arboricultural impact assessment report

AIA-01
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PROJECT
Chief Mechanical Engineer's Office
Redfern North Eveleigh,
505 Wilson Street, Darlington NSW

CLIENT
Transport for NSW
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Sydney, NSW

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i EXECUTIVE SUMMARY

This Arboricultural Impact Assessment (AIA) report supports a State Significant Development application (SSD-39971796) for the revitalisation of the Chief Mechanical Engineer's Office (CME) building at Redfern North Eveleigh, (the site). Arterra was engaged to provide guidance on tree related matters and prepare the AIA.

Arterra undertook arboricultural assessments of the site in 2019, as part of the Urban Forest and Greening Study for the Paint Shop Sub-Precinct of Redfern North Eveleigh. That study recommended retention of all existing trees within the curtilage of CME and the adjacent street trees in Wilson Street Redfern. This work distinguished three trees for particular focus (T204, T208 and T209). The proposed CME development is consistent with this objective of tree retention and this AIA report provides a tree management approach aimed at preserving all the existing trees, including the historically significant trees associated with the CME building and the public street trees.

Arterra has been involved during the design development phase and worked closely with the design team to ensure that any major construction activities were situated away from required tree protection zones. Similarly, guidance has been provided for the alignment of services trenches, so as to avoid tree roots as much as possible.

The tree assessment in the Urban Forest and Greening Study for the Paint Shop Sub-Precinct of Redfern North Eveleigh was used as base line data and the detailed assessment was then confirmed and updated to reflect the current status of the trees. The trees were reinspected by Arterra on the 26 July 2022.

There are four trees located within the works boundary of the CME and 16 other trees in the vicinity of proposed construction works. All trees will be retained and protected during construction. The development proposal involves encroachment into the tree protection zones of some of these trees, generally ranging from <5%, up to 28% of the nominal TPZ. The larger TPZ encroachments relate to the four street trees on Wilson Street, potentially impacted by the construction of a new fence to the street boundary. Due to the configuration of levels in this area, it is unlikely that tree roots will be found within the TPZ encroachment area. A management method has been outlined for any roots found adjacent to the new boundary fence that will ensure retention of roots over 50mm diameter. An area around T209 a Canary Island Date Palm (*Phoenix canariensis*) is proposed to have existing asphalt carefully removed to improve the soil conditions around this tree and the adjacent significant Camphor Laurel (*Cinnamomum camphora*) (T208).

All works undertaken within the nominal TPZs, including removal of asphalt surface and minor trenching for services are to be carried out using non-destructive methods, under the direct oversight of a Project Consulting Arborist who will provide direction in the event that any roots over 50mm diameter are encountered.

In view of the above methods proposed, and the nature of the site and the conservation project, the overall arboricultural impact is considered to be acceptable. Potential root or canopy loss to the trees within the CME site and in the adjacent street will be negligible and all trees are expected to remain viable and continue their contribution as a significant part of the setting of the historic CME building.

Robert Smart AAILA , ISA, AA
Director, Registered Landscape Architect (054),
Registered Consulting Arborist (1804).

1.0 INTRODUCTION

1.1 Background

This report supports State Significant Development (SSD) Development Application (DA) No. SSD-39971796 for the heritage conservation and adaptive reuse of the former Chief Mechanical Engineer's Building (CME Building) in North Eveleigh, which is submitted to the Minister for Planning pursuant to Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act). Transport for NSW is the proponent for the SSDA.

1.2 Site Description

The site comprises the former CME Building (Figure1) and immediate surrounds (Figure 2). The site is identified as 505 Wilson Street, and forms part of Lot 5 in Deposited Plan 1175706.

Originally constructed in 1887 and subsequently extended to keep pace with the expansion of the NSW railways and demand for engineering services, the CME Building is of State heritage significance. The CME Building is listed on the NSW Heritage Register (SHR No. 5014147) and Transport for NSW's s170 Register. The statement of significance provided on the NSW Heritage Inventory outlines the significance of the site:

> *The building is a very fine late Victorian railways office on a scale above all other such structures in the State. The building reflects the importance of the railway engineers in the development of the State and its closeness to the Eveleigh workshops (mainly under the control of the Mechanical Branch) indicates the confidence in railway construction. The building is in a style not often seen in Sydney and is a rare survivor. More often this form of building is in evidence in the country where the pressure of development is less. It is an important element in the town and streetscape of Wilson St, Redfern, particularly to close proximity to the railway workshops.*

The CME Building is located within the Redfern North Eveleigh Precinct (Figure 3). The Redfern North Eveleigh Precinct is located within the wider Redfern-Waterloo Authority Sites SSP. The Redfern North Eveleigh Precinct is 10 hectares of land owned by Transport Asset Holding Entity (TAHE) at the southern edge of Redfern Station, located between the rail corridor and Wilson Street.

The Redfern North Eveleigh Precinct, including the CME Building, is the subject of an approved Part 3A Concept Plan (MP08_0015) which continues to apply to the land pursuant to Schedule 2 of *Environmental Planning and Assessment (Savings, Transitional and Other Provisions) Regulation 2017*. TfNSW is currently preparing a SSP Study for the Paint Shop Sub-Precinct within the wider Redfern North Eveleigh Precinct, which was exhibited between 26 July and 25 August 2022. It is noted that the SSP Study indicates that the Concept Approval would be surrendered should rezoning of the Paint Shop Precinct occur.

Figure 1 – Chief Mechanical Engineer's Building (existing), viewed from Wilson Street. (Source: TfNSW/Ethos Urban)

Figure 2 – Aerial image showing extent of works. (Source: Nearmap/Ethos Urban)

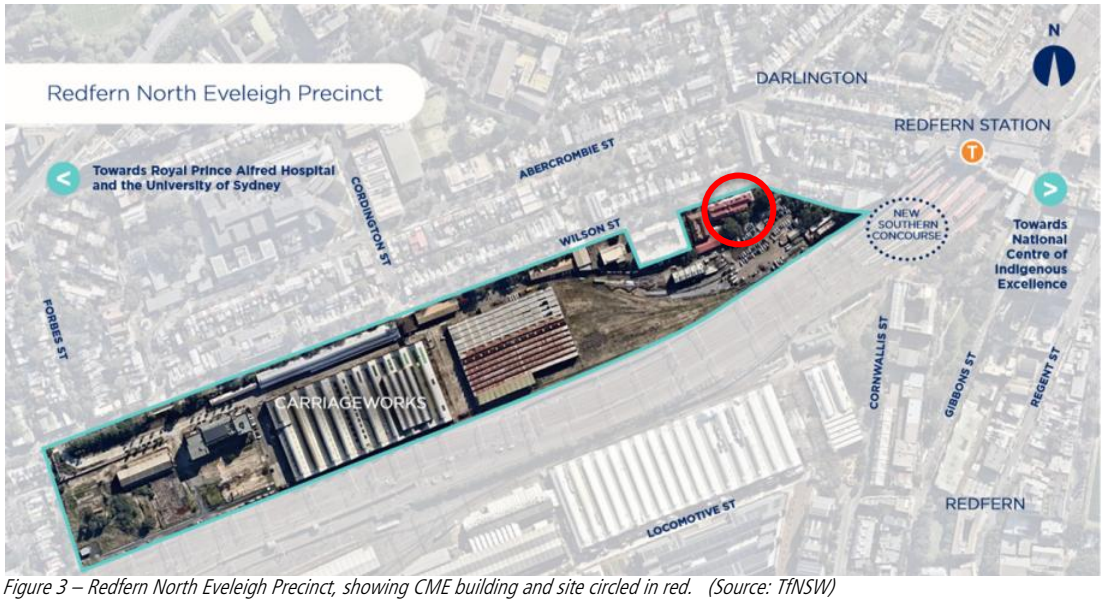

Figure 3 – Redfern North Eveleigh Precinct, showing CME building and site circled in red. (Source: TfNSW)

1.3 Overview of Proposed Development

The application seeks consent for the heritage conservation and adaptive reuse of the CME Building, which includes:

- internal and external heritage conservation works to make the building suitable for adaptive reuse, including painting, repairs and refurbishment of the existing building (primarily internally) and installation of services to support future usage for offices or the like;
- building upgrades to ensure compliance with the Building Code of Australia, including accessibility and fire safety requirements;
- removal of any hazardous building materials; and
- minor landscaping works.

No significant additions (except those necessary to facilitate suitable access and fire egress) or substantive demolition of external heritage fabric is envisaged as part of the project. Internal changes comprise the removal of some internal walls and alterations to building fabric to create suitable spaces and compliant paths of travel.

1.4 Assessment Requirements

The Department of Planning and Environment have issued Secretary's Environmental Assessment Requirements (SEARs) to the applicant for the preparation of an Environmental Impact Statement for the proposed development. This report has been prepared having regard to the SEARs as follows:

Issue and Assessment Requirements	Documentation
8. Trees and Landscaping • 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.	Arboricultural Impact Assessment

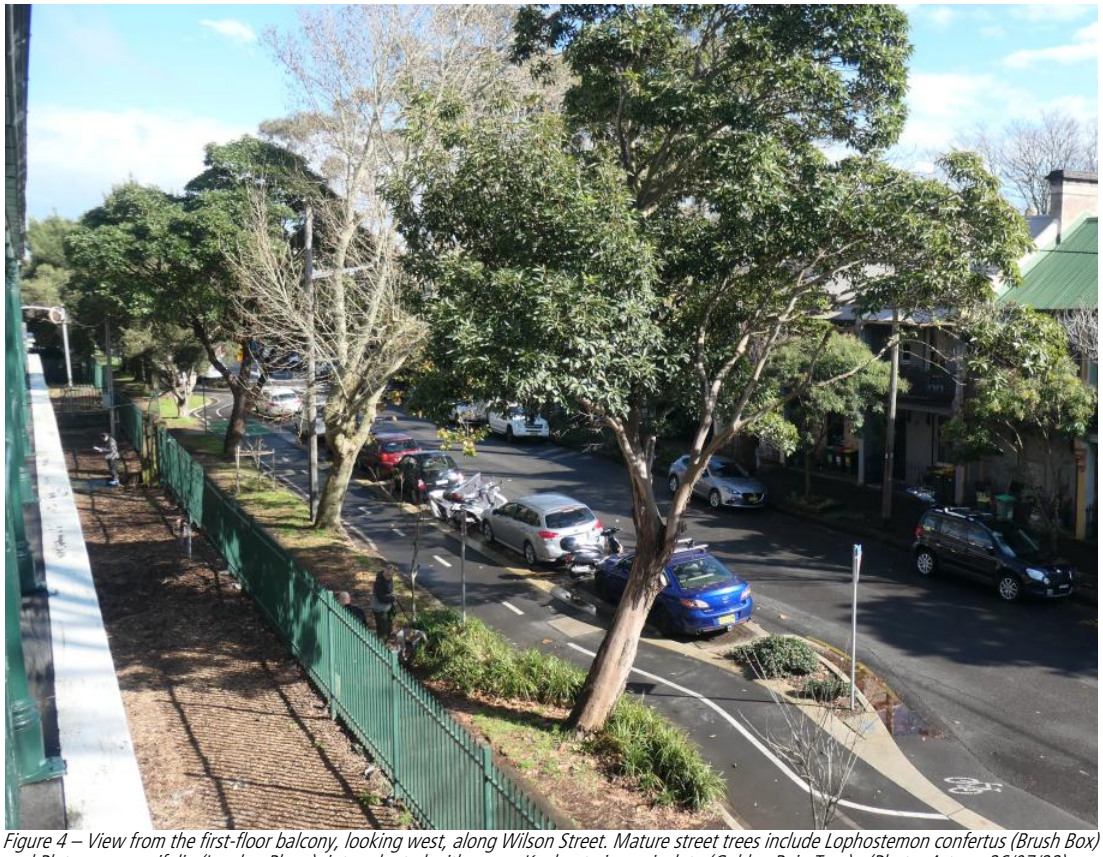

Figure 4 – View from the first-floor balcony, looking west, along Wilson Street. Mature street trees include Lophostemon confertus (Brush Box) and Platanus x acerifolia (London Plane), inter-planted with young Koelreuteria paniculata (Golden Rain Tree). (Photo: Arterra 26/07/22)

Figure 5 – View looking southwest, towards the eastern flagpole garden of the CME building. Mature trees include Eucalyptus microcorys (Tallowwood) and Platanus x acerifolia (London Plane). (Photo: Arterra 26/07/22)

Figure 6– View of the area at the rear (south) of the building, showing the extensively asphalted surface, previously trenched for services. The Camphora cinnamomum (Camphor Laurel) on the right of the image is T207, the smaller of the two C. Cinnamomum (Camphor Laurel) on the southern embankment whose canopies and tree protection zones extend into this terrace area. (Photo: Arterra 26/07/22)

1.5 Aims of this Report

The aim of this report is to assess the impact of the new development on the existing trees within the curtilage of the CME building. Specifically, the report aims to:

- assess the health and condition of the existing site trees and record all relevant tree information;
- assess the significance, Useful Life Expectancy and retention value of the existing trees;
- assess the likely arboricultural impacts of the development on the trees;
- identify Tree Protection Zones (TPZ) and advise on the tree protection measures that will be required during construction to ensure the trees are successfully retained;

All tree plans contained in this report are based on information provided to Arterra, including site survey and architectural drawings. The tree plans should only be used for reference relating to tree issues and are not suitable for any other purpose.

Figure 7 – View of the substantial T208 Camphora cinnamomum (Camphor Laurel) growing in the southern embankment; and T209 Phoenix canariensis (Canary Island Date Palm). Both are high value trees associated with the history of the CME building and appear to be earliest remaining trees planted on the site. (Photo: Arterra 26/07/22)

1.6 Documents Reviewed

This tree impact assessment report is based on review of the following documents:

- Architectural Concept plans, dated 21 October 2022
- Landscape Concept plans, dated 21 October 2022

Arterra has co-ordinated with the project team in relation to location of services to avoid or limit tree impacts, however at the time of drafting this report, we have not been provided with final servicing plans.

Arterra must be notified of any alterations to the development proposal and drawings, so that we can advise on tree related implications before any work is undertaken.

1.7 Relevant Controls or Legislation

The site is located within the Redfern North Eveleigh Precinct with is part of the wider Redfern-Waterloo Authority Sites State Significant Precinct (SSP). The subject development will be considered and determined by the TfNSW CME project team, working closely with the community and Sydney City Council, and in consultation with other state government agencies.

City of Sydney (CoS)
The CoS tree management controls are embodied in the Local Environmental Plan (LEP); the Development Control Plan (DCP) and the Significant Tree Register. DCP 2012 tree provisions in section 3.5.3 address the protection of trees within and adjacent to development sites.

> *(1) A permit or development consent is required to ringbark, cut down, top, lop, prune, remove, injure or wilfully destroy a tree that:*
> *(a) has a height of 5m or more; or*
> *(b) has a canopy spread of over 5m; or*
> *(c) has a trunk diameter of more than 300mm, measured at ground level; or*
> *(d) is listed in the Register of Significant Trees.*

All the CME site trees are protected under the DCP, however, none are identified on the CoS Significant Tree Register.

Heritage NSW
Listing under the *Heritage Act 1977* means that no part of the site may be damaged or altered without approval. The state listing is focussed on the architectural qualities of the building, with the following note on the garden and trees:

> *"Once famous for its extensive and elaborate grounds, these have been neglected and comprise chiefly now of open space, unkept grass and a row of mature, formerly-pollarded London or hybrid plane trees (Platanus x hybrida) lining Wilson Street, Redfern." (State Heritage Inventory)*

The trees referred to above have since been removed. The existing site trees are not specifically identified in the listing.

1.8 Author Qualifications

This report has been prepared by Christina Kanellaki Lowe and reviewed by Robert Smart, (AQF Level 5) Consulting Arborists, qualified to provide arboricultural assessment and advice. Furthermore, Robert Smart is a member of the International Society of Arboriculture - Australian Chapter, a Registered Consulting Arborist with Arboriculture Australia and a licenced Quantified Tree Risk Assessment practitioner, with 25 years' experience in managing trees in complex development sites.

1.9 Key Definitions and Abbreviations

Tree Protection Zone (TPZ)
The TPZ is defined by the Australian Standard *AS 4970 – Protection of Trees on Development Sites* as a nominal, minimum area above and below ground, at a given distance from a tree trunk, required for the protection of the tree. The standard applies the calculation for the radius of the TPZ as 12 x (the tree trunk diameter (in metres) calculated at breast height (DBH)). DBH is taken at 1.4m above ground level.

The TPZ represents the extent of the root zone required to be left undisturbed in order to maintain a healthy and viable tree. It should be noted that roots will usually extend well beyond this zone, so this represents the minimum remaining root zone required, assuming all others are lost or damaged due to construction. It is typically calculated as a circle centred on the trunk unless existing site conditions can be assessed and indicate otherwise.

The standard sets a maximum TPZ radius as 15m (unless crown protection is required) and a minimum TPZ radius of 2m. The TPZ is generally assumed to be radial and centred on the centre of the tree's trunk unless other site factors or tree canopy size and location dictate an adjustment.

An encroachment into to TPZ of up to 10% of the area may be acceptable, provided it is outside of the Structural Root Zone (SRZ). This is known as a "minor encroachment". Encroachments greater than this, known as "major encroachments", are only acceptable with additional specific evidence that the tree will not be unduly impacted. Whenever an encroachment is made into a TPZ, a suitable compensation should be made elsewhere, which is physically contiguous to the remaining TPZ.

Structural Root Zone (SRZ)
The SRZ is defined as the minimum area required to retain the structural stability of the tree. The formula for calculating the SRZ is outlined in AS 4970 Section 3.3.5. No encroachment into the SRZ shall typically be allowed.

Diameter at Breast Height (DBH)
This is the diameter of the trunk measured at 1.4m above ground level.

Diameter at Ground Level (DGL)
This is the diameter of the trunk measured at ground level, but just above any root flare.

Non-destructive Digging
This is the process of carefully excavating the ground surface to minimise the risk of damage to existing tree roots. This method is used to locate and map existing tree roots within the TPZ and/or SRZ and helps to guide and inform the installation and/or construction of proposed services and/or structures which are in close proximity to retained trees. This is often achieved through hand-digging using a shovel, trowel and/or fork with care not to damage the bark and wood of any roots. Compressed air (air spade) or water vacuum extraction are appropriate non-destructive alternatives to hand digging. Low pressures are required in the use of air spade or water vacuum to avoid stripping root bark and other live tissue. When this work occurs within a TPZ and/or SRZ of a tree to be retained, a qualified consulting arborist should always be present to monitor the works.

Inclusion or Included Bark Branch Union
Growth of bark at the interface of two or more branches on the inner side of the branch union which is unable to be lost from the tree and accumulates, or is trapped, between the acutely divergent branches. This can form a weakened branch union in some species.

Epicormic Growth
Juvenile shoots produced along branches or trunks from dormant or latent buds concealed beneath bark. Production can be stimulated by fire, pruning, wounding or root damage and when excessively produced may also be an indicator of tree stress or decline.

1.10 Assessment Methodology

Arterra undertook a preliminary arboricultural assessment of the site in 2019, as part of an Urban Forest and Greening Study for the Paint Shop Sub-precinct of Redfern North Eveleigh. That study addressed arboricultural impacts associated with the whole of the Paint Shop Sub-precinct master plan. Data from the Paint Shop Sub-Precinct study has been used as a baseline for the current assessments. The previous detailed tree assessments were then re-confirmed and updated to reflect the current status of the trees. The trees were re-inspected by Arterra on the 26 July 2022. No significant issues or changes in the trees were noted.

The current study focuses specifically on the immediate setting of the CME building and assesses the likely impacts of the development on the trees within the vicinity of the site. It includes the trees within the building's curtilage and those immediately adjacent, that have potential to be impacted by the proposed works. It also identifies a proactive approach to managing the trees with measures to retain and protect them during construction works.

The assessment addresses arboricultural impacts associated only with the present scope of works for the CME building and immediate surrounds, as set out in section 1.4. It does not respond to future works for the Paint Shop Sub-precinct.

Data Collection
The Arterra team attended the site to update the detailed assessment of the trees undertaken in 2019. The trees reviewed for this report are those located within the curtilage of the CME building, and immediately adjacent, and may be impacted by the proposed development. The trees' health and condition were assessed via a visual inspection undertaken from the ground only. Requisite tree data (including DBH, DGL, height & canopy spread, condition & proximity to services) were recorded using an Apple iPad and FileMaker Pro database.

The basic health and condition criteria that were inspected for each tree is summarised as follows:

- tree size, broad age-class and general balance of the tree;
- canopy foliage size, colour and density;
- dieback and epicormic growth;
- trunk or branch wounding, branch tear outs and pruning history;
- structural defects such as co-dominant stems, cracks, splits, included bark, decay;
- pests and disease evidence or occurrence;
- above-ground obstructions; and
- evidence of recent site disturbance.

All trees were photographed, given a unique identification number, and plotted onto a scaled base plan for referencing and identification throughout the report and for future discussions and co-ordination. Tree trunk diameters were measured using a metric diameter tape measure. Tree heights were measured using the two-point clinometer function of a Nikon Forestry Pro laser range finder. Canopy spreads were estimated by pacing out distances along the cardinal axis of the canopy and cross-referencing to survey information and aerial photos.

No specialised equipment or methods were employed to test for the extent of decay in any of the trees, apart from a nylon 'sounding' mallet. No plant samples were analysed or independently tested to verify or formally identify any pests or diseases.

The information gathered in the field was tabulated and the retention value assessed using a combination of techniques commonly used and recognised in the arboricultural industry. The tree life expectancy was established using the Useful Life Expectance (ULE) system. A brief summary of these systems is provided below.

ULE

ULE is a system based on Jeremy Barrell's SULE (Safe Useful Life Expectancy) developed in 1993. It determines the time a tree may be expected to be retained based on its age, health, condition, safety and location. This is then moderated by the economics of maintenance or other costs of retaining the tree. A long ULE means the tree is presently expected to live longer than 40 years with minimal intervention and cost. A short ULE indicates a tree that is not expected to live longer than 5 years or may require substantial intervention or costs to retain it. The reference to 'safe' useful life expectancy is generally no longer used in the industry as it implies a certainty that cannot be delivered.

Retention Values

The proposed retention value of the trees was determined based on a considered combination of the size, age, condition and suitability of the tree. Each tree was then ranked according to one of 4 retention categories.

1. **"High" Retention Value** – these are trees that are typically in good or very good condition, large and visually prominent, historically or environmentally important. They may also be lesser quality trees, but part of an important grouping of trees. They should represent a serious physical constraint to the development and their removal avoided where possible and feasible.
2. **"Moderate" Retention Value** – these are trees that are in good to reasonable condition and should be retained where possible and feasible to do so. They may also be lesser trees, but part of an important grouping of trees and therefore warrant retention based on the group's value.
3. **"Low" Retention Value** – these are trees that are in poor condition or have structural defects, are particularly small or commonplace, are not historically, environmentally or socially significant and should not be considered as a constraint to the development. They could be retained only if they are not likely to be impacted by, or constrain potential desirable, development outcomes.
4. **"Should Remove" / No Retention Value** – these are trees that are in very poor health, exhibit poor form, or have serious structural defects, are considered weeds or combination of all these, and therefore should be considered for removal regardless of any development.

Consideration has also been given to the relationship of the trees to one another and their proximity to the likely development areas on the site. For example, trees that are part of a closely spaced group, or are likely to be significantly misshapen or unstable with the removal of surrounding trees and structures are considered with these factors in mind.

Tree Protection

TPZs and SRZs have been calculated in accordance with the formulae and criteria outlined in the Australian Standard *AS 4970-2009 Protection of Trees on Development Sites*.

Desktop Review and Research

Digital AutoCAD files of the proposed works were imported into Arterra's standard CAD software (ArchiCAD v24) and superimposed over the tree and site survey information. The extent of site disturbance was analysed for the proposed building works, landscaping, services and other site grading. An assessment was made of the likely extent of impacts on the TPZs, taking into account the likely construction impacts depending on the type of work being undertaken (ie: cut or fill, suspended slabs, decks, service trenches). Various area calculations and measurements were made in the CAD software of the likely incursions into the TPZs or SRZs.

Marked up aerial images from the Urban Forest and Greening study (prepared by Arterra, April 2022) have been used for historical reference.

Climatic data was obtained from the Bureau of Meteorology using statistics from the Sydney Airport AMO weather station. (http://www.bom.gov.au/climate/data)

2.0 BACKGROUND, OBSERVATIONS & ASSESSMENT

2.1 Identification of the Trees and Assessment

The curtilage of the CME building contains the majority of significant trees that exist in the Paint Shop Sub-precinct and in fact, across the Carriage Workshops precinct of North Eveleigh. The remainder of the sub-precinct is characterised by cleared land, railway infrastructure and other built fabric.

As a group, the trees surrounding the CME building, have additional aesthetic contribution to the setting of the building. Unlike other structures of the North Eveleigh workshops, the design of the CME was intentionally integrated into the Wilson Street streetscape, through its scale, materials and architectural detailing. The garden and the tree plantings are an important part of that aesthetic and have been identified for conservation as part of the CME setting.

There is only one tree located within the immediate development area for the conservation and upgrade of the CME building. The works relate largely to the building itself and the development area boundary wraps closely around the building. However, there are also eight trees located within the gardens that form the curtilage of the historic building and a further 11 street trees immediately adjacent in Wilson Street. There is varying potential for impacts to these trees, during works. All 20 trees were inspected and assessed as part of the preparation of this AIA report.

Detailed information on each tree (including heights, trunk diameters, canopy spreads, age classes and condition) is provided in Appendix 4.2.

Wilson Street Trees

The street trees along Wilson Street are under the care and control of the City of Sydney and they will be protected in any development proposal. The Wilson Street trees are rated as having Low to Moderate significance. They represent a mix of species, and their varying sizes indicate a range of planting periods. The most recently planted are the young *Koelreuteria paniculata* (Golden Rain Tree) which have been assessed as being of Low significance due to their being small and easily replaceable. The other tree rated as having Low significance is a *Eucalyptus camaldulensis* (River Red Gum), which has a major lean and overhangs the adjacent cycleway and roadway. The Wilson Street tree retention values are included in Table 1, below.

Table 1 – Wilson Street Trees and Their Retention Values

Tree ID	Tree Species	Common Name	Retention Value
1	*Platanus x acerifolia*	**London Plane**	**Moderate**
2	*Koelreuteria paniculata*	**Golden Rain Tree**	**Low**
3	*Lophostemon confertus*	**Brush Box**	**Moderate**
4	*Koelreuteria paniculata*	**Golden Rain Tree**	**Low**
5	*Platanus x acerifolia*	**London Plane**	**Moderate**
6	*Koelreuteria paniculata*	**Golden Rain Tree**	**Low**
7	*Lophostemon confertus*	**Brush Box**	**Moderate**
8	*Melaleuca quinquenervia*	**Broad Leafed Paperbark**	**Moderate**
9	*Eucalyptus camaldulensis*	**River Red Gum**	**Low**
10	*Melaleuca styphelioides*	**Prickly Paperbark**	**Moderate**
11	*Casuarina cunninghamiana*	**River She-Oak**	**Moderate**

Chief Mechanical Engineer's Office site

The assessment of trees within the curtilage of the CME building has identified three trees of high significance:

- T208 *Cinnamomum camphora* and T209 *Phoenix canariensis*, relating to the earlier phases of planting around the building.
- T204 *Eucalyptus microcorys*, a later but visually prominent tree in very good condition.

The current assessment is consistent with the 2019 tree assessment in the Urban Forest and Greening Study for the Paint Shop sub-precinct, which identified the high contribution of these trees and recommended that they should be the focus of retention and protection throughout any redevelopment of the place. Tree retention values for all trees within the CME are included in Table 2.

Figure 8– The view from the CME eastern balcony, looking east, features a large Eucalyptus microcorys (Tallowwood). This is one of a group of four substantial trees in the easterly 'Flagpole Garden'. This garden area is located beyond the proposed CME development area and is outside of any potential area of impact from the proposed works. (Photo: Arterra 26/07/22)

Table 2 – Other Site Trees and Their Tree Retention Values

Tree ID	Tree Species	Common Name	Retention Value
201	*Eucalyptus microcorys*	**Tallowood**	**Moderate**
202	*Platanus x acerifolia*	**London Plane**	**Moderate**
203	*Platanus x acerifolia*	**London Plane**	**Moderate**
204	*Eucalyptus microcorys*	**Tallowood**	**High**
205	*Phoenix canariensis*	**Canary Island Date Palm**	**Low**
206	*Phoenix canariensis*	**Canary Island Date Palm**	**Moderate**
207	*Cinnamomum camphora*	**Camphor Laurel**	**Moderate**
208	*Cinnamomum camphora*	**Camphor Laurel**	**High**
209	*Phoenix canariensis*	**Canary Island Date Palm**	**High**

Figure 9 – View from the eastern balcony, looking east and encompassing the main garden area. Historically this part of the site was more open, with low perimeter garden beds, to maintain views to the railway and South Eveleigh. (Photo: 26/07/22)

2.2 History and Significance of the Trees

The earliest available aerial image from 1930, 50 years on from the construction of the CME building, shows what appear to be a stand of trees to the south of the building. These trees remain constant in the historic aerial imagery, through to the present day. It is likely that the larger currently remaining *Phoenix canariensis* (Canary Island Date Palms) date from c1930 and the *Cinnamomum camphora* (Camphor Laurel) probably dates from the period 1940-1950s when these species were still commonly planted in public landscapes around Sydney.

Figure 10 – Photograph of the Chief Mechanical Engineers Office believed to date from the early 1920s. Although the trees that can be seen in this photo probably no longer exist, it is likely that the larger and currently remaining Phoenix canariensis (Canary Island Date Palms) date from a period just after this photo, possibly around 1930 and the two large Cinnamomum camphora (Camphor Laurel) probably date from the period 1940-1950s when these species were still commonly planted in public landscapes around Sydney. (Source: Central to Eveleigh Facebook page and Caldis Cook - CMEO CMP, 1997)

Figure 11 – 1960 photo of Wilson Street, near the blacksmiths shop looking north, illustrating the potential timing of the remaining London Plane Trees and Brush Box along the street which can be seen here as newly planted specimens and can be seen in the 1956 aerial photos. It is assumed they were therefore planted around mid 1950s in an effort to improve amenity and urban beautification. (Source: CoS Archives - SRC18944)

The 1956 aerial image clearly shows trees around the CME and a regular planting of street trees along Wilson Street. The larger *Platanus x acerifolia* (London Plane Trees) associated with the CME and Wilson Street are likely to date from early 1950s.

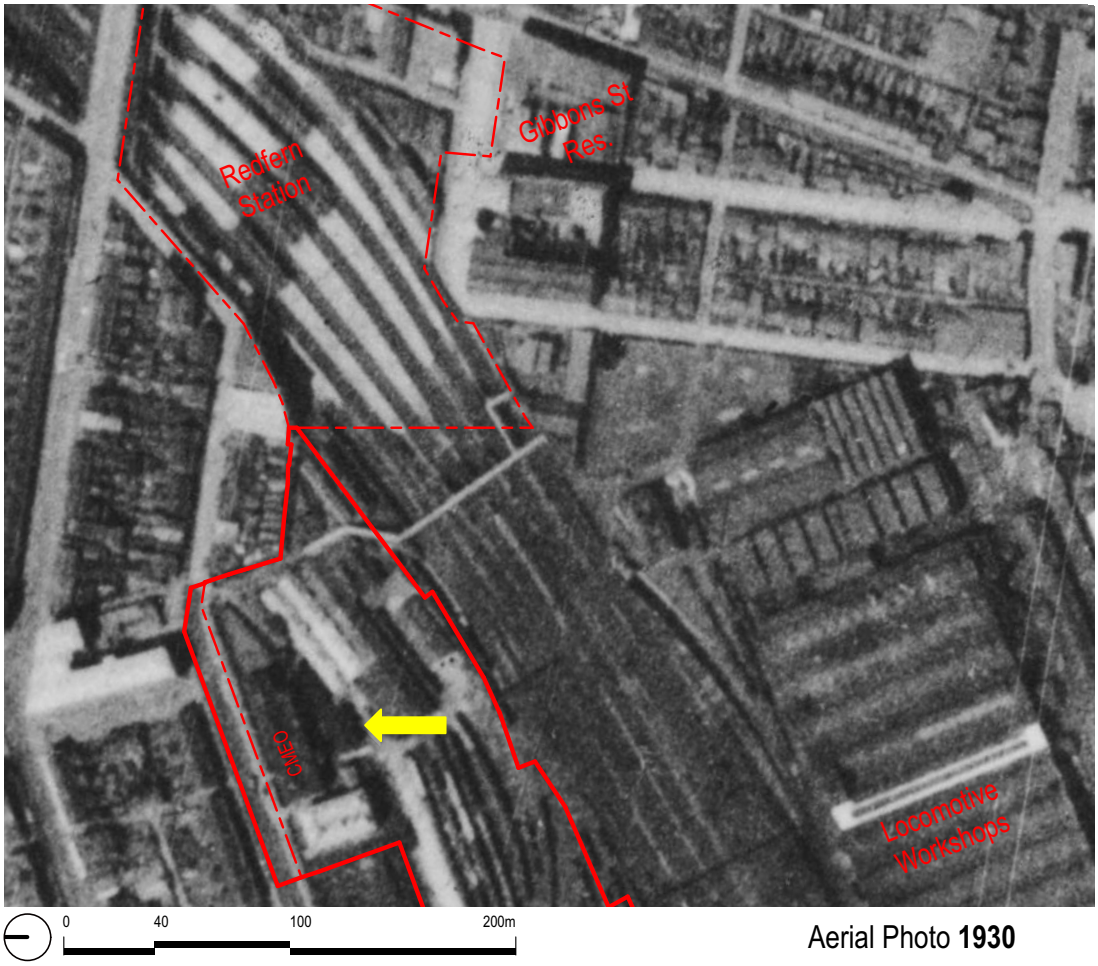

Figure 12 – Site context – extract from1930 aerial photo of the Paint Shop sub-precinct showing a possible stand of trees on the southern side of the CME building. (Source: NSWSSD)

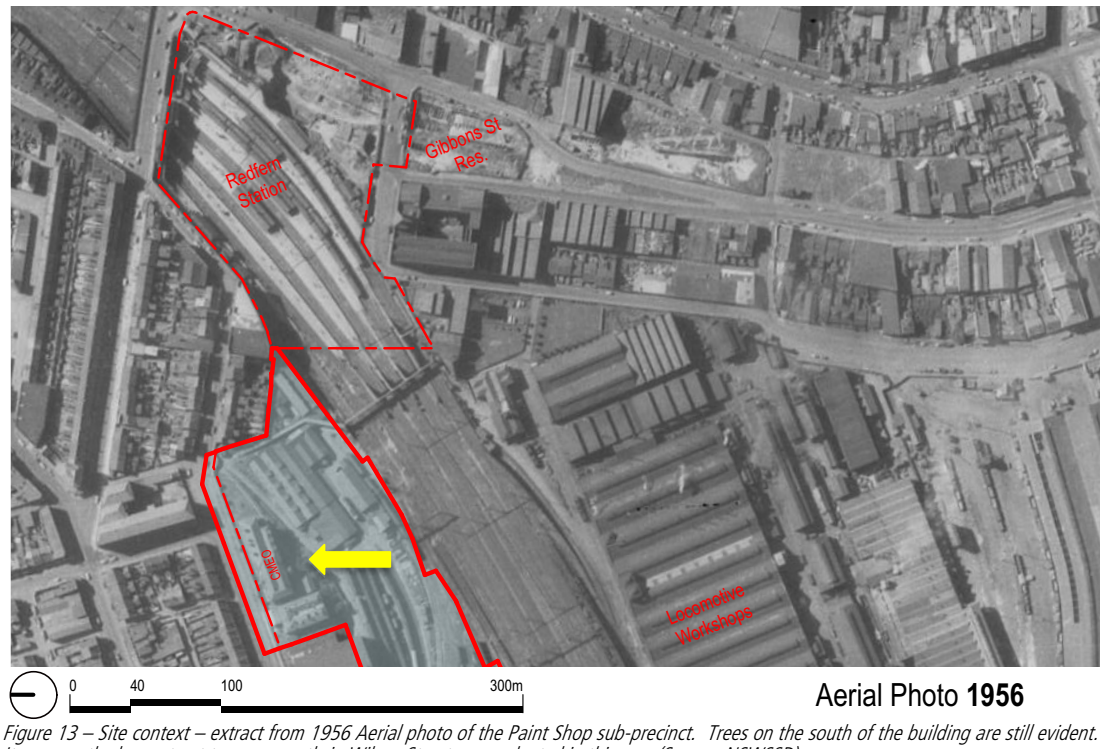

Figure 13 – Site context – extract from 1956 Aerial photo of the Paint Shop sub-precinct. Trees on the south of the building are still evident. It appears the large street trees, currently in Wilson Street, were planted in this year (Source: NSWSSD)

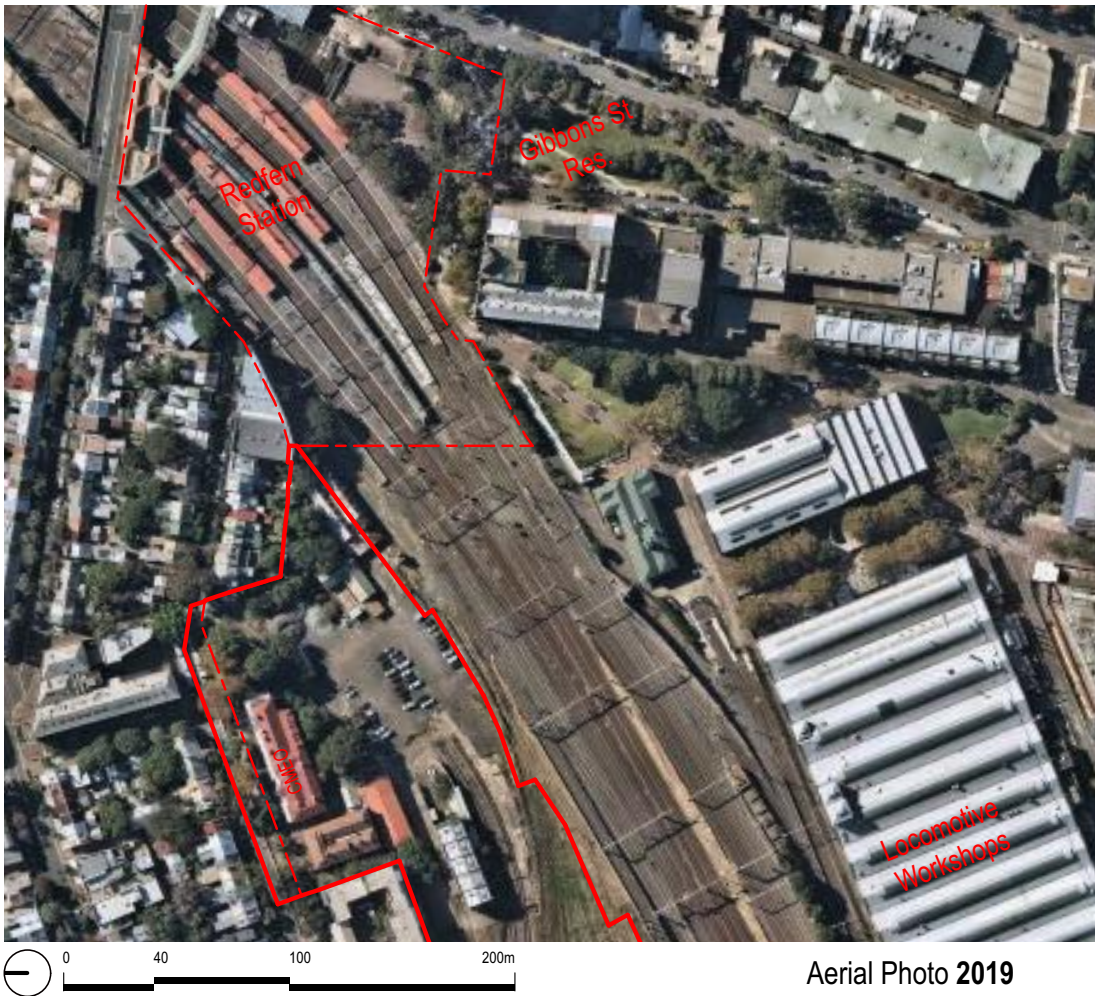

Figure 14 – Site context – extract of 2019 aerial photo showing a site configuration close to its present -day arrangement. (Source: NSW Spatial Services)

2.3 Climate and Microclimate

The Redfern North Eveleigh Precinct experiences moderate temperatures, good rainfall and minimal climatic and weather extremes. It is typically described as a 'temperate' climate with hot to warm summers and cool winters, with relatively uniform rainfalls across the seasons. There is no distinctly dry season. It is located very close to the moderating effects of the coast. The average annual rainfall is 1085 millimetres which is spread evenly across the year but with a slightly drier period from July to October. The highest rainfall usually occurs in June with an average of 123 millimetres. The driest month is September with an average of just 60 millimetres (figures according to the Sydney Airport AMO weather recording station).

Maximum average daily temperatures range from 26.5ºC in January to 17ºC in July. The minimum average daily temperatures range from a low of 19ºC in February down to lows of 7.2ºC in July. Frosts are extremely rare.

The primary wind direction is from the north-east to south-east in the afternoons while it is predominantly from the west and north-west in the mornings. This is common of coastal areas dominated by 'sea breeze' affects. The strongest winds (>30km/h) are normally experienced from the south-east and southerly directions and later in the day. (Source: Australian Bureau of Meteorology).

The data represents a reasonably comfortable climate which lends itself to a very diverse range of tree species that will happily grow in the area. There are no noticeable microclimatic influences on the CME site. The potential impacts of climate change are likely to result in higher average temperatures, longer drought periods and increased extreme storm events.

2.4 Landform and Natural Soils

The North Eveleigh area has been extensively modified since the late 1800s to create the very large and levelled areas for development of the railways and the infrastructure for heavy equipment manufacturing associated with the Redfern locomotive and carriage workshops.

The site is identified as part of the Blacktown Soil Landscape Association which extended throughout much of the Inner West of Sydney. This soil landscape is characterised by gently undulating landforms on Wianamatta Group shales and Hawkesbury shales. The natural soil landscape only warrants passing comment as the soil profile across the site has been highly modified because of the extensive earthworks associated with the development of the railway corridor.

The naturally occurring soil would have been typically a very well-defined Brown Podzolic soil. The topsoil horizon would have been moist, dark brown and friable, and likely to have been relatively deep at 450-550 millimetres depth, with neutral pH of 7.0. The texture would have been clay / silty clay loam with a very low proportion of sand particles and a very high proportion of cl ay. It would have been very plastic when wet.

The soil would have typically displayed increasing acidity moving downward through the profile becoming quite acid in the subsoil, probably recording a pH of 5.0 - 5.5. (Chapman 1989).

The natural soils would have typically had very good water holding capacity and may been subject to waterlogging. It would have good cation exchange capacity (CEC) and although naturally low fertility, it would have good nutrient holding capacity if fertilizers were applied. The high clay contents of both the topsoil and subsoils however make the soils highly subject to compaction if trafficked when wet and would then set hard when dry. This may often lead to difficulty in them absorbing surface water and soil oxygenation.

In these highly clay-based soil conditions, major tree roots will often be confined to the top 300-400 millimetres of the profile and cause greater impacts with pavements, kerbs and footings resulting in pronounced damage once mature. This is clearly displayed by many of the existing larger street trees located along Wilson Street.

Figure 15 – This exposed embankment near Wilson Street provides a very good indication of the naturally occurring clay soils that would have occurred throughout much of the site. This profile is reflective of the common and extensive Blacktown Soil Landscape Association. The clay soils can be favourable to tree growth but also present problems in terms of potential compaction and waterlogging. (Photo: Arterra)

2.5 Tree Impact Assessment

2.5.1 General

The proposed development focusses on conservation work and upgrade of the CME building fabric, with minor works to the surrounding landscape areas. Being a heritage conservation project, works will be limited in scale and extent. Dismantling or removal of components, such as roofing elements or asphalt surfaces, will be typically undertaken by hand. A general description of works is included in section 1.4.

Consultation was undertaken with Arterra during the design process to guide the location of below-ground works such as trenching for services and excavation for a rainwater tank. The primary works within the landscape setting of the CME building are:

- a replacement boundary fence to Wilson Street
- new access ramp at the Wilson Street entry;
- gravel-filled drainage trench, adjacent to southern and western external walls of the CME building;
- screen fence at the 'rear' of the site for equipment and bin storage; and
- minor landscape works to 'tidy-up' the eastern garden, including removal of existing fence between the CME building and the garden and replacement of the flag pole with a symbolic tree planting.

The above works have potential for varying impacts to the following existing trees:

- **T01** *Platanus x acerifolia* (London Plane)
- **T03** *Lophostemon confertus* (Brush Box)
- **T05** *Platanus x acerifolia* (London Plane)
- **T07** *Lophostemon confertus* (Brush Box)
- **T203** *Platanus x acerifolia* (London Plane) & **T204** *Eucalyptus microcorys* (Tallowood)
- **T207** & **T208** *Cinnamomum camphora* (Camphor Laurel); and
- **T209** *Phoenix canariensis* (Canary Island Date Palm).

Some key assumptions are made for the impact assessment that follows:

- All excavations and demolition work within the defined TPAs shall be done using hand tools and or other non-destructive methods only and with oversight of an appropriately qualified consulting arborist. Roots of 50mm diameter or greater are not to be cut or damaged unless specifically approved by the Project Consulting Arborist.
- Repairs to the existing asphalt surfaces within the TPA shall be constructed at or above the existing surface levels to minimise surface root impacts.
- All construction access and deliveries are to be made via existing site access from Wilson Street.
- Where no spot levels are indicated, the existing surface levels are retained.
- Any landscape grading within the TPAs will be minimal and installed using high quality, imported manufactured topsoil. No cultivation of the existing soils shall be undertaken within the defined TPA.
- Existing site fencing and any installed Tree Protection Fencing is to remain in place during works and can only be removed to undertake final landscape works for the CME, associated with the current scope of works (as set out in section 1.4 and above).
- Trunk protection will be installed as identified in Tree Plans (Appendix 4.1) and specified in the Tree Protection Specifications (Section 3.7).
- Minor canopy pruning (<10%) may be required for building and scaffold clearances. Canopy pruning to be undertaken by a minimum AQF Level 3 Arborist and only at the direction of the Project Consulting Arborist. Pruning extent is to be minimised.

2.5.2 Fence and Wall Replacement

Due to the historic nature of the CME building and as a site of state heritage significance, it is considered appropriate to replace the existing unsympathetic fence on the Wilson Street boundary with a new fence that is more in keeping with the aesthetic of the place. The proposed fence is a 300mm height, brick wall, surmounted with low-height, lightweight contemporary palisade-style fence panels. The wall would be constructed with a relatively shallow footing of up to 200mm in depth.

As the boundary of the site is within the TPZ of the Wilson Street street trees, demolition of the existing fence and construction of a new fence footing, will unavoidably occur within the TPZs of four mature street trees and has potential to impact the trees. The area of nominal TPZ encroachment is large, however is located behind the existing fence and generally above the tree's general ground level. The street trees were well established by 1996 when the current fence was installed, and it is unlikely that roots will have since grown into the raised area behind the fence (see figure 16).

A tree-sensitive approach to the works, as outlined below, will minimise tree impacts while working within the TPZ of the street trees. The tree species involved, *Platanus x acerifolia* (London Plane) and *Lophostemon confertus*

(Brush Box), are known to be hardy and able to tolerate some root disturbance and minor root loss. In our opinion, the approach to construction of the fence, as outlined below, will protect the trees and ensure they remain viable in the long term.

1. The existing steel rail fence posts and concrete sleepers should be carefully removed, with a consulting arborist present to observe the process and ensure that there is minimal disturbance occurring near tree roots during demolition.
2. Excavation of footing trench is to be to maximum depth of 200mm and to be undertaken with care, with a consulting arborist to be present to monitor and assess any roots found. Roots with a diameter of less than 50mm can be cleanly cut to facilitate construction. Localised modification of the footing will be undertaken for any larger roots found. Modifications will be considered where necessary and may include:
    - Locally altering the footing and/or reinforcing it to bridge over the roots; or
    - allowing the roots to penetrate through the footing by being sleeved in an appropriately sized section of PVC piping, which is then set within the footing.

2.5.3 Other Works

A gravel drainage and evaporation trench has been proposed as a conservation measure for two of the external masonry walls of the CME. It will involve intentionally cutting any tree roots in this zone and installation of a root barrier to prevent root penetration in future. During installation, any roots encountered should be exposed by hand and cut cleanly at the edge of the trench. The gravel zone extends along the southern building perimeter, potentially affecting the historically significant trees at the southern part of the site. This is discussed below in relation to the individual trees.

This AIA is consistent with the recommendations of the arboricultural assessment of the Urban Forest and Greening Study for the Paint Shop Sub-Precinct of Redfern North Eveleigh, which recommended that all surveyed trees on the site are to be retained and protected. No surveyed trees are to be removed as part of the development proposal. A self-sown Date Palm and regrowth from a previously removed tree, are noted for removal, as are other self-sown weeds. These are not identified as 'trees' under the CoS DCP, however are noted on the Tree Plans for clarity.

2.5.4 Individual Tree Impact Assessment

T01 *Platanus x acerifolia* (London Plane)

This is a mature street tree on Wilson Street assessed as having moderate landscape significance. An incursion of 18% is expected within the nominal TPZ, from footing excavation for a new fence and trenching for new storm water connection to the street. As discussed above this area is located above the tree's general ground level, where it is unlikely that roots will exist in the area of the TPZ being impacted. In our opinion, potential impacts to T01 can be managed during construction with close oversight and monitoring from the Project Consulting Arborist to ensure minimal root loss

T03 *Lophostemon confertus* (Brush Box)

This is a mature street tree of moderate landscape significance. An encroachment of 15% into the nominal TPZ would occur from works associated with construction of a new boundary fence. The works are outside the Structural Root Zone (SRZ) of the tree. The tree-sensitive approach to excavation for the new fence discussed above, would limit root loss to only minor roots, less than 50mm diameter. *Lophostemon confertus* is known to be a hardy species, well able to tolerate some root loss. In our opinion the overall impact to this tree is acceptable.

T05 *Platanus x acerifolia* (London Plane)

Another mature, public street tree assessed as having moderate landscape significance and retention value. The calculations for this tree suggest a theoretical incursion of 20% into the nominal TPZ, from works associated with the proposed Wilson Street fence. The works for the fence are outside the Structural Root Zone (SRZ) of the tree. The approach discussed above, for investigating tree roots during excavation and accommodating any roots over 50mm diameter, would ensure minimal root loss for T05 (*Platanus x acerifolia)*, which is also known to be a hardy species able to tolerate minor root loss. In our opinion the overall impact to this tree is acceptable.

T07 *Lophostemon confertus* (Brush Box)

A moderate value street tree, which is located near a low point of the site, where a series of works are proposed. Potential impacts to the tree are an overlay of works proposed for the new boundary fence, a proposed new access ramp and stormwater connection. In combination, these represent a major incursion of 28% into what is identified as the theoretical TPZ. There are a number of mitigating factors that suggest the actual impacts are likely to be relatively minor.

- The street trees would have been well established by the time the existing fence was constructed in 1997. It is unlikely that the roots would have since grown upwards, into the soil behind the retaining wall (see figure 16).

- The ramp landing on the Wilson Street boundary would involve a ground slab with no signficant footing excavation required.
- Excavation for the fence footing would be limited to 200mm depth and monitored by the Project Consulting Arborist to assess any roots found. Roots having greater than 50mm diameter will be retained and protected, as discussed above.
- *Lophostemon confertus* is proven to be a resilient species, able to flourish in challenging environments and able to tolerate some root loss.

In our opinion, potential impacts to T07 can be managed during construction with close oversight and monitoring from the Project Consulting Arborist to ensure minimal root loss and an overall acceptable impact.

T203 *Platanus x acerifolia* (London Plane) & **T204** *Eucalyptus microcorys* (Tallowood)
T203 *Platanus x acerifolia* (London Plane) is assessed as having Moderate significance & **T204** *Eucalyptus microcorys* (Tallowood) identified as having High significance. T204 is not only a fine specimen but also visually prominent across the Paint Shop Sub-Precinct due to its location. The proposal is to open up the eastern garden to the future CME building tenants and undertake the following:

- 100mm imported topsoil and small ground covers added over existing geotextile, to the area delineated by existing edging stones around the flagpole.
- Removal of woody weeds by cutting close to ground level and painting with suitable herbicide.
- Addition of 75mm mulch throughout the remainder of the eastern garden.

These minor landscape works are intended to tidy the site for the use of the CME leaseholder until the garden can be incorporated into the broader parklands of the Paint Shop Sub-Precinct. There is very limited potential for surface impacts to the tree roots as a result of this work. The work is minor in nature and is carried out above the existing protective geotextile. It is expected that the treatment of the ground surfaces would generally result in marginally improved growing conditions.

Figure 16– View along Wilson Street, looking west. The image illustrates the relatively higher ground level behind the CME boundary fence and the relationship of the street trees to pedestrian path and fence. The boundary fence is known to have been constructed in 1997, at a time when the street trees would have already been well established. It is unlikely that the roots would have since grown upwards, into the soil behind the retaining wall. (Photo: Arterra 26/07/22)

T207 *Cinnamomum camphora* (Camphor Laurel)
This tree is historically associated with the CME building. It is assessed as having moderate landscape significance and retention value, having somewhat lesser value than the adjacent T208, due to its poor form. Excavation proposed for a gravel drainage zone and root barrier along the southern external wall of the CME would involve an 8% encroachment within the nominal TPZ. This is considered a minor impact and acceptable.

T208 *Cinnamomum camphora* (Camphor Laurel)
This is a very large and well-formed tree, associated with the early garden plantings adjacent to the CME building. It is a prominent tree, especially when viewed across the tracks from South Eveleigh. It is assessed as having high landscape significance and retention value due to its heritage and aesthetic values as well as its scale and excellent form. T208 is located on steeply sloping bank.

The gravel drainage zone and root barrier proposed along the southern external wall of the CME would occur within the nominal TPZ. An additional, and small area, within the TPZ would be trenched for services. In total, the TPZ encroachment due to the works amounts to 4.5%, which is considered a minor impact and acceptable.

Surface impacts from the removal of the existing asphalt pavement and the introduction of a garden bed around T209 would be carefully managed and kept above the existing ground level. Ultimately, this is anticipated to provide a slight improvement in conditions for the tree. T208 may require limited pruning for construction access, scaffold and building clearance. The pruning associated with this is less than 5% of the canopy and is considered acceptable. Pruning is to be undertaken as per methods outlined.

T209 *Phoenix canariensis* (Canary Island Date Palm)
T209 is seen in early photographs and has high landscape significance for its historic association with the CME. This is the only tree located within the current development site boundary. At present, the asphalt surface at the 'rear' of the CME, covers at least a third of the tree's TPZ. A garden treatment is proposed at the base of the palm. This is anticipated to provide a slight improvement in conditions for the tree and is recommended.

The works involve removal of a small area of asphalt and the placement of a raised sandstone-edged garden, replenishment of the area with topsoil and planting with groundcovers. The sandstone edging would be installed with minimal footings and will allow the planting bed to be slightly elevated, thereby minimising the disturbance of existing tree roots during new planting. There are minimal surface impacts anticipated as part of this work and the species is known to be very tolerant of root disturbance. The removal of asphalt and installation of the new garden treatment will expose the underlying soil to oxygen and rainwater, thereby improving the localised growing conditions considerably and having an overall positive effect on T209 and adjacent T208.

2.6 Potential Tree Related Impacts to be Managed During Construction

Other than potential impacts associated with specific works in the vicinity of trees, there is a range of potential impacts of a more general nature that can occur on a construction site from the use of heavy vehicles, materials handling and chemicals.

Potential impacts from the proposed construction activity can be summarised as potential tree damage and 'reduced life expectancy' caused by:

- compaction of the root zone from storage or stockpiling of materials;
- contamination of the soil from; the preparation of chemicals, wash down/ cleaning of equipment, refuelling of vehicles and dumping of waste;
- compaction of the root zones from parking or use of vehicles/ plant equipment;
- physical damage to the tree trunks and branches from passing machinery;
- damage to the tree roots from landscaping, pedestrian ramp construction and asphalt repairs: and
- root disturbances from unauthorised cut and fill and soil level changes.

The following section of this report provides the proposed measures that will aim to avoid these impacts as much as possible or to minimise them where they are unavoidable.

Figure 17– T05 Platanus x acerifolia (London Plane) public tree on Wilson Street, to be retained and protected. (Photo: Arterra 26/07/22)

3.0 TREE MANAGEMENT RECOMMENDATIONS

3.1 Reducing Construction Site Tree Impacts

The following recommendations are made to potentially reduce the negative construction impacts on the existing trees identified to be retained.

- Ensure that all work within the identified TPAs is carried out with appropriate skill and care to limit surface impacts. If roots greater than 50mm Ø are encountered, works shall cease, and direction sought from the Project Consulting Arborist before proceeding further.
- Appropriately fence the TPA around T209 for the duration of all major site work. See Appendix 4.1 Tree Plans for location and extent.
- The existing fence to east of CME will be considered appropriate fencing for protection of the 'Flagpole Garden' TPA. No construction activity is to take place in this easterly area, nor is to be used for access to the site from Little Eveleigh Street.
- Do not allow storage or stockpiling of any materials or site sheds to be established within TPAs unless it can be demonstrated that this will not impact trees to be retained and it is specifically approved in writing by the Project Consulting Arborist.
- Ensure all the new above and below ground services are excluded from running through any TPAs beyond any already noted incursions.
- Avoid digging into existing root zones for the installation of any proposed landscaping around the trees. The installation sizes of any new plants are to be 5L or less to ensure that excavations are less than 200mm in depth. It is recommended to build up soil levels for any new planting areas to a maximum of 200mm to enable the new planting to occur without disturbing any existing tree roots.

3.2 Canopy Pruning Methodology

T208 will require some minor canopy pruning to provide building clearance. **T204** requires removal of a major branch hanger. The following section provides a suitable canopy pruning methodology. All pruning works are to be completed according to AS4373 Pruning of Amenity Trees and under the direction of the project consulting arborist.

- A suitably qualified Tree Contractor/Utility Arborist shall be employed to undertake the pruning and they shall be a member of Arboriculture Australia or equivalent body. They are to be employed, instructed, and directly supervised in their activities by an Arborist with a minimum AQF level 4 qualification in arboriculture.
- The Head Contractor/Development Manager is to submit to the Project Consulting Arborist the name(s), relevant qualifications, trade certificates, first aid and memberships, licenses and experience of the chosen utility arborist personnel.
- The Tree Contractor shall prune only the selected branches of **T208** and only as directed by the Project Consulting Arborist. The resulting pruning wounds are not to be treated.
- The Tree Contractor shall minimise the size and number of wounds resulting from all pruning and ensure the remaining canopy is balanced with appropriate foliage weight and crown distribution. They shall use only clean, sharp pruning implements for all pruning work, ensuring that cuts are made without damage, tearing, or bruising to remaining vascular tissue.
- Access to the foliage shall be from the ground using equipment with suitable reach to access the required canopy.
- Where the tree work can result in a danger to other workers on the site, 'spotter' personnel shall be placed to ensure the work is undertaken safely.
- All branches and foliage that is pruned is to be chipped and removed from the site. All chipping activities shall be undertaken within the site boundaries, where feasible.
- Only the specified 'selective pruning' is to be undertaken as annotated on the drawings and as directed by the Project Consulting Arborist. Work shall be done 'incrementally' until the appropriate pedestrian or building clearance is achieved.

3.3 Proposed Tree Protection & Construction Activity Sequencing

The following sequence of activities should be followed for this project:

1. A Tree Protection Specification & Plan is to be prepared and issued as part of the construction contract prior to any construction work.
2. The Project Consulting Arborist, Landscape Architect, Civil and Structural Engineers, Client and Contractor Site Foreman are to meet prior to beginning any work on the site to discuss and review all work procedures, construction access routes, stockpiling and tree protection measures (such as fence types and locations and access).

3. Contractors to discuss locations and type of any sediment and erosion controls (if any) and install them with minimal tree impact when within or passing through the TPA.
4. Trunk protection to be installed, as shown on Tree Plans.
5. A utility Arborist is to undertake selective pruning of canopy or branches to facilitate building works without accidental damage to the tree canopy. Pruning to be done in accordance with AS4373 – Pruning of Amenity Trees and performed by staff with appropriate qualifications and equipment, as noted above.
6. The Construction Phase TPA is to be clearly defined and fenced off with either the existing site fence, or a 1.8m high metal or plywood temporary fence prior to any further work within the vicinity of the trees as shown on the Tree Protection Plans.
7. Project Consulting Arborist to be advised in advance of Wilson Street demolition schedule, and to be present during removal of existing Wilson Street fence, to ensure there is minimal disturbance to any roots of the affected street trees.
8. Project Consulting Arborist to be advised in advance of excavation for the footing of the Wilson Street fence, to monitor and assess any roots found and advise on construction methods to accommodate any roots having over 50mm diameter.
9. Following completion of all external construction works, Contractor is to remove the TPA fencing and only then install final landscaping within the TPAs under the trees.

3.4 Demolition Work Near Trees or within TPAs

Demolition of paving surfaces, retaining wall or other structures required within a TPA shall be undertaken by hand, with care to limit surface damage and disturbance of tree root zones. All such work within TPAs shall be supervised and overseen by a qualified Project Consulting Arborist.

3.5 Tree Protection Fencing & Definition of TPAs

Establish a clearly defined tree protection zone as indicated in Appendix 4.1 Tree Plans. Install a 1.8m high temporary fence with either plywood hoarding or temporary steel mesh or chain wire fencing with adequate lateral bracing. Fencing shall comply with the requirements of AS 4687-2007 Temporary fencing and hoardings. These areas around the trees shall be delineated as a "Tree Protection Zone" during the remaining construction process, via appropriate weatherproof signage at not more than 30m spacing. For the TPA at the eastern end of the site ('Flagpole Garden' area) the existing fencing can form 3 sides of the TPA boundary, as indicated on Tree Protection Plan, Appendix 4.1. Access will typically be excluded from these zones and the levels will be left largely at the existing levels. No stockpiling, excavation, trenching, re-fuelling, or material storage should be allowed in these areas.

3.6 Ground Protection within TPAs

Vehicular movement and access shall typically not be required or approved through the TPAs. If it is absolutely necessary and it is proposed to create any access within the TPA of a retained tree, the Contractor shall install suitable rumble strips / boards over the designated TPA ground surface. No excavation shall be allowed. Contractor shall first place a suitable permeable geotextile to the extent required and then a 100mm thick layer of wood chip mulch or coarse no-fines gravel over the extent to be covered with the rumble strip / boards. Then place hardwood boards (minimum 3600 x 200 x 75mm) on their flat edge, side by side, with a 30 - 50mm gap to form a rumble strip. These boards are to be held together with three galvanised metal bracing straps nailed to each board. The two outer straps are to be approximately 200mm in from the ends of the boards. The third strap is to be along the centre line of the boards.

Figure 18 – Example of acceptable Tree Protection Area ground protection. (Photo: Arterra)

3.7 Trunk and Lower Branch Protection

A trunk barrier is to be erected around the circumference of the tree trunk and root buttress where shown. This barrier will consist of two or three 'rings' of 50mm diameter socked 'ag line' wrapped around tree trunk or branch and the ends cable tied to secure in place. A layer of battens is to be placed over and tight to the 'ag line'. The battens are to have a maximum spacing of 50mm. The height of the battens is to be at least 2.4m or to the height of the first branches. Lower large branches may require the same protection if likely to be damaged by passing vehicles or equipment. Secure battens in place with galvanised steel bracing straps. Do not nail or screw into or otherwise injure the trunk or bark. Battens may be made from any suitable waste timber of similar sizes and depths. All sharp or protruding edges are to be properly covered with tape or similar padding.

Figure 19 – Example of acceptable Trunk Protection batten installation. (Photo: Arterra)

3.8 Final Landscaping within TPZs

The final trimming and landscaping shall be judiciously undertaken. The final pavements shall be installed without undue excavation or compaction to the soil and all soft landscaping within the tree protection zone will be installed with care to avoid root disturbance via irrigation trenching, lighting installation and the planting of larger plants. The installation of 100-200mm of new garden mix topsoil over the pre-existing soil will provide a suitable medium in which to plant new plants without damage to existing tree roots. Permanent irrigation (if used) shall be installed as spray heads located outside of TPAs and spraying inwards. All other services such as electrical services shall also be designed and installed to avoid any excavation or trenching around the trees.

3.9 Final Building and Pedestrian Clearance Pruning

Once the final levels and finishes are in place the Project Consulting Arborist shall direct and supervise any remaining selective pruning of any lower peripheral branches to the retained trees to achieve any clearances for final pedestrian or building access. This shall be minimised as much as possible. It is anticipated that the final pruning of any of the retained trees will be less than 5% of the existing canopy and will not have any serious impact to the trees' health or habit.

The branches of the tree shall only be pruned as specifically needed and directed by the Project Consulting Arborist. Work is to be in strictly accordance with the methodology set out in Section 3.2.

3.10 Other Tree Protection Measures to be Implemented

The following is a summary of the main measures that will be required during construction. These should be adopted for the Construction Contract and conditioned by the Consent Authority.

Controlled Construction Access & Parking

Construction access points and stockpiling and storage areas shall be clearly identified and fenced where appropriate. Uncontrolled access points and parking of vehicles outside of designated areas is to be avoided. If temporary access is required through a tree protection zone, ground protection shall be employed to limit soil compaction and root damage and disturbance.

Clearing and Removal of Trees to be Removed

Removal and clearing of existing weeds and small trees/ shrubs shall be done by qualified arboricultural staff with care not to impact or damage other surrounding trees throughout the process. Existing stumps should be grubbed out or ground in a controlled fashion to remove wood that may decay and promote unwanted pathogens.

Communication - Tool Box Meetings and Construction Inductions

All contractors and subcontractors shall be inducted prior to working on the site. All inductions shall include description and identification of the Tree Protection Zones and the restriction on work and activities regarding trees. The site foreman shall ensure that all new staff and contractors are appropriately inducted and that brief "toolbox" meetings are conducted regularly to ensure Tree Protection is maintained at the forefront of all construction workers minds.

3.11 References

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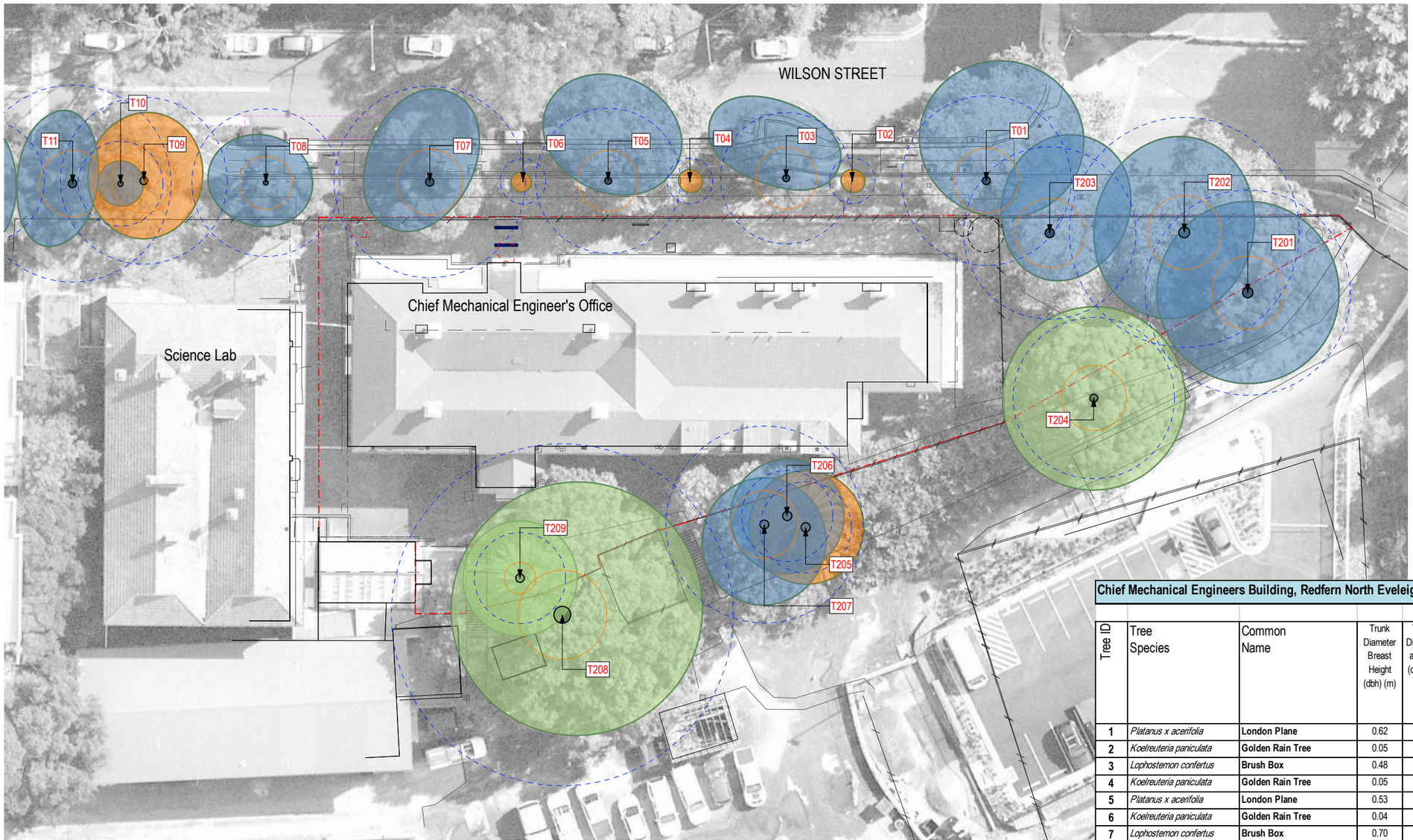
- Standards Australia, 2007, *AS 4373-2007 Pruning of amenity trees*. Standards Australia, Sydney.
- Standards Australia, 2009, *AS 4970-2009 Protection of Trees on Development Sites*. Standards Australia, Sydney.
- Standards Australia, 2007, AS 4687-2007 *Temporary fencing and hoardings*. Standards Australia, Sydney.

- End of report.

4.0 APPENDICES

4.1 Tree Plans



Tree Retention Value Legend

- High Retention value
- Moderate Retention value
- Low Retention value
- Nil Retention value (should remove) (Note : no TPZ's shown for these trees)
- Nominal Tree Protection Zone (TPZ)
- Nominal Structural Root Zone (SRZ)
- Extent of canopy as verified by site measure and aerial photos
- T26 Tree Identification Number

NOTE
Refer to the accompanying Arboricultural Impact Assessment Report for full description of trees, measurements and methods used to assess the trees, and proposed tree protection measures.

0 4 10 20m

TREE RETENTION VALUE NOTES
The proposed retention value of the trees was determined based on a considered combination of the size, age, condition and suitability of the tree. Each tree was then ranked according to one of 4 retention categories;

1. **"High" Retention Value** — these are trees that are typically in good or very good condition, large and visually prominent, historically or environmentally important. They should represent a serious physical constraint to development and their removal avoided where possible and feasible.
2. **"Moderate" Retention Value** — these are trees that are in good to reasonable condition, with no major structural defects and could be retained where possible and feasible to do so.
3. **"Low" Retention Value** — these are trees that are of poor condition or have structural defects, are particularly small or common place, are not historically, environmentally or socially significant and should not be considered as a constraint to development. They could be retained only if they are not likely to be impacted by or constrain potentially desirable development outcomes.
4. **"Nil" Retention Value** — these are trees that are in very poor health, or poor form, or have serious structural defects, are considered weeds or combination of all these, and therefore should be considered for removal regardless of any development.

Consideration has also been given to the relationship of the trees to one another and their proximity to the likely development areas on the site. For example, trees that are part of a closely spaced group, or are likely to be significantly misshapen or unstable with the removal of surrounding trees and structures are considered with these factors in mind.

Chief Mechanical Engineers Building, Redfern North Eveleigh - Tree Assessment Schedule

Tree ID	Tree Species	Common Name	Trunk Diameter Breast Height (dbh) (m)	Trunk Diameter at base (dgl) (m)	Nominal TPZ radius (m) 12xdbh (AS 4970)	Nominal SRZ radius (m) (AS 4970)	Retention Value	Recommendation
1	*Platanus x acerifolia*	London Plane	0.62	0.70	7.44	2.85	Moderate	Retain and Protect
2	*Koelreuteria paniculata*	Golden Rain Tree	0.05	0.05	2.00	0.94	Low	Retain and Protect
3	*Lophostemon confertus*	Brush Box	0.48	0.61	5.76	2.69	Moderate	Retain and Protect
4	*Koelreuteria paniculata*	Golden Rain Tree	0.05	0.06	2.00	1.02	Low	Retain and Protect
5	*Platanus x acerifolia*	London Plane	0.53	0.60	6.36	2.67	Moderate	Retain and Protect
6	*Koelreuteria paniculata*	Golden Rain Tree	0.04	0.05	2.00	0.94	Low	Retain and Protect
7	*Lophostemon confertus*	Brush Box	0.70	0.72	8.40	2.88	Moderate	Retain and Protect
8	*Melaleuca quinquenervia*	Broad Leafed Paperbark	0.54	0.43	6.48	2.32	Moderate	Retain and Protect
9	*Eucalyptus camaldulensis*	River Red Gum	0.61	0.69	7.32	2.83	Low	Retain and Protect
10	*Melaleuca styphelioides*	Prickly Paperbark	0.31	0.45	3.72	2.37	Moderate	Retain and Protect
11	*Casuarina cunninghamiana*	River She-Oak	0.72	0.73	8.64	2.90	Moderate	Retain and Protect
201	*Eucalyptus microcorys*	Tallowood	0.75	0.92	9.00	3.20	Moderate	Retain and Protect
202	*Platanus x acerifolia*	London Plane	0.84	0.95	10.08	3.24	Moderate	Retain and Protect
203	*Platanus x acerifolia*	London Plane	0.63	0.82	7.56	3.04	Moderate	Retain and Protect
204	*Eucalyptus microcorys*	Tallowood	0.59	0.70	7.08	2.85	High	Retain and Protect
205	*Phoenix canariensis*	Canary Island Date Palm	0.72	0.81	4.00	1.41	Low	Retain and Protect
206	*Phoenix canariensis*	Canary Island Date Palm	0.71	0.81	4.00	1.41	Moderate	Retain and Protect
207	*Cinnamomum camphora*	Camphor Laurel	0.72	0.77	8.64	2.97	Moderate	Retain and Protect
208	*Cinnamomum camphora*	Camphor Laurel	1.44	1.48	15.00	3.90	High	Retain and Protect
209	*Phoenix canariensis*	Canary Island Date Palm	0.65	0.75	4.00	1.38	High	Retain and Protect

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REVISION	DESCRIPTION	CHKD	DATE
A	For SSDA Submission	RWS	03/11/22

PROJECT & CLIENT
RNE - Chief Mechanical Engineers Building
Transport for NSW

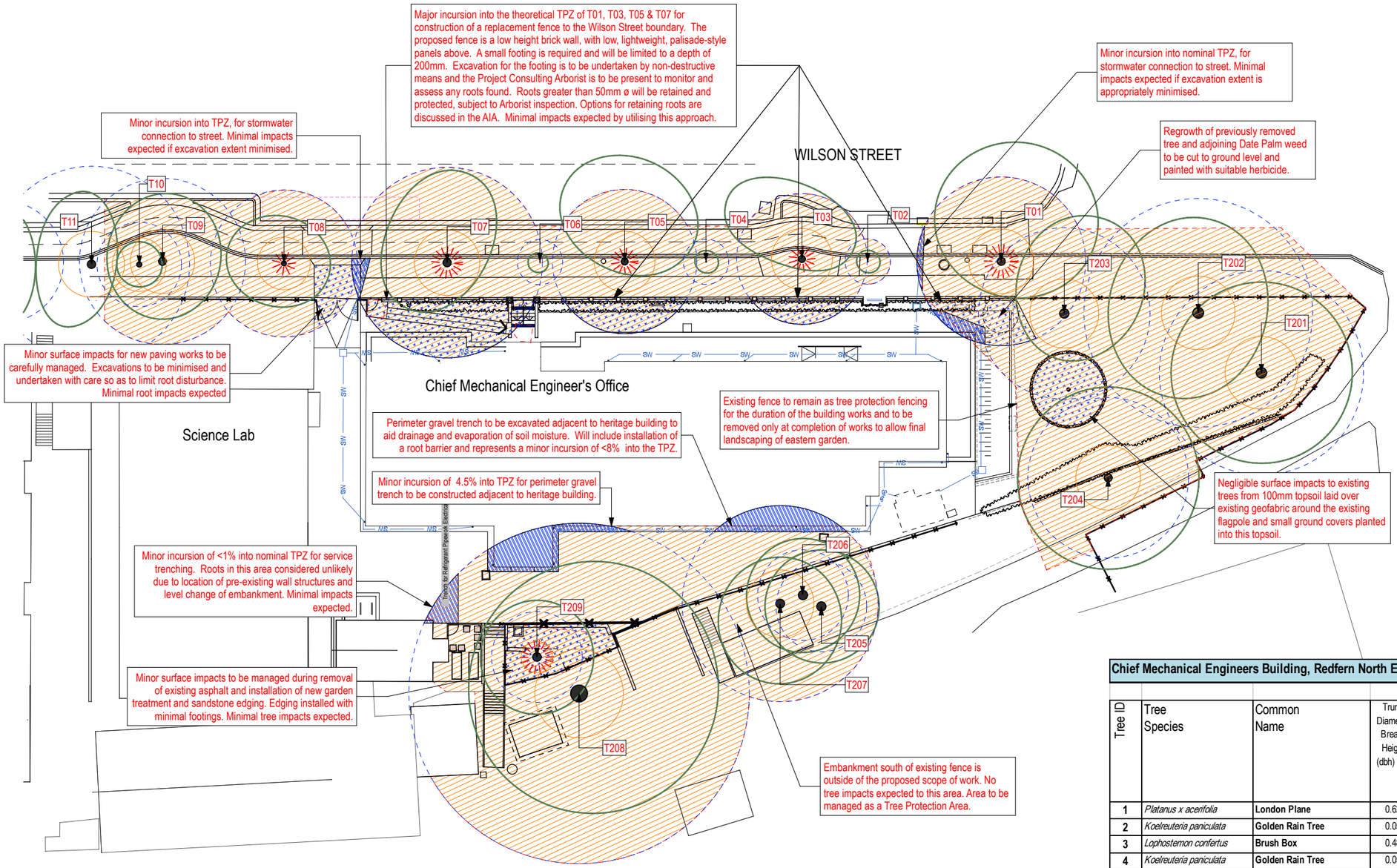
Project No : 22.15
Designed : DSO/RWS
Drawn : DSO/RWS
North Scale : 1:200@A1/1:400@A3

DRAWING TITLE
Tree Retention Value Plan

DRAWING NUMBER
T-01

REVISION
A

Plotted at : 10:58 am 4/11/2022



Tree Protection and Removal Plan Legend

- Existing Tree Retained — Extent of canopy as verified by site measure and aerial photos
- Existing Tree Removed (Note: no TPZ's shown for these trees)
- T26 — Tree Identification Number
- Construction Period Tree Protection Area - consolidated area
- Tree Protection Area Temporary Fencing
- Trunk Protection Battens to be installed
- Ground Protection- Rumble Boards to be installed
- Expected loss of roots due to excavation or trenching
- Surface impact to be managed - minimal root loss expected
- Nominal Tree Protection Zone Radius (TPZ)
- Nominal Structural Root Zone (SRZ) shown where relevant

NOTE
Refer to the accompanying Arboricultural Impact Assessment Report for full description of trees, measurements and methods used to assess the trees, and proposed tree protection measures.

Chief Mechanical Engineers Building, Redfern North Eveleigh - Tree Assessment Schedule

Tree ID	Tree Species	Common Name	Trunk Diameter Breast Height (dbh) (m)	Trunk Diameter at base (dgl) (m)	Nominal TPZ radius (m) 12xdbh (AS 4970)	Nominal SRZ radius (m) (AS 4970)	Retention Value	Recommendation
1	*Platanus x acerifolia*	**London Plane**	0.62	0.70	7.44	2.85	**Moderate**	Retain and Protect
2	*Koelreuteria paniculata*	**Golden Rain Tree**	0.05	0.05	2.00	0.94	**Low**	Retain and Protect
3	*Lophostemon confertus*	**Brush Box**	0.48	0.61	5.76	2.69	**Moderate**	Retain and Protect
4	*Koelreuteria paniculata*	**Golden Rain Tree**	0.05	0.06	2.00	1.02	**Low**	Retain and Protect
5	*Platanus x acerifolia*	**London Plane**	0.53	0.60	6.36	2.67	**Moderate**	Retain and Protect
6	*Koelreuteria paniculata*	**Golden Rain Tree**	0.04	0.05	2.00	0.94	**Low**	Retain and Protect
7	*Lophostemon confertus*	**Brush Box**	0.70	0.72	8.40	2.88	**Moderate**	Retain and Protect
8	*Melaleuca quinquenervia*	**Broad Leafed Paperbark**	0.54	0.43	6.48	2.32	**Moderate**	Retain and Protect
9	*Eucalyptus camaldulensis*	**River Red Gum**	0.61	0.69	7.32	2.83	**Low**	Retain and Protect
10	*Melaleuca stypheliodes*	**Prickly Paperbark**	0.31	0.45	3.72	2.37	**Moderate**	Retain and Protect
11	*Casuarina cunninghamiana*	**River She-Oak**	0.72	0.73	8.64	2.90	**Moderate**	Retain and Protect
201	*Eucalyptus microcorys*	**Tallowood**	0.75	0.92	9.00	3.20	**Moderate**	Retain and Protect
202	*Platanus x acerifolia*	**London Plane**	0.84	0.95	10.08	3.24	**Moderate**	Retain and Protect
203	*Platanus x acerifolia*	**London Plane**	0.63	0.82	7.56	3.04	**Moderate**	Retain and Protect
204	*Eucalyptus microcorys*	**Tallowood**	0.59	0.70	7.08	2.85	**High**	Retain and Protect
205	*Phoenix canariensis*	**Canary Island Date Palm**	0.72	0.81	4.00	1.41	**Low**	Retain and Protect
206	*Phoenix canariensis*	**Canary Island Date Palm**	0.71	0.81	4.00	1.41	**Moderate**	Retain and Protect
207	*Cinnamomum camphora*	**Camphor Laurel**	0.72	0.77	8.64	2.97	**Moderate**	Retain and Protect
208	*Cinnamomum camphora*	**Camphor Laurel**	1.44	1.48	15.00	3.90	**High**	Retain and Protect
209	*Phoenix canariensis*	**Canary Island Date Palm**	0.65	0.75	4.00	1.38	**High**	Retain and Protect

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REVISION	DESCRIPTION	CHKD	DATE
A	For SSDA Submission	CKL	03/11/22

PROJECT & CLIENT
RNE - Chief Mechanical Engineers Building
Transport for NSW

Project No : 22.15
Designed : DSO/RWS
Drawn : DSO/RWS
North Scale : 1:200@A1/1:400@A3

DRAWING TITLE
Tree Protection Plan

DRAWING NUMBER T-02
REVISION A

Plotted at : 10:59 am 4/11/2022

TREE PROTECTION SPECIFICATIONS

1. Tree Protection Measures and Protocols.
All work around existing trees to be retained shall be in accordance with AS 4970-2009 Protection of trees on development sites with the clear establishment of the required Tree Protection Areas (TPA's). If the scope of work allowed within or the extent of the Tree Protection Areas of existing trees is not clear, please refer to the Contract Manager or Project Consulting Arborist for clarification.

Before any site works commence tree protection zones and other measures must be established and conveyed to those all working on the site. The Contractor shall ensure all subcontractors are inducted prior to working on the site. All inductions shall include description and identification of the Tree Protection Zones and the restriction on work and activities with regard to trees.

Damage to roots or degradation of the soil through compaction and/or excavation within TPA's is likely to cause serious damage to the tree. Any work operations required within TPA's must be carried out with extreme care. All trees, palms and other shrubs within TPA's are to be retained unless shown otherwise on the Tree Protection Plan(s). Trees marked for retention shall not be used to display signage, or as fence or cable supports for any reason. No materials stockpiling, chemicals or washout areas are permitted immediately upslope of or within the Tree Protection Area. The washing down of wheel barrows, paint cans/brushes, acids and the like shall not to be done near existing trees as the runoff is very harmful to tree roots.

No fuel powered pumps or generators or air compressors are to be placed within TPA's. No fuel or chemicals shall be stored and no equipment or vehicles shall be serviced or re-fuelled within a TPA.

2. Controlled Construction Access
Construction access points, stockpiling and storage areas shall be clearly identified on site and fenced off where appropriate. Uncontrolled access and parking of vehicles inside TPA's shall be avoided. If access is required through a tree protection area, the access way shall be treated with ground protection.

3. Tree Protection Fencing & Signage
The Tree Protection Plan(s) shows the extent of areas to be fenced and protected. Protection measures shall be certified as adequate by the Project Consulting Arborist. This fencing may form part of the general construction site fencing, where practical. It shall remain in place as long as possible and typically not be removed until the final landscape installation in those areas begins.

All tree protection fencing shall be 1800mm high galvanised chain wire or welded steel mesh. Fencing must be bolted together and secured with the necessary back stays and bracing.

Star pickets with bunting or danger tape shall not constitute acceptable tree protection fencing.

Suitable signage as defined by AS 4970-2009 Appendix C shall be affixed to the external side of the fencing at a spacing of not less than 1 sign per 20 lineal metres of fence.

If fence locations conflict with the proposed works, contact the Project Consulting Arborist and Contract Manager for resolution. No new services (unless under-bored) shall be located within or through the Tree Protection Area.

4. Trunk and Lower Branch Protection
A trunk barrier is to be erected around the circumference of the tree trunk and root buttress where shown. This barrier will consist of two to three 'rings' of 50mm diameter socked ag-line wrapped around tree trunk or branch and the ends cable tied to secure in place. A layer of battens is to be placed over and tight to the ag-lines. The battens are to have a maximum spacing of 50mm. The height of the battens is to be 2 metres or to the height of the first branches. Lower large branches may require the same protection if likely to be damaged by passing vehicles or equipment. Secure battens in place with galvanised steel bracing straps. Do not nail into or otherwise injure the trunk or bark. Battens may be made from any suitable waste timber of similar sizes and depths. All sharp or protruding edges are to be properly covered with tape or similar padding.

5. Works within the TPA's
All work within the root zone of existing trees shall be undertaken with the utmost care. If by necessity a tree requires removal of branches for building or access, pruning shall be done in strict accordance with accepted arboriculture techniques and AS 4373-2007. No rubbish, spoil or new materials shall be placed on the root zone of any existing tree or against their trunks.

6. Ground Protection
If it is proposed to create any access route, or similar, within the TPA of a retained tree, the Contractor shall install rumble boards over the TPA ground surface. No excavation shall be allowed. Contractor shall first place a suitable permeable geotextile to the extent required and then a 100mm thick layer of wood chip mulch or coarse no-fines gravel over the extent to be covered. Then place hardwood boards (minimum 3600 x 200 x 75mm) on their flat edge, side by side, with a 30 - 50mm gap to form a rumble strip. These boards are to be held together with three galvanised metal bracing straps nailed to each board. The two outer straps are to be approximately 200mm in from the ends of the boards. The third strap is to be along the centre line of the boards.

7. Provision of Temporary Irrigation
No temporary irrigation requirement is anticipated for this project. However if accidental damage or other weather extremes dictate and the Project Consulting Arborist considers one is necessary it shall be installed as per the following. A temporary and automated (battery powered timer is sufficient) watering system to be placed within the specified TPAs of the trees nominated to maintain adequate water to the retained trees and help maintain their healthy condition. This shall be a surface mounted 'residential-style' soaker hose and/or similar surface sprinkler systems. It is to be surface visible and spray delivered so that is operation can be easily visible and verified. It should be on a designated supply line, separate from other construction related water supplies to minimise its likelihood of being disconnected.

Typically, during spring and summer months it should be set to run for a minimum of 30 minutes every day, in the early morning. During, autumn and winter months it should be set to run for 1 hour once every week. The operation can be suspended temporarily in periods of extensive and prolonged rain. The system is to remain in place for the duration of construction, or until the Project Consulting Arborist approves it's removal. It may be removed to allow final landscape treatments to proceed. If accidentally disturbed or damaged by construction activities, it is to be reinstated as soon as practicable.

8. Structural Demolition Within TPA's
Project Consulting Arborist shall be on site during all demolition work within the TPA's to monitor and advise on tree protection. Secateurs and a handsaw shall be available to deal with and cleanly cut any exposed roots that have to be cut. Machines with a long reach may be used if they can work from outside TPA's or from protected areas within TPA's. They shall not encroach onto unprotected soil in TPA's.

Debris to be removed from TPA's must be moved across existing hard surfacing or temporary ground protection in a way that prevents compaction and disturbance of soil. Alternatively, it can be lifted out by machines provided this does not disturb TPA's or damage the canopy. If appropriate, leave below ground structures such as footings and disused pipes in place if their removal will cause excessive root disturbance.

When pulling up existing paving the Contractor shall work backwards, lifting demolished paving back onto the existing paving. Roots may be found growing under the pavement and should not be trafficked. Roots growing into existing sub-base should be left and new surface finishes placed over the top without disturbance.

9. Excavations or Trenching within TPA's
Excavation within TPA's shall not be allowed using mechanical equipment such as excavators or backhoes. Excavation within TPA's shall only be carried out carefully by hand taking care not to damage the bark and wood of any roots. Specialist tools for removing soil around roots using compressed air (air spade), or water vacuum extraction shall be an appropriate alternative to hand digging and is the preferred method.

Exposed roots to be removed shall be cut cleanly with a sharp saw or secateurs at the face of the excavation. Roots temporarily exposed must be protected by appropriate covering with damp hessian or sand. Roots greater than 50mm in diameter are to be retained and shall only be cut in exceptional circumstances and only after consultation with the Project Consulting Arborist. Roots greater than 100mm in diameter shall typically not be allowed to be cut and must be worked around.

10. Soft Landscaping Installation
Final trimming and planting shall be judiciously undertaken around trees. All soft landscaping within the tree protection zones will be installed with care to avoid root disturbance from irrigation trenching, lighting installation and the planting of larger plants. Permanent irrigation (if used) shall be installed as spray heads located outside of TPA's and spraying inwards. All other services such as small-scale electrical services shall also be designed and installed to avoid any excavation or trenching around the trees.

No significant excavation or cultivation, especially by rotary hoes or excavators, shall occur within TPA's. Where new designs require the levels to be increased, good quality and permeable top soil shall be used. It should be firmed into place but not over compacted. All areas close to tree trunks shall be kept at the original ground level. Where turf is to be installed tree trunks shall have mulched rings applied rather than grass laid up to the trunk.

The size of the installed plants shall typically be less than 5L pots so that the maximum depth of the new root balls is less than 200mm. Any planting proposed that is larger than this shall be only installed outside of the SRZ and with care to not injure roots while digging planting holes.

11. Canopy Pruning
The Contractor shall prune branches of protected trees only as directed by the Project Consulting Arborist. Pruning is only to be undertaken by a qualified arborist (under the supervision of a person with AQF Level 4 or above). The Project Consulting Arborist is to be present at all times during the pruning work. Work is to be in strict accordance with AS4373 Pruning of Amenity Trees. Do not treat wounds.

12. Root Pruning
Pruning of roots of protected trees shall only be as directed the Project Consulting Arborist. The Tree Contractor shall use only a qualified arborist (AQF Level 4 or above). The Project Consulting Arborist is to be present at all times during the root pruning.

Roots are not to be cut using normal excavation machinery of any sort. This usually results in splitting and massive disturbance well past the intended line of cut. When required to cut roots, use hand methods and sharp hand tools (e.g. secateurs, hand saw) such that the remaining root systems are preserved intact and undamaged. Roots are to be cut back by hand square to the direction of the root travel (or edge of the excavation). Do not cut any tree roots exceeding 40mm diameter unless permitted. Excavations within root zones should be kept open for as short a period as possible. Any excavated face containing roots is to be temporarily supported, where necessary, to prevent soil loss from around the other retained roots.

13. Accidental Tree Damage
Should a tree be accidentally damaged, the Contractor shall immediately notify the Project Consulting Arborist. Timing can be of the essence, particularly with bark injuries, trunk damage or chemical contaminations.

If a branch has been broken, it shall be removed and the damaged end pruned to a suitable branch collar. If the branch has been torn out of the trunk, assessment shall be made and the damage cleaned up by as much as possible without further damage to the tree.

If roots are accidentally disturbed or excavated, any broken, crushed and torn sections shall be exposed and pruned leaving clean cuts to minimise risk of infection by fungal pathogens and promote good conditions for new root growth.

Example image of acceptable tree protection fencing measures to be applied. (1.8m high rigid metal fencing with appropriate lateral bracing)

Example image of acceptable tree tree protection battens

Example image of acceptable ground protection rumble boards

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REVISION	DESCRIPTION	CHKD	DATE
A	For SSDA Submission	RWS	03/11/22

PROJECT & CLIENT
RNE - Chief Mechanical Engineers Building
Transport for NSW

North
Project No : 22.15
Designed : DSO/RWS
Drawn : DSO/RWS
Scale : N/A

DRAWING TITLE
Tree Protection Specifications

DRAWING NUMBER
T-03

REVISION
A

Plotted at : 10:59 am 4/11/2022

4.2 Tree Impact Assessment Schedule

Chief Mechanical Engineers Building, Redfern North Eveleigh - Tree Assessment Schedule

Tree ID	Trees in Group	Tree Species	Common Name	Height (m)	Spread North (m)	Spread East (m)	Spread South (m)	Spread West (m)	Trunk Diameter Breast Height (dbh) (m)	Trunk Diameter at base (dgl) (m)	Nominal TPZ radius (m) 12xdbh (AS 4970)	Nominal SRZ radius (m) (AS 4970)	Age Class	Current Vigour	Current Form	Tree Origin	Noted Defects	SULE Rating	Retention Value	General Comments and Notes	Incursion and Impact	Recommendation
1	1	*Platanus x acerifolia*	**London Plane**	16.5	10.0	7.0	3.0	7.0	0.62	0.70	7.44	2.85	Mature	Good	Good	Exotic	Epicormic Growth, Asymmetric Canopy, Root Impacts	Long (>40 years)	**Moderate**	Public street tree. Exposed roots growing over and along the kerb. Asymmetric canopy to the north east.	Theoretical major TPZ incursion of 18% associated with replacement fence at Wilson Street. Unlikely for roots to be found in affected area, however excavation is to be monitored by Aborist and management approach adopted to retain all roots of > 50mm diameter. Minor incursion is related to stormwater connection within street. Considered acceptable.	Retain and Protect
2	1	*Koelreuteria paniculata*	**Golden Rain Tree**	3.0	1.0	1.0	1.0	1.0	0.05	0.05	2.00	0.94	Young	Fair	Average	Exotic		Replaceable (Small/Young)	**Low**	Public street tree. Newly planted, low value due to small and replaceable size.	No impacts	Retain and Protect
3	1	*Lophostemon confertus*	**Brush Box**	12.0	6.0	4.0	1.0	8.0	0.48	0.61	5.76	2.69	Mature	Good	Average	Native	Lean-Minor, Epicormic Growth, Asymmetric Canopy, Tip Dieback	Long (>40 years)	**Moderate**	Public street tree. Minor lean towards the road. Pruning to the north western side of the tree for road clearance.	Theoretical major TPZ incursion of 15% associated with replacement fence at Wilson Street. Unlikely for roots to be found in affected area, however excavation is to be monitored by Aborist and management approach adopted to retain all roots of > 50mm diameter. Considered acceptable.	Retain and Protect
4	1	*Koelreuteria paniculata*	**Golden Rain Tree**	3.0	1.0	1.0	1.0	1.0	0.05	0.06	2.00	1.02	Young	Fair	Average	Exotic	Decay-Minor	Replaceable (Small/Young)	**Low**	Public street tree. Mechanical damage at the base of the trunk. Newly planted, low value due to small and replaceable size.	No impacts	Retain and Protect
5	1	*Platanus x acerifolia*	**London Plane**	13.5	9.0		1.0	7.0	0.53	0.60	6.36	2.67	Mature	Good	Good	Exotic	Epicormic Growth, Lean-Minor, Root Impacts, Asymmetric Canopy	Long (>40 years)	**Moderate**	Public street tree. Pruning to the north western side of the tree. Roots growing over and along the kerb. Canopy conflicting with light pole on south east side of tree.	Theoretical major TPZ incursion of 20% associated with replacement fence at Wilson Street. Unlikely for roots to be found in affected area, however excavation is to be monitored by Aborist and management approach adopted to retain all roots of > 50mm diameter. Considered acceptable.	Retain and Protect
6	1	*Koelreuteria paniculata*	**Golden Rain Tree**	2.0	0.5	0.5	1.0	1.0	0.04	0.05	2.00	0.94	Young	Fair	Poor	Exotic	Asymmetric Canopy	Replaceable (Small/Young)	**Low**	Public street tree. Newly planted, low value due to small and replaceable size.	No impacts	Retain and Protect
7	1	*Lophostemon confertus*	**Brush Box**	11.0	8.0	3.0	5.0	6.0	0.70	0.72	8.40	2.88	Mature	Good	Good	Native	Lean-Minor, Tip Dieback	Long (>40 years)	**Moderate**	Public street tree. Minor pruning on the north eastern side for clearance. Exposed roots growing along kerb. Minor lean towards the road.	Theoretical major TPZ incursion of 28% associated with replacement fence at Wilson Street. Unlikely for roots to be found in affected area, however excavation is to be monitored by Aborist and management approach adopted to retain all roots of > 50mm diameter. Minor incursion for installation of stormwater to street and some surface impacts to be managed during resurfacing of driveway crossover. Species is tolerant of minor root loss. Impacts considered acceptable.	Retain and Protect
8	1	*Melaleuca quinquenervia*	**Broad Leafed Paperbark**	7.5	4.0	4.0	4.0	5.0	0.54	0.43	6.48	2.32	Mature	Good	Average	Native	Inclusions, Co-dominant Stems	Long (>40 years)	**Moderate**	Public street tree. Multi-stemmed with inclusions.	No impacts	Retain and Protect
9	1	*Eucalyptus camaldulensis*	**River Red Gum**	7.5	6.0	5.0	5.0	5.0	0.61	0.69	7.32	2.83	Mature	Fair	Poor	Native	Lean-Major, Epicormic Growth, Tip Dieback, Cavity	Medium (15-40 years)	**Low**	Public street tree. Pruning to north east for clearance. Minor hollow to east. Major lean towards and overhanging the road. Potentially dangerous to passing cars, cyclists. Vehicle impact likely. New cycleway now built around lean.	No impacts	Retain and Protect
10	1	*Melaleuca styphelioides*	**Prickly Paperbark**	7.5	2.0	2.0	2.0	2.0	0.31	0.45	3.72	2.37	Mature	Good	Good	Endemic	Inclusions, Deadwood-Minor	Long (>40 years)	**Moderate**	Public street tree. Slightly suppressed by overhanging canopies of adjoining trees on the north-east and south-west.	No impacts	Retain and Protect
11	1	*Casuarina cunninghamiana*	**River She-Oak**	8.5	6.0	2.0	6.0	5.0	0.72	0.73	8.64	2.90	Mature	Good	Average	Endemic	Epicormic Growth, Co-dominant Stems, Root Impacts	Long (>40 years)	**Moderate**	Public street tree. Pruning throughout the canopy. Surface roots throughout verge.	No impacts	Retain and Protect
201	1	*Eucalyptus microcorys*	**Tallowood**	18.0	8.0	8.0	8.0	8.0	0.75	0.92	9.00	3.20	Mature	Fair	Average	Native	Tip Dieback, Epicormic Growth, Deadwood-Minor	Long (>40 years)	**Moderate**	Some tip dieback noted. Root area covered with geotextile marker layer and mulch.	No impacts	Retain and Protect
202	1	*Platanus x acerifolia*	**London Plane**	17.0	8.0	6.0	8.0	8.0	0.84	0.95	10.08	3.24	Mature	Good	Average	Exotic	Epicormic Growth, Congested Branches	Long (>40 years)	**Moderate**	Growing very near small retaining wall on road side. Numerous large branches pruned on road side. Root area covered with geotextile marker layer and mulch.	No impacts	Retain and Protect
203	1	*Platanus x acerifolia*	**London Plane**	17.0	9.0	6.0	4.0	5.0	0.63	0.82	7.56	3.04	Mature	Good	Average	Exotic	Epicormic Growth, Congested Branches	Long (>40 years)	**Moderate**	Growing very near small retaining wall on road side. Numerous large branches pruned on road side and building side. Root area covered with geotextile marker layer and mulch.	Surface impacts associated with introduction of 100mm topsoil and small groundcovers, over existing geotextile, in a restricted area around the flagpole. Tree's growing conditions will be marginally improved; Negligible root loss expected.	Retain and Protect
204	1	*Eucalyptus microcorys*	**Tallowood**	19.0	8.0	8.0	8.0	8.0	0.59	0.70	7.08	2.85	Mature	Good	Good	Native	Hangers	Long (>40 years)	**High**	Growing at apex of embankment. Root area covered with geotextile marker layer and mulch. One of the better and more prominent trees within the site. Major branch hanger which should be removed.	Surface impacts associated with introduction of 100mm topsoil and small groundcovers, over existing geotextile, in a restricted area around the flagpole. Tree's growing conditions will be marginally improved; Negligible root loss expected.	Retain and Protect
205	1	*Phoenix canariensis*	**Canary Island Date Palm**	6.5	3.0	3.0	3.0	3.0	0.72	0.81	4.00	1.41	Mature	Fair	Average	Exotic		Long (>40 years)	**Low**	Significant number of Ibis nesting in tree. Growing on steep embankment. Smaller specimen of the two specimens growing in close proximity. Likely self sown rather than intentionally planted.	No impacts	Retain and Protect
206	1	*Phoenix canariensis*	**Canary Island Date Palm**	13.0	3.0	3.0	3.0	3.0	0.71	0.81	4.00	1.41	Mature	Good	Good	Exotic		Long (>40 years)	**Moderate**	Significant number of Ibis nesting in tree. Growing on steep embankment. Larger of the two closely growing specimens. Assumed to relate to the original landscaping treatments associated with the historic building complex.	No impacts	Retain and Protect
207	1	*Cinnamomum camphora*	**Camphor Laurel**	16.5	4.0	6.0	7.0	5.0	0.72	0.77	8.64	2.97	Mature	Fair	Poor	Invasive	Asymmetric Canopy, Major Wounding, Cavity	Long (>40 years)	**Moderate**	Poorly formed tree but likely to be of heritage significance due to association with Mechanical Engineers building and matching tree nearby. Large root and flare noted extending to south-west.	Minor TPZ incursion of 8% associated with gravel drainage trench and root barrier to southern external wall of CME building.	Retain and Protect
208	1	*Cinnamomum camphora*	**Camphor Laurel**	16.5	12.0	12.0	10.0	10.0	1.44	1.48	15.00	3.90	Mature	Good	Good	Invasive		Long (>40 years)	**High**	Very large and well formed tree and likely to be of heritage significance due to association with Chief Mechanical Engineers building and matching tree nearby.	Minor TPZ incursion of <5% associated with gravel drainage trench and root barrier to southern external wall of CME building and small section of trenching for services. <5% canopy pruning required for scaffold and building clearance. Considered acceptable.	Retain and Protect
209	1	*Phoenix canariensis*	**Canary Island Date Palm**	12.0	3.0	3.0	3.0	3.0	0.65	0.75	4.00	1.38	Mature	Fair	Good	Exotic		Long (>40 years)	**High**	Likely to be of heritage significance due to association with Chief Mechanical Engineers building and matching tree nearby.	Surface impacts to be managed for the removal of existing asphalt and the installtion of new garden edge and planting around base of tree. Species extremely tolerant of root disturbance and works proposed likely to improve growing conditions for the tree. Impacts considered acceptable.	Retain and Protect

4.3 Tree Data Summary Sheets

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Tree Data Summary

Project: CME Blg-Redfern North Eveleigh

ID # **201**
Species: Eucalyptus microcorys
Common: Tallowood
Height: **18.0**
DBH: 0.75 DGL: 0.92
TPZ: 9 SRZ: 3.2
Current Form: Average
Current Vigour: Fair
Age Class: Mature
SULE: Long (>40 years)
Retention Value: **Moderate**

Comments

Some tip dieback noted. Root area covered with geotextile marker layer and mulch.
CME

ID # **202**
Species: Platanus x acerifolia
Common: London Plane
Height: **17.0**
DBH: 0.84 DGL: 0.95
TPZ: 10.08 SRZ: 3.24
Current Form: Average
Current Vigour: Good
Age Class: Mature
SULE: Long (>40 years)
Retention Value: **Moderate**

Comments

Growing very near small retaining wall on road side. Numerous large branches pruned on road side. Root area covered with geotextile marker layer and mulch.
CME

ID # **203**
Species: Platanus x acerifolia
Common: London Plane
Height: **17.0**
DBH: 0.63 DGL: 0.82
TPZ: 7.56 SRZ: 3.04
Current Form: Average
Current Vigour: Good
Age Class: Mature
SULE: Long (>40 years)
Retention Value: **Moderate**

Comments

Growing very near small retaining wall on road side. Numerous large branches pruned on road side and building side. Root area covered with geotextile marker layer and mulch.
CME

ID # **204**
Species: Eucalyptus microcorys
Common: Tallowood
Height: **19.0**
DBH: 0.59 DGL: 0.70
TPZ: 7.08 SRZ: 2.85
Current Form: Good
Current Vigour: Good
Age Class: Mature
SULE: Long (>40 years)
Retention Value: **High**

Comments

Growing at apex of embankment. Root area covered with geotextile marker layer and mulch. One of the better and more prominent trees within the site. Major branch hanger which should be removed.
CME

ID # **205**
Species: Phoenix canariensis
Common: Canary Island Date Palm
Height: **6.5**
DBH: 0.72 DGL: 0.81
TPZ: 8.64 SRZ: 3.03
Current Form: Average
Current Vigour: Fair
Age Class: Mature
SULE: Long (>40 years)
Retention Value: **Low**

Comments

Significant number of Ibis nesting in tree. Growing on steep embankment. Smaller specimen of the two specimens growing in close proximity. Likely self sown rather than intentionally planted.
CME

ID # **206**
Species: Phoenix canariensis
Common: Canary Island Date Palm
Height: **13.0**
DBH: 0.71 DGL: 0.81
TPZ: 8.52 SRZ: 3.03
Current Form: Good
Current Vigour: Good
Age Class: Mature
SULE: Long (>40 years)
Retention Value: **Moderate**

Comments

Significant number of Ibis nesting in tree. Growing on steep embankment. Larger of the two closely growing specimens. Assumed to relate to the original landscaping treatments associated with the historic building complex.
CME

ID # 207
Species: Cinnamomum camphora
Common: Camphor Laurel
Height: **16.5**
DBH: 0.72 DGL: 0.77
TPZ: 8.64 SRZ: 2.97
Current Form: Poor
Current Vigour: Fair
Age Class: Mature
SULE: Long (>40 years)
Retention Value: **Moderate**

Comments

Poorly formed tree but likely to be of heritage significance due to association with Mechanical Engineers building and matching tree nearby. Large root and flare noted extending to south-west.
CME

ID # 01
Species: Platanus x acerifolia
Common: London Plane
Height: 16.5
DBH: 0.62 DGL: 0.70
TPZ: 7.44 SRZ: 2.85
Current Form: Good
Current Vigour: Good
Age Class: Mature
SULE: Long (>40 years)
Retention Value: **Moderate**

Comments

Public street tree. Exposed roots growing over and along the kerb. Asymmetric canopy to the north east.
CME

ID # 208
Species: Cinnamomum camphora
Common: Camphor Laurel
Height: **16.5**
DBH: 1.44 DGL: 1.48
TPZ: 15 SRZ: 3.9
Current Form: Good
Current Vigour: Good
Age Class: Mature
SULE: Long (>40 years)
Retention Value: **High**

Comments

Very large and well formed tree and likely to be of heritage significance due to association with Chief Mechanical Engineers building and matching tree nearby.
CME

ID # 03
Species: Lophostemon confertus
Common: Brush Box
Height: 12.0
DBH: 0.48 DGL: 0.61
TPZ: 5.76 SRZ: 2.69
Current Form: Average
Current Vigour: Good
Age Class: Mature
SULE: Long (>40 years)
Retention Value: **Moderate**

Comments

Public street tree. Minor lean towards the road. Pruning to the north western side of the tree for road clearance.
CME

ID # 209
Species: Phoenix canariensis
Common: Canary Island Date Palm
Height: **12.0**
DBH: 0.65 DGL: 0.75
TPZ: 7.8 SRZ: 2.93
Current Form: Good
Current Vigour: Fair
Age Class: Mature
SULE: Long (>40 years)
Retention Value: **High**

Comments

Likely to be of heritage significance due to association with Chief Mechanical Engineers building and matching tree nearby.
CME

ID # 02
Species: Koelreuteria paniculata
Common: Golden Rain Tree
Height: 3.0
DBH: 0.05 DGL: 0.05
TPZ: 2 SRZ: 1.5
Current Form: Average
Current Vigour: Fair
Age Class: Young
SULE: Replaceable
Retention Value: **Low**

Comments

Public street tree. Newly planted, low value due to small and replaceable size.
CME

ID # **04**
Species: Koelreuteria paniculata
Common: Golden Rain Tree
Height: 3.0
DBH: 0.05 DGL: 0.06
TPZ: 2 SRZ: 1.5
Current Form: Average
Current Vigour: Fair
Age Class: Young
SULE: Replaceable
Retention Value: **Low**

Comments

Public street tree. Mechanical damage at the base of the trunk. Newly planted, low value due to small and replaceable size.
CME

ID # **05**
Species: Platanus x acerifolia
Common: London Plane
Height: 13.5
DBH: 0.53 DGL: 0.60
TPZ: 6.36 SRZ: 2.67
Current Form: Good
Current Vigour: Good
Age Class: Mature
SULE: Long (>40 years)
Retention Value: **Moderate**

Comments

Public street tree. Pruning to the north western side of the tree. Roots growing over and along the kerb. Canopy conflicting with light pole on south east side of tree.
CME

ID # **06**
Species: Koelreuteria paniculata
Common: Golden Rain Tree
Height: 2.0
DBH: 0.04 DGL: 0.05
TPZ: 2 SRZ: 1.5
Current Form: Poor
Current Vigour: Fair
Age Class: Young
SULE: Replaceable
Retention Value: **Low**

Comments

Public street tree. Newly planted, low value due to small and replaceable size.
CME

ID # **07**
Species: Lophostemon confertus
Common: Brush Box
Height: 11.0
DBH: 0.70 DGL: 0.72
TPZ: 8.4 SRZ: 2.88
Current Form: Good
Current Vigour: Good
Age Class: Mature
SULE: Long (>40 years)
Retention Value: **Moderate**

Comments

Public street tree. Minor pruning on the north eastern side for clearance. Exposed roots growing along kerb. Minor lean towards the road.
CME

ID # **08**
Species: Melaleuca quinquenervia
Common: Broad Leafed Paperbark
Height: 7.50
DBH: 0.54 DGL: 0.43
TPZ: 6.48 SRZ: 2.32
Current Form: Average
Current Vigour: Good
Age Class: Mature
SULE: Long (>40 years)
Retention Value: **Moderate**

Comments

Public street tree. Multi-stemmed with inclusions.
CME

ID # **09**
Species: Eucalyptus camaldulensis
Common: River Red Gum
Height: 7.50
DBH: 0.61 DGL: 0.69
TPZ: 7.32 SRZ: 2.83
Current Form: Poor
Current Vigour: Fair
Age Class: Mature
SULE: Medium (15-40 years)
Retention Value: **Low**

Comments

Public street tree. Pruning to north east for clearance. Minor hollow to east. Major lean towards and overhanging the road. Potentially dangerous to passing cars, cyclists. Vehicle impact likely. New cycleway now built around lean.
CME

ID #	**10**
Species:	Melaleuca styphelioides
Common:	Prickly Paperbark
Height:	7.50
DBH: 0.31	DGL: 0.45
TPZ: 3.72	SRZ: 2.37
Current Form:	Good
Current Vigour:	Good
Age Class:	Mature
SULE:	Long (>40 years)
Retention Value:	**Moderate**

Comments

Public street tree. Slightly suppressed by overhanging canopies of adjoining trees on the north-east and south-west.
CME

ID #	**11**
Species:	Casuarina cunninghamiana
Common:	River She-Oak
Height:	8.5
DBH: .72	DGL: 0.73
TPZ: 8.64	SRZ: 2.9
Current Form:	Average
Current Vigour:	Good
Age Class:	Mature
SULE:	Long (>40 years)
Retention Value:	**Moderate**

Comments

Public street tree. Pruning throughout the canopy. Surface roots throughout verge.
CME