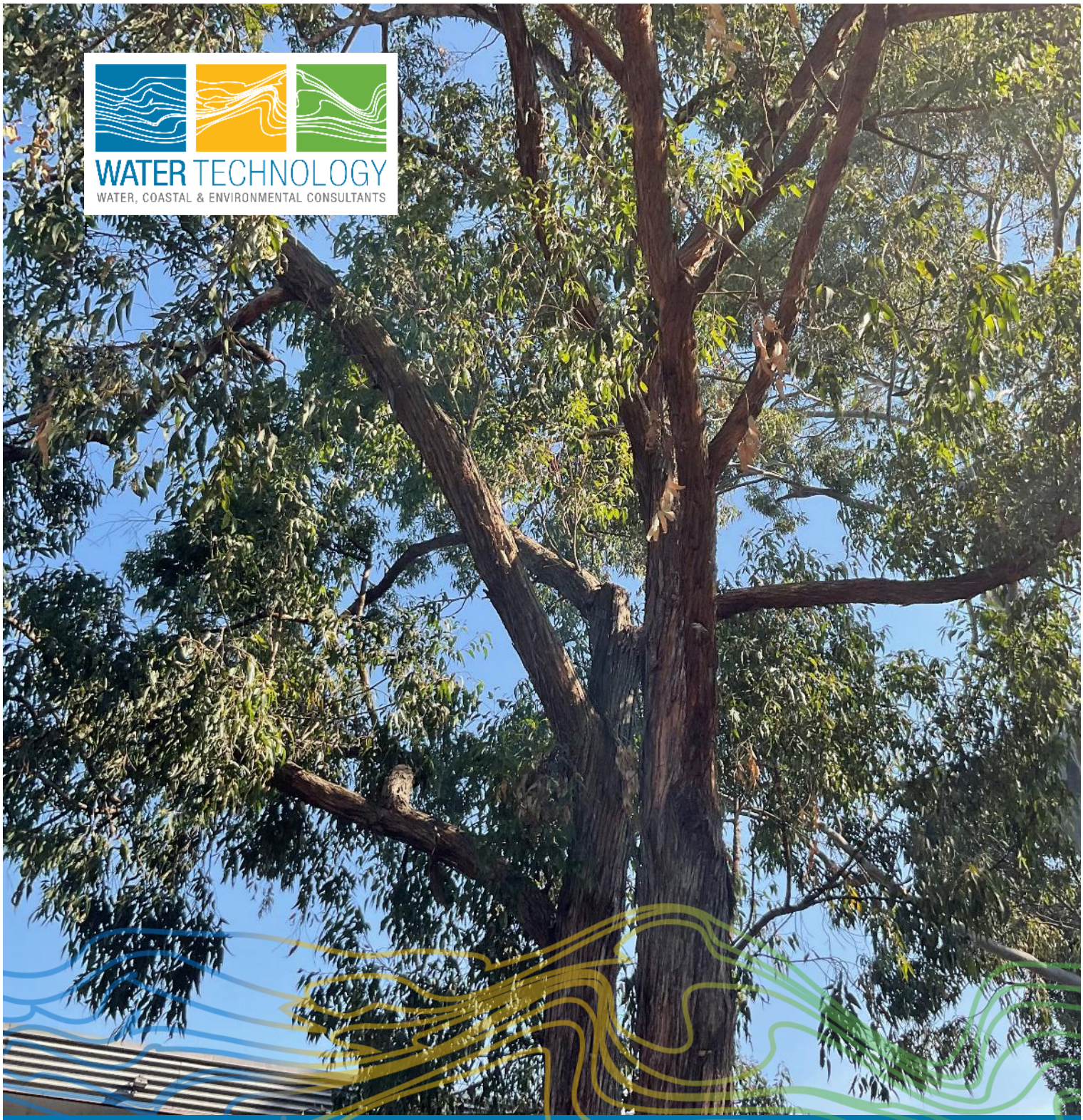

Flora and Fauna Assessment

Liverpool Boys and Girls High School Upgrade - Biodiversity

NSW Department of Education

14 February 2025

School Name	Liverpool Boys and Girls High School	**Consultancy Name**	Water Technology
School ID Number	Liverpool Boys 8186	**Report Status**	Draft
School Address	18 Forbes Street, Liverpool NSW, 2170	**Report Date**	14 February 2025
School Region	Liverpool City	**Contract Number**	DDWO04546/23

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Project Name	Liverpool Boys and Girls High School Upgrade
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ACKNOWLEDGEMENT OF COUNTRY

The Board and employees of Water Technology acknowledge and respect the Aboriginal and Torres Strait Islander Peoples as the Traditional Custodians of Country throughout Australia. We specifically acknowledge the Traditional Custodians of the land on which our offices reside and where we undertake our work.

We respect the knowledge, skills and lived experiences of Aboriginal and Torres Strait Islander Peoples, who we continue to learn from and collaborate with. We also extend our respect to all First Nations Peoples, their cultures and to their Elders, past and present.

Artwork by Maurice Goolagong 2023. This piece was commissioned by Water Technology and visualises the important connections we have to water, and the cultural significance of journeys taken by traditional custodians of our land to meeting places, where communities connect with each other around waterways.

The symbolism in the artwork includes:

- *Seven circles representing each of the States and Territories in Australia where we do our work*
- *Blue dots between each circle representing the waterways that connect us*
- *The animals that rely on healthy waterways for their home*
- *Black and white dots representing all the different communities that we visit in our work*
- *Hands that are for the people we help on our journey*

CONTENTS

APPENDICES

LIST OF FIGURES

LIST OF TABLES

ACRONYMS AND DEFINITIONS

Acronym	Definition
BC Act	*Biodiversity Conservation Act 2016*
BV	Biodiversity Values
DCP	Development Control Plan
DD	Due Diligence
EP&A Act	*Environmental Planning and Assessment Act 1979*
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
FM Act	*Fisheries Management Act 1994*
LEP	Local Environment Plan
LGA	Local Government Area
MNES	Matter of National Environmental Significance
PCT	Plant Community Type
FFA	Flora and Fauna Assessment
SEARS	Secretary's Environmental Assessment Requirements
SINSW	Schools Infrastructure New South Wales
SSD	State Significant Development
TEC	Threatened Ecological Community
WM Act	*Water Management Act 2000*

1 EXECUTIVE SUMMARY

A Flora and Fauna Assessment has been conducted to identify potential constraints that may impede the future school infrastructure upgrades for the Liverpool Boys and Girls High School. This assessment aims to seek approval for a development without consent application under Part 5 of the EP&A Act, mitigating any risks during the delivery of the school upgrades. The report documents the findings of the biodiversity assessment, identifying potential biodiversity constraints relevant to the proposed activity under the NSW Biodiversity Conservation Act 2016, Commonwealth Environment Protection and Biodiversity Conservation Act 1999, and the NSW Fisheries Management Act 1994.

Liverpool Boys and Girls High School comprises existing buildings, play areas, mature trees, and sports fields. No Biodiversity Values areas were mapped, and no Plant Community Types were found. The Grey-headed Flying-fox and Downy Wattle have a moderate likelihood of occurrence, but no threatened species were found. There was potential habitat found in the form of a hollow found in a Spotted Gum tree. The site has no Key Fish habitat.

The Flora and Fauna Assessment concluded that there will be no significant impacts on matters of national environmental significance. As there were no threatened species found, a Test of Significance was not required. Consequently, no referral to the Australian Minister for the Environment under the Environment Protection and Biodiversity Conservation Act 1999 is required. The proposal will not cause a significant impact on the environment. Therefore, it is not necessary for an Environmental Impact Statement to be prepared and approval to be sought from the Minister for Planning under the Environment Protection and Biodiversity Conservation Act 1999.

The proposed activity will not be carried out in a declared area of outstanding biodiversity value and is not likely to significantly affect threatened species, populations, ecological communities, their habitats, or impact biodiversity values. Additionally, the proposed activity is not likely to have a significant impact on matters of national environmental significance or on the environment of Commonwealth land. Therefore, referral to the Minister under the EPBC Act is not required, nor an Species Impact Statement (SIS). The potential impacts can be appropriately mitigated or managed to ensure minimal effect on the locality or community.

2 INTRODUCTION

This Liverpool Boys and Girls High School Upgrade Flora and Fauna Assessment (FFA) for Biodiversity has been prepared by Water Technology on behalf the NSW Department of Education (the Proponent) to assess the potential biodiversity impacts that could arise from the redevelopment of the Liverpool Boys and Girls High School at 18 Forbes Street, Liverpool NSW, 2170 (the site).

This report has been prepared to assess potential biodiversity impacts for the Liverpool Boys and Girls High School Upgrade.

This report accompanies a Review of Environment Factors that seeks approval for redeveloping the Liverpool Boys and Girls High Schools into a single co-educational school, including:

- [redacted]
- Construction and operation of a six-storey school building, including school hall and gymnasium;
- Associated parking and building services;
- Tree removal;
- Associated landscaping and play spaces;
- Augmentation of service infrastructure; and
- Associated off-site infrastructure works to support the school, including (but not limited to) services, kiss and drop point and pedestrian crossings.

Refer to the Review of Environmental Factors prepared by Ethos Urban for a full description of works.

The Liverpool Boys and Girls High School Upgrade will be assessed under Part 5, Division 5.1, the Department of Education serves as both the proponent and the determining authority. The Department of Education must examine all matters likely to affect the environment from this activity.

The principal contractor will make sure the proposal is carried out as described in this FFA. If the scope of work or work methods, described in this FFA, change significantly following determination, an additional environmental impact assessment, or FFA Addendum, may be required.

2.1 Determination

- The proposed activity can proceed subject to mitigation measures relayed in this FFA
- A SIS and/or BDAR is not required. The proposed activity can proceed, with mitigation measures and conditions. The activity is unlikely to be classed as a controlled action under the Commonwealth Environmental Protection and Biodiversity Conservation Act 1999 (EPBC Act), and an EPBC referral is not required.

2.2 Statement of Significance

Based on the identification of potential issues, and an assessment of the nature and extent of the impacts of the proposed activity, it was determined that:

- The extent and nature of potential impacts are low and will not have significant adverse effects on the locality, community and the environment
- Potential impacts can be appropriately mitigated or managed to ensure that there is minimal effect on the locality, community.

3 REF DELIVERABLE

See below FFA deliverable requirement from Schools Infrastructure New South Wales (the department) Table 3-1.

Table 3-1 REF Devliverable

Item	Requirement	Relevant Section of Report
1.0	Address all relevant legislation, environmental planning instruments (EPIs) (including drafts), plans, policies, guidelines and planning circulars.	See Section 6
2.0	Trees and Landscaping	See Section 7.2.4
	Assess the number, location, condition and significance of trees to be removed and retained and note any existing canopy coverage to be retained on-site.	See Section 7.2.4 See Appendix D
3.0	Ecologically Sustainable Development (ESD)	See Section 4.2 See Table 4-1
4.0	Biodiversity	See Section 7.2.4
	Assess any biodiversity impacts associated with the development in accordance with the Biodiversity Conservation Act 2016 and the Biodiversity Assessment Method 2020, including the preparation of a Biodiversity Development Assessment Report (BDAR), unless a waiver is granted or the site is on biodiversity certified land	See Section 7.2.4

4 PROJECT JUSTIFICATION

The Liverpool Boys and Girls High School Upgrade is part of the NSW Government's plan to rebuild public education in 2024-25. This upgrade will ensure growing communities get access to public education.

4.1 Options

Option 1 – Do Nothing: The current school will continue to become dilapidated and outdated.

Option 2 – Implement Project Proposal: (Preferred option) Liverpool Boys and Girls High School Upgrade will be enhanced by providing more educational facilities for the local community. By providing enhanced services and spaces, the new proposed Liverpool Boys and Girls High School Upgrade aims to meet the current and future needs of the community.

4.2 Consideration of Ecologically Sustainable Development

The proposal has been considered against the principles of ecologically sustainable development (ESD) (refer to Table 4-1).

Table 4-1 Consideration of principles of ecologically sustainable development (ESD)

ESD Principle	Consideration in FFA
Precautionary principle	The proposal will not result in serious or irreversible environmental damage and there is no scientific uncertainty relating to the proposal.
Intergenerational equity	The proposal will help to meet the needs of future generations by providing education facilities, which can be used for future generations.
Conservation of biological diversity and ecological integrity	The proposal will not significantly impact on biological diversity or impact ecological integrity.
Improved valuation, pricing and incentive mechanisms	The proposal will provide cost efficient use of resources and provide optimum outcomes for the community, environment and with respect to financial cost.

5 SITE DESCRIPTION

5.1 Site Location and Background

The site is located at 18 Forbes Street, Liverpool, within the Liverpool Local Government Area (LGA). The site is legally described as Lot 1 DP1137425 and has a total area of approximately 74,973m^2.

This FFA will address the Liverpool Boys and Girls High School exclusively and has a total area of approximately 32,914 m^2.

Liverpool Boys and Girls High School comprises approximately four, two-storey buildings, with adjacent at-grade carparking and various sports courts.

An aerial image of the site is shown in Figure 5-1 below.

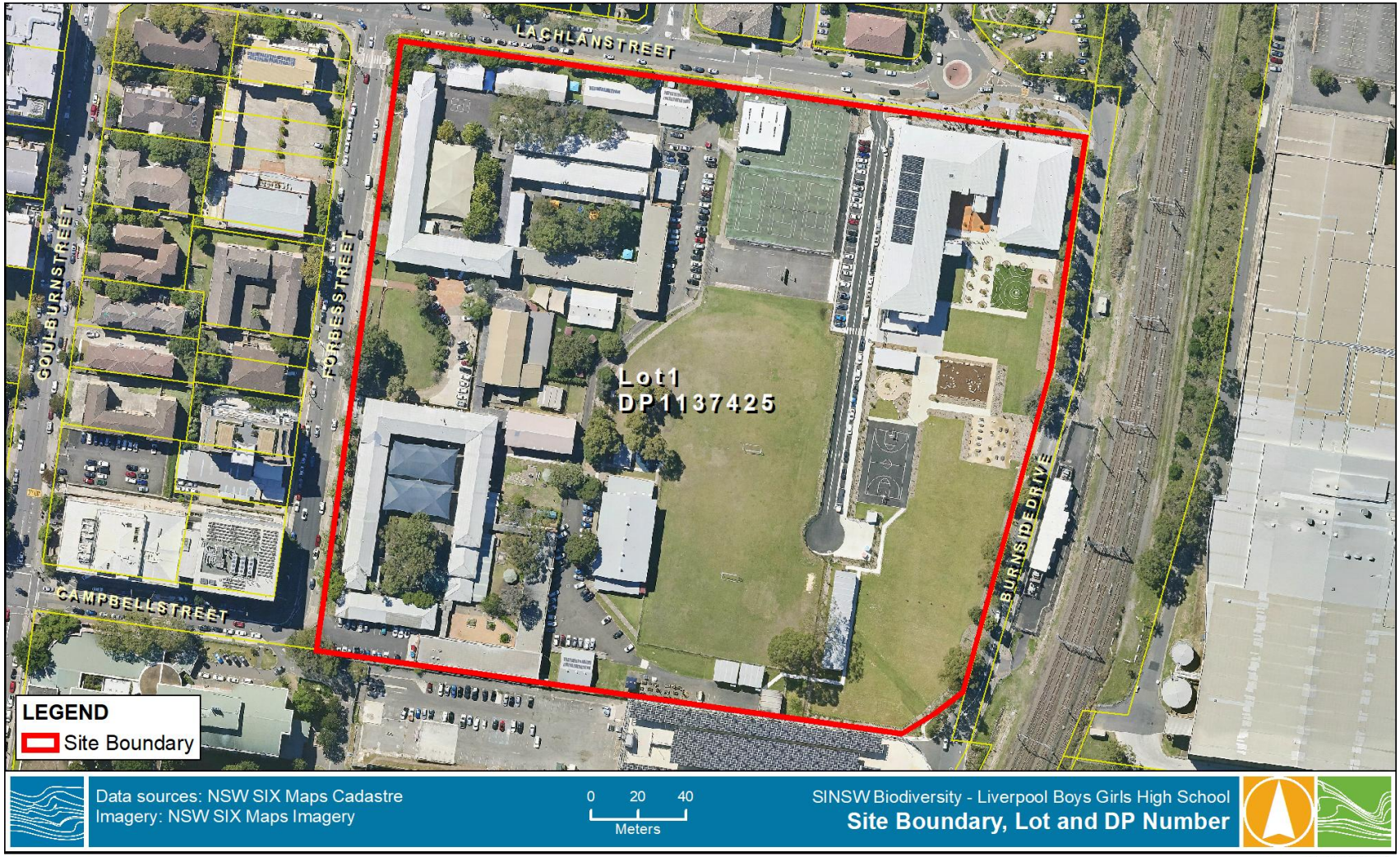

Figure 5-1 Site Aerial

6 RELEVANT LEGISLATION

Legislation and policy relevant to the biodiversity component of works within the subject site are outlined below:

6.1 Environmental Planning & Assessment Act 1979

Planning and development within NSW is regulated by the Environmental Planning & Assessment Act 1979 (EP&A Act).

The proposed works are permitted without consent under the State Environmental Planning Policy (Transport and Infrastructure) 2021 (TISEPP). Where works do not require development consent but require approval of a Government organisation under any legislation, then they are defined as an activity under Part 5 of the EP&A Act. Division 5.1 and Section 5.7 of the EP&A Act requires any such Government body to determine whether the impacts of the activity are likely to be significant. A FFA contributes to that determination.

A FFA is prepared, to inform a Review of Environmental Factors, to meet the requirements of Clause 171 of the *Environmental Planning and Assessment Regulation 2023*.

6.1.1 State Environmental Planning Policy (Transport and Infrastructure) 2021

The State Environmental Planning Policy (Transport and Infrastructure) 2021 (TISEPP) provides for the efficient provision of public infrastructure in NSW. The aim of this Policy is to facilitate the effective delivery of infrastructure across the State.

6.2 Water Management Act 2000

The Water Management Act 2000 (WM Act) provides for the sustainable and integrated management of the water sources of the State for the benefit of both present and future generations. The WM Act defines principles of water management, sets out water licensing laws and environmental water provisions.

Section 91 (2) states that: *waterfront land means—…where the prescribed distance is 40 metres or (if the regulations prescribe a lesser distance, either generally or in relation to a particular location or class of locations) that lesser distance.*

This project is being carried out further than 40 metres so is exempt from requiring a Controlled Activity Approval in accordance with the WM Act.

6.3 Biodiversity Conservation Act 2016

The Biodiversity Conservation Act 2016 (BC Act) includes the Biodiversity Offsets Scheme (BOS) that governs how biodiversity offsets will be used to ensure they offset the loss due to development and deliver conservation outcomes. The Act and Regulations also govern the Biodiversity Assessment Method (BAM) as a scientific method that assesses biodiversity losses from impacts at development sites and gains from conserving land at stewardship sites.

Public authorities seeking to undertake an activity under Part 5 of the EP&A Act can voluntarily opt-in to the BOS and BAM scheme, or alternatively can elect to undertake an Assessment of Significance and proceed with a Part 5 approval. It will be required to:

- take serious and irreversible impacts into consideration; and
- determine if there are any additional and appropriate measures that will minimise the impact if the activity is to be carried out or approved.
- The potential ecological impacts of the proposal are discussed in Section 9 of this FFA.

6.4 Fisheries Management Act 1994

The provisions of the Fisheries Management Act 1994 relating to project development and approval processes operate similarly to the BC Act. The Act identifies threatened aquatic species, populations and ecological communities, as well as Key Fish Habitat.

Significant impacts trigger the need for a species impact statement for Part 4 and Part 5 projects. The potential ecological impacts of the proposal are discussed in Section 9 of this FFA report. It is concluded that the proposal is not likely to have a significant impact on any threatened aquatic species, populations or communities, or Key Fish Habitat.

6.5 Environment Protection and Biodiversity Conservation Act 1999

Under the Commonwealth Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act), Commonwealth approval is required for certain actions. Actions which have or may have or are likely to have a significant impact on Matters of National Environmental Significance (MNES). MNES include nationally threatened species or endangered ecological communities. Under the EPBC Act an assessment of the impact of a proposal on a MNES must be undertaken to determine whether there is likely to be a significant impact. If the assessment concludes there is a significant impact, then it will become a controlled action under the EPBC Act and the proposal must be referred to the Commonwealth. Approval from the relevant Federal Minister is also required for any actions that may have a significant impact on matters of National Environmental Significance, except in circumstances which are set out in the EPBC Act.

Approval from the Commonwealth is in addition to any approvals under NSW legislation.

The potential ecological impacts of the proposal are discussed in Section 9 of this FFA. It is concluded that the proposal is not likely to have a significant impact on any EPBC listed threatened species, populations or communities nor is it likely to impact on any MNES and so does not require referral to the Commonwealth under the EPBC Act.

A SIS and/or BDAR is not required.

6.6 Liverpool Local Environmental Plan 2008

The Liverpool Local Environmental Plan 2008 (LEP) came into effect on 29th August 2008. This Plan aims to make local environmental planning provisions for land in the Liverpool LGA in accordance with the relevant standard environmental planning instrument.

The works are to be conducted in SP2-Infrastructure zoned land as per the LEP. The objectives of this zone include:

- To provide for infrastructure and related uses
- To prevent development that is not compatible with or that may detract from the provision of infrastructure
- To reserve land for the provision of infrastructure

6.7 Liverpool Development Control Plan 2008

The aim of the Liverpool Development Control Plan 2008 (DCP) is to allow detailed provisions to be made to control and guide development and subdivision within the Liverpool LGA.

The DCP Section 2 contains provisions relating to biodiversity including:

- Section 2 Tree Preservation:
  - Tree preservation
  - Landscaping and incorporation of existing trees

- Bushland and fauna habitat preservation
- To ensure the protection of trees that are contributing to the ecological and aesthetic biodiversity
- To protect the integrity of heritage items through the preservation of all trees occurring within the heritage place, precinct, or land
- To ensure trees are maintained in an appropriate manner so as not to cause harm or damage to the tree or community
- To ensure that construction works and the ultimate design treatments protect the identified trees
- To ensure that trees providing high ecological or amenity benefits are protected wherever possible

- Section 3 Landscaping and Incorporation of Existing Trees:
  - Promote landscape planning and design as part of a fully integrated approach to site development
  - Assist in improving the climate of the local environment
  - Retain as many existing trees as possible
  - To provide habitat for locally indigenous plants and animals and contribute to biodiversity
  - To encourage landscaping that is appropriate to the natural, cultural, built and heritage characteristics of its locality
  - Improve the amenity of developments and adjoining areas by ensuring proposals adequately complement the proposed building forms and surrounding streetscape
  - Ensure that the proposed landscape designs provide functional attributes such as privacy, shade and wind protection, while discouraging the opportunity for crime and vandalism
- Section 4 Bushland and Fauna Habitat Preservation:
  - To protect and manage natural assets in association with the development of land
  - To conserve the natural heritage of Liverpool
  - To maintain and improve the amenity and scenic qualities of Liverpool
  - To maintain and enhance the biodiversity and natural ecology of Liverpool

7 EXISTING ENVIRONMENT

7.1 Existing Environment

The subject site encompasses an area of approximately 32,914 sqm, comprising of single and double storey buildings, grassed field areas, paved semi shaded areas and multi-use sporting facilities (

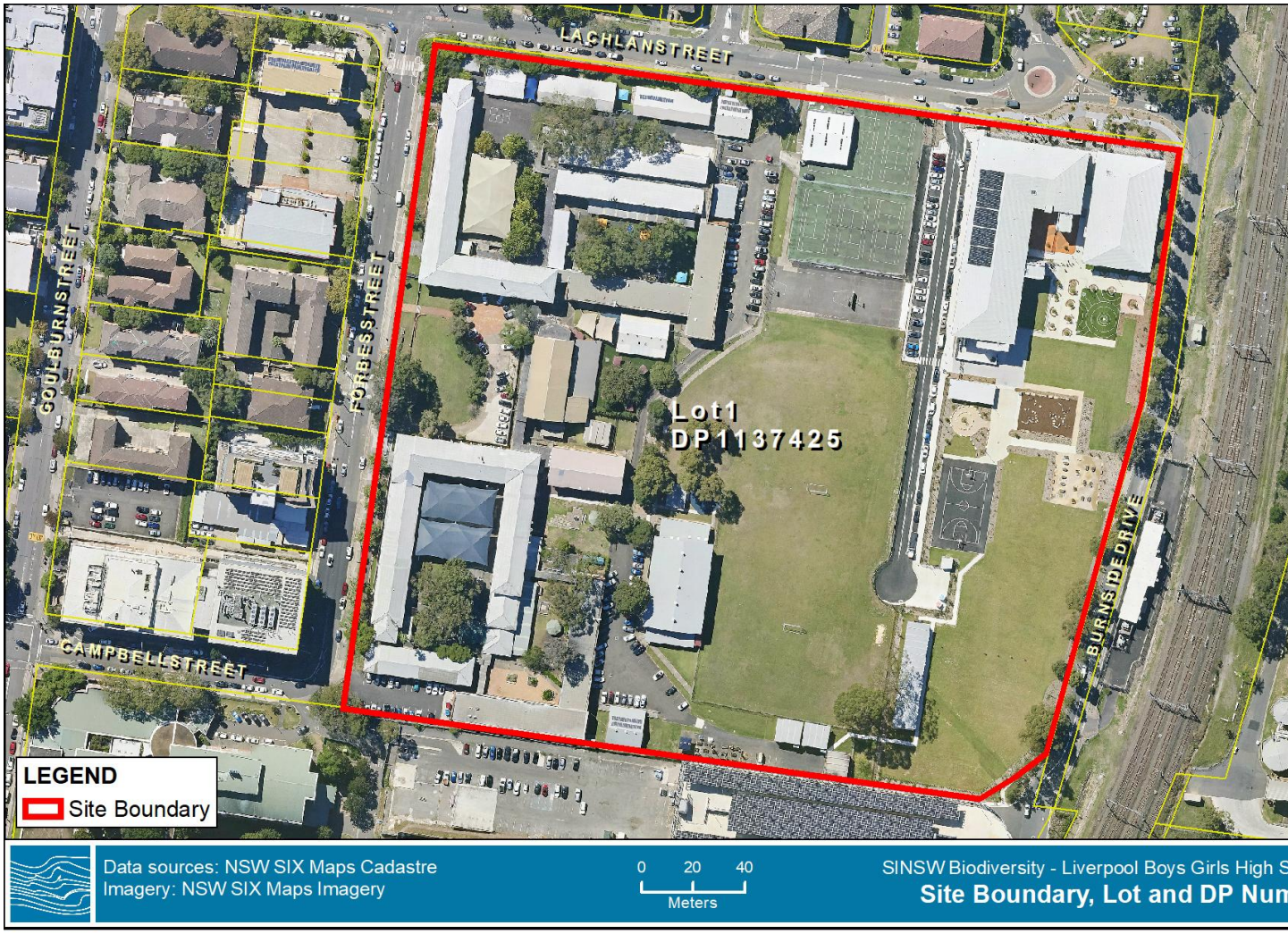

Figure 5-1).

7.2 Desktop Research and Analysis

Prior to undertaking the ecological field survey, desktop searches were conducted to provide a context of the surrounding environment.

7.2.1 Biodiversity Values

The Biodiversity Values Map is prepared by DCCEEW under Part 7 of the BC Act. It identifies land with high biodiversity value that is particularly sensitive to impacts from development and clearing. The map forms part of the Biodiversity Offsets Scheme threshold, which is one of the triggers for determining whether the Biodiversity Offset Scheme applies to a clearing or development proposal.

The site does not contain any areas mapped as Biodiversity Values (Figure 7-1). The closest mapped biodiversity values is at Horse Shoe Pond approximately 700 m east of the site.

7.2.2 Vegetation communities

A review of the vegetation mapping databases using the SEED portal- (NSW Government's central resource for Sharing and Enabling Environmental Data in NSW) was undertaken to identify Plant Community Types (PCTs) present within the area. As indicated in Figure 7-2, no PCTs were mapped as being present within the project site. The closest mapped PCTs were south and east of the site and are unlikely to be impacted by the proposed construction works.

Some mature canopy trees are established throughout the site, however, there is a lack of large, vegetated patches on the site as the undeveloped areas are mostly cleared sporting fields and lawn areas. Historic photographs from 1943 revealed the trees on site were planted and are not remnants of native vegetation (Figure 7-3).

7.2.3 NSW BioNet Atlas of Threatened Species

A search of the DCCEEW BioNet Atlas revealed 4,911 records of 31 fauna and 18 flora species previously recorded within 10 km of the site. Analysis of the Protected Matters Search Tool indicated 12 listed threatened ecological communities, 104 listed threatened species, and 42 listed migratory species previously recorded within 10 km of the subject site. No World Heritage Properties, National Heritage Places, Protected Marine Areas, nor Wetlands of international importance occurred within 10 km of the site (Appendix A).

The DCCEEW BioNet Atlas mapping identified four endangered or threatened species near the site, including *Pteropus poliocephalus* (Grey-headed Flying-fox), *Acacia pubescens* (Downy Wattle), *Eucalyptus scoparia* (Wallangarra White Gum), and *Ninox strenua* (Powerful Owl). The Likelihood of Occurrence analysis indicated no species were highly likely to occur within the site, though the Grey-headed Flying-fox and Downy Wattle had a moderate likelihood due to their proximity (Appendix B).

The SEED database showed Downy Wattle has been previously recorded within 100m to the east of the site (

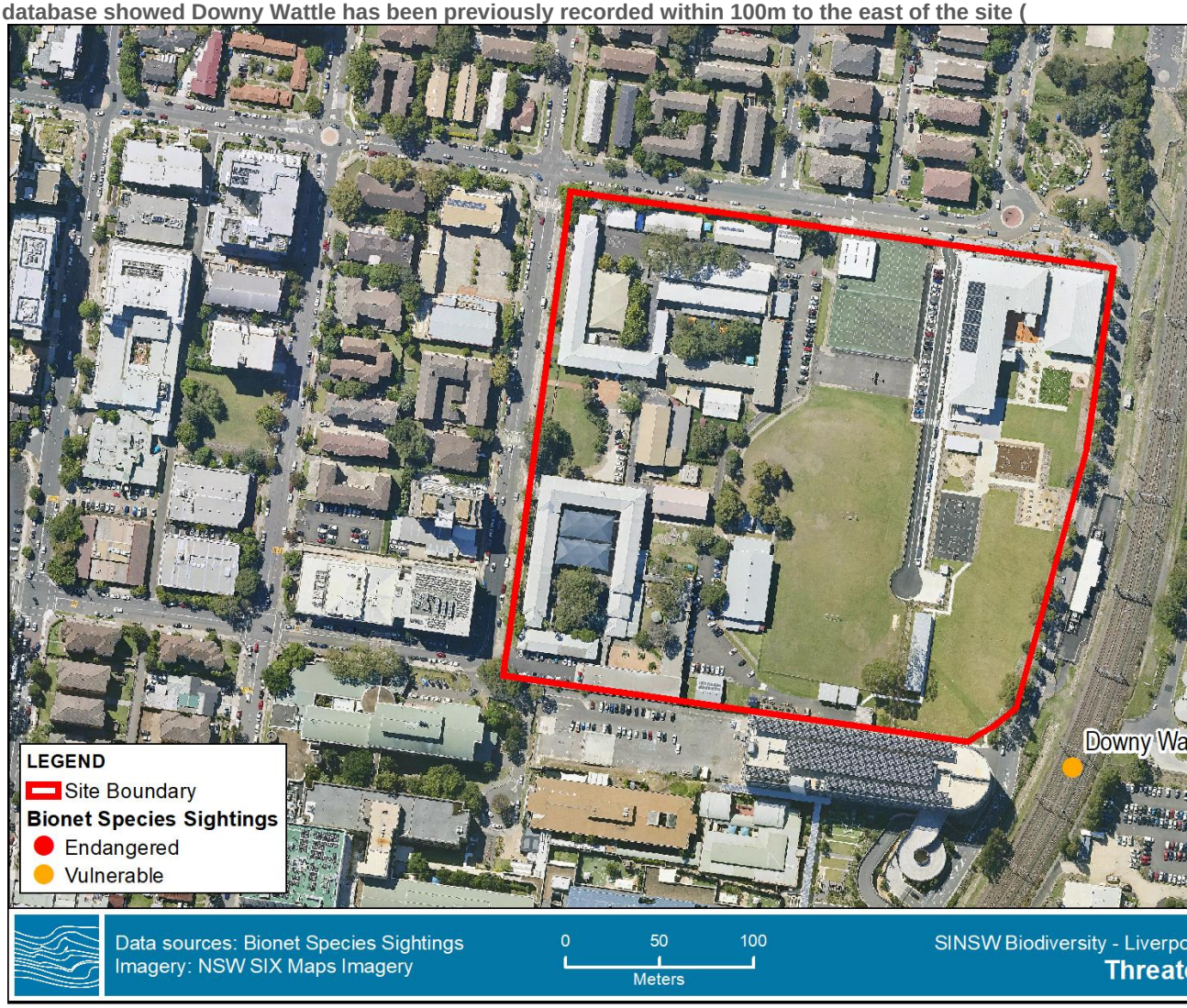

Figure 7-4).

Figure 7-1 Biodiversity Values

Figure 7-2 Plant Community Types

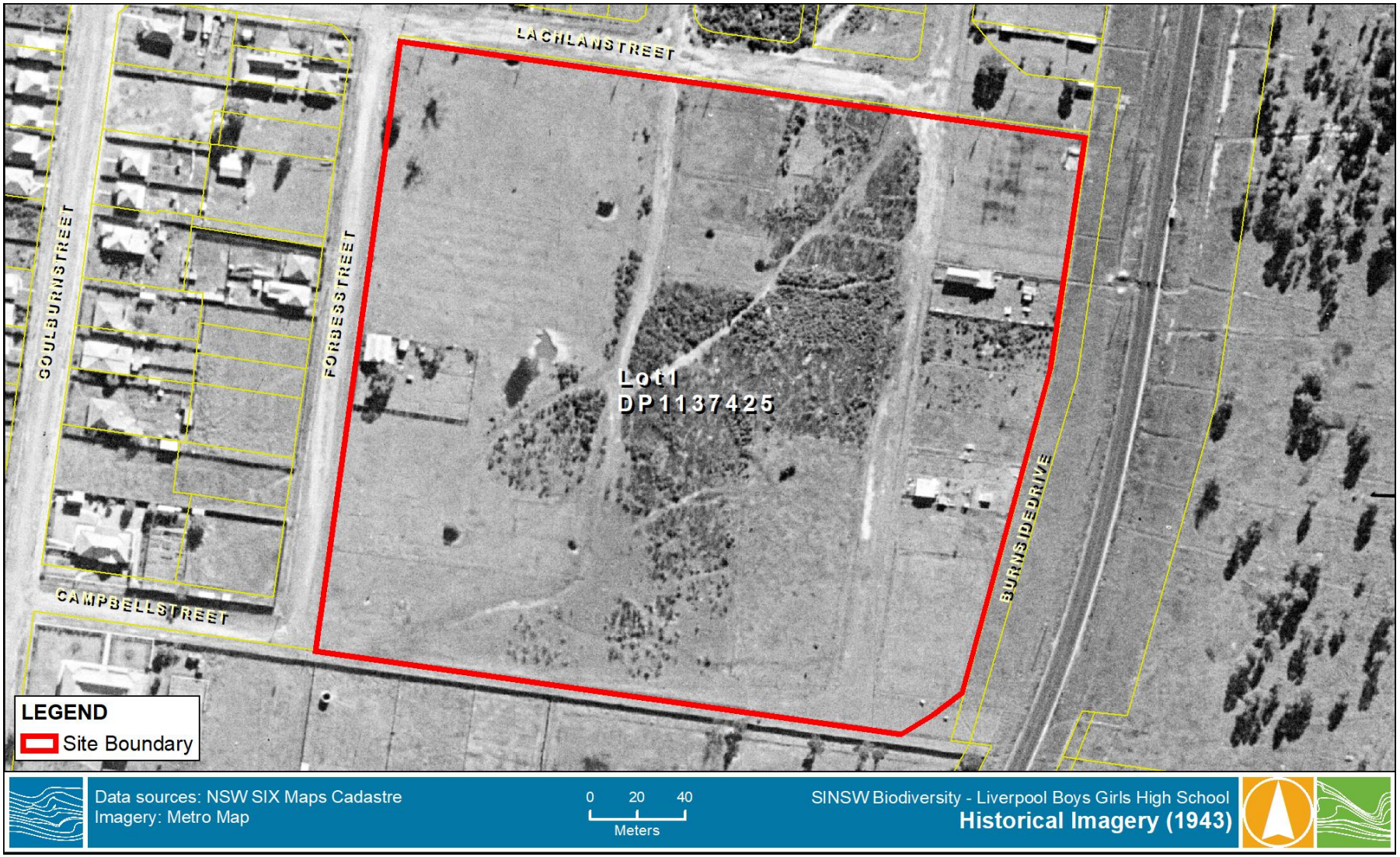

Figure 7-3 Historic Photograph 1943

Figure 7-4 Threatened species

7.2.4 Matters of National Significance

The Commonwealth Government Department of Climate Change, Energy, the Environment and Water's (DCCEEW) Protected Matters Search Tool summarises the Matters of National Environmental Significance (MNES) that may occur in, or may relate to, the subject site. The results are provided in 11Appendix A).

Under the EPBC Act, a person must not, without an approval under the Act, take an action that has or will have, or is likely to have, a significant impact on a MNES. These matters are listed as:

- The world heritage values of a declared World Heritage property;
- The ecological character of a declared Ramsar wetland;
- A threatened species or endangered community listed under the Act;
- A migratory species listed under the Act; or
- The environment in a Commonwealth marine area or on Commonwealth.

The *EPBC Act* does not require Commonwealth approval for the construction of infrastructure. It does suggest that when approving such developments, determining authorities should consider whether to allow actions that could significantly affect MNES or the environment of Commonwealth land. Commonwealth Assessment will be required for proposed activities on the site if they are considered likely to affect any MNES.

Analysis of the Protected Matters Search Tool indicated that there are 12 listed threatened ecological communities, 104 listed threatened species, and 38 listed migratory species previously recorded within 10 km of the subject site. These have been considered herein as part of the PCT analysis and the Likelihood of Occurrence process. No National Heritage Properties, World Heritage Properties, Wetlands of International Importance (Ramsar) nor Protected Marine Areas occur within 10km of the site.

7.2.5 Waterways and Key Fish Habitat

The subject site was not mapped as containing any Key Fish Habitat, nor is it in proximity to significant waterways or waterfront land, thus no further provisions within the FM Act and WM Act are not required for the proposed activity.

7.3 Site Visit

On 14th September 2023, ecologist Caroline Weller conducted a site assessment for Liverpool Boys and Girls High School , involving a walkthrough of all accessible vegetated areas. Flora species were identified and recorded by stratum, and vegetation communities were cross-checked with nearby mapped areas. Given the proximity of the threatened Downy Wattle, a targeted survey for this species was performed. A general fauna survey was also conducted, focusing on proxy evidence of fauna activity. Due to the cryptic and nocturnal nature of many species, the fauna assessment primarily evaluated the site's potential as habitat. The precautionary principle was adopted, assuming the presence of threatened species if suitable habitat exists.

7.3.1 Liverpool Boys and Girls High School

The site was largely dominated by canopy species, including Spotted Gum (*Corymbia maculata*) and Narrow-leaved Ironbark (*Eucalyptus crebra*), which are associated with the surrounding mapped PCTs. However, most of these trees are either in a straight line or in planter boxes, indicating they were likely planted.

The majority of the trees were an entire row of mature Eucalyptus trees and two large trees inside the quadrangle area. There was limited presence of midstorey and understory species, and the threatened Downy Wattle was not found on site. The understory vegetation present was generally in garden features adjoining the school buildings or along the outskirts of the site, suggesting they are planted.

Much of the ground surface comprised maintained lawn or concrete. There were many large native trees scattered around the teaching building areas providing shade, but minimal shade trees in the open oval areas, except for a small patch near the gate and a single tree in the bottom corner of the oval shared with the Girls High School. A small vegetated cluster in the northwestern end of the sports field, approximately 700 sqm, of mixed native and exotic vegetation, is proposed for removal. A comprehensive floristics list can be found in Appendix C.

The subject site contained exotic species dominated by London Plane Tree (*Platanus* × *acerifolia*). Other exotic species were garden species planted in raised garden beds throughout the school. A comprehensive list of weeds found onsite can be found in Appendix C.

Potential habitat was identified on-site in the form of one small (approximately 10cm diameter) hollow in a Spotted Gum located in the bottom quadrangle section near the table tennis courts, which is to be retained. Examples of non-threatened habitat found on site include a pair of Masked Lapwing (*Vanellus miles*) nesting and defending their territory in the northern cul-de-sac car park. There was also a beehive installation in this area to encourage pollination, seemingly used by native bee species rather than the European bees typically found in beehives. The majority of this area, approximately 32,914 sqm, is proposed for removal. A comprehensive list of fauna and potential habitat sites can be found Appendix C.

Nectar-bearing trees used for foraging by the Grey-headed Flying-fox were found to be very minimal, primarily limited to the Eucalyptus trees. The nearest likely roosting spot for the Grey-headed Flying-fox would most likely be Bulba-Dibeen Island on Lake Moore, approximately 850m to the south, or along the Georges River to the east.

8 ENVIRONMENTAL DETERMINATION

No native fauna, including any threatened species, were identified during the site inspection. The terrestrial flora and fauna survey was limited to less than one hour. The field survey was restricted to the area of impact of the proposed works

As there were no threatened species found, a Test of Significance was not required. As many faunal species likely to occur within the project area are cryptic and/or nocturnal, or may only visit the site on occasion, they are unlikely to be detected even during seasonal surveys. The fauna assessment is, accordingly, largely an assessment of the potential of the project site as habitat for various fauna species. Therefore, it is important to adopt the precautionary principle such that it is assumed that threatened species may be at the site if suitable habitat exists.

9 POTENTIAL IMPACTS

9.1 Construction Impacts

The following is a summary of the direct and indirect impacts to the biodiversity potentially persisting onsite.

9.1.1 Vegetation and Trees

There were no trees or vegetation on-site classified as an Endangered Ecological Community (EEC) or identified as threatened species.

The arborist report Birds Tree Consultancy Report, 2024 in Arborist Report11Appendix D) recommended the that approximately 57 trees, with a total area of 2832 sqm will be cleared, please refer to architectural plans (Figure 9-3 and Figure 9-4). The proposed vegetation to be cleared includes the small, vegetated cluster in the northwestern end of the sports field approximately 700 sqm of planted trees, comprising native and exotic species.

It is important to note that activities are scheduled to take place within the Tree Protection Zone (TPZ) of the trees designated for retention. The Eucalyptus trees should be protected to avoid them being damaged. As the construction takes place in an area of the TPZ precautions should be taken (Figure 9-4).

It is recommended that a qualified arborist is to attend to the pruning and the removal of any trees. Also, if roots greater than 50mm are encountered or if any trees are to be removed or significantly pruned, an arborist will monitor and evaluate the remaining trees. An arborist will be engaged prior to construction to provide a Tree Protection Plan.

All tree protection measures during construction should be adhered to, as described in the Birds Tree Consultancy Report, 2024 in Arborist Report11Appendix D).

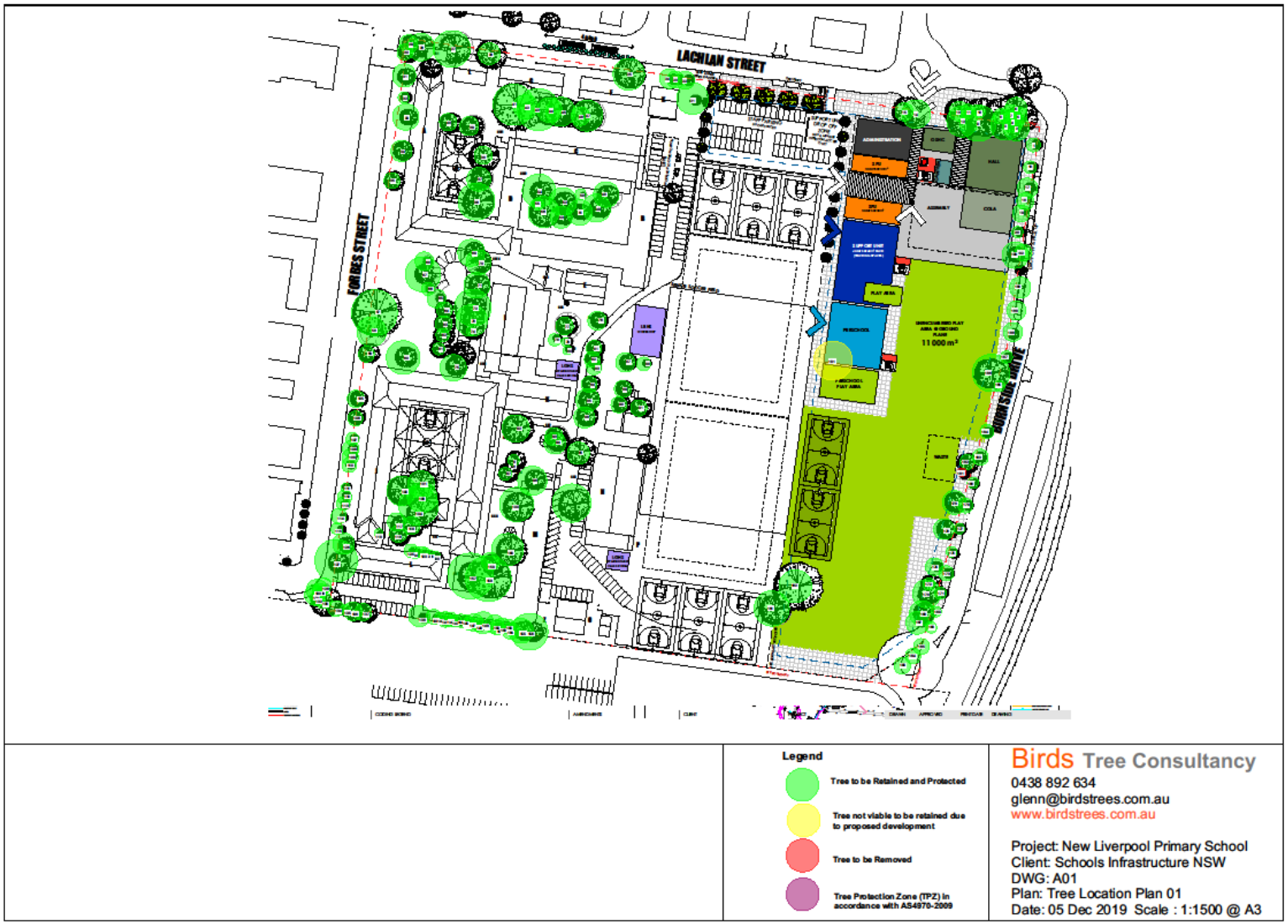

Figure 9-1 Arborist Plan curtesy of Birds Tree Consultancy

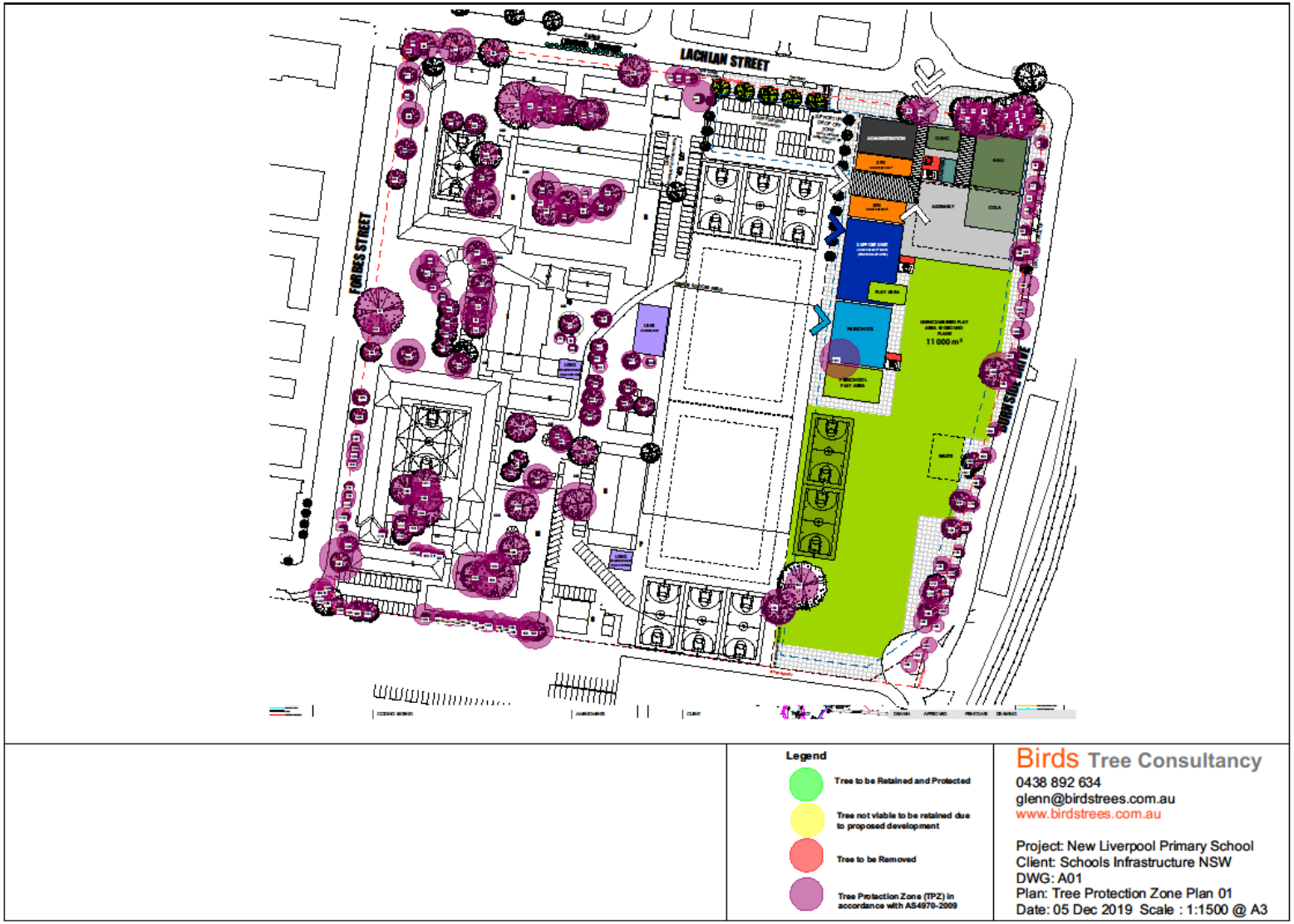

Figure 9-2 Arborist TPZ Plan curtesy of Birds Tree Consultancy

9.1.2 Nests and Hollows

Prior to the commencement of the construction, all trees and vegetation should be inspected for hollows and nests. If fauna is discovered inhabiting hollows or nests, an ecologist may be required to remove and relocate any fauna if the tree or vegetation is to be removed.

Potential habitat was present on-site in the form of two dead mistletoe (*Amyema miquelii*) in a tree near the oval which could be reused as a nesting site. This tree is to be retained and is not included in the small patch proposed for removal. There was also a small section of native ground cover which could be used as shelter for lizards and small birds etc.

9.1.3 Contractors and Staff Inductions

Induction of all contractors and staff outlining the ecological sensitivity of the site, no-go areas, the need to minimise ecological impact, and all other required mitigation measures is to be undertaken.

9.1.4 Hygiene

Basic hygiene protocols would be implemented for construction personnel and machinery on site to reduce the potential for invasion by plant pathogens including *Phytopthora cinnamomi*, the fungus myrtle rust *Uredo rangelli* and amphibian chytrid fungus.

9.2 Operational Impacts

No operational impacts to fauna are anticipated as a result of the proposal.

9.2.1 Mitigation Measures

Measures that will be implemented to address potential pre-construction impacts are listed in Table 9-1 and construction impacts are listed in Table 9-2. Detailed tree mitigation measures during pre-construction and construction should be adhered to, as described in Arborist Report11Appendix D).

Table 9-1 Mitigation measures for pre-construction impacts (PI)

FFA	Mitigation Measure	Timing
PI1	Tree protection must be approved by a Consulting Arborist AQF Level 5. No materials, mixing, parking, disposal, repairs, refuelling, fires, stockpiling, or backfilling is allowed near remaining trees. Removal or lopping of trees needs written permission from the Superintendent.	Pre-construction
PI2	All trees to be protected shall be clearly identified and all TPZs surveyed.	Pre-construction
PI3	Protective fencing around existing trees and within TPZs must be installed before any site work begins. The fence must be 1800mm high chain wire mesh fixed to Galvanised steel posts, enclosing an area to prevent damage as defined in the Tree Protection Plan. No storage inside fenced area.	Pre-construction
PI4	Use AS 4454 leaf mulch with 90% recycled content for tree protection fencing. Chip trees marked for removal and use mulch 100mm deep. Avoid soil, weeds, sticks, and stones. Comply with AS 4454 (1999) and AS 4419 (1998).	Pre-construction
PI5	Tree protection signage must be attached to tree protection zones before works begin. Signs should be displayed prominently and repeated at 10m intervals or closer when the fence changes direction. Signs must include information about the tree protection zone, access restrictions, developer's contact details, and Site Arborist information.	Pre-construction

FFA	Mitigation Measure	Timing
PI6	Inspect all trees for hollows and nests. If fauna is discovered an ecologist may be required to remove and relocate any fauna if the tree or vegetation is to be removed.	Pre-construction
PI7	Induction of all contractors and staff outlining the ecological sensitivity of the site, no-go areas, the need to minimise ecological impact, and all other required mitigation measures is to be undertaken.	Pre-construction

Table 9-2 Mitigation measures for construction impacts (CI)

FFA	Mitigation Measure	Timing
CI1	Tree Protection Zones (TPZs) will be maintained around vegetation to be retained. TPZs will be maintained in accordance with Australian Standard 4970 (2009) Protection of Trees on Development Sites (AS-4970). No activities are to take place within the Structural Root Zones (SRZs) of mature trees. No works, stockpiling of materials, excavation, parking or any other potentially harmful activities will be undertaken within TPZs unless a Level 5 Arborist has provided confirmation that the works will not impact the tree (Appendix D).	Construction
CI2	No pedestrian or plant access is permissible to the TPZ.	Construction
CI3	Avoid storing bulk or harmful materials near trees. Keep spoil from excavations away from TPZs. Ensure wind-blown materials like cement don't harm trees. Contaminants stored properly with spill measures.	Construction
CI4	Protect the tree from harm. Avoid tying ropes, cables, or similar items to trees. No staff members. No plant, machinery, or materials can enter the tree protection fencing.	Construction
CI5	Do not fill or compact soil above tree roots enclosed by protection fencing during construction near trees. Guidelines must be followed to prevent soil compaction in these areas. Protection includes using elevated planks attached to scaffolding to prevent ground compression.	Construction
CI6	Trenching is not allowed in TPZs or tree protection fencing. Approval needed for trenching, must be done by hand with arborist supervision.	Construction
CI7	Contractors are to maintain plants are watered. Apply water at an appropriate rate suitable for the plant species during periods of little or no rainfall.	Construction
CI8	All site facilities must be located outside of TPZ. Chemicals and contaminants must be stored properly in an enclosed area with a spill bund to prevent runoff in case of accidents.	Construction
CI9	Basic hygiene protocols would be implemented for construction personnel and machinery on site to reduce the potential for invasion by plant pathogens including *Phytopthora cinnamomi*, the fungus myrtle rust *Uredo rangelli* and amphibian chytrid fungus.	Construction
CI9	Implement construction noise and vibration controls in line with local environmental standards. Dust suppression measures will include water spraying, covering stockpiles, and using dust screens around construction zones.	Construction
C20	A detailed Construction Traffic Management Plan (CTMP) will be developed once a contractor is appointed to ensure minimal disruption. This plan will outline safe construction vehicle routes, temporary access, and designated parking areas to prevent conflicts with local traffic.	Construction

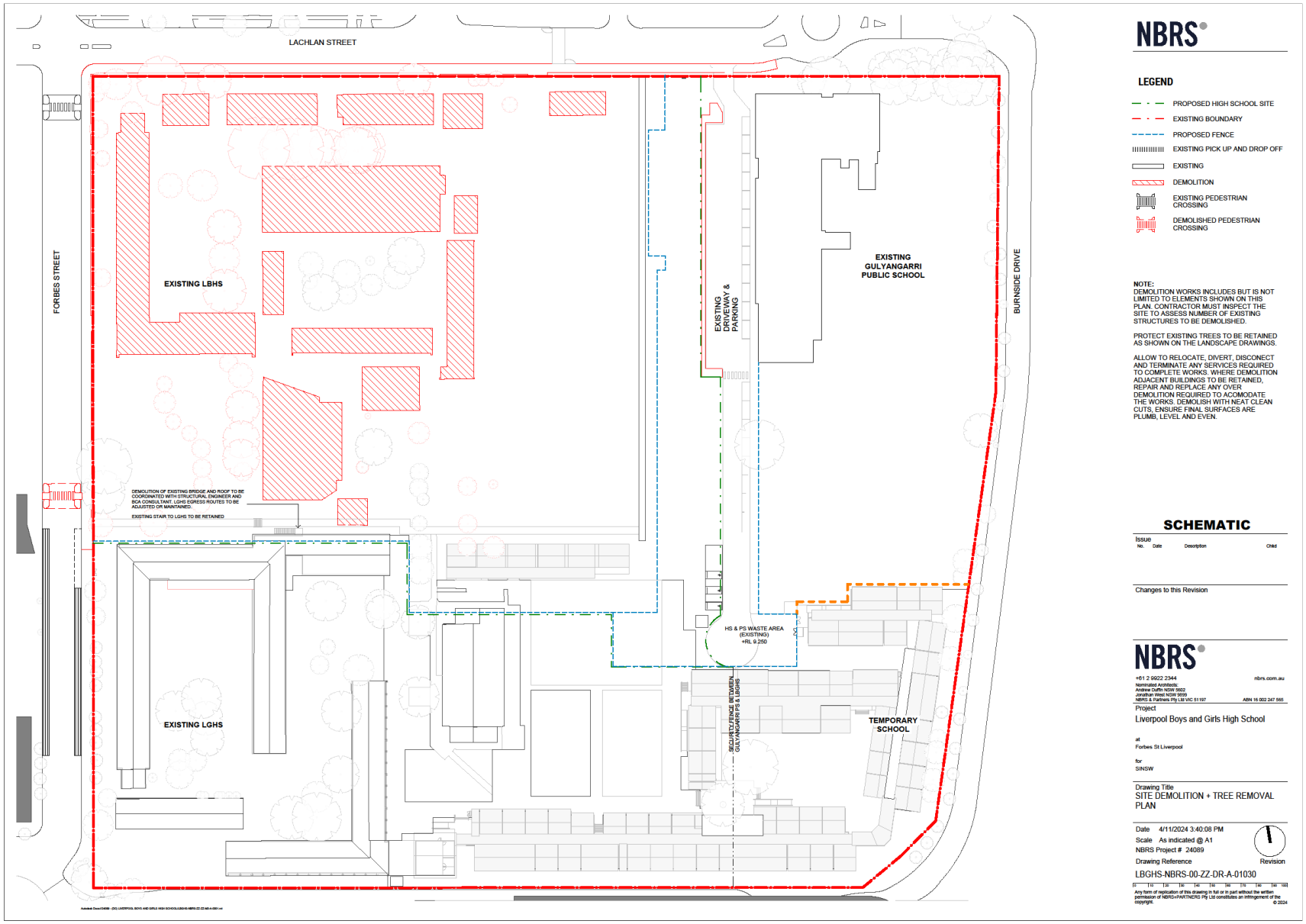

Figure 9-3 Plan curtesy of NBRS Architects

Figure 9-4 Tree Protection Zones

10 CONCLUSION AND RECOMMENDATIONS

The construction project will clear approximately 57 trees including a small cluster in the sports fields at the Liverpool Boys and Girls High School end. Most tree removal will affect mature Eucalyptus trees. Activities within the Tree Protection Zone (TPZ) will require precautions to avoid damage, with a qualified arborist overseeing the process and providing a Tree Protection Plan. Trees and vegetation will be inspected for hollows and nests, with an ecologist relocating any fauna found. Contractors and staff will be inducted on the site's ecological sensitivity, and basic hygiene protocols will be implemented to prevent plant pathogens and fungi.

No operational impacts to fauna are anticipated, and mitigation measures will include maintaining TPZs, inspecting trees for fauna, and implementing hygiene protocols. If these mitigation measures are followed, the ecological impact of the construction can be minimised, ensuring the protection of the remaining trees and local wildlife.

The proposed activity will be carried out as development without consent.

The proposed activity will not be carried out in a declared area of outstanding biodiversity value and is not likely to significantly affect threatened species, populations, ecological communities, their habitats, or impact biodiversity values. Additionally, the proposed activity is not likely to have a significant impact on matters of national environmental significance or on the environment of Commonwealth land. Therefore, referral to the Minister under the EPBC Act is not required, and a Species Impact Statement (SIS) and/or a Biodiversity Development Assessment Report (BDAR) is not required, in accordance with Section 7.8 of the Biodiversity Conservation Act 2016.The potential impacts can be appropriately mitigated or managed to ensure minimal effect on the locality or community.

Water Technology hereby certifies that the contents of this report are true and correct to the best of our knowledge and belief.

Please refer below to the mitigation measures *Table 10-1*.

Table 10-1 Project Stage Design (D) Construction (C) Operation (O)

Project Stage	Mitigation Measures	Relevant Section of Report
C	Tree protection must be approved by a Consulting Arborist (AQF Level 5). Activities such as mixing, parking, disposal, repairs, refuelling, fires, stockpiling, or backfilling are not allowed near trees. Any tree removal or lopping requires written permission from the Superintendent.	Section 9.2.1 Table 9-1
C	All trees to be protected must be clearly identified, and Tree Protection Zones (TPZs) surveyed.	Section 9.2.1 Table 9-1
C	Protective fencing, 1800mm high chain wire mesh fixed to galvanised steel posts, must be installed around all existing trees and within TPZs before any site work begins. No storage or activities should occur within the fenced area.	Section 9.2.1 Table 9-1
C	Use AS 4454 leaf mulch with 90% recycled content for tree protection fencing. Chip trees marked for removal and spread mulch to a depth of 100mm, ensuring no soil, weeds, sticks, or stones. Comply with AS 4454 (1999) and AS 4419 (1998).	Section 9.2.1 Table 9-1

Project Stage	Mitigation Measures	Relevant Section of Report
C	Tree protection signage must be displayed at the TPZs before work commences, at intervals of no more than 10m. Signs must include details of the tree protection zone, access restrictions, the developer's contact information, and Site Arborist details.	Section 9.2.1 Table 9-1
C	Conduct an inspection of all trees for hollows and nests. If fauna is found, an ecologist may need to remove and relocate any fauna before tree removal or vegetation clearance.	Section 9.2.1 Table 9-1
C	All contractors and staff must undergo induction on the ecological sensitivity of the site, including no-go areas, minimisation of ecological impacts, and tree protection measures.	Section 9.2.1 Table 9-1
C	Tree Protection Zones (TPZs) should be maintained in accordance with AS 4970 (2009) and ensure no activities take place within the Structural Root Zones (SRZs) of mature trees. Any works within TPZs must be approved by a Level 5 Arborist.	Section 9.2.1 Table 9-2
C	No pedestrian or plant access is permitted within the TPZ.	Section 9.2.1 Table 9-2
C	Do not store bulk materials or harmful substances near trees. Ensure that spoil from excavation work is kept away from TPZs and wind-blown materials such as cement are managed appropriately.	Section 9.2.1 Table 9-2
C	The tree must be protected from damage, including not allowing ropes, cables, or other materials to be tied to it. No plant, machinery, or staff should enter the tree protection fencing.	Section 9.2.1 Table 9-2
C	Avoid soil compaction in TPZs by not filling or compacting soil above tree roots. Use elevated planks attached to scaffolding to prevent ground compression during construction.	Section 9.2.1 Table 9-2
C	Trenching within TPZs is prohibited unless approved and supervised by an Arborist. Trenching must be done by hand.	Section 9.2.1 Table 9-2
C	Maintain appropriate watering of plants, especially during periods of little or no rainfall, to ensure plant health.	Section 9.2.1 Table 9-2
C	Site facilities must be located outside TPZs. Chemicals and contaminants should be stored in an enclosed area with a spill bund to prevent runoff in case of accidents.	Section 9.2.1 Table 9-2
C	Noise, vibration, and dust must be managed through measures such as installing noise barriers, limiting vibration-intensive activities to designated hours, and suppressing dust using water sprays and dust screens.	Section 9.2.1 Table 9-2
C	A detailed Construction Traffic Management Plan (CTMP) will be developed once a contractor is appointed to ensure minimal disruption. This plan will outline safe construction vehicle routes, temporary access, and designated parking areas to prevent conflicts with local traffic.	Section 9.2.1 Table 9-2
C	Flood and bushfire assessments must be conducted to identify risks. Evacuation plans and mitigation strategies must be included in project design.	Section 9.2.1 Table 9-2
C	Utility infrastructure and service assets must be assessed and protected to prevent disruption. Coordination with service providers is required.	Section 9.2.1 Table 9-2

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APPENDIX A
PROTECTED MATTERS SEARCH

APPENDIX B
LIKELIHOOD OF OCCURRENCE

Recorded	The species was observed in the study area during the current survey.
High	It is highly likely that a species inhabits the study area and is dependent on identified suitable habitat (i.e., for breeding or important life cycle periods such as winter flowering resources), has been recorded recently in the locality (10km) and is known or likely to maintain resident populations in the study area. Also includes species known or likely to visit the study area during regular seasonal movements or migration.
Moderate	Potential habitat is present in the study area. Species unlikely to maintain sedentary populations, however, may seasonally use resources within the study area opportunistically or during migration. The species is unlikely to be dependent (i.e., for breeding or important life cycle periods such as winter flowering resources) on habitat within the study area, or habitat is in a modified or degraded state. Includes cryptic flowering flora species that were not seasonally targeted by surveys and that have not been recorded.
Low	It is unlikely that the species inhabits the study area and has not been recorded recently in the locality (10km). It may be an occasional visitor, but habitat similar to the study area is widely distributed in the local area, meaning that the species is not dependent (i.e., for breeding or important life cycle periods such as winter flowering resources) on available habitat. Specific habitat is not present in the study area, or the species are a non-cryptic perennial flora species that were specifically targeted by surveys and not recorded.
None	Suitable habitat is absent from the study area.

Family	Scientific Name	Common Name	NSW status	Comm. Status	Records	Comment	Likelihood of Occurrence
Fauna							
Hylidae	*Litoria aurea*	Green and Golden Bell Frog	E1, P	V	2	Inhabits marshes, dams, and stream-sides, particularly those containing bullrushes (*Typha* spp.) or spikerushes (*Eleocharis* spp.). Optimum habitat includes waterbodies that are unshaded, free of predatory fish such as Plague Minnow (*Gambusia holbrooki*), have a grassy area nearby and diurnal sheltering sites available. Some sites, particularly in the Greater Sydney region, occur in highly disturbed areas. The species is active by day and usually breeds in summer when conditions are warm and wet.	Low
Apodidae	*Apus pacificus*	Fork-tailed Swift	P	C, J, K	1	The Fork-tailed Swift is almost exclusively aerial, flying from less than 1 m to at least 300 m above ground and probably much higher. In Australia, they mostly occur over inland plains but sometimes above foothills or in coastal areas. They mostly occur over dry or open habitats, including riparian woodland and tea-tree swamps, low scrub, heathland, or saltmarsh. They are also found at treeless grassland and sandplains covered with spinifex, open farmland, and inland and coastal sand-dunes. The sometimes occur above rainforests, wet sclerophyll forest or open forest or plantations of pines.	Low

Family	Scientific Name	Common Name	NSW status	Comm. Status	Records	Comment	Likelihood of Occurrence
						They forage aerially up to hundreds of metres above ground. They sometimes feed aerially among treetops in open forest. They probably roost aerially but are occasionally observed to land.	
Apodidae	*Hirundapus caudacutus*	White-throated Needletail	P	V, C, J, K	2	In Australia, the White-throated Needletail is almost exclusively aerial, from heights of less than 1 m up to more than 1000 m above the ground. Although they occur over most types of habitats, they are probably recorded most often above wooded areas, including open forest and rainforest, and may also fly between trees or in clearings, below the canopy, but they are less commonly recorded flying above woodland. They also commonly occur over heathland, but less often over treeless areas, such as grassland or swamps. When flying above farmland, they are more often recorded above partly cleared pasture, plantations, or remnant vegetation at the edge of paddocks. In coastal areas, they are sometimes seen flying over sandy beaches or mudflats, and often around coastal cliffs and other areas with prominent updraughts, such as ridges and sand-dunes. They are sometimes recorded above islands well out to sea.	Low
Ardeidae	*Ixobrychus flavicollis*	Black Bittern	V, P		8	Inhabits both terrestrial and estuarine wetlands, generally in areas of permanent water and dense vegetation. Where permanent water is present, the species may occur in flooded grassland, forest, woodland, rainforest, and mangroves. Feeds on frogs, reptiles, fish, and invertebrates, including snails, dragonflies, shrimps, and crayfish, with most feeding done at dusk and at night.	Low
Accipitridae	*Circus assimilis*	Spotted Harrier	V, P		5	Occurs in grassy open woodland including Acacia and mallee remnants, inland riparian woodland, grassland, and shrub steppe. It is found most commonly in native grassland, but also occurs in agricultural land, foraging over open habitats including edges of inland wetlands. Builds a stick nest in a tree and lays eggs in spring (or sometimes autumn), with young remaining in the nest for several months.	Low
Accipitridae	*Haliaeetus leucogaster*	White-bellied Sea-Eagle	V, P		16	Habitats are characterised by the presence of large areas of open water including larger rivers, swamps, lakes, and the sea. Occurs at sites near the sea or seashore, such as around bays and inlets, beaches, reefs, lagoons, estuaries, and mangroves; and at, or in the vicinity of freshwater swamps, lakes, reservoirs,	Low

Family	Scientific Name	Common Name	NSW status	Comm. Status	Records	Comment	Likelihood of Occurrence
						billabongs, and saltmarsh. Terrestrial habitats include coastal dunes, tidal flats, grassland, heathland, woodland, and forest (including rainforest).	
Accipitridae	*Hieraaetus morphnoides*	Little Eagle	V, P		11	Occupies open eucalypt forest, woodland, or open woodland. Sheoak or Acacia woodlands and riparian woodlands of interior NSW are also used. Nests in tall living trees within a remnant patch, where pairs build a large stick nest in winter.	Low
Accipitridae	*Pandion cristatus*	Eastern Osprey	V, P,3		5	Favour coastal areas, especially the mouths of large rivers, lagoons, and lakes. Feed the fish over clear, open water. Breed from July to September in NSW. Nests are made high up in dead trees or in dead crowns of live trees, usually within one kilometre of the sea.	Low
Scolopacidae	*Calidris ferruginea*	Curlew Sandpiper	E1, P	CE, C, J, K	1	It generally occupies littoral and estuarine habitats, and in New South Wales is mainly found in intertidal mudflats of sheltered coasts. It also occurs in non-tidal swamps, lakes, and lagoons on the coast and sometimes inland. 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.	Low
Cacatuidae	*Lophochroa leadbeateri*	Major Mitchell's Cockatoo	V, P,2		1	Inhabits a wide range of treed and treeless inland habitats, always within easy reach of water. Feeds mostly on the ground, especially on the seeds of native and exotic melons and on the seeds of species of saltbush, wattles, and cypress pines.	Low
Psittacidae	*Glossopsitta pusilla*	Little Lorikeet	V, P		32	Forages primarily in the canopy of open Eucalyptus Forest and woodland, yet also finds food in Angophora, Melaleuca, and other tree species. Riparian habitats are particularly used, due to higher soil fertility and hence greater productivity. Isolated flowering trees in open country, e.g., paddocks, roadside remnants and urban trees also help sustain viable populations of the species. Feeds mostly on nectar and pollen, occasionally on native fruits such as mistletoe, and only rarely in orchards	Low
Psittacidae	*Lathamus discolor*	Swift Parrot	E1, P	CE	11	Migrates to the Australian south-east mainland between February and October. On the mainland they occur in areas where eucalypts are flowering profusely or where there are abundant lerp (from sap-sucking bugs) infestations. Favoured feed trees include winter flowering species such as Swamp Mahogany *Eucalyptus robusta*, Spotted Gum Corymbia maculata, Red Bloodwood C. gummifera, Forest Red Gum E. tereticornis, Mugga Ironbark *E. sideroxylon*, and White Box *E. albens*. Commonly used lerp infested trees include Inland Grey Box E. microcarpa, Grey	Low

Family	Scientific Name	Common Name	NSW status	Comm. Status	Records	Comment	Likelihood of Occurrence
						Box *E. moluccana*, Blackbutt *E. pilularis*, and Yellow Box E. melliodora. Return to some foraging sites on a cyclic basis depending on food availability.	
Psittacidae	*Neophema pulchella*	Turquoise Parrot	V, P,3		1	Lives on the edges of eucalypt woodland adjoining clearings, timbered ridges, and creeks in farmland. Usually seen in pairs or small, family groups and have also been reported in flocks of up to thirty individuals. Prefers to feed in the shade of a tree and spends most of the day on the ground searching for the seeds or grasses and herbaceous plants or browsing on vegetable matter.	Low
Strigidae	*Ninox connivens*	Barking Owl	V, P,3		1	Inhabits woodland and open forest, including fragmented remnants and partly cleared farmland. It is flexible in its habitat use, and hunting can extend into closed forest and more open areas. Sometimes able to successfully breed along timbered watercourses in heavily cleared habitats (e.g., western NSW) due to the higher density of prey found on these fertile riparian soils. Roost in shaded portions of tree canopies, including tall midstorey trees with dense foliage such as Acacia and Casuarina species. During nesting season, the male perches in a nearby tree overlooking the hollow entrance. Requires large permanent territories in most habitats due to sparse prey densities. Monogamous pairs hunt over as much as 6000 hectares, with 2000 hectares being more typical in NSW habitats.	Low
Strigidae	*Ninox strenua*	Powerful Owl	V, P,3		7	The Powerful Owl inhabits a range of vegetation types, from woodland and open sclerophyll forest to tall open wet forest and rainforest. The Powerful Owl requires large tracts of forest or woodland habitat but can occur in fragmented landscapes as well. The species breeds and hunts in open or closed sclerophyll forest or woodlands and occasionally hunts in open habitats. It roosts by day in dense vegetation comprising species such as Turpentine *Syncarpia glomulifera*, Black She-oak *Allocasuarina littoralis*, Blackwood *Acacia melanoxylon*, Rough-barked Apple *Angophora floribunda*, Cherry Ballart *Exocarpus cupressiformis* and a number of eucalypt species.	Low
Neosittidae	*Daphoenositta chrysoptera*	Varied Sittella	V, P		2	Inhabits eucalypt forests and woodlands, especially those containing rough-barked species and mature smooth-barked gums with dead branches, mallee, and Acacia woodland.	Low

Family	Scientific Name	Common Name	NSW status	Comm. Status	Records	Comment	Likelihood of Occurrence
Artamidae	*Artamus cyanopterus cyanopterus*	Dusky Woodswallow	V, P		5	Primarily inhabit dry, open eucalypt forests and woodlands, including mallee associations, with an open or sparse understorey of eucalypt saplings, acacias and other shrubs, and groundcover of grasses or sedges and fallen woody debris. It has also been recorded in shrublands, heathlands and very occasionally in moist forest or rainforest. Also found in farmland, usually at the edges of forest or woodland.	Low
Petroicidae	*Petroica boodang*	Scarlet Robin	V, P		2	The Scarlet Robin lives in dry eucalypt forests and woodlands. The understorey is usually open and grassy with a few scattered shrubs. This species lives in both mature and regrowth vegetation. It occasionally occurs in mallee or wet forest communities, or in wetlands and tea-tree swamps. The Scarlet Robin breeds on ridges, hills and foothills of the western slopes, the Great Dividing Range, and eastern coastal regions; this species is occasionally found up to 1000 metres in altitude. The Scarlet Robin is primarily a resident in forests and woodlands, but some adults and young birds disperse to more open habitats after breeding. In autumn and winter many Scarlet Robins live in open grassy woodlands, and grasslands or grazed paddocks with scattered trees.	Low
Phascolarctidae	*Phascolarctos cinereus*	Koala	E1, P	E	53	Inhabit eucalypt woodlands and forests. Feed on the foliage of more than 70 eucalypt species and 30 non-eucalypt species, but in any one area will select preferred browse species.	Low
Burramyidae	Cercartetus nanus	Eastern Pygmy-possum	V, P		1	Found in a broad range of habitats from rainforest through sclerophyll (including Box-Ironbark) forest and woodland to heath, but in most areas woodlands and heath appear to be preferred, except in north-eastern NSW where they are most frequently encountered in rainforest. Feeds largely on nectar and pollen collected from banksias, eucalypts, and bottlebrushes; an important pollinator of heathland plants such as banksias; soft fruits are eaten when flowers are unavailable.	Low
Petauridae	Petaurus norfolcensis	Squirrel Glider	V, P		1	Inhabits mature or old growth Box, Box-Ironbark woodlands and River Red Gum Forest west of the Great Dividing Range and Blackbutt-Bloodwood Forest with heath understorey in coastal areas. Prefers mixed species stands with a shrub or Acacia midstorey.	Low

Family	Scientific Name	Common Name	NSW status	Comm. Status	Records	Comment	Likelihood of Occurrence
Pteropodidae	*Pteropus poliocephalus*	Grey-headed Flying-fox	V, P	V	197	Occur in subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths, and swamps as well as urban gardens and cultivated fruit crops. 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.	Moderate
Emballonuridae	*Saccolaimus flaviventris*	Yellow-bellied Sheathtail-bat	V, P		5	Roosts singly or in groups of up to six, in tree hollows and buildings; in treeless areas they are known to utilise mammal burrows. When foraging for insects, flies high and fast over the forest canopy, but lower in more open country. Forages in most habitats across its very wide range, with and without trees; appears to defend an aerial territory.	Low
Molossidae	*Micronomus norfolkensis*	Eastern Coastal Free-tailed Bat	V, P		5	Occur in dry sclerophyll forest, woodland, swamp forests and mangrove forests east of the Great Dividing Range. Roost mainly in tree hollows but will also roost under bark or in manufactured structures.	Low
Vespertilionidae	*Chalinolobus dwyeri*	Large-eared Pied Bat	V, P	V	2	Roosts in caves (near their entrances), crevices in cliffs, old mine workings and in the disused, bottle-shaped mud nests of the Fairy Martin (*Petrochelidon ariel*), frequenting low to mid-elevation dry open forest and woodland close to these features. Females have been recorded raising young in maternity roosts (c. 20-40 females) from November through to January in roof domes in sandstone caves and overhangs. They remain loyal to the same cave over many years. Found in well-timbered areas containing gullies.	Low
Vespertilionidae	*Falsistrellus tasmaniensis*	Eastern False Pipistrelle	V, P		9	Prefers moist habitats, with trees taller than 20 m. Generally, roosts in eucalypt hollows, but has also been found under loose bark on trees or in buildings.	Low
Vespertilionidae	*Myotis macropus*	Southern Myotis	V, P		13	Generally, roost in groups of 10 - 15 close to water in caves, mine shafts, hollow-bearing trees, storm water channels, buildings, under bridges and in dense foliage.	Low
Vespertilionidae	*Scoteanax rueppellii*	Greater Broad-nosed Bat	V, P		7	Utilises a variety of habitats from woodland through to moist and dry eucalypt forest and rainforest, though it is most commonly found in tall wet forest. Although this species usually roosts in tree hollows, it has also been found in buildings. Open woodland habitat and dry open forest suits the direct flight of	Low

Family	Scientific Name	Common Name	NSW status	Comm. Status	Records	Comment	Likelihood of Occurrence
						this species as it searches for beetles and other large, slow-flying insects; this species has been known to eat other bat species.	
Miniopteridae	*Miniopterus australis*	Little Bent-winged Bat	V, P		9	Little Bentwing-bats roost in caves, tunnels, tree hollows, abandoned mines, stormwater drains, culverts, bridges and sometimes buildings during the day, and at night forage for small insects beneath the canopy of densely vegetated habitats. They prefer Moist eucalypt forest, rainforest, vine thicket, wet and dry sclerophyll forest, Melaleuca swamps, dense coastal forests, and banksia scrub. Generally found in well-timbered areas.	Low
Miniopteridae	*Miniopterus orianae oceanensis*	Large Bent-winged Bat	V, P		9	Caves are the primary roosting habitat, but also use derelict mines, storm-water tunnels, buildings, and other manufactured structures. Form discrete populations centred on a maternity cave that is used annually in spring and summer for the birth and rearing of young. Maternity caves have very specific temperature and humidity regimes. At other times of the year, populations disperse within about 300 km range of maternity caves. Cold caves are used for hibernation in southern Australia. Breeding or roosting colonies can number from 100 to 150,000 individuals. Hunt in forested areas, catching moths and other flying insects above the treetops.	Low
Camaenidae	*Meridolum corneovirens*	Cumberland Plain Land Snail	E1		24	Primarily inhabits Cumberland Plain Woodland (a critically endangered ecological community). This community is a grassy, open woodland with occasional dense patches of shrubs. It is also known from Shale Gravel Transition Forests, Castlereagh Swamp Woodlands, and the margins of River-flat Eucalypt Forest, which are also listed communities.	Low
FLORA							
Apocynaceae	*Marsdenia viridiflora* subsp. *viridiflora*	Marsdenia viridiflora R. Br. subsp. viridiflora population in the Bankstown, Blacktown, Camden, Campbelltown,	E2		129	Grows in vine thickets and open shale woodland.	Low

Family	Scientific Name	Common Name	NSW status	Comm. Status	Records	Comment	Likelihood of Occurrence
		Fairfield, Holroyd, Liverpool, and Penrith local government areas					
Campanulaceae	*Wahlenbergia multicaulis*	Tadgell's Bluebell in the local government areas of Auburn, Bankstown, Baulkham Hills, Canterbury, Hornsby, Parramatta, and Strathfield	E2		1	In Western Sydney, most sites are closely aligned with the Villawood Soil Series, which is a poorly drained, yellow podsolic extensively permeated with fine, concretionary ironstone (laterite). However, the sites in Hornsby LGA are on the 'Hawkesbury' soil landscape. Found in disturbed sites and grows in a variety of habitats including forest, woodland, scrub, grassland and the edges of watercourses and wetlands. Typically occurs in damp, disturbed sites (with natural or human disturbance of various forms), typically amongst other herbs rather than in the open. In Hornsby LGA it occurs in or adjacent to sandstone gully forest. In Western Sydney it is found in remnants of Cooks River/ Castlereagh Ironbark Forest.	Low
Convolvulaceae	*Wilsonia backhousei*	Narrow-leafed Wilsonia	V		1	This is a species of the margins of salt marshes and lakes.	Low
Dilleniaceae	*Hibbertia fumana*		E4A		1071	Species are known to occur in a long intergrade between Castlereagh Scribbly Gum Woodland and Castlereagh Ironbark Forest. Also recently found associated with aeolian sand deposits. Species have been found to occur in a variety of structural habitats including open areas, disturbed sites and also within thick ground cover dominated by a heavy cover of sedges, rushes, and grasses. Has the potential to occur in similar intergrade alluvial habitats rich in sands and laterite in other parts of western Sydney. The soil texture and character described as fine sandy clay loam, grey, brown in colour. Community composition is noted to include *Eucalyptus sideroxylon*, *E. fibrosa, E. parramattensis* and *E. sclerophylla*, with *Melaleuca decora*. Shrub layer with *Hakea sericea, Callistemon linearis, Bursaria spinosa, Grevillea parviflora, Acacia brownii, Acacia bynoeana, Pultenaea retusa, P. villosa*, a diverse groundcover of Goo*denia, Dianella, Poa, Stylidium, Themeda* and *Gonocarpus*.	Low
Dilleniaceae	*Hibbertia puberula*		E1		1190	Occurs on sandy soil often associated with sandstone, or on clay. Habitats are typically dry sclerophyll woodland communities, although heaths are also	Low

Family	Scientific Name	Common Name	NSW status	Comm. Status	Records	Comment	Likelihood of Occurrence
						occupied. One of the recently (2012) described subspecies also favours upland swamps.	
Dilleniaceae	*Hibbertia* sp. *Bankstown*		E4A	CE	157	The airport site is very heavily modified from the natural state, lacks canopy species and is currently a low grass/shrub association with many pasture grasses and other introduced herbaceous weeds. Soil at the site is a sandy (Tertiary) alluvium with a high silt content. The remnant at the site and soil type are consistent with an inferred pre-settlement cover of Castlereagh Ironbark Forest although some remnant vegetation at and near the site (along the channel in particular) suggests Castlereagh Scribbly Gum Woodland is equally valid.	Low
Ericaceae	*Epacris purpurascens* var. *purpurascens*		V		1	Recorded from Gosford in the north, to Narrabeen in the east, Silverdale in the west and Avon Dam vicinity in the South. Found in a range of habitat types, most of which have a strong shale soil influence.	Low
Ericaceae	*Leucopogon exolasius*	Woronora Beard-heath	V	V	1	Woronora Beard-heath is found along the upper Georges River area and in Heathcote National Park. The plant occurs in woodland on sandstone. Flowering occurs in August and September.	Low
Fabaceae (Mimosoideae)	*Acacia bynoeana*	Bynoe's Wattle	E1	V	68	Bynoe's wattle is found in central eastern NSW, from the Hunter District (Morisset) south to the Southern Highlands and west to the Blue Mountains. The species is currently known from about 30 locations, with the size of the populations at most locations being very small (1-5 plants). It has recently been found in the Colymea and Parma Creek areas west of Nowra. Occurs in heath or dry sclerophyll forest on sandy soils. Seems to prefer open, sometimes slightly disturbed sites such as trail margins, edges of roadside spoil mounds and recently burnt patches. Associated overstorey species include Red Bloodwood, Scribbly Gum, Parramatta Red Gum, Saw Banksia, and Narrow-leaved Apple.	Low
Fabaceae (Mimosoideae)	*Acacia pubescens*	Downy Wattle	V	V	434	Concentrated around the Bankstown-Fairfield-Rookwood area and the Pitt Town area, with outliers occurring at Barden Ridge, Oakdale, and Mountain Lagoon. Occurs in open woodland and forest, in a variety of plant communities, including Cooks River/Castlereagh Ironbark Forest, Shale/Gravel Transition Forest and Cumberland Plain Woodland. Occurs on alluviums, shales and at the intergrade between shales and sandstones. The soils are characteristically gravely soils,	Moderate

Family	Scientific Name	Common Name	NSW status	Comm. Status	Records	Comment	Likelihood of Occurrence
						often with ironstone. Flowers from August to October. Pollination of Acacia flowers is usually by insects and birds. The pods mature in October to December.	
Myrtaceae	*Callistemon linearifolius*	Netted Bottle Brush	V,3		1	Recorded from the Georges River to Hawkesbury River in the Sydney area, and north to the Nelson Bay area of NSW. Recorded in 2000 at Coalcliff in northern Illawarra. For the Sydney area, recent records are limited to the Hornsby Plateau area near the Hawkesbury River. The species was more widespread in the past, and there are currently only 5-6 populations remaining from the 22 populations historically recorded in the Sydney area. Three of the remaining populations are reserved in Ku-ring-gai Chase National Park, Lion Island Nature Reserve and Spectacle Island Nature Reserve. The species has also been recorded from Yengo National Park. Grows in dry sclerophyll forest on the coast and adjacent ranges. Flowers spring – summer.	Low
Myrtaceae	*Melaleuca deanei*	Deane's Paperbark	V	V	1	Deane's Paperbark occurs in two distinct areas, in the Ku-ring-gai/Berowra and Holsworthy/Wedderburn areas, respectively. There are also more isolated occurrences at Springwood (in the Blue Mountains), Wollemi National Park, Yalwal (west of Nowra) and Central Coast (Hawkesbury River) areas. The species occurs mostly in ridgetop woodland, with only 5% of sites in heath on sandstone. Flowers appear in summer, but seed production appears to be small and consequently the species exhibits a limited capacity to regenerate.	Low
Myrtaceae	*Syzygium paniculatum*	Magenta Lilly Pilly	E1	V	1	The Magenta Lilly Pilly is found only in NSW, in a narrow, linear coastal strip from Upper Lansdowne to Conjola State Forest. On the south coast the Magenta Lilly Pilly occurs on grey soils over sandstone, restricted mainly to remnant stands of littoral (coastal) rainforest. On the central coast Magenta Lilly Pilly occurs on gravels, sands, silts and clays in riverside gallery rainforests and remnant littoral rainforest communities.	Low
Proteaceae	*Grevillea parviflora* subsp. *parviflora*	Small-flower Grevillea	V	V	1084	Sporadically distributed throughout the Sydney Basin with sizeable populations around Picton, Appin and Bargo (and possibly further south to the Moss Vale area) and in the Hunter at in the Cessnock - Kurri Kurri area (particularly Werakata NP). Separate populations are also known from Putty to Wyong and Lake Macquarie on the Central Coast. Grows in sandy or light clay soils usually over thin shales, often with lateritic ironstone gravels and nodules. Sydney region occurrences are usually on Tertiary sands and alluvium, and soils derived from	Low

Family	Scientific Name	Common Name	NSW status	Comm. Status	Records	Comment	Likelihood of Occurrence
						the Mittagong Formation. Soil landscapes include Lucas Heights or Berkshire Park. Often occurs in open, slightly disturbed sites such as along tracks.	
Proteaceae	*Macadamia integrifolia*	Macadamia Nut		V	1	In this region the Macadamia Nut - Sydney Basin is known to be associated with the following vegetation formations and classes: Northern Ranges Coachwood Warm Temperate Rainforest, Far North Lowland Subtropical Rainforest, Northern Lowland Subtropical Rainforest, Far North Brush Box-Bloodwood Wet Forest, and the Far North Brush Box-Walnut Wet Forest	Low
Proteaceae	*Persoonia nutans*	Nodding Geebung	E1, P	E	316	Restricted to the Cumberland Plain in western Sydney, between Richmond in the north and Macquarie Fields in the south. The species has a disjunct distribution, with the majority of populations (and 99% of individuals) occurring in the north of the species range in the Agnes Banks, Londonderry, Castlereagh, Berkshire Park, and Windsor Downs areas. Core distribution occurs within Penrith, and to a lesser extent Hawkesbury, local government areas, with isolated and relatively small populations also occurring in the Liverpool, Campbelltown, Bankstown, and Blacktown local government areas. The southern and northern populations have distinct habitat differences. Northern populations are confined to aeolian and alluvial sediments and occur in a range of sclerophyll forest and woodland vegetation communities, with the majority of individuals occurring within Agnes Banks Woodland or Castlereagh Scribbly Gum Woodland and some in Cooks River / Castlereagh Ironbark Forests. Southern populations also occupy tertiary alluvium but extend onto shale sandstone transition communities and into Cooks River / Castlereagh Ironbark Forest. Peak flowering is from November to March with sporadic flowering all year round.	Low
Rhamnaceae	*Pomaderris brunnea*	Brown Pomaderris	E1	V	5	Brown Pomaderris is found in a very limited area around the Colo, Nepean, and Hawkesbury Rivers, including the Bargo area and near Camden. It also occurs near Walcha on the New England tablelands and in far eastern Gippsland in Victoria. Brown Pomaderris grows in moist woodland or forest on clay and alluvial soils of flood plains and creek lines Flowers appear in September and October.	Low
Thymelaeaceae	*Pimelea spicata*	Spiked Rice-flower	E1	E	1	Once widespread on the Cumberland Plain, the Spiked Rice-flower occurs in 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). On the Cumberland Plain sites, it is associated with Grey Box	Low

Family	Scientific Name	Common Name	NSW status	Comm. Status	Records	Comment	Likelihood of Occurrence
						communities (particularly Cumberland Plain Woodland variants and Moist Shale Woodland) and in areas of ironbark. In the coastal Illawarra it occurs commonly in Coast Banksia open woodland with a better developed shrub and grass understorey. Coastal headlands and hilltops are the favoured sites.	

APPENDIX C
SPECIES LIST

Table 11-1 Flora Species List

NATIVE SPECIES	
Scientific Name	**Common Name**
Canopy Species	
Allocasuarina glauca	Swamp Oak, Guman (Cadigal name)
Corymbia maculata	Spotted Gum
Eucalyptus sp.	Stringybark
Eucalyptus botryoides	Southern Mahogany
Eucalyptus crebra	Narrow-leaved Ironbark, Muggago (D'harawal)
Eucalyptus fibrosa	Broad-leaved Red Ironbark
Eucalyptus saligna	Sydney Blue Gum
Eucalyptus tereticornis	Forest Red Gum
Grevillea robusta	Silky Oak
Livistona australis	Cabbage Palm
Melia azedarach	White Cedar
Midstorey species	
Acacia sp.	Wattle
Callistemon sp.	Bottlebrush
Melaleuca sp.	Paperbark Tree
Syzygium australe	Lilly Pilly, Bush Cherry
Westringea fruticosa	Coastal Rosemary
Climbers/Scramblers	
Amyema miquelii	Box Mistletoe
Groundcover species	
Dianella caerulea	Blue Flax-lily
Lomandra confertifolia	Mat-rush
Dichondra repens	Kidney Weed
Microlaena stipoides var. stipoides	Weeping Grass
Pseudognaphalium luteoalbum	Cudweed
Wahlenbergia spp.	Bluebells

WEED SPECIES		
Scientific Name	**Common Name**	**Weeds Of National Significance WONS (*)**

WEED SPECIES		
Canopy Species		
Ficus benjamina	Weeping Fig	
Fraxinus sp	Ash	
Jacaranda mimosifolia	Jacaranda	
Platanus × acerifolia	London Plane Tree	
Plumeria sp.	Frangipani	
Schinus mole var. areira	Pepper Tree	
Midstorey species		
Abelia sp.	Abelia	
Buxus microphylla var. japonica	Japanese Box	
Hibiscus sp.	Hibiscus	
Nandina domestica	Nandina	
Photinia × fraseri	Photinia 'Red Robin'	
Yucca aloifolia	Yucca	
Climbers/Scramblers		
Passiflora sp.	Passionfruit	
Groundcover species		
Agapanthus praecox. subsp. orientalis	Agapanthus, Lily of the Nile	
Agave attenuata	Foxtail Agave	
Argyranthemum frutescens	Marguerite Daisy	
Chenopodium album	Fat Hen	
Convolvulus cneorum	Silverbush	
Cirsium vulgare	Spear Thistle	
Ehrharta calycina	Veldt Grass	
Pennisetum clandestinum	Kikuyu grass	
Sonchus oleraceus	Common Sow Thistle	
Viburnum odoratissimum	Sweet Viburnum	
Anagallis spp.	Scarlett pimpernel	
Araujia sericifera	Moth vine	
Bidens pilosa var. pilosa	Farmer's friends	
Cynodon dactylon	Couch grass	
Ehrharta erecta	Veldt Grass	
Elymus spp.	-	

WEED SPECIES		
Eragrostis curvula	African Lovegrass	
Hypochaeris radicata	Flatweed	
Lespedeza spp.	Bush clovers	
Malva spp.	Mallow	
Modiola caroliniana	Carolina Mallow	
Oxalis spp.	-	
Paspalum spp.	Paspalum	
Pennisetum spp.	Fountain grass	
Plantago lanceolata	Plantain	
Setaria spp.	-	
Sporobolus africanus	Rat's tail grass	
Tribulus terrestris	Bindi	

Table 11-2 Fauna Species List

FAUNA SPECIES	
Scientific Name	**Common Name**
Eolophus roseicapilla	Galah
Threskiornis moluccus	Australian White Ibis
Trichoglossus moluccanus	Rainbow Lorikeet
Vanellus miles	Masked Lapwing
INTRODUCED/EXOTIC SPECIES	
Scientific Name	Common Name
Columba livia	Rock dove

WATER TECHNOLOGY
WATER, COASTAL & ENVIRONMENTAL CONSULTANTS

APPENDIX D
ARBORIST REPORT, BIRDS TREE CONSULTANCY, 2024

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