Appendix 2 – Biodiversity Assessment

26 Kissing Point Road and 266 Victoria Road Parramatta

Proposed Rezoning

Biodiversity Assessment Report

Report Number 630.11688

4 November 2016

Elton Consulting
PO Box 1488
BONDI JUNCTION NSW 1355

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26 Kissing Point Road and 266 Victoria Road Parramatta

Proposed Rezoning

Biodiversity Assessment Report

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1 INTRODUCTION

This Biodiversity Assessment Report has been prepared on behalf of Property NSW to support a planning proposal to amend of the *Parramatta Local Environmental Plan* (LEP) *2011* to allow for the redevelopment of surplus land in North Parramatta to create a new mixed use precinct.

The new precinct will provide a high density residential development with a diverse range of housing and retail and commercial development with the opportunity for research and education related employment in close proximity to existing and planned public transport nodes. The proposal will allow for the provision of over 2,500 dwellings and approximately with up to 40,000 m^2 of retail and commercial floor space.

The proposal will also deliver community facilities, a significant public open space network and a new public domain to meet the needs of the new community.

1.1 Background

Comprising two adjoining land parcels, the Ageing, Disability and Home Care (ADHC) facility at 266 Victoria Road, Parramatta and the former Macquarie Boys High School (MBHS) at 26 Kissing Point Road, the site encompasses approximately 19.4 hectares (ha) in the City of Parramatta local government area (LGA). The MBHS was closed by the Department of Education in 2008 and the site has been vacant since that time. The ADHC facility is still in operation; however, the site will be vacated by mid-2017.

Property NSW on behalf of Family and Community Services (FACS) and Department of Education (DE) have been charged with responsibility of divesting the site.

The site is located north of Rydalmere train station, on the north eastern corner of James Ruse Drive and Victoria Road intersection, bounded to the north by Kissing Point Road and Vineyard Creek to the east. The site is a 5-10 minute walk from Rydalmere train station, with the potential for improvements in connectivity to further enhance accessibility. The University of Western Sydney's North Parramatta and Parramatta campuses lie to the west and south of the site, offering the potential for synergies between education, research and employment.

The divestment and redevelopment of the site offers opportunities to:

- Provide a significant urban infill opportunity within the City of Parramatta LGA aligning with the broader Government objectives and the Sydney Metropolitan Strategy to increase and accelerate housing supply.
- Optimise the site's strategic location relative to the proposed Western Sydney Light Rail network in terms of increasing density along public transport corridors.
- Support FACS and DE's commitment to recycling of capital investment in new facilities to meet the needs of the community.

In line with the above and to provide certainty of housing supply to the market, job creation and development of underutilised assets, Property NSW has developed a concept plan to guide the redevelopment of the site. The concept plan seeks to satisfy the NSW Government's priorities for the precinct:

- Create a sustainable community with access to employment and education opportunities, community facilities and a high quality of life.
- Improve connectivity between the site and its surrounds in terms of transport, pedestrian and cycling networks and the open space network.
- Create a high quality public domain that is legible and activates the precinct.

- Enhance the riparian corridor along the boundary of the site with the potential to deliver the missing link in the Vineyard Creek Corridor and to support the development of Sydney's Green Grid.

To realise the vision for the site articulated in the concept plan, an amendment to the *Parramatta Local Environmental Plan (LEP) 2011* is required to allow for the redevelopment of surplus land in Parramatta to create a new mixed use precinct.

1.2 Description of the Site

The majority of the site is cleared and developed (**Figure 1**). There is a band of vegetation associated with the riparian corridor of Vineyard Creek and a smaller tributary along the eastern boundary of the site.

The majority of the site proposed for development has had a long history of vegetation clearing and disturbance. Historically, the site was cleared for agricultural purposes, with the 1943 aerial imagery of Sydney (**Figure 2**) revealing:

- a very open canopy of scattered trees across the MBHS land, with a patch of vegetation remaining along a section of Vineyard Creek; and
- clearing of virtually all of the FACS land aside from a narrow band of scattered trees along the creek.

The current topography suggests earthworks were undertaken to level the site for existing uses (**Figure 1**). There are several flatter benched areas running across the site, with artificial bunds at the site boundaries, including a steep artificial embankment along Vineyard Creek.

The site is characterised by cleared and developed land in the west, with vegetated land associated with Vineyard Creek along the eastern boundary. The cleared and developed land in the west of the site contains education buildings, residential dwellings as well as many internal roads and carparks. The land surrounding the buildings and infrastructure consists of exotic lawns, maintained garden beds and scattered patches of planted trees (some native to the area).

The site is currently zoned 'SP1 Educational Establishment' and 'R2 Low Density Residential' under Parramatta LEP 2011. The vegetation along the eastern boundary of the site (adjacent to Vineyard Creek, a tributary of the Parramatta River) is also mapped as an area of 'Biodiversity Protection' and 'Riparian Land and Waterways' in the LEP 2011.

1.3 Aims of the Study

The aims of this *Biodiversity Assessment Report* with respect to the site are:

- to identify the flora and fauna present on the site and/or likely to occur;
- to assess the likely impacts of the proposed rezoning and future development on the natural environment in general and on threatened biota in particular;
- to undertake a detailed assessment of likely impacts on flora and fauna pursuant to the *Environmental Planning & Assessment Act 1979* (EP&A Act) and the *Threatened Species Conservation Act 1995* (TSC Act);
- to consider all relevant environmental planning instruments with respect to flora and fauna matters, the site and the proposal;
- to identify any relevant threatened species, populations or communities and to carry out an assessment of significance in accordance with Section 5A of the EP&A Act and the 'Threatened Species Assessment Guidelines' (DECC 2007);

- to consider application of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act); and
- to identify suitable impact mitigation measures, in order to avoid or minimise adverse effects on flora and fauna.

The current concept plan for the site is provided in **Figure 3**.

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Site Details

FIGURE 1

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DFSI Historical Aerial Imagery (1943)

FIGURE 2

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Proposed Master Plan

FIGURE 3

2 METHODS

Preparation of this report involved a desktop review of available information, combined with a site inspection, ecological field survey and GIS mapping. Details are provided below, along with the qualifications of the project team responsible for preparation of the report.

2.1 Desktop Assessment

Existing information regarding relevant threatened and other native biota was also obtained from:

- the OEH *BioNet Atlas of NSW Wildlife* for previous records of threatened species (as listed under the TSC Act) for the locality (i.e. within a 10 km radius of the site);
- EPBC Act Protected Matters Search Tool (i.e. within a 10 km radius of the site)
- regional vegetation mapping (OEH 2013; NPWS 2002); and
- relevant published literature on threatened biota (see References).

Two previous ecological studies have been conducted on the site, one by Cumberland Ecology in 2012 and one by Ambrose Ecological Consultants in 2015. Both were reviewed as part of the desktop assessment for this report.

Ambrose (2015) completed ten 20 m x 20 m flora quadrats within the MBHS and Vineyard Creek, as well as habitat assessments for flora and fauna species. No nocturnal fauna surveys or trapping were completed. The study did not encompass the FACS land in the southern portion of the current study area.

Cumberland Ecology (2012) conducted a diurnal inspection of the site involving vegetation mapping. No nocturnal fauna surveys or trapping were completed.

2.2 Field Work

Field work completed by SLR as part of the current investigation involved the following:

- a preliminary site inspection by one ecologist on 21 June 2016 as part of a project inception meeting with the project team. Photos and general notes of the extent, type and condition of vegetation and habitats were taken, noting potential sampling locations for the field survey;
- a detailed site survey by two ecologists on 25 July 2016. The survey was completed over one day and involved completion of a range of flora and fauna survey techniques listed below; and
- a follow-up site inspection on 15 August 2016, which involved completion of vegetation sampling and mapping and collection of cameras and bat detectors that were deployed during the detailed site survey.

The site survey involved assessments of the vegetation and habitats across the site using the following techniques:

- collection of site photographs as photo points;
- collection of floristic data, including two 20 metre (m) x 20 m flora sample quadrats and species list compilation;
- collection of an opportunistic fauna species list;
- a general survey of the flora and fauna - noting the nature of the vegetation across the site and recording any notable fauna habitat features (e.g. tree hollows);
- a review of vegetation mapping – recording any areas of remnant or regrowth natural vegetation and assessing vegetation type and condition;

- targeted searches for threatened plants using the 'random meander' technique (*sensu* Cropper 1993) through areas of suitable habitat;
- targeted searches for threatened fauna in vegetated riparian areas using one infrared camera (targeting terrestrial mammals) and one AnaBat detector (targeting microchiropteran bats); and
- general searches for evidence of threatened fauna and/or their habitats.

See **Figure 4** for the location of photo points, hollow-bearing trees, quadrats, infrared stations and AnaBat stations.

The weather during the survey on the 25 July 2016 was typical of the time of year with clear skies, cool temperatures and moderate south-west winds. Temperatures ranged from 13^{o}C to 19^{o}C.

Weather recorded during the two week infrared camera and AnaBat monitoring period was similar, with predominantly clear skies and westerly winds, with some milder temperatures. Night time minimum temperatures were generally around 10^{o}C dropping to as low as 7^{o}C on one night.

2.3 Staff Qualifications

The roles and qualifications of all staff responsible for preparation of this report are listed **Table 1**.

Table 1 Staff Roles and Qualifications

Staff Name	Project Role	Qualifications
Matt Consterdine	Ecologist	Bachelor of Environmental Science & Management, University of Newcastle, 2011
Fiona Iolini	Senior Ecologist	Bachelor of Environmental Science & Management, University of Newcastle, 2007 Certificate III in Conservation and Land Management, TAFE NSW, 2015
Jeremy Pepper	Principal Ecologist	Bachelor of Science (Hons Class 1) University of NSW 1996 Cert. II Bushland Regeneration, TAFE NSW Cert. III Horticulture (Arboriculture), TAFE NSW
Louise Hibbert	CAD/GIS Draftsperson	Dip Architectural Technology, 2007 Cert IV Civil Construction Design, 2012

2.4 Limitations

The diurnal fauna surveys on the site were undertaken over two days. One infrared camera and one Anabat detector were set up in riparian vegetation areas for two weeks duration. Whilst a number of species were recorded, a longer survey involving nocturnal inspections of the site would likely uncover a larger fauna assemblage. Duration of survey techniques are typically required to cover at least one week and may not meet the NSW *Threatened Biodiversity Survey and Assessment Guidelines* (NSW Department of Environment and Conservation, 2004) for a number of the relevant threatened species. However, the survey design was appropriate and suited to the nature and condition of the site and the time of year (being winter).

The flora survey was not conducted during the flowering times of some of the threatened flora species known to occur in the locality. However, the presence of such species on the site is highly unlikely due to the degraded, disturbed and exotic status of most of the vegetation present.

Due to these limitations, priority was given to habitat identification and assessment for relevant threatened species. Favourable habitat features and characteristics for relevant species were noted and used to further define the likelihood of occurrence of these species on the site.

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Survey Details

FIGURE 4

3 FLORA AND VEGETATION

3.1 Vegetation Communities

3.1.1 Existing Information

The vegetation on the site has been mapped by various government agencies and other ecological consultancies, as part of broad-scale mapping or site specific preliminary investigations. The following summarises the findings of these studies:

- The Native Vegetation of the Sydney Metropolitan Area (OEH 2013) maps two patches of vegetation along the bed of Vineyard Creek as Sydney Turpentine Ironbark Forest (STIF). STIF is listed as an Endangered Ecological Community (EEC) on the TSC Act and a Critically Endangered Ecological Community (CEEC) on the EPBC Act. See **Figure 5** for OEH (2013) mapping of the site.
- The Cumberland Plain Mapping Project (NPWS 2002) maps the site as Shale Sandstone Transition Forest (SSTF) (High Sandstone Influence) with a less than 10% canopy cover. SSTF is listed as a CEEC on both the TSC Act and EPBC Act; however, according to NPWS (2002) some patches of less than 10% canopy cover may no longer represent the CEEC. See **Figure 6** for NPWS 2002 mapping of the site.
- Cumberland Ecology (Robertson 2012) prepared a Due Diligence Ecological Assessment for the MBHS site and a small adjoining lot to the south (Lot 1 DP 247855). Native vegetation communities mapped by Cumberland Ecology include a few small patches of Yellow Box Open Forest and Forest Red Gum Forest along Vineyard Creek. They also mapped a few patches of Blue Gum High Forest around the buildings in the west of the school. They determined that the Blue Gum High Forest met the criteria of the CEEC on the TSC Act but not the EPBC Act.
- Ambrose Ecological Services (2015) prepared an Ecological Constraints Assessment for the high school site (Lot 1 DP128413) which determined that the vegetation along the riparian corridor and along the access driveway to the school buildings is SSTF, and qualifies as CEEC.

The confusion surrounding the vegetation types on the site is likely attributed to the long history of clearing, the scarcity of native vegetation present, smothering by invasive vines and other weeds, the inaccessible nature of the vegetation along Vineyard Creek and the planting and self-recruiting of ornamental *Eucalyptus* trees ('eucalypts') across the site.

3.1.2 Developed Land

In areas occupied by recent land uses, scattered mature eucalypts amongst exotic lawns and garden beds occur between some of the buildings, along internal roads and within landscaped sections of the site. These include species that have typically been planted around Sydney since the 1980's (Klaphake 2012) such as Spotted Gum *Corymbia maculata*, Red-flowering Gum *C. ficifolia*, Lemon-scented Gum *C. citriodora*, Sydney Blue Gum *Eucalyptus saligna*, Swamp Mahogany *E. robusta*, Yellow Box *E. melliodora*, Bangalay *E. botryoides*, Tallowwood *E. microcorys*, Narrow-leaved Black Peppermint *E. nicholii* and Wallangarra White Gum *E. scoparia*.

In addition, a number of smaller native tree and shrub species have been planted including Swamp Oak *Casuarina glauca*, Magenta Lilly Pilly *Syzygium paniculatum*, Coast Myall *Acacia binervia*, White Wattle *A. linifolia*, Lilly Pilly *Acmena smithii*, Water Gum *Tristaniopsis laurina*, Plum Pine *Podocarpus elatus*, Lemon-scented Teatree *Leptospermum petersonii*, as well as bottlebrushes *Callistemon* spp., grevilleas *Grevillea* spp. and paperbarks *Melaleuca* spp. Many of the planted native species are not indigenous to the Sydney region.

In the north-eastern corner of the site, Vineyard Creek extends to the east and a smaller drainage line runs north along the bottom of the embankment, creating a triangular flat area. The flat area contains an old bitumen road loop and a bridge over the small drainage line. The vegetation here contains planted Swamp Mahogany *Eucalyptus robusta*, Tallowwood *E. microcorys* and Yellow Box *E. melliodora* with overgrown lawn (comprising predominantly Kikuyu *Pennisetum clandestinum*) and weeds. The Yellow Box *E melliodora* appears to have self-recruited with several saplings observed.

Similarly, the few individual specimens of planted Sydney Blue Gum *Eucalyptus saligna* amongst the relict school buildings in the former MBHS land do not constitute the BGHF CEEC. Based on the site history and the current observations, none of the vegetation on the recently occupied portions of the site (including the small area of bitumen in the north-eastern corner of the site) is remnant, therefore there are no native vegetation communities at these locations.

With regard to other areas previously mapped (OEH 2013; NPWS 2002) as threatened ecological communities, there is a small linear patch of Weeping Grass *Microlaena stipoides* with some Fishweed *Einadia trigonis* and a couple of scattered Parramatta Wattle *Acacia parramattensis* along a ditch at the northern boundary of the MBHS land. There are also two individual Rough-barked Apple *Angophora floribunda* trees amongst exotic and planted vegetation nearby. Whilst vegetation in this area has been mapped by others as SSTF, due to the history of earthworks and the overwhelming majority of exotic and planted vegetation present, this small area does not constitute a native plant community and does not meet the criteria for the SSTF CEEC on either the TSC Act or the EPBC Act.

3.1.3 Riparian Areas

The historic aerial imagery (**Figure 2**) highlights the drastic changes to the site and surrounds which have occurred over the past 70 years. The developed nature of the catchment to Vineyard Creek has modified the characteristics of the creek line, changing the nature of the bed and banks and has intensified the velocity and volume of the flow along the creek.

Virtually all of the vegetation along Vineyard Creek is comprised of noxious and problematic weed species including Camphor Laurel *Cinnamomum camphora*, Coral Tree *Erythrina x sykesii*, Large-leaved Privet *Ligustrum lucidum*, Small-leaved Privet *Ligustrum sinense*, African Olive *Olea europaea*, Lantana *Lantana camara*, Fishpole Bamboo *Phyllostachys aurea*, Balloon Vine *Cardiospermum grandiflorum*, Madeira Vine *Anredera cordifolia*, Morning Glory *Ipomoea indica*, Rambling Dock *Acetosa sagittata*, Blackberry *Rubus anglocandicans* and Wandering Jew *Tradescantia fluminensis*. In the southern areas, most of the riparian vegetation has been removed due to clearing and mowing as part of maintenance and landscaping activities.

The only native vegetation present includes:

- planted native trees along the top edge of the western embankment of Vineyard Creek, associated with the school and community services centre;
- a few stands of planted and/or self-recruited non-indigenous Flooded Gum *Eucalyptus grandis*, in the creek line at the southern end of the site;
- a few specimens of mature to over-mature age Red Mahogany *Eucalyptus resinifera* and Smooth-barked Apple *Angophora costata* within the central portion of the creek bed;
- a few scattered small trees including Sweet Pittosporum *Pittosporum undulatum*, Cheese Tree *Glochidion ferdinandi*, Black She-oak *Allocasuarina littoralis* and Tree Violet *Melicytus dentatus*; and
- a small patch of Woollybutt *Eucalyptus longifolia* and Smooth-barked Apple *Angophora costata* with some native understorey and groundcover at the creek edge in the northeast of the site.

The patch in the north of the site runs along the edge of Vineyard Creek and is just south of the area of bitumen in the north-eastern corner of the site (**Figure 7**).

The small patch which might resemble remnant native vegetation appears to have been present in the historic aerial imagery (**Figure 2**) and contains a few Smooth-barked Apple *Angophora costata*, Woollybutt *Eucalyptus longifolia*, Forest Red Gum *E. tereticornis* and Red Mahogany *E. resinifera*, with some Parramatta Wattle *Acacia parramattensis*, native grasses (Weeping Grass *Microlaena stipoides* and Two-colour Panic *Panicum simile*) and herbs (Fishweed *Einadia trigonis*, *Glycine clandestina*, *Dianella caerulea* and Kidney Weed *Dichondra repens*).

Whilst Smooth-barked Apple *A. costata*, Woollybutt *E. longifolia* and Red Mahogany *E. resinifera* are not listed as characteristic species in the Final Determination for SSTF (REF), NPWS (2002) includes these species in its diagnostic species list for SSTF, albeit classified as uninformative. Nonetheless, the vegetation present within the riparian corridor on the site is likely to have once existed as Shale Sandstone Transition Forest. As such, the small patch with remaining canopy, understorey and groundcover layers is mapped as SSTF and constitutes the CEEC.

3.2 Flora Species

A total of 116 species of flora, including 54 natives (26 planted), 62 exotic species were recorded during the survey. Of the exotic species, 19 are listed under the NSW *Noxious Weeds Act 1993* within the Parramatta LGA (see **Table 2**). A total of 12 native species found on the site are listed as characteristic of the Shale Sandstone Transition Forest. The majority of the flora observed on the site is exotic and/or planted. A plant species list for the site is included in **Appendix B**.

Two flora survey quadrats were undertaken in areas that were mapped as native vegetation by Cumberland Ecology (Robertson 2012). Quadrat 1 was set up in the area mapped as Forest Red Gum Forest and Quadrat 2 in the area mapped as Yellow Box Forest.

Quadrat 1 contains a canopy of Forest Red Gum *Eucalyptus tereticornis* to 25 metres in height, with a scattered understorey (5-25 % cover[1]) of Lantana *Lantata camara* and Green Cestrum *Cestrum parquii* and a dense groundcover (75-100 % cover) of Balloon Vine *Cardiospermum clandestinum*, with a few other scattered weeds at less than 25 % cover (e.g. Fennel *Foeniculum vulgare*, Madeira Vine *Anredera cordifolia*, Kikuyu *Pennisetum clandestinum* and Goosegrass *Galium aparine*).

Quadrat 2 contains a canopy of Yellow Box *Eucalyptus melliodora* to 30 m height, with a cover of 25-50 %. The understorey is around 3 metres in height and includes only exotic species, the most abundant being Lantana *Lantana camara*, Large-leaved Privet *Ligustrum lucidum* and Madeira Vine *Anredera cordifolia*, with a single Jacaranda *Jacaranda mimosifolia*.

The groundcover is dominated by exotic Kikuyu *Pennisetum clandestinum* at 25-50 % cover, with exotic herbs and grasses (e.g. Cobblers Peg *Bidens pilosa*, Wandering Jew *Tradescantia fluminensis*, Mother of millions *Bryophyllum delagoense* and Paddy's Lucerne *Sida rhombifolia*) and two native species (Fishweed *Einadia trigonos* and Weeping Grass *Microlaena stipoides*) at 5-25%. Other exotic species recorded at less than 5 % cover included Spider Plant *Chlorophytum comosum*, Dandelion *Taraxacum officinale*, Twiggy Turnip *Brassica fruticulosa*, Panic Veldtgrass *Ehrharta erecta*, African Lovegrass *Eragrostis curvula* and Paspalum *Paspalum dilatatum*.

The results, in terms of flora data collected from the two quadrats, showed no native vegetation communities are present at these locations.

1 Cover in this context is defined as foliage projective cover.

Table 2 Noxious Weeds on the Site (DPI 2016 – Parramatta LGA listings)

Class	Species	Actions
2	Brazilian Pepper Tree *Schinus terebinthifolius*	The plant must be eradicated from the land and that land must be kept free of the plant
3	Green Cestrum *Cestrum parqui*	The plant must be fully and continuously suppressed and destroyed
4	Asparagus 'Fern' *Asparagus aethiopicus*, Bridal Creeper *Asparagus asparagoides,* Fireweed *Senecio madagascariensis,* Madeira Vine *Anredera cordifolia,* Yellow Bignonia *Tecoma stans,* Coastal Morning Glory *Ipomoea cairica*, Morning Glory *Ipomoea indica,* Mother of millions *Bryophyllum delagoense,* Castor Oil Plant *Ricinus communis,* Large-leaved Privet *Ligustrum lucidum,* Small-leaved Privet *L. sinense,* African Olive *Olea europaea* subsp. *cuspidata,* Giant Reed *Arundo donax*, Fishpole Bamboo *Phyllostachys aurea,* Blackberry *Rubus anglocandicans*, Balloon Vine *Cardiospermum grandiflorum* and Lantana *Lantana camara*	The growth of the plant must be managed in a manner that continuously inhibits the ability of the plant to spread, and/or the plant must not be sold, propagated or knowingly distributed

Scale: 1:2,500
GDA 1994 MGA Zone 56

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Threatened Ecological Communities (TECs)

Vegetation communiteies that relate to current NSW TECs are identified in the map legend with a *
Vegetation communites that relate to current Commonwealth TECs are identified in the map legend with a #

VIS Map Catalogue Number. VIS3817 (OEH website)
http://www.environment.nsw.gov.au/research/Vegetationinformationsystem.htm

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OEH Vegetation Mapping (2013)

FIGURE 5

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NPWS Vegetation Mapping (2002)

FIGURE 6

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SLR Vegetation Mapping

FIGURE 7

4 FAUNA SPECIES AND FAUNA HABITAT

4.1 Fauna Habitats

The majority of the site is cleared and developed, consisting of buildings, carparks, maintained gardens and lawn areas with planted trees. Habitat for native fauna in this area is limited and only species that are tolerant of urban and peri-urban environments are likely to occur.

The vegetated portions of the site, which are confined mainly to the riparian zone of Vineyard Creek and its tributary, contain dense areas of noxious and environmental weed species with a small area of disturbed Shale Sandstone Transition Forest (SSTF) (**Figure 7**). Marginal quality habitat for most native fauna groups is available and features such as hollow-bearing trees, flowering shrubs, ground logs, wood debris, leaf litter and rock rubble are only present in small quantities.

The riparian corridor of Vineyard Creek contains patches and isolated specimens of eucalypt trees, some of which contain hollows. Tree hollows are an important resource for many Australian fauna species, particularly those that rely on hollows for roosting, nesting, shelter and protection. Although a detailed inventory of tree hollows was not conducted as part of this study, a small number of trees within the riparian corridor contain hollows of various sizes. Accordingly it may be assumed that a certain proportion of these hollows may represent useful resources for local populations of birds, microchiropteran bats and arboreal mammals.

The understorey of the riparian vegetation is largely exotic, with canopy trees and shrubs smothered by invasive climbers and shrubs, most notably Privet *Ligustrum* spp., Lantana *Lantana camara* and Balloon Vine *Cardiospermum grandiflorum*. This noxious weed cover provides some limited foraging and shelter opportunity mainly for smaller birds and mammals.

Vineyard Creek contains potential habitat for urban tolerant amphibian species, such as Common Eastern Froglet (*Crinia signifera*), Striped Marsh Frog (*Limnodynastes peronii*) or Dwarf Green Tree Frog (*Litoria fallax*). Likewise, the vegetated riparian areas could contain habitat for a number of common reptiles such as the Eastern Water Dragon and Garden-Sun Skink. This watercourse is highly modified form its original conditions, with evidence of stormwater pollution, placement of fill, rubbish dumping and gully erosion. Dense thickets of weeds choke the banks of the creek in the northern section. In the southern section, most of the original native riparian vegetation has evidently been removed due to clearing and mowing as part of maintenance and landscaping activities. The remaining vegetation is largely exotic.

The vegetation along Vineyard Creek forms part of a larger corridor extending northward to Vineyard Creek Reserve and southward to Parramatta River. Whilst there is some vegetation connectivity between the site and adjoining or nearby areas, at least in the tree canopy layer, there are substantial barriers that would hinder the movement of native fauna and dispersal of native plant propagules (i.e. pollen, seeds). In relation to the north-south riparian corridor of Vineyard Creek within the site, Victoria Road forms a hostile barrier to fauna movement to the south, whilst Kissing Point Road, forms a similar barrier to the north. In addition, the poor condition of the vegetation and habitats, as well as surrounding residential development and rail line to the east, limit the connectivity and value of these areas as natural habitat and dispersal corridors for flora and fauna.

Aquatic habitats within Vineyard Creek are considered to be of low quality due to high disturbance, extensive weed infestation, high levels of bank and channel erosion as well as polluted water inputs (roads and stormwater runoff). Nonetheless, it is possible that disturbance tolerant aquatic species (including reptiles, fish and macroinvertebrates) could utilise the creek line as habitat and as a movement passage throughout the wider landscape.

4.2 Fauna Species

A fauna assemblage of 29 fauna species, comprising 28 native species and one introduced species was recorded on the site during the investigations (**Appendix C**). The native fauna recorded include 22 birds, four mammals one amphibian and one reptile.

The only amphibian species recorded was the Common Eastern Froglet (*Crinea signifera*), which is tolerant of disturbed sites and is known to occur in urban and peri-urban environments. Overall, the nature and condition of the aquatic and riparian habitats within Vineyard Creek are not suited to most native frog species.

Only one reptile, the Garden Sun-skink (*Lampropholis delicata*), was observed along the creek during the survey period. Other reptile species which are common in urban and peri-urban environments (such as the Common Blue-tongue Lizard, Eastern Water Dragon and Eastern Water Skink) could also utilise the site, at least on occasion.

Twenty-two native bird species have been recorded in the site (**Appendix C**), all of which occur commonly in urban and peri-urban environments. Whilst the site could theoretically be utilised on a temporary basis by individuals of some of the more wide-ranging threatened bird species known to occur in the locality, the highly modified and disturbed nature and the small size of the relevant vegetation present indicates that the site would not be important for any of these species.

Two arboreal mammals were recorded via scat analysis, the Common Ringtail Possum and Common Brush-tail Possum. These records were found within the northern riparian areas of Vineyard Creek. Both species are tolerant to urban environments and are likely to be relatively widespread in similar habitats throughout this area of Sydney. The presence of other arboreal mammals is unlikely, as most are likely to be more forest dependent, and require better quality habitat.

Two microchiropteran bats ('microbats') were recorded using Anabat detectors, the Eastern Bentwing-Bat (*Miniopterus schreibersii oceanensis*) and the Southern Forest Bat (*Vespadelus regulus*). Both records were of 'probable' confidence, meaning there is some possibility of confusion of calls with those of other bat species. The Eastern Bentwing-Bat is listed as 'vulnerable' under the TSC Act. The Southern Forest Bat is not listed as threatened. It is likely that a range of other microbat species would utilise the site for foraging and possibly shelter. The survey was conducted in winter months when most microbat species are less active. The working draft guidelines on threatened species surveys (DEC 2004) note that the ideal survey period for microbats is between October and March. Accordingly, it is likely that a similar survey conducted during warmer months would reveal a greater number of microbat species within the site, particularly within the riparian vegetation of Vineyard Creek. However, potential roosting resources for microbats (e.g. caves, tunnels, tree-hollows) within the site are limited to a few hollow bearing trees within the riparian corridor, and so the most likely scenario is that microbats utilise the site for foraging purposes, gleaning insects above and below the tree canopy along Vineyard Creek.

A Red Fox *Vulpes vulpes* was recorded using Infrared cameras (the only species recorded on camera) positioned in the riparian vegetation of Vineyard Creek (see location in **Figure 4**). Whilst this was the only introduced mammal species recorded, it is likely that other feral mammals, such as rabbits, cats, mice and rats occur within the site. The presence of native ground mammals, such as rats, antechinus and bandicoots, is unlikely given the lack of suitable habitats and the presence of feral predators.

5 THREATENED BIOTA

5.1 Threatened Species Conservation Act 1995

The OEH *BioNet Atlas of NSW Wildlife* database was used to generate a list of all threatened biota, as listed on the TSC Act, previously recorded within the locality (Appendix **D**). The locations of previous threatened species records are displayed in **Figure 8**.

Given the disturbed nature of the majority of the site and the general locality, it is unlikely that threatened species would occur on the site other than the wide ranging and highly mobile fauna species such as microchiropteran bats or various urban bird species (during foraging activities or dispersal movements). The Eastern Bentwing Bat (*Miniopterus schreibersii oceanensis*) was recorded within the riparian vegetation of Vineyard Creek.

Recent ecological surveys by other consultants (Robertson 2012, Ambrose 2015) have not record any threatened flora or fauna species.

5.1.1 Threatened Ecological Communities

As detailed in **Section 3.1**, government agencies and other ecological consultancies have mapped the site as containing various 'Threatened Ecological Communities' (TECs) listed on the TSC Act and EPBC Act, including Shale Sandstone Transition Forest, Sydney Turpentine Ironbark Forest and Blue Gum High Forest.

SLR studies revealed a small patch of native vegetation is present along Vineyard Creek in the north of the site (**Figure 7**). This vegetation constitutes Shale Sandstone Transition Forest (SSTF), which is listed as a 'Critically Endangered Ecological Community' (CEEC) on both the TSC Act and EPBC Act. This vegetation is outside the development footprint and will not be impacted by the proposal.

The other areas of vegetation across the site are planted or exotic and do not represent native vegetation or indeed TECs.

5.1.2 Threatened Flora Species

A total of 42 threatened plant species have been recorded within a 10 km radius of the site.

Three species recorded as planted trees across the site are listed threatened species:

- Wallangarra White Gum *Eucalyptus scoparia* is listed as 'endangered' in the TSC Act and 'vulnerable' in the EPBC Act – the species naturally occurs at a few locations on the border of NSW and QLD;
- Narrow-leaved Black Peppermint *E. nicholii* is listed as 'vulnerable' in the TSC Act and EPBC Act – the natural distribution of the species is restricted to the New England Tablelands; and
- Magenta Lilly Pilly *Syzygium paniculatum* is listed as 'endangered' in the TSC Act and 'vulnerable' in the EPBC Act – the species is known to occur naturally in the Sydney region.

The three species have long been popular horticultural plants in Sydney, and such garden plantings are not regarded as properly representing the "*threatened species*". Based on the natural distributions and the nature of the site (being cleared and landscaped) the specimens of Wallangarra White Gum *E. scoparia*, Narrow-leaved Black Peppermint *E. nicholii* and Magenta Lilly Pilly *S. paniculatum* on the site are obviously horticultural plantings. The specimens of Wallangarra White Gum *E. scoparia*, Narrow-leaved Black Peppermint *E. nicholii* and Magenta Lilly Pilly *S. paniculatum* are not representative of the "*threatened species*", and their removal is of no biodiversity conservation relevance.

Targeted surveys for threatened flora species undertaken as part of this investigation and previous investigations by others (Robertson 2012; Ambrose 2015), have failed to detect any other threatened species of flora. Given the widespread and dense cover of exotic plants in the ground layer and understorey across the site, as well as significant historical disturbance, it is unlikely that any naturally occurring threatened flora species would exist on the site.

5.1.3 Threatened Fauna Species

Analysis of the OEH *BioNet Atlas of NSW Wildlife* threatened species records revealed a large assemblage of threatened fauna species occurring within a 10 km radius of the site. No previous records of threatened fauna species have been identified on the site and only a few species of threatened fauna occur within a 3 km radius of the site.

A total of 48 threatened fauna species have been recorded within a 10 km radius of the site. Of these, 13 threatened terrestrial mammals have been recorded within a 10 km radius of the site (comprising eight microchiropteran bats, the Grey-headed Flying-fox, two arboreal mammals and two ground mammals), most of which are forest-dependent. The majority of these species are highly unlikely to occur on the site, with the exception of individuals of some microchiropteran bat species and the Grey-headed Flying-Fox. The Eastern Bentwing- Bat (*Miniopterus schreibersii oceanensis*) was recorded within the riparian vegetation of Vineyard Creek. This species could use the site for foraging purposes and could potentially shelter in the small number of hollow-bearing trees recorded within the riparian vegetation or even within the abandoned Macquarie Boys High School buildings. Other threatened microchiropteran bats could potentially occur on the site (particularly within riparian areas), at least on an occasional basis as part of foraging activities. Notably, there is no evidence of a camp or colony of Grey-headed Flying-Fox on or near to the site.

The site does not provide habitat for the Red-crowned Toadlet. Vineyard Creek represents low condition potential habitat for the Green & Golden Bell Frog; however, this species generally occurs in freshwater ponds and wetlands, rather than creeks, and based on the lack of recent records in the locality, and poor condition of aquatic habitats, is not likely to occur on the site.

A total of 33 threatened bird species have been recorded within 10 km of the site. It is possible that individuals of some wide-ranging threatened species (particularly those tolerant of urban and peri-urban environments) could occur on a temporary basis, the site would unlikely constitute a significant area of habitat for even individuals of these species due to its small size, disturbed nature and the general nature of the locality. There are numerous records of the Powerful Owl within three kilometres of the site and it is possible that the site forms part of the home range (containing foraging habitat) of any locally occurring Powerful Owls. There are unlikely to be any hollow trees on site that could offer large enough hollows for nesting by this species.

The areas of native vegetation on the site (predominantly the small patch of SSTF in the riparian corridor) could theoretically provide potential habitat for the threatened Cumberland Plain Land Snail. This species occurs under leaf litter and debris in areas of woodland in western Sydney. This habitat is not present on the majority of the site, particularly within areas proposed for development. Moreover, there are no previous records of this species on the site or within a 5 km radius of the site and so the likelihood of its presence is low.

5.1.4 Endangered Populations

Three endangered fauna populations have been recorded within a 10 km radius of the site, including:

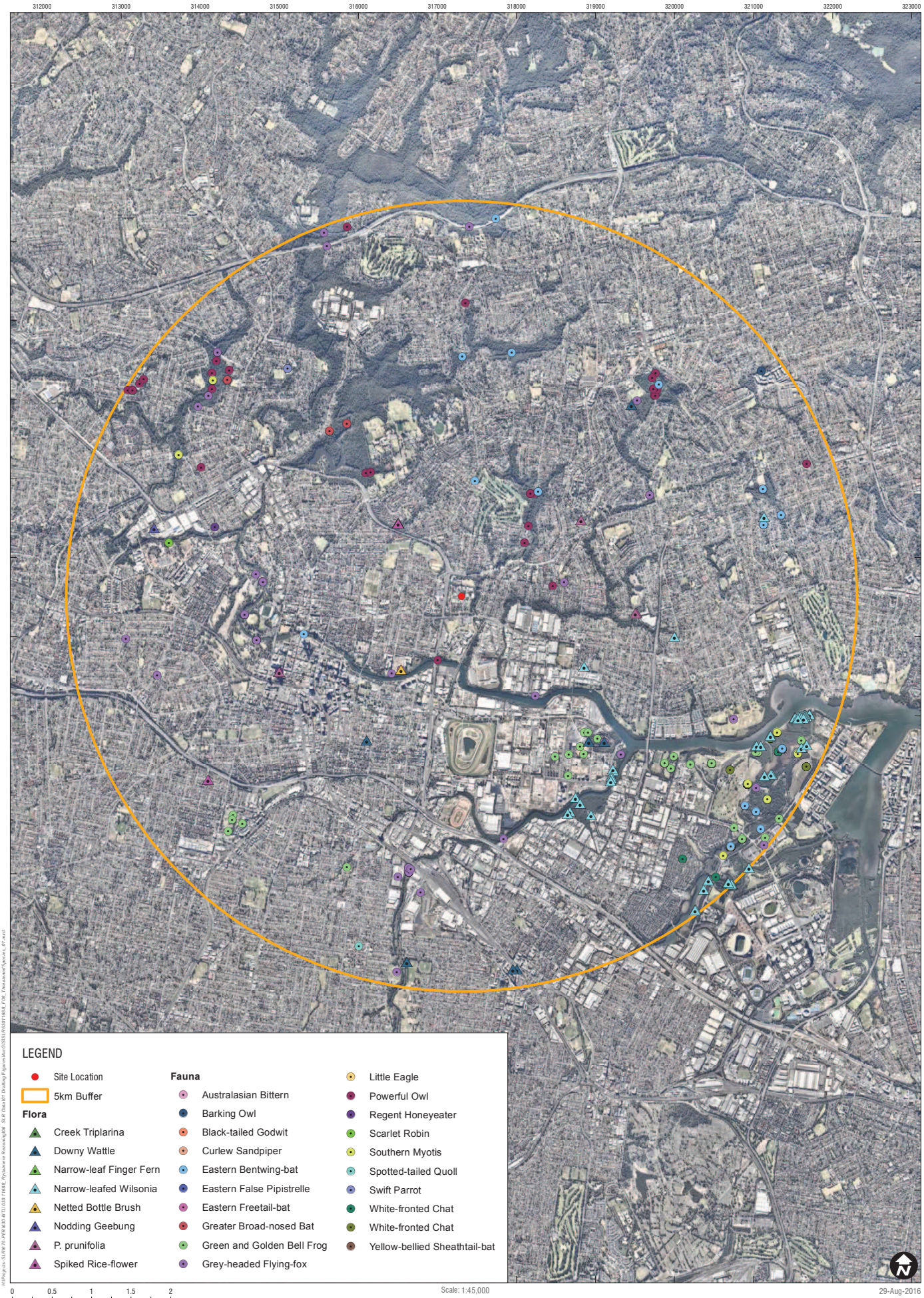
- Gang-gang Cockatoo population in the Hornsby and Ku-ring-gai Local Government Areas;
- White-fronted Chat population in the Sydney Metropolitan Catchment Management Area; and
- Long-nosed Bandicoot population in inner western Sydney.

These populations are not located in the areas surrounding the site and only marginal habitat occurs within the riparian vegetation of Vineyard Creek, which is to be retained in any case.

Three endangered populations of flora occur within a 10 km radius of the site, being:

- Tadgell's Bluebell in the local government areas of Auburn, Bankstown, Baulkham Hills, Canterbury, Hornsby, Parramatta and Strathfield;
- *Pomaderris prunifolia* in the Parramatta, Auburn, Strathfield and Bankstown Local Government Areas; and
- *Marsdenia viridiflora R. Br.* subsp. *viridiflora* population in the Bankstown, Blacktown, Camden, Campbelltown, Fairfield, Holroyd, Liverpool and Penrith local government areas.

No evidence of these endangered populations was recorded on the site. There are no previous records Tadgell's Bluebell or *M.viridiflora* populations within 5 km of the site. A record of *P. prunifolia* occurs approximately 2 km to the northeast of the site, however, the species has not been detected despite detailed surveys, and given the highly disturbed nature of the site and its riparian corridor these species are unlikely to occur.



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Threatened Species Records (NSW Wildlife Atlas)

FIGURE 8

5.2 Environment Protection Biodiversity Conservation Act 1999

The Protected Matters Search Tool (PMST, DoE 2015) was used to generate a list of matters of national environmental significance (and their habitats) predicted to occur in the locality of the site at Parramatta. The search results are presented in **Appendix E**.

Taking into consideration the PMST search results and the nature and condition of the habitats recorded on the site, relevant EPBC Act matters in relation to the site are:

- listed threatened species, with some bird and bat species possibly foraging or roosting on the site (e.g. Swift Parrot, Grey-headed Flying Fox or Large-eared Pied Bat);
- listed migratory species, with individuals of some terrestrial migratory species possibly flying over the site on a seasonal or transient basis; and
- Shale Sandstone Transition Forest (SSTF), which is listed as a CEEC on the EPBC Act and is present along Vineyard Creek in the north-eastern corner of the site (**Figure 7**).

Given the disturbed nature of the majority of the site and the general locality, it is unlikely that threatened species would occur on the site other than the wide ranging and highly mobile fauna species such as microchiropteran bats or various urban bird species (during foraging activities or dispersal movements). The patch of SSTF will not be impacted by the proposed rezoning.

6 IMPACT ASSESSMENT

6.1 General Flora and Fauna Impacts

Whilst the proposed development will require the removal of some native vegetation from the site, there are a number of relevant considerations in assessing the potential or likely impacts of the proposal. Relevant matters in this assessment include:

- The majority of trees and understorey species that will be removed are predominantly planted natives or exotic garden species. Other trees to be removed which might be remnant or regrowth (i.e. which may have arrived on the site naturally) are isolated and situated within areas that are heavily weed infested and modified.
- The majority of the land proposed for development has been totally cleared in previous decades for agricultural uses and more recently for the high school and ADHC facility. Topographic maps indicate that the entire site has previously been heavily excavated and shaped into steps – meaning that all remnant ground vegetation would have been lost.
- The majority of the land proposed for development is maintained and landscaped by on-site gardeners. Most of this land contains exotic lawns and there is essentially no native understorey vegetation, and only a sparse scatter or small patches of native grasses and herbs.
- The majority of the land proposed for development lacks any significant resources or habitat features of particular significance for any native biota, including in particular for threatened species.
- The native vegetation present in the riparian areas of Vineyard Creek (including the SSTF areas) will be retained.
- Vineyard Creek and its riparian areas represent approximately 20% of the site and will be retained. These areas provide higher value habitat to flora and fauna (including threatened species), in particular with regard to the patch of SSTF CEEC vegetation and local fauna movements.

Given the lack of relevance of the proposed development areas for those threatened species which could potentially occur (as discussed in Section 5), detailed 'assessments of significance' pursuant to Section 5A of the EP&A Act are not required. Nevertheless, a generic assessment of significance for threatened species is provided in Section **6.3** of this report.

The small patch of SSTF CEEC in the north-eastern corner of the site is to be retained and regenerated as part of the proposal. Any rehabilitation of the riparian vegetation will likely require a Vegetation Management Plan to be prepared.

6.2 Section 79c of the EP&A Act

The site has long been highly modified, and overall does not constitute a significant element of the "*natural environment*".

All vegetation along the riparian corridor in the east of the site, in particular that within the 20 m vegetated riparian zone (VRZ) of Vineyard Creek and the 10 m VRZ of its tributary, is to be retained and subject to a Vegetation Management Plan (VMP) in accordance with the WMA 2000. This includes an existing small area of SSTF vegetation in the northeast corner.

The remainder of the site which is likely to be developed does not contain any threatened ecological communities or habitat of any ecological value for threatened species, or other notable biodiversity values.

As a consequence, the proposed development does not constitute an activity which could be regarded as unacceptable or unreasonable in terms of Section 79C of the EP&A Act.

6.3 Section 5A of the EP&A Act

The *Environmental Planning & Assessment Act 1979* (EP&A Act) includes a requirement to determine "…*whether there is likely to be a significant effect on threatened species, populations or ecological communities, or their habitats*". Section 5A of the Act details seven factors which "…*must be taken into account*" by a consent or determining authority in administering Sections 78A, 79B, 79C, 111 and 112 of the EP&A Act, as relevant. In considering the factors, if a conclusion is drawn that a 'significant effect' is likely, then a species impact statement must be prepared to allow determination of the development application.

Shale Sandstone Transition Forest CEEC is present within the northern riparian areas of Vineyard Creek (**Figure 7**). Consideration of the significance of potential impacts on SSTF pursuant to Section 5A of the EP&A Act is provided below. There are no other threatened ecological communities and no threatened flora species or populations present on the site.

In addition, the assessment of significance provided below deals with those threatened species of fauna which could occur or potentially occur on the site (e.g. individuals of some threatened mammals, particularly microchiropteran bats, or threatened birds).

Factor A Threatened Species – Risk of Extinction

It is not likely that the site itself would support or be crucial to the survival of a "*viable local population*" of any of the "*threatened species*" which could potentially occur on the site.

With respect to threatened fauna, the Eastern Bentwing-Bat (*Miniopterus schreibersii oceanensis*) was the only threatened species recorded during the recent surveys by SLR. This species could use the site for foraging purposes and could potentially shelter in the small number of hollow-bearing trees recorded (within the riparian vegetation). It is likely that only individuals of a few wide-ranging threatened species (such as microchiropteran bats or birds) would utilise the site. Native vegetation along Vineyard Creek is of higher value in terms of habitat for threatened species and this vegetation will be retained as part of the proposal. The areas of the site proposed for development lack suitable habitat for the threatened species. It is not likely that a "*viable local population*" of any such species could be dependent on the areas of the site proposed for development, either in isolation or as a significant element in a broader area of habitat.

No threatened flora species were recorded on the site during the surveys and, given the highly disturbed nature of the vegetation present; none are likely to occur. Consequently, the removal of vegetation from the areas of the site proposed for development, could not be regarded as significant in terms of the "*life cycle*" of any of those possible threatened biota.

Given the considerations discussed above, there is no likelihood of a "*viable local population*" of any "*threatened species*" being "*placed at risk of extinction*".

Factor B Endangered Populations – Risk of Extinction

The TSC Act defines an "*endangered population*" as "*a population specified in Part 2 of Schedule 1*" of the Act. As discussed in Section 5.1.4, there are six populations of threatened species recorded within the 10 km radius of the site. The assessment concludes that none of those species are likely to occur on the site, due mainly to the highly disturbed nature of the habitats present. In any case, the proposal will retain and enhance areas of riparian vegetation along the eastern boundary of the site where habitat for these species is more likely to exist.

Factor C Endangered Ecological Communities – Risk of Extinction

Shale Sandstone Transition Forest CEEC is present within the northern riparian areas of Vineyard Creek. The proposed development will not affect this area of the site. In addition all areas of riparian vegetation are to be retained and enhanced as part of the proposal. Appropriate stormwater management measures will be put in place to reduce any impacts of changed water regime on the area of SSTF on the site.

There are no other threatened ecological communities present on the site.

Factor D Impacts on Habitat for Threatened Biota

As noted above, the site does not contain significant or important habitat or resources for any of the threatened biota which occur or could potentially occur on the land, as a consequence of the highly modified nature of the site, its context, its location and its size.

The Eastern Bentwing- Bat (*Miniopterus schreibersii oceanensis*) as well as other threatened species which could potentially occur are likely to be widely distributed in the general locality and/or are wide-ranging and highly mobile. Those parts of the site proposed for development activities do not constitute significant, critical or important habitat for threatened biota.

Given the circumstances described above, and given the nature and condition of the site, as well as its context and size, "*the action proposed*":

- is not likely to result in the removal or modification of significant areas of potential habitat for any threatened biota. The area to be affected by the proposal is not of any particular relevance or significance for any threatened biota, and constitutes only a very small proportion of potentially suitable habitat for any such biota in the locality – Factor (d)(i);
- is not likely to result in any habitat for threatened biota becoming "*fragmented or isolated from other areas of habitat*" – Factor (d)(ii), given:
  - the extent and distribution of potential habitat in the locality;
  - the context and location of the site; and
  - the lack of significant or relevant resources;
- is not likely to result in any disturbance to important or significant habitat for any threatened biota, even if any such biota may occasionally be present. Those portions of the site proposed to be developed cannot reasonably be regarded as of importance with respect to "*the long-term survival*" of any threatened biota "*in the locality*" – Factor (d)(iii).

Factor E Critical Habitat

The TSC Act defines "*critical habitat*" as "*habitat declared to be critical habitat under Part 3*" of the Act.

The site does not represent listed "*critical habitat*" for any threatened biota.

Factor F Recovery Plans and Threat Abatement Plans

There are no relevant Recovery or Threat Abatement Plans.

Factor G Key Threatening Processes

The "*key threatening processes*" listed in the TSC Act that could be of potential relevance to the proposed development are the "*clearing of native vegetation*", "*the loss of hollow-bearing trees*", "*infection of native plants by Phytophthora cinnamomi*", "*the introduction and establishment of exotic rust fungi of the order Pucciniales pathogenic on plants of the family Myrtaceae*", "*the invasion, establishment and spread of Lantana camara*" and "*invasion of native plant communities by exotic perennial grasses*".

With respect to the "*clearing of native vegetation*", the patch of SSTF and other riparian vegetation along Vineyard Creek will be retained and protected. There is potential for other native trees within the development areas of the site to be retained, although the majority (mostly planted specimens) will likely require removal. Clearing of the original native vegetation of the site and surrounds probably began as early as 1807 (see Benson and Howell 1990). It is likely that all trees on the site are no more than 60 years old and are planted specimens after initial clearing. The historical aerial imagery (**Figure 2**) indicates that most of the site had been cleared in 1943.

With respect to the "*loss of hollow-bearing trees*" the only hollow-bearing trees in the site are likely to be retained and protected within riparian areas.

With respect to "*infection of native plants by Phytophthora cinnamomi*" and "*introduction and establishment of exotic rust fungi*": this could take place during vegetation clearing, weed control or by the planting of infected nursery material. A Vegetation Management Plan (VMP) will form part of the proposal, within which a set of hygiene protocols will be included in order to minimise the risk of infection of the SSTF patch by *Phytophthora cinnamomi* or by Myrtle Rust.

With respect to "*invasion, establishment and spread of Lantana camara*" and *"invasion of native plant communities by exotic perennial grasses*": Lantana and exotic grasses already occur and are self-recruiting in the site. The proposal will remove much of the exotic vegetation present on the site and a VMP will facilitate the management of weeds within the riparian area.

Conclusion

Given the considerations outlined above, the proposed development on the site at Parramatta is not "*likely*" to impose a "*significant effect*" upon any "*threatened species, populations or ecological communities, or their habitats*", pursuant to Section 5A of the EP&A Act.

6.4 Application of the EPBC Act

The *Environment Protection & Biodiversity Conservation Act 1999* (EPBC Act) requires consideration of the potential for a "*significant impact*" to be imposed by an activity on any "*matters of national environmental significance*". In the event that such an impact is likely to be imposed, the activity must be referred to the Commonwealth for determination as to whether it constitutes a "*controlled action*". Where a development activity does constitute a controlled action, an approval from the Commonwealth Minister of the Environment is required.

As mentioned in Section **5.2**, protected matters relevant to the site at Parramatta include SSTF vegetation, as well as the more mobile threatened species of fauna (such as birds and bats) and terrestrial migratory birds which have been recorded within a 10 km radius of the site.

The portions of the site likely to be used for development are of little or no relevance with respect to the life cycles and habitat requirements of any such threatened or migratory species listed in the EPBC Act. The patch of SSTF in the riparian areas of Vineyard Creek will be retained.

On the basis of the above considerations, there is not likely to be a significant impact on any matters of national environmental significance listed under the EPBC Act as a result the proposed development.

6.5 State Environment Planning Policy No.19

State Environment Planning Policy 19 - Bushland in Urban Areas (SEPP 19) aims to protect bushland and vegetation patches that remain in urban areas, and applies to the Parramatta LGA. The general aim of SEPP 19 is to preserve the following items:

- bushland areas within the urban area;
- natural heritage value;

- aesthetic value;
- value as recreational, educational and scientific resource; and
- ecosystem values such as flora and fauna habitat, vegetation links and soil stabilisation.

Under Clause 4 of this policy the definition of 'bushland' is "*land on which there is vegetation which is either a remainder of the natural vegetation of the land or, if altered, is still representative of the structure and floristics of the natural vegetation*". This investigation has determined that there is one small patch of native vegetation, or bushland, remaining in the northeast corner of the site. This area has been mapped as SSTF (**Figure 7**) and will be retained as part of the proposed activity. The remainder of the site has been impacted by clearing, development and weed invasion and does not constitute 'bushland' as defined by the policy. Given the above, the proposed activity does not contravene the objectives of Clause 4 of SEPP 19.

Clause 6(1) of the Policy states "*A person shall not disturb bushland zoned or reserved for public open space purposes without the consent of the council*". As the site is not zoned or reserved for public open space under Parramatta LEP, Clause 6 of SEPP 19 does not apply.

Furthermore, Clause 9 "*applies to land which adjoins bushland zoned or reserved for public open space purposes*". As the site at Parramatta does not adjoin public reserves containing bushland, the considerations under Clause 9 will not apply to future development applications on this site.

6.6 State Environment Planning Policy No.44

State Environment Planning Policy No. 44–Koala Habitat Protection (SEPP 44) applies to the Parramatta LGA. However, the vegetation on the site does not form Potential or Core Koala Habitat, as defined under SEPP 44. The reason for this is largely due to the absence of forest habitat with preferred Koala food trees. Although the site does contain some scattered Koala feed trees (e.g. *Eucalyptus tereticornis* and *Eucalyptus microcorys*), as listed under Schedule 2 of the Policy, these are planted within a mostly urban setting and are isolated from any intact native bushland. Moreover, these species do not form at least 15 % of the tree canopy and hence the site does not contain 'potential Koala habitat', as defined under SEPP 44.

Furthermore, no evidence or nearby records of koala exist within the site. According to Ambrose Ecological Services (2015) *"The urban landscape within which the subject site is located also negates the likelihood of Koalas occurring there. Therefore, residential development of the subject site would not impact on the local status of Koalas, their movements, or the status of their habitat"*. Therefore, even if the site did contain potential Koala habitat, the site would not represent 'core Koala habitat', as there is no recent evidence of a resident population.

6.7 As the site does not contain potential Koala habitat, SEPP 44 does not apply. Parramatta Local Environment Plan 2011

The Parramatta LEP 2011 identifies areas of 'Biodiversity Protection' within the LGA. The LEP 2011 'Natural Resources - Biodiversity Map' shows that the vegetation occurring along the edges of Vineyard Creek and on the eastern edges of the site constitutes 'Biodiversity Protection' land. The objective of such land is to "*maintain terrestrial and aquatic biodiversity"*, including: "*protecting native fauna and flora*", "*protecting the ecological processes necessary for their continued existence*" and "*encouraging the recovery of native fauna and flora and their habitats*".

Clause 6.4 of the LEP 2011 describes the relevant development limitations to 'Biodiversity Protection' land. Given that the areas proposed for development are outside the riparian corridor, these development limitations are not relevant.

The LEP 2011 'Natural Resources' mapping also shows that this vegetation constitutes 'Riparian Land and Waterways' as described in Clause 6.5 of the LEP 2011. The objective of this clause is "*to maintain the hydrological functions of riparian land, waterways and aquifers*". Given the highly altered condition of the catchment and the existing artificial nature of the riparian land and waterways on the site it is unlikely that the proposed development would impose any relevant additional impacts to the hydrology of these areas. The proposed development will include appropriate stormwater management measures to ensure that there are no negative impacts from the altered hydrology as a consequence of the development, in particular with regard to the area of SSTF vegetation.

6.8 Parramatta Tree Preservation Order

The Parramatta Tree Preservation Order (TPO), contained in Section 5.4 of the Parramatta Development Control Plan (DCP) 2011, outlines trees or vegetation to which Clause 5.9 of the Parramatta Local Environmental Plan (LEP) 2011 and Clause 34 of the Parramatta Local Environmental Plan (LEP) 2007 applies. LEP 2011 Clause 5.9 and LEP 2007 Clause 34 apply to trees and vegetation that are identified by species, size and location.

DCP 2011 defines tree as "*long lived, woody, perennial plant greater than (or potentially greater than) 5 meters in height with one or relatively few stems*". The TPO applies to any tree or palm species (indigenous, exotic, endemic or introduced) with a height equal to or greater than 5 meters. Any tree or mangrove, regardless of size, that is located on public land, any tree or plant, regardless of size, that is listed in a register of trees, forms a, or part of a, significant heritage item or that is, or forms part of a, object that is significant to Aboriginal heritage.

The objectives of the Parramatta TPO are as follows (DCP 2011):

- "*To maintain and enhance the amenity of Parramatta Local Government Area through the preservation of appropriate trees and vegetation.*
- *To retain Parramatta Local Government Area's urban forest cover particularly its street tree and parkland tree population to alleviate urban heat impact.*
- *To appropriately manage trees and vegetation in order to ensure their health and long term retention.*
- *To conserve trees of ecological, heritage, aesthetic and cultural.*
- *To protect and manage individual trees as an important community asset.*
- *To establish the procedural framework and requirements governing the pruning, removal and subsequent replacement of trees within the City.*
- *To ensure all new development considers and protects existing trees on development sites and provides opportunity for the healthy growth of large trees.*"

The Parramatta TPO states that before any tree works can be carried out a tree permit must be obtained (DCP 2011). Obtaining a tree works permit requires an arboriculture report and any other relevant reports and information to be submitted as part of the tree permit assessment process (DCP 2011). The TPO also states that all tree work must be carried out in accordance with the NSW code of practice: 'Amenity Tree Industry' – 1998. Finally, the TPO states that any trees removed as a consequence of approval by a tree permit may need to be replaced with suitable canopy tree or trees in a suitable location on site (DCP 2011).

6.9 NSW Water Management Act 2000

Vineyard Creek intersects the north-eastern corner of the site where it flows south for its entire length falling for the most part within the eastern boundary. At the north of the site a smaller drainage line runs northwest along the bottom of the embankment where it is then piped beneath Kissing Point Road. These watercourses are surrounded by a narrow band of dense riparian vegetation, with a steep bank on its western side.

Land within 40 m of Vineyard Creek and the smaller tributary constitute 'waterfront land' under the NSW *Water Management Act 2000*, and any works within 40 m of the top-of-bank require approval from the NSW Department of Industry (Water).

The *Water Management Act 2000* is administered by DPI Water (formerly NSW Office of Water). The NOW (2012) guidelines for controlled activities define 'riparian corridor' as:

- the channel, which comprises the bed and banks of the watercourse (to the highest bank); and
- the vegetated riparian zone (VRZ) adjoining the channel.

The VRZ is measured from "*the top of the highest bank on both sides of the watercourse*" (referred to as 'top-of-bank') and extends out from the top-of-bank according to a set of prescribed widths based on the classification of the watercourse under the 'Strahler System'. The DPI Water recommended widths of the VRZ for different categories of watercourse are listed in **Table 3**.

Table 3 Vegetated Riparian Zone (VRZ) widths (NOW 2012)

Watercourse type	VRZ width
1st order	10
2nd order	20
3rd order	30
4th order	40

According to the Strahler System, Vineyard Creek is a 2nd order stream and the smaller tributary is a 1st order stream. Therefore a VRZ of 20 m would be required from the top-of-bank of Vineyard Creek and a VRZ of 10 m would be required for the tributary. There are no works proposed within 40 m of the top-of-bank of either of the watercourses in the east of the site, therefore the WMA 2000 is not triggered. In addition, there are no works proposed within 20 m of the top-of-bank of Vineyard Creek or within 10 m of the tributary.

It should be noted that DPI Water adopt the "averaging rule", whereby incursions into the outer 50% of the VRZ can be acceptable, provided that the equivalent area is offset by adding it to another portion of the riparian zone such that the average width of the VRZ remains the same. The guide states that "*where appropriate, 50 per cent of the outer vegetated riparian zone width may be used for non-riparian uses including asset protection zones, recreational areas, roads, development lots and infrastructure*". Specifically, NOW (2012) states that "*an equivalent area connected to the riparian corridor must be offset on the site*" and further that the inner 50% of the VRZ "*must be fully protected and vegetated with native endemic riparian plant species*".

6.10 Sydney Green Grid

The Sydney Green Grid is a part of the NSW Governments Department of Planning and Environments (DP&E) Metropolitan Greenspace Program (MGP). The framework of the project is based on the East London Green grid, a project which successfully created a network of connected open spaces in the inner city.

The aims of the Sydney Green Grid are to conserve, improve and expand Sydney's strategic network of open spaces to:

- "*use town centres and public transport to connect Sydney's residents, workers and tourists to the cities open spaces, sports facilities and leisure experiences.*
- *Enhance appreciation of Sydney's natural and cultural environment through improving open spaces.*
- *Promote the social, economic health and environmental benefits of open space by integrating the planned green infrastructure of Sydney with the cities other planned infrastructure.*"

The Green Grid project is part of NSW government's 2030 target for a sustainable Sydney. The 'Parramatta Greenspace Pilot Map' shows that the Parramatta site is located on a greenspace site near Vineyard Creek. Whilst the Green Grid project is a non-binding framework the proposal retains the riparian corridor along Vineyard Creek and is in line with the aims of this project.

7 IMPACT AMELIORATION

The impacts to the natural environment which would ensue from development of the site at Parramatta could be minimised by applying appropriate impact amelioration and environmental management measures. Specific measures in this regard which either have been incorporated into the residential development design or which should be included as Conditions of Consent should include:

- the management of stormwater discharge volumes and water quality from the development area, both during construction activities and following completion and occupation of the site, according to current best practice and 'Water Sensitive Urban Design' principles;
- the use of sediment fences and other appropriate control measures during construction activities to avoid erosion and sediment discharge or the discharge of other pollutants or contaminants;
- the implementation of a management regime during the construction process to ensure that no other wastes (including building rubble, garbage, contaminants, fuels, oils, paints or other chemicals) are discharged from the construction area, and that all such wastes and contaminants are contained within the construction footprint, and are appropriately managed;
- the use of appropriate native plant species in the landscaping of roads and public areas to enhance the adjoining vegetation and to avoid invasive species;
- the retention of as many trees as possible and preferably the mature eucalypts which provide small tree hollows;
- the collection for re-use in rehabilitation programs (e.g. in the riparian area) of all native vegetation removed from the developed portions of the site; and
- contribution to rehabilitation activities in the adjoining riparian area, involving the preparation and implementation of a Vegetation Management Plan (VMP).

8 CONCLUSIONS

The site has been dramatically altered in previous decades for development of the Macquarie Boys High School and the ADHC facility. Prior to these developments, the land was almost entirely cleared for agricultural pursuits. The majority of the site comprises buildings, roads and landscaped areas.

The riparian areas associated with Vineyard Creek have been heavily impacted by clearing, surrounding development and subsequent weed invasion. An area of Shale Sandstone Transition Forest Critically Endangered Ecological Community is present in the northeast corner of the site, which is to be retained and rehabilitated. A number of urban-tolerant threatened species of fauna, in particular microbats which were recorded during site investigations, are likely to utilise the vegetated riparian corridor on the site on occasion.

Three tree species planted within the landscaped parts of the site are listed as threatened species on the TSC Act and EPBC Act. These trees are of horticultural origin and are not positioned within their natural range or habitat. They are therefore not representative of the "*threatened species*", as listed under the TSC Act and EPBC Act, and their removal is of no biodiversity conservation relevance. There have been no other threatened flora species recorded on the site and given the disturbed nature of the site none are likely to occur.

The proposed development will not involve the removal of any areas of habitat for threatened species, populations or communities. The areas proposed for development are predominantly cleared and are highly disturbed and as such habitat for threatened species is virtually absent. Threatened species which scored a high or moderate likelihood of occurrence (such as Tadgell's Bluebell, the Green and Golden Bell Frog, Little Eagle, Powerful Owl and several bats) were generally recorded nearby and are only likely to occur within the riparian area to be retained at least theoretically or on an occasional basis. Accordingly, the proposed development is not likely to have any adverse ecological effects on threatened species, populations or communities listed under the TSC Act.

The site contains SSTF CEEC in the northeast corner and could theoretically provide habitat to some of the more mobile threatened and migratory species listed under the EPBC Act, in particular along the riparian corridor. However, given that development is proposed on the existing developed portions of the site, the proposal is not likely to impose a significant impact on any matters of national environmental significance listed under the EPBC Act.

The proposed development does not contravene the objectives of the *State Environment Planning Policy 19 - Bushland in Urban Areas* (SEPP 19), as the only area of native bushland present on the site is the small area of SSTF vegetation which is to be retained, protected and rehabilitated.

There is no potential or core Koala habitat present on the site and therefore *State Environment Planning Policy No. 44–Koala Habitat Protection* (SEPP 44) does not apply.

Objectives of the LEP 2011 with regard to biodiversity and riparian lands and waterways will be met under the current proposal, based on the retention and rehabilitation of the riparian corridor and the management of stormwater.

With regard to the Water Management Act 2000, there are no works proposed within 40 m of the top-of-bank of either of the watercourses in the east of the site, therefore the Act is not triggered. In addition, there are no works proposed within 20 m of the top-of-bank of Vineyard Creek or within 10 m of the tributary.

The objectives of the Sydney Green Grid will not be contravened by the proposal based on the retention and rehabilitation of vegetation along the riparian corridor of Vineyard Creek.

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