumn, but has been recorded calling throughout the year. Egg masses are foamy with an average of approximately 500-800 eggs and are laid in burrows or under vegetation in small pools. Spends more than 95% of its time in non-breeding habitat in areas up to 300 m from breeding sites. Whilst in non-breeding habitat it burrows below the soil surface or in the leaf litter.		No - no habitat available	No
Hirundapus caudacutus	White-throated Needletail		M	All coastal regions of NSW, inland to the western slopes and inland plains of the Great Divide. Breeds in eastern Siberia, north-eastern China and Japan. The species arrives in Australia in September–October, and most depart by April. It almost always forages aerially. Recorded roosting in trees in forests and woodlands, both among dense foliage in the canopy or in hollows.		Unlikely – highly fragmented habitat with no records within 10	No

Scientific name	Common name	BC Act	EPBC Act	Distribution and habitat	Habitat	Likelihood of occurrence	Impact Assessment Required
						km of study area	
Lathamus discolor	Swift Parrot	E1	CE	Migrates from Tasmania to mainland in Autumn-Winter. In NSW, the species mostly occurs on the coast and south west slopes. Favoured feed trees include winter flowering species such as Eucalyptus robusta (Swamp Mahogany), Corymbia maculata (Spotted Gum), C. gummifera (Red Bloodwood), E. sideroxylon (Mugga Ironbark), and E. albens (White Box). Commonly used lerp infested trees include E. microcarpa (Inland Grey Box), E. moluccana (Grey Box) and E. pilularis (Blackbutt). Following winter they return to Tasmania where they breed from September to January.		Unlikely – highly fragmented habitat with no records within 10 km of study area	No
Litoria aurea	Green and Golden Bell Frog	E1	V	Since 1990, recorded from ~50 scattered sites within its former range in NSW, from the north coast near Brunswick Heads, south along the coast to Victoria. Records exist west to Bathurst, Tumut and the ACT region. The species is active by day and usually breeds in summer when conditions are warm and wet. Males call while floating in water and females produce a raft of eggs that initially float before settling to the bottom, often amongst vegetation. Tadpoles feed on algae and other plant-matter; adults eat mainly insects, but also other frogs.		Unlikely – no habitat present with no records within 10 km of study area	No
Litoria raniformis	Southern Bell Frog	E1	V	In NSW, only known to exist in isolated populations in the Coleambally Irrigation Area, the Lowbidgee floodplain and around Lake Victoria. A few recent unconfirmed records have also been made in the Murray Irrigation Area. Breeding occurs during the warmer months and is triggered by flooding or a significant rise in water levels. The species has been known to breed anytime from early spring through to late summer/early autumn. Outside the breeding season animals disperse away from the water and take shelter beneath ground debris such as fallen timber and bark, rocks, grass clumps and in deep soil cracks. Prey includes a variety of invertebrates as well as other small frogs, including young of their own species.		Unlikely – no habitat present with no records within 10 km of study area	No
Merops ornatus	Rainbow Bee-eater			Distributed across much of mainland Australia, including NSW. The breeding season extends from August to January. The nest is constructed in an enlarged chamber at the end of long burrow that is excavated by both sexes. Populations that breed in southern Australia are migratory, birds		Unlikely - no habitat present	No

Scientific name	Common name	BC Act	EPBC Act	Distribution and habitat	Habitat	Likelihood of occurrence	Impact Assessment Required
				moving north to northern Australia, Papua New Guinea and eastern Indonesia after breeding, and remaining there for the duration of the Australian winter. Its diet mainly consists of bees and wasps.		with no records within 10 km of study area	
Monarcha melanopsis	Black-faced Monarch		M	In NSW, occurs around the eastern slopes and tablelands of the Great Divide, inland to Coutts Crossing, Armidale, Widden Valley, Wollemi National Park and Wombeyan Caves. It is rarely recorded farther inland. The species spends summer and autumn in eastern Australia, and winters in southern and eastern Papua New Guinea from March to August. Breeds from October to March, in rainforest habitat.		No – no habitat present	No
Motacilla flava	Yellow Wagtail		M	Regular summer migrant to mostly coastal Australia. In NSW recorded Sydney to Newcastle, the Hawkesbury and inland in the Bogan LGA. Breeds Europe to Siberia and west Alaska,. Regular summer migrant to Australia (November-April).		Unlikely – no habitat present	No
Myiagra cyanoleuca	Satin Flycatcher		M	In NSW, widespread on and east of the Great Divide and sparsely scattered on the western slopes, with very occasional records on the western plains. Satin Flycatchers move north in autumn to spend winter in northern Australia and New Guinea and returning south in spring. In NSW, they depart between February and March and return between September and October. In NSW, breeding occurs between November and March, with a nest usually built in the high, exposed outer branches of a tree.		Unlikely – no habitat present	No
Numenius madagascariensis	Eastern Curlew		CE, M	Summer migrant to Australia. Primarily coastal distribution in NSW, with some scattered inland records. Breeds in Russia and north-eastern China, summer migrant to Australia August to May. Mainly forages on sheltered intertidal sandflats or mudflats, on saltflats and in saltmarsh, rockpools, coral reefs, and on ocean beaches. Roosts on sandy spits and islets, among saltmarsh or mangroves, on reef-flats, in the shallow water of near-coastal wetlands, and in trees.		Unlikely – no habitat present with no records within 10 km of study area	No

Scientific name	Common name	BC Act	EPBC Act	Distribution and habitat	Habitat	Likelihood of occurrence	Impact Assessment Required
Petrogale penicillata	Brush-tailed Rock-wallaby	E1	V	In NSW they occur from the Qld border in the north to the Shoalhaven in the south, with the population in the Warrumbungle Ranges being the western limit. Browse on vegetation in and adjacent to rocky areas eating grasses and forbs as well as the foliage and fruits of shrubs and trees. Shelter or bask during the day in rock crevices, caves and overhangs and are most active at night. Highly territorial and have strong site fidelity with an average home range size of about 15 ha. Breeding is likely to be continuous, at least in the southern populations, with no apparent seasonal trends in births.		Unlikely – no habitat present with no records within 10 km of study area	No
Pseudomys novaehollandiae	New Holland Mouse		V	Fragmented distribution across eastern NSW. It is a social animal, living predominantly in burrows shared with other individuals. Distribution is patchy in time and space, with peaks in abundance during early to mid stages of vegetation succession typically induced by fire.		Unlikely – no habitat present with no records within 10 km of study area	No
Pteropus poliocephalus	**Grey-headed Flying-fox**	**V**	**V**	**Along the eastern coast of Australia, from Bundaberg in Qld to Melbourne in Victoria. Roosting camps are generally located within 20 km of a regular food source and are commonly found in gullies, close to water, in vegetation with a dense canopy. Annual mating commences in January and a single young is born in October or November. Can travel up to 50 km from the camp to forage. Feed on the nectar and pollen of Eucalyptus, Melaleuca and Banksia species, and fruits of rainforest trees and vines. Also forage in cultivated gardens and fruit crops.**		**Potential – potential habitat in the referral area**	**yes**
Rhipidura rufifrons	Rufous Fantail		M	Coastal and near coastal districts of northern and eastern Australia, including on and east of the Great Divide in NSW. The southern subspecies Rhipidura rufifrons rufifrons is migratory, being virtually absent from south-east Australia in winter. Departure from the breeding areas is usually March to early April, most moving to coastal lowlands and off-shore islands in south-east Queensland, north to Cape York Peninsula and Torres Strait Island. Birds arrive back in south-east Australia mostly in September to November, and breed September to February.		Unlikely – no habitat present with no records within 10 km of study area	No

Scientific name	Common name	BC Act	EPBC Act	Distribution and habitat	Habitat	Likelihood of occurrence	Impact Assessment Required
Rostratula australis	Australian Painted Snipe	E1	E	In NSW most records are from the Murray-Darling Basin. Other recent records include wetlands on the Hawkesbury River and the Clarence and lower Hunter Valleys. Nests on the ground amongst tall vegetation, such as grasses, tussocks or reeds. The nest consists of a scrape in the ground, lined with grasses and leaves. Breeding is often in response to local conditions; generally occurs from September to December. Forages nocturnally on mud-flats and in shallow water. Feeds on worms, molluscs, insects and some plant-matter.		Unlikely – no habitat present with no records within 10 km of study area	No
Synemon plana	Golden Sun Moth	E1	CE	NSW populations are found in the area between Queanbeyan, Gunning, Young and Tumut. Adults are short-lived (one to four days) and do not feed - having no functional mouthparts; the larvae are thought to feed exclusively on the roots of wallaby grasses. Eggs are laid at the bases of wallaby grass tussocks. The flight period typically lasts from six to eight weeks (during November and December in the ACT region). Males fly only in bright sunshine during the warmest part of the day (1000 - 1400 hrs).		No – distribution does not overlap with referral area	No
Tringa nebularia	Common Greenshank		M	Summer migrant to Australia. Recorded in most coastal regions of NSW; also widespread west of the Great Dividing Range, especially between the Lachlan and Murray Rivers and the Darling River drainage basin, including the Macquarie Marshes, and north-west regions. Breeds Scotland to Siberia. Summer migrant to Australia September to April. Forages at edges of wetlands, mudflats, in channels, in shallows and on exposed seagrass beds. Roosts and loafs around wetlands, in shallow pools and puddles, or on rocks, sandbanks or small muddy islets.		Unlikely – no habitat present with no records within 10 km of study area	No
FLORA							
Acacia bynoeana	Bynoe's Wattle	E1	V	Found in central eastern NSW, from the Hunter District (Morisset) south to the Southern Highlands and west to the Blue Mountains. Seems to prefer open, sometimes slightly disturbed sites such as trail margins, edges of roadside spoil mounds and in recently burnt patches. Associated overstorey species include Red Bloodwood, Scribbly Gum, Parramatta Red Gum, Saw Banksia and Narrow-leaved Apple.		No – no habitat present with no records	No

Scientific name	Common name	BC Act	EPBC Act	Distribution and habitat	Habitat	Likelihood of occurrence	Impact Assessment Required
						within 10 km of study area	
Acacia pubescens	Downy Wattle	V	V	Restricted to the Sydney region around the Bankstown-Fairfield-Rookwood and Pitt Town area, with outliers occurring at Barden Ridge, Oakdale and Mountain Lagoon. Flowers from August to October. The pods mature in October to December. Recruitment is more commonly from vegetative reproduction than from seedlings. The percentage of pod production and seed fall for this species appears to be low.		No – no habitat present with no records within 10 km of study area	No
Allocasuarina glareicola		E1	E	Primarily restricted to the Richmond (NW Cumberland Plain) district, but with an outlier population found at Voyager Point, Liverpool. Common associated understorey species include *Melaleuca nodosa, Hakea dactyloides, Hakea sericea, Dillwynia tenuifolia, Micromyrtus minutiflora, Acacia elongata, Acacia brownei, Themeda australis and Xanthorrhoea minor*. Not killed outright by fire but resprouts from the rootstock. Spreads by vegetative means, such that clumps of up to 100s of stems may be a single individual.		No – no habitat present with no records within 10 km of study area	No
Cryptostylis hunteriana	Leafless Tongue Orchid	V	V	In NSW, recorded mainly on coastal and near coastal ranges north from Victoria to near Forster, with two isolated occurrences inland north-west of Grafton. The larger populations typically occur in woodland dominated by *Eucalyptus sclerophylla* (Scribbly Gum*), E. sieberi* (Silvertop Ash), *Corymbia gummifera* (Red Bloodwood) and *Allocasuarina littoralis* (Black Sheoak); appears to prefer open areas in the understorey of this community. Being leafless it is expected to have limited photosynthetic capability and probably depends upon a fungal associate to meet its nutritional requirements from either living or dead organic material. In addition to reproducing from seed, it is also capable of vegetative reproduction and thus forms colonies which can become more or less permanent at a site.		No – no habitat present with no records within 10 km of study area	No

Scientific name	Common name	BC Act	EPBC Act	Distribution and habitat	Habitat	Likelihood of occurrence	Impact Assessment Required
Cynanchum elegans	White-flowered Wax Plant	E1	E	Restricted to eastern NSW, from Brunswick Heads on the north coast to Gerroa in the Illawarra region, and as far west as Merriwa in the upper Hunter River valley. Flowering occurs between August and May, with a peak in November. The fruit can take up to six months to mature. Seed production is variable and unreliable. Seeds are wind dispersed. It is considered to be unlikely that a soil seed bank for this species exists. Plants are capable of suckering from rootstock in response to occasional slashing or grazing. The fire response of the species is unknown.		No – no habitat present with no records within 10 km of study area	No
Darwinia biflora		V	V	Recorded in Ku-ring-gai, Hornsby, Baulkham Hills and Ryde local government areas, in an area bounded by Maroota, North Ryde, Cowan and Kellyville. Flowering occurs throughout the year but is concentrated in autumn, with mature fruits being produced from May to August. Self-pollination is the usual form of pollination. Fire is an important factor in the life cycle of this species. Fire kills all plants, but also produces a flush of germination from seed stored in the soil. The number of individuals at a site then declines with time since fire, as the surrounding vegetation develops.		No – no habitat present with no records within 10 km of study area	No
Eucalyptus sp. Cattai		E4A		Between Colo Heights and Castle Hill, north-western Sydney.		No – no habitat present with no records within 10 km of study area	No
Genoplesium baueri	Bauer's Midge Orchid	E1	E	Has been recorded from locations between Nowra and Pittwater and may occur as far north as Port Stephens. Flowers February to March.		No – no habitat present with no records within 10	No

Scientific name	Common name	BC Act	EPBC Act	Distribution and habitat	Habitat	Likelihood of occurrence	Impact Assessment Required
						km of study area	
Grevillea parviflora subsp. parviflora	Small-flower Grevillea	V	V	Sporadically distributed throughout the Sydney Basin and in the Hunter in the Cessnock - Kurri Kurri area. Also known from Putty to Wyong and Lake Macquarie on the Central Coast. Plants are capable of suckering from a rootstock and most populations demonstrate a degree of vegetative spread, particularly after disturbance such as fire. Flowering has been recorded between July to December as well as April-May. Flowers are insect-pollinated and seed dispersal is limited. Seedling recruitment after fire is uncommon, and most recovery after disturbance appears to be gesprouting from rhizomes.		No – no habitat present with no records within 10 km of study area	No
Haloragis exalata subsp. exalata	Square Raspwort	V	V	Disjunct distribution in the Central Coast, South Coast and North Western Slopes botanical subdivisions of NSW. Flowering specimens in NSW are recorded from November to January.		No – no habitat present with no records within 10 km of study area	No
Micromyrtus minutiflora		E1	V	Restricted to the general area between Richmond and Penrith, western Sydney. Sporadic flowering, June to March Response to fire and mechanical disturbance is uncertain. Regeneration may be due to resprouting or germination of soil-stored seed		No – no habitat present with no records within 10 km of study area	No
Persicaria elatior	Tall Knotweed	V	V	In south-eastern NSW recorded from Mt Dromedary, Moruya State Forest near Turlinjah, the Upper Avon River catchment north of Robertson, Bermagui, and Picton Lakes. In northern NSW		No – no habitat present with no	No

Scientific name	Common name	BC Act	EPBC Act	Distribution and habitat	Habitat	Likelihood of occurrence	Impact Assessment Required
				known from Raymond Terrace (near Newcastle) and the Grafton area (Cherry Tree and Gibberagee State Forests).		records within 10 km of study area	
Persoonia hirsuta	Hairy Geebung	E1	E	Scattered distribution around Sydney, from Singleton in the north, along the east coast to Bargo in the south and the Blue Mountains to the west. It is usually present as isolated individuals or very small populations. It is probably killed by fire (as other Persoonia species are) but will regenerate from seed.		No – no habitat present with no records within 10 km of study area	No
Persoonia nutans	Nodding Geebung	E1	E	Restricted to the Cumberland Plain in western Sydney, between Richmond in the north and Macquarie Fields in the south. Peak flowering is from November to March with sporadic flowering all year round. An obligate seed regenerator. Seed germination is promoted by fire and also by physical disturbance. Although listed as a short-lived species much of the ecology is poorly known. Maturity is expected in about 10 years.		No – no habitat present with no records within 10 km of study area	No
Pimelea curviflora var. curviflora		V	V	Confined to the coastal area of the Sydney and Illawarra regions between northern Sydney and Maroota in the north-west and Croom Reserve near Albion Park in the south. Flowers October to May. It may not always be visible at a site as it appears to survive for some time without any foliage after fire or grazing, relying on energy reserves in its tuberous roots. Likely to be fire tolerant species capable of resprouting following fire due to the presence of a tap root. Seedlings have been observed following fire.		No – no habitat present with no records within 10 km of study area	No

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Pimelea spicata	Spiked Rice-flower	E1	E	Two disjunct areas; the Cumberland Plain (Marayong and Prospect Reservoir south to Narellan and Douglas Park) and the Illawarra (Landsdowne to Shellharbour to northern Kiama). Mature plants spread over short distances through underground rhizomes. Flowers may be self-pollinating, although fruit production is variable. A soil seedbank develops and is maintained in the presence of a suitable disturbance regime.		No – no habitat present with no records within 10 km of study area	No
Pomaderris brunnea	Brown Pomaderris	E1	V	In NSW, found around the Colo, Nepean and Hawkesbury Rivers, including the Bargo area and near Camden. It also occurs near Walcha on the New England tablelands. Flowers appear in September and October. The species has been found in association with Eucalyptus amplifolia, Angophora floribunda, Acacia parramattensis, Bursaria spinosa and Kunzea ambigua.		No – no habitat present with no records within 10 km of study area	No
Pterostylis gibbosa	Illawarra Greenhood	E1	E	Known from a small number of populations in the Hunter region (Milbrodale), the Illawarra region (Albion Park and Yallah) and the Shoalhaven region (near Nowra). The Illawarra Greenhood is a deciduous orchid that is only visible above the ground between late summer and spring, and only when soil moisture levels can sustain its growth. The leaf rosette grows from an underground tuber in late summer, followed by the flower stem in winter. After a spring flowering, the plant begins to die back and seed capsules form (if pollination has taken place).		No – no habitat present with no records within 10 km of study area	No
Pterostylis saxicola	Sydney Plains Greenhood	E1	E	Restricted to western Sydney between Freemans Reach in the north and Picton in the south. All species of Pterostylis are deciduous and die back to fleshy, rounded underground tuberoids. The time of emergence and withering has not been recorded for this species, however flowering occurs from October to December and may vary due to climatic conditions. The above ground parts of the plant whither and die following seed dispersal and the plant persists as a tuberoid until the next year. Typically occurs as scattered individuals or in small groups.		No – no habitat present with no records within 10	No

Scientific name	Common name	BC Act	EPBC Act	Distribution and habitat	Habitat	Likelihood of occurrence	Impact Assessment Required
						km of study area	
Pultenaea parviflora		E1	V	Endemic to the Cumberland Plain. Mainly from Windsor to Penrith and east to Dean Park, with outlier populations at Kemps Creek and Wilberforce. Flowering may occur between August and November depending on environmental conditions. Killed by fire and re-establishes from soil-stored seed. There is no evidence of vegetative spread. Germination can be prolific after a moderate to high intensity fire.		Unlikely – not identified during survey	No
Syzygium paniculatum	Magenta Lilly Pilly	E1	V	Only in NSW, in a narrow, linear coastal strip from Upper Lansdowne to Conjola State Forest.		No – no habitat present with no records within 10 km of study area	No
Thesium australe	Austral Toadflax	V	V	In eastern NSW it is found in very small populations scattered along the coast, and from the Northern to Southern Tablelands. Often found in association with Themeda australis (Kangaroo Grass). A root parasite that takes water and some nutrient from other plants, especially Kangaroo Grass. Flowers in spring.		No – no habitat present with no records within 10 km of study area	No

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