

Tree Impact Assessment Report

City and Southwest Metro Station Upgrade Works Package 5 & 6

**Project wide: Hurlstone Park, Wiley Park, Belmore,
Campsie, Dulwich Hill and Punchbowl**

Contract: Package 5: 00013/11766

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1 PURPOSE

This report has been produced to assess impacts to vegetation and detail the species and number of trees that will be removed as part of the Southwest Metro Package 5 and Package 6 works.

The report has been written in accordance with the requirements of the *Sydney Metro City & Southwest - Sydenham to Bankstown Tree Management Strategy* and *Sydney Metro City & Southwest - Sydenham to Bankstown - Instrument of Approval*, Condition of Approval E5.

2 PROJECT OVERVIEW AND LOCATION

The Sydney Metro City & Southwest project includes a new 30km metro line extending metro rail from the end of the Metro North West Line at Chatswood, under Sydney Harbour, through new Central Business District stations and southwest to Bankstown. It is due to open in 2024 with the ultimate capacity to run a metro train every two minutes each way through the centre of Sydney. Sydney Metro City & Southwest comprises two core components – the Chatswood to Sydenham project, and the Sydenham to Bankstown upgrade. This document refers to the Sydenham to Bankstown upgrade (herein referred to as the Southwest Metro (SWM) Project).

The SWM Project was declared to be State Significant Infrastructure (SSI) and Critical State Significant Infrastructure (CSSI) by a Ministerial order on 10 December 2015 under Section 5.12 (4) and 5.13 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) (previously referred to as sections 115U(4) and 115V prior to amendment of the EP&A Act). An Environmental Impact Statement (EIS) (GHD/AECOM September 2017) was prepared and placed on public exhibition from 13 September 2017 to 8 November 2017. A Submissions and Preferred Infrastructure Report (SPIR) (GHD/AECOM June 2018) was prepared in response to the submissions received during the EIS exhibition period. The SPIR was placed on public exhibition from 20 June 2018 to 18 July 2018. A Submissions Report was then prepared by Sydney Metro (September 2018) in response to submissions received during the SPIR exhibition period. The project was approved by the Minister for Planning on 12 December 2018 (Planning Approval number SSI-8256).

A modification report for the SWM Project was prepared by Sydney Metro (May 2020) and placed on public exhibition from 21 May 2020 to 4 June 2020. A Submissions Report was prepared by Sydney Metro (September 2020) in response to the submissions received during the modification report exhibition period. The SWM Project Modification was determined by the Minister for Planning on 22 October 2020.

This document refers to the Southwest Metro Package 5 and Package 6 station upgrade works comprising of – Dulwich Hill, Campsie and Punchbowl Station (package 5) and Belmore, Hurlstone Park and Wiley Park (package 6) (the Project). Below is a description of the Construction scope for the Project:

Dulwich Hill Station

- Construction of new covered station concourse bridge from Bedford Crescent and Light Rail entry to Ewart Lane with connection to platforms;
- Refurbishment and reuse of overhead booking office;
- Refurbishment and reuse existing platform building;

- Provision of new safety rail to Wardell Road bridge adjacent to booking office;
- Construction of new landscaped public plaza incorporating lighting, seating and access to station entries;
- Construction of new platform building;
- Construction of new shared path linking Wardell Road and Ewart Lane;
- Construction of new stairs to Ewart Lane car park;
- Provision of accessible access to the pedestrian crossing at Wardell Road;
- Provision of new bicycle parking hoops;
- Construction of new service building and associated infrastructure;
- Platform works, including raising platform and provision of platform drainage. Installation of 1500mm deep tile zone, temporary tactiles and yellow safety line;
- Platform works also includes provision for platform edge screens (PES), platform screen doors (PSD) and mechanical gap fillers (MGF) (to be installed by others);
- Provision of new pedestrian lighting between Bedford Crescent and Keith Lane;
- Provision of new shelter and seat for kiss and ride on Bedford Crescent;
- Landscaping to the south of the station;
- Dudley Street bus interchange area works;
- Provision of new vertical protection screens to both sides of existing Wardell Road bridge;
- Provision of 2 new lifts and associated infrastructure, landings and canopies to lift entries;
- Installation of new security and segregation fencing;
- Construction of new Combined Services Route (CSR); and
- Services relocations / enabling works.

Campsie Station

- Refurbishment and reuse of heritage platform buildings;
- Construction of secured bike locker;
- Construction of new canopy over the concourse;
- Platform works, including raising platform and provision of platform drainage. Installation of 1500mm deep tile zone, temporary tactiles and yellow safety line;
- Platform works also includes provision for PES, PSD and MGF (to be installed by others);
- Replace open fencing on Beamish Street and renew existing planters;
- Installation of 16 x bike racks off North Parade in existing car park;
- Construction of new services building and associated infrastructure;
- Replacement of planter beds to corners of Beamish Street;
- Construction of new kiss and ride on South Parade;
- Installation of new security and segregation fencing;
- Construction of new CSR; and
- Services relocations / enabling works.

Punchbowl Station

- Repurpose and refurbishment of station rooms in Platform buildings 1 and 2;
- Provision of three new lifts and associated infrastructure, landings and canopies to lift entries and platform;
- Installation of new canopy over existing stair at Northern entry;
- Installation of new roof above the concourse bridge, Southern entry and platform stairs.

- Removal of hooped top fencing to station concourse overbridge and platform stairs and replaced with compliant glass screens and stair balustrades;
- Installation of new handrails;
- Removal of existing southern stairs, installation of new concrete slab at concourse level and new stairs further south;
- Platform works, including raising platform and provide platform drainage. Installation of 1500mm deep tile zone, temporary tactiles and yellow safety line. Provision of egress ramps off platform as required by fire life safety strategy;
- Platform works also includes provision for PES, PSD and MGF to be installed by others;
- Installation of new bike parking hoops off The Boulevarde and adjacent to the Northern entry;
- Installation of bollards to the edge of the carpark and extension to new paving to lift landing and edge of carpark;
- Landscaping to western end of Southern entry behind the retail properties;
- Mass planting to existing garden beds adjacent to Northern entry and replace timber logs;
- Upgrade to existing pedestrian pathway under Punchbowl Road, including handrail and fencing;
- Upgrade to existing lighting;
- Paint finish to wall and soffit and provision for CCTV;
- Landscaping and new lighting to Northern entry;
- Provision for pop-up retail in the park adjacent the Northern entry.
- Provision of kiss and ride on The Boulevarde;
- Construction of new service building, associated infrastructure and landscaping;
- Installation of new security fencing;
- Construction of retaining walls;
- Construction of new CSR; and
- Services relocations / enabling works.

Hurlstone Park Station

- Refurbishment and re-use of existing overhead booking office with new cladding and new canopy roof;
- Installation of bike parking hoops;
- Provision of new kiss and ride and taxi parking on Floss Street;
- New accessible carpark space at Duntroon Street;
- Construction of new service building
- Landscaped embankment treatment with new planting;
- Regrade platforms as per Metro requirements, including drainage and provision for platform screen doors, platform edge screens and mechanical gap fillers to Platform 1 and 2
- Refurbishment and re-use existing platform buildings;
- Extension of existing concourse and provision of new lifts and stairs, including canopies;
- Repair and repainting of existing fencing on corner of Duntroon Street and Crinan Street;
- Installation of new paving and provision of an extended kerb ramp on Duntroon Street;
- Installation of new vertical protection (anti-throw) screens to both sides of Duntroon Street overbridge; and

- Installation of new security and segregation fencing; and
- Construction of a new Combined Services Route.

Belmore Station

- Raise platform edges, regrade platform as required, provide platform drainage and emergency egress ramps from platforms to rail corridors as required;
- Provision for platform edge screens, platform screen doors and mechanical gap fillers
- Construction of new services building with associated landscaping;
- Replace existing seats and bins;
- Refurbish and reuse platform building;
- Provide associated passenger information displays;
- New vertical protection (anti-throw) screens to Burwood road bridge;
- New landscape works to the north and south of the station entrance, including landscaping, paving and relocation of existing bike parking and new bike parking;
- New shelter and seat to kiss and ride. New kiss and ride and taxi parking on Tobruk Avenue;
- New line marking to accessible parking within the station carpark off Tobruk Avenue;
- Installation of new security fencing;
- Construction of new Combined Services Route.

Wiley Park Station

- Provision of new accessible parking, kiss and ride and taxi spaces on The Boulevarde;
- Refurbishment and reuse of heritage overhead booking office;
- The existing station platforms would be removed, excavated and replaced within a like-for like concrete slab platform;
- Installation of new lifts and retaining walls;
- Refurbishment and reuse of heritage platform buildings;
- Construction of new services building including retaining wall construction;
- Construction of new concrete swale;
- Construction of new platform building and canopy;
- Installation of new public plaza, including paving, planters and bicycle parking;
- Installation of lighting to shared path between King Georges Road and Urunga Parade;
- Installation of errant vehicle bollards at King Georges Road and The Boulevarde intersection;
- Reinstatement of original station kiosk;
- New vertical protection screens to existing King Georges Road bridge;
- Installation of new security fencing; and
- Construction of new Combined Services Route.

An illustrative and aerial overview of each station scope is depicted below:

Tree Impact Assessment Report

City and Southwest Metro Station Upgrade Works
Package 5 and 6

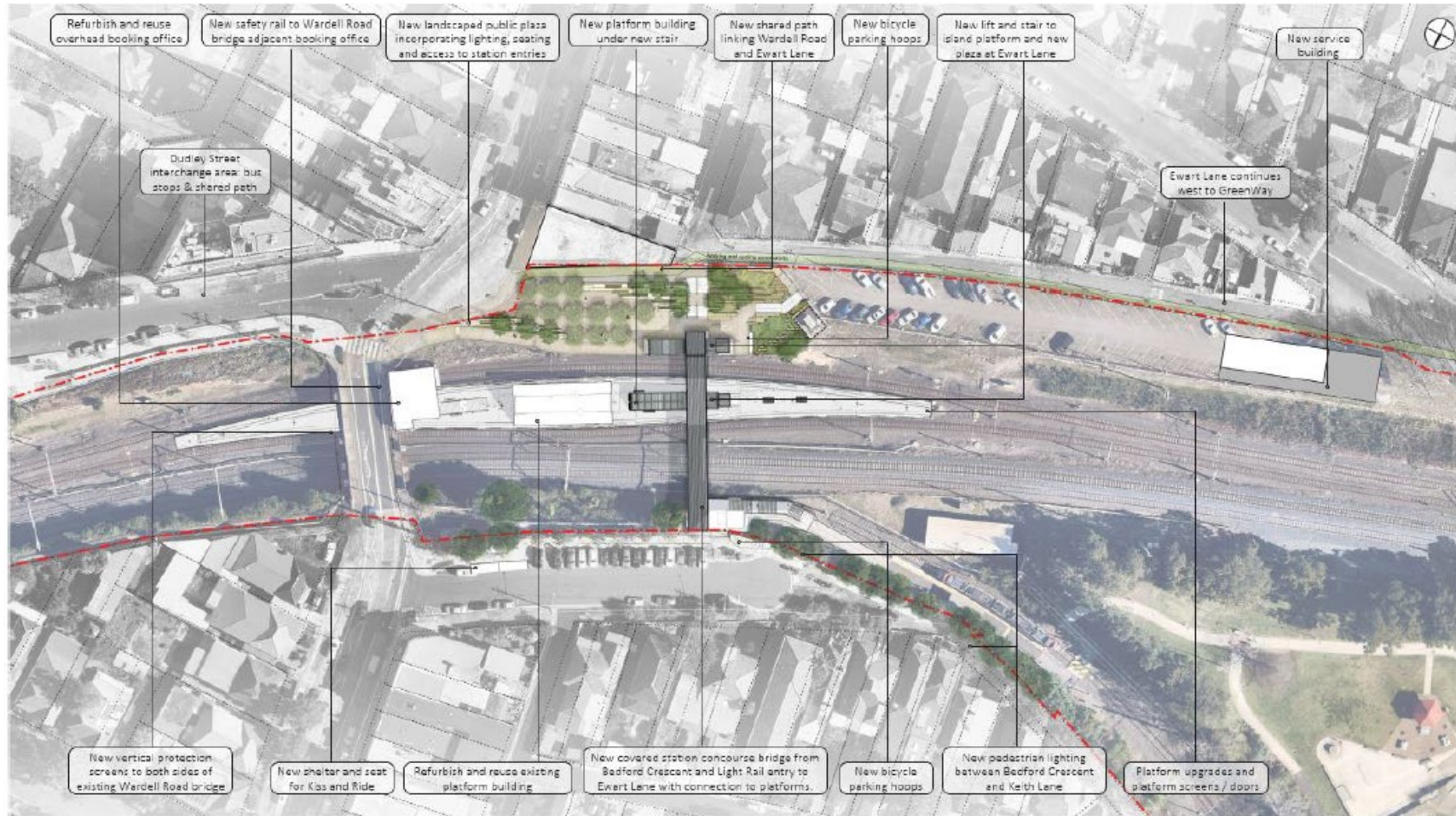


Figure 1 Sydney Metro Dulwich Hill Station upgrades

Tree Impact Assessment Report

City and Southwest Metro Station Upgrade Works
Package 5 and 6

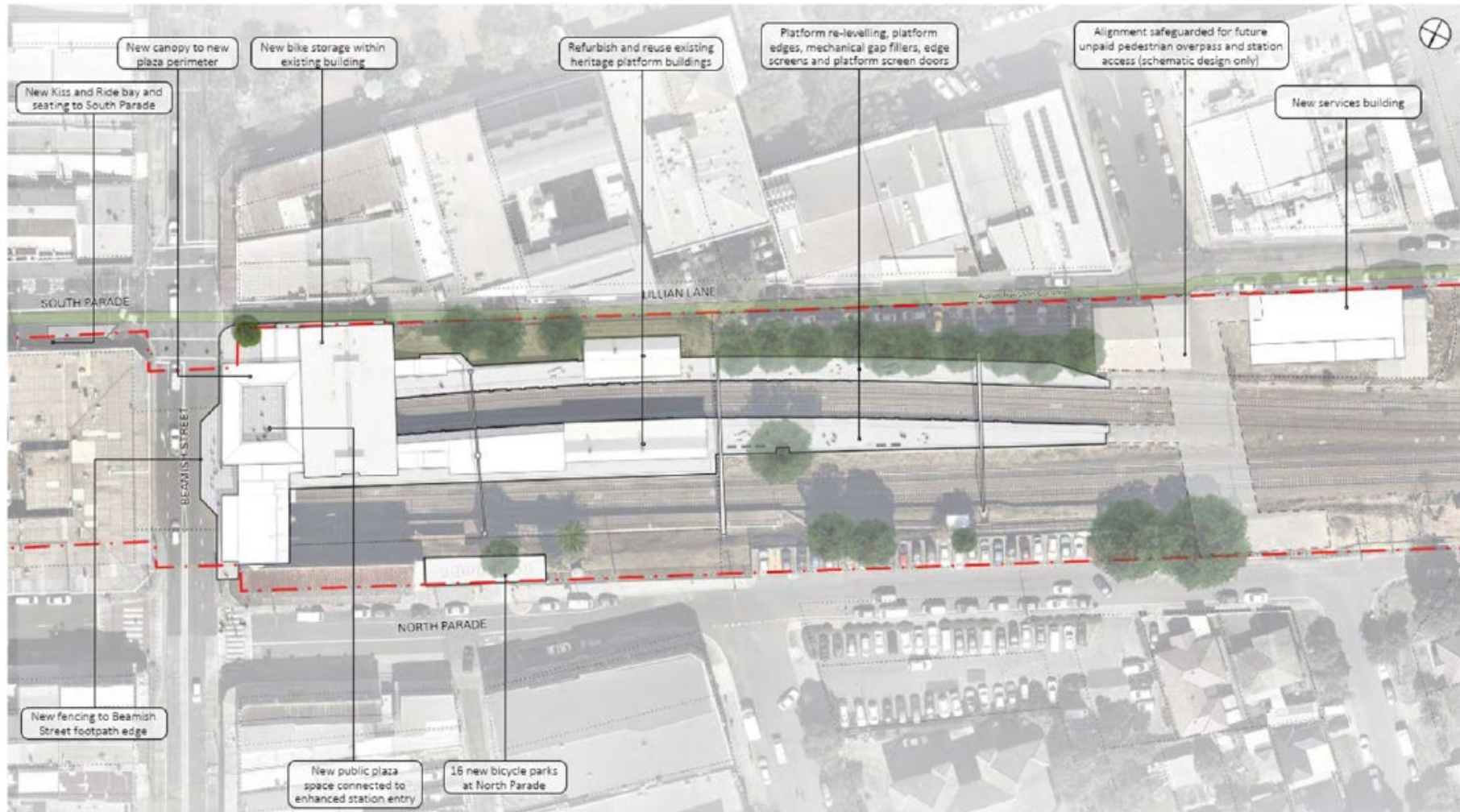


Figure 2 Sydney Metro Campsie Station upgrades

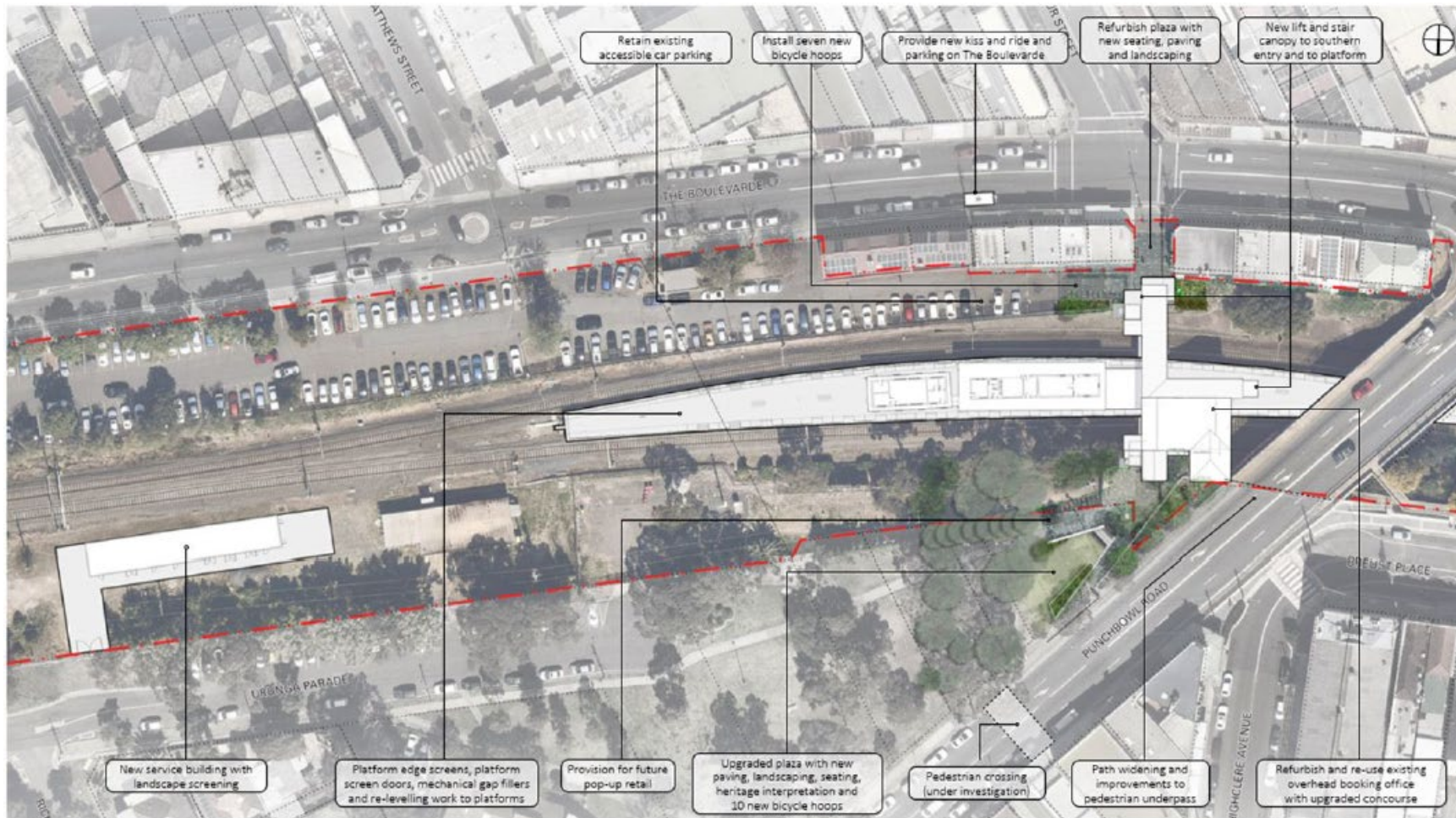


Figure 3 Sydney Metro Punchbowl Station upgrades

Tree Impact Assessment Report

City and Southwest Metro Station Upgrade Works
Package 5 and 6



Figure 4 Sydney Metro Hurlstone Park Station upgrades

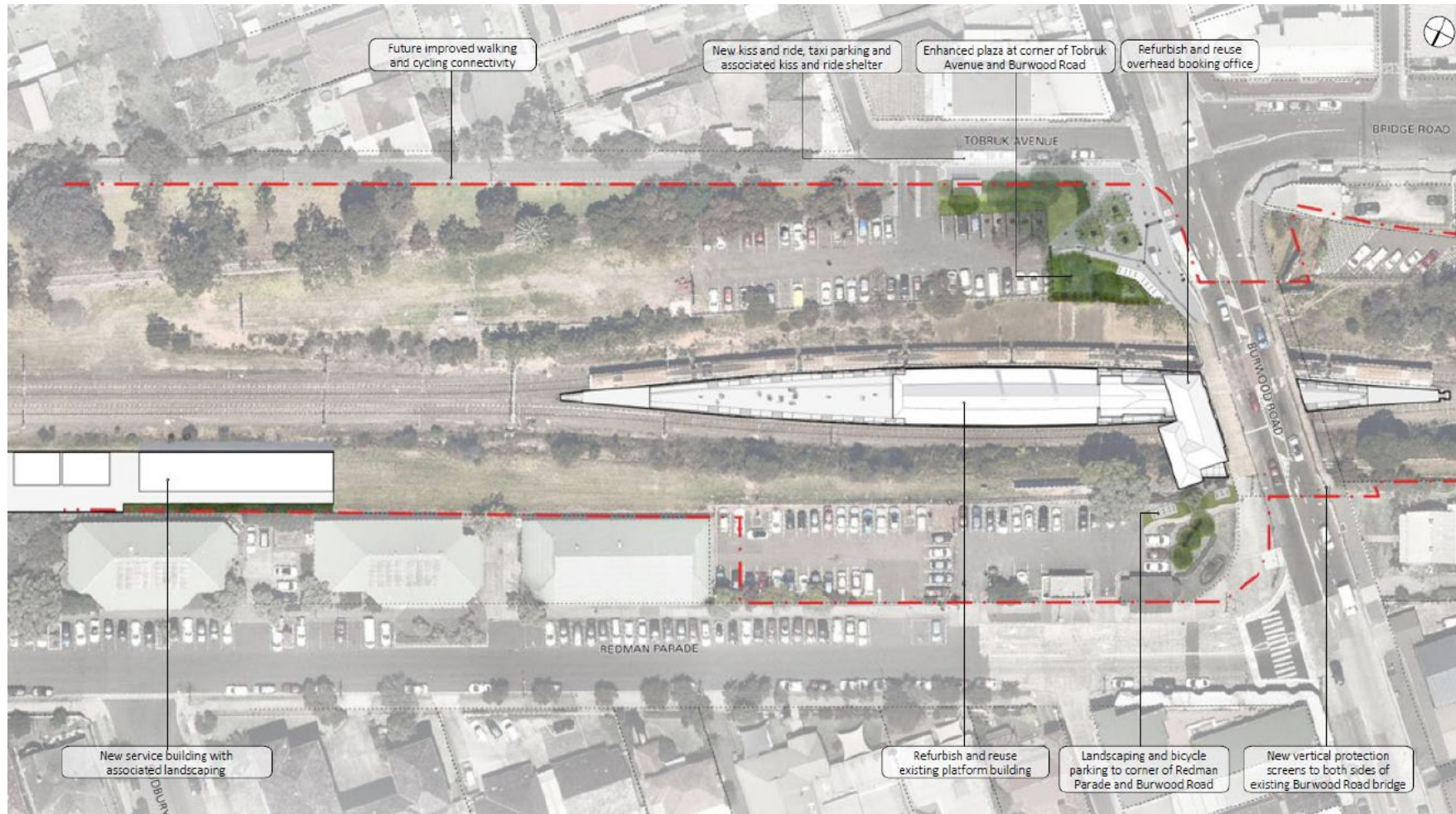


Figure 5 Sydney Metro Belmore Station upgrades

Tree Impact Assessment Report

City and Southwest Metro Station Upgrade Works
Package 5 and 6



Figure 6 Sydney Metro Wiley Park Station upgrades

3 BACKGROUND

In accordance with the *Sydney Metro City & Southwest Sydenham to Bankstown Instrument of Approval* a tree is defined as “Long lived woody perennial plant greater than (or usually greater than) 3 m in height with one or relatively few main stems or trunks”.

Condition of Approval E5 states “*The Proponent must commission an independent experienced and suitably qualified arborist, to prepare a comprehensive Tree Report(s) before removing any trees as detailed in the documents listed in Condition A1. The Tree Report may be prepared for the entire CSSI or separate reports may be prepared for individual areas where trees are required to be removed. The report(s) must identify the impacts of the CSSI on trees and vegetation within and adjacent to the Construction footprint. The report(s) must include:*

- a) a description of the conditions of the tree(s) and its amenity and visual value;*
- b) consideration of all options to avoid tree removal, including relocation of services, redesign or relocation of ancillary components (such as substations, fencing etc.) and reduction of standard offsets to underground services; and*
- c) measures to avoid the removal of trees or minimise damage to existing trees and ensure the health and stability of those trees to be protected. This includes details of any proposed canopy or root pruning, root protection zone, excavation, site controls on waste disposal, vehicular access, storage of materials and protection of public utilities.*

A copy of the report(s) must be submitted to the Planning Secretary before the removal or pruning of any trees, including those affected by site establishment Work. All recommendations of the report must be implemented by the Proponent, unless otherwise agreed by the Planning Secretary.”

The ecological potential of the project site has been assessed under the Sydney Metro City & Southwest Chatswood to Sydenham Environmental Impact Statement (EIS). Section 22.2 of the EIS states “*The majority of the study area has been heavily modified by past and ongoing disturbances associated with urban development and the active rail corridor. Urban development, clearance, and ongoing maintenance of the rail corridor has resulted in fragmentation, a high level of disturbance, and degradation of vegetation communities*”.

The majority of vegetation in the project area and surrounding study area comprises exotic or planted native species on highly modified landforms. There are small isolated patches of remnant or regrowth native vegetation in small portions of the study area associated with rail cuttings with less disturbed soil profiles.

Native vegetation and habitat within the project area is in medium to poor condition, and features impacts from existing maintenance activities, edge effects, weed infestation, and exotic pests.”

The EIS also states “*There is relatively low native species richness within the study area, which confirms that the native vegetation has been extensively modified and is in moderate to poor condition.*

A total of 129 flora species from 40 families were recorded within the study area, comprising 63 native and 66 exotic species. Poaceae (grasses, 22 species, 11 native), Myrtaceae (flowering shrubs and trees, 20 species, 13 native), Fabaceae (23 species, 17 native), and Asteraceae (flowering herbs, 11 species, 2 native) were the most diverse families recorded. One threatened flora species (Downy Wattle) was recorded in the study area, outside the project area."

In regard to plant communities Section 22.2 of the EIS states *"two of the native plant communities identified conform to the following threatened ecological communities listed under the TSC Act:*

- *Sydney Turpentine Ironbark Forest in the Sydney Basin Bioregion (Sydney Turpentine Ironbark Forest)*
- *Shale Gravel Transition Forest in the Sydney Basin Bioregion (Shale Gravel Transition Forest).*

No threatened ecological communities listed under the EPBC Act are located in the study area."

It is noted that one threatened plant species was recorded in the vicinity of the EIS study area, however the species does not reside within the Project impact area. Downy Wattle (*Acacia pubescens*) was recorded near Punchbowl Station (not within 20m of the work zone). The Downy Wattle will not be impacted or removed as part of these works and will be protected. The EIS states *"No listed threatened flora species were recorded in the project area. One threatened plant species Downy Wattle (Acacia pubescens) listed as vulnerable under the EPBC Act and TSC Act, was recorded in the study area. Around 650 stems are located near the project area as shown in Figure 22.1.*

The patches of stems recorded are located mainly in the vicinity of Punchbowl Station, with around two stems recorded in the rail corridor, and one stem in a Council reserve around 100 metres east of the Yagoona substation. The project has been designed to avoid impacting on the recorded locations of this species."

As part of the EIS, GHD produced a report to support the EIS Biodiversity Impact assessments, GHD's report: *Sydney Metro: Sydenham to Bankstown tree count dated 21 August 2017* considered the numbers of trees within each station precinct and in the rail corridor between each station. The below summarises the tree count within the station precincts:

Figure 7: tree count within the stations:

Note: only Dulwich Hill, Wiley Park, Hurlstone Park, Campsie, Punchbowl and Belmore are applicable.

Station	Native			Exotic			Total
	Small	Medium	Large	Small	Medium	Large	
Marrickville	9	46	9	8	13	3	88
Dulwich Hill	10	3	-	1	4	1	19
Hurlstone Park	8	10	-	9	14	2	43
Canterbury	30	13	-	2	4	7	56
Campsie	17	16	2	2	10	1	48
Belmore	44	45	16	12	8	5	130
Lakemba	35	26	6	3	16	2	88
Wiley Park	26	14	7	24	33	4	108
Punchbowl	17	51	14	15	35	5	137
Bankstown	1	77	19	44	33	2	176
Total	197	301	73	120	170	32	893

Figure 8: tree count between stations:

Note: only Dulwich Hill, Wiley Park, Hurlstone Park, Campsie, Punchbowl and Belmore are applicable.

Station	Native			Exotic			Total
	Small	Medium	Large	Small	Medium	Large	
East of Marrickville	41	60	5	1	2	2	111
Marrickville – Dulwich Hill	20	45	5	2	12	10	94
Dulwich Hill – Hurlstone Park	21	9	1	1	3	9	44
Hurlstone Park – Canterbury	30	41	24	68	45	11	219
Canterbury – Campsie	188	171	5	7	14	1	386
Campsie – Belmore	36	58	10	10	31	14	159
Belmore – Lakemba	20	67	10		7	1	105
Lakemba – Wiley Park	58	38	16		4	5	121
Wiley Park – Punchbowl	29	25	9	9	18	10	100
Punchbowl – Bankstown	134	94	18	9	3	1	259
West of Bankstown	47	40	18	9	10	4	128
Total	624	648	121	116	149	68	1726

The total numbers were assessed and during the SPIR consultation process, which further elaborated upon: The Sydney Metro City & Southwest Sydneyham to Bankstown Upgrade – Submissions and Preferred Project Report (SPIR) states “It is expected that large areas of the planted native vegetation and exotic scrub and forest would not

require removal for the corridor works, however this is subject to the detailed design of the proposed works, including fencing and the communications services route. This vegetation would potentially include trees that provide screening along the corridor for surrounding properties. The need to clear vegetation would be reviewed by the construction contractor/s and minimised wherever practicable.” The SPIR also states “about 16.3 hectares of vegetation (not including vegetation classed as exotic grassland) may need to be removed, including:

- *up to 7.3 hectares of planted native vegetation*
- *up to nine hectares of exotic scrub and forest.”*

The SPIR does not specify where these areas of clearing are located as this was to be developed as part of detailed design. Furthermore, these areas represent the clearing to occur for corridor works from Sydenham to Bankstown under all work packages (refer to the *Sydney Metro City & Southwest Sydenham to Bankstown Upgrade Staging Report* for more information of the different packages under which the project has been staged).

However, the SPIR does provide a summarised overview of the anticipated number of trees to be removed within each station precinct, as per Table 2.1 of Appendix B of the SPIR. This is extracted as below:

Figure 9: estimated number of trees to be removed per station:

Note: only Dulwich Hill, Wiley Park, Hurlstone Park, Campsie, Punchbowl and Belmore are applicable.

Station	Native trees	Exotic trees	Total trees
Marrickville	50	15	65
Dulwich Hill	11	2	13
Hurlstone Park	8	9	17
Canterbury	38	7	45
Campsie	28	6	34
Belmore	61	11	72
Lakemba	67	0	67
Wiley Park	22	41	63
Punchbowl	25	22	47
Bankstown	79	1	80

Note: The table presents the maximum number of trees around stations with the potential to be impacted during construction. The final numbers would be confirmed during detailed design. It does not include other trees along the corridor that may also need to be removed as part of general vegetation removal in the rail corridor (refer to Section 2.4.3).

Whilst the above nominates an anticipated number of trees per station, Appendix B of the SPIR Section 2.4.4 identifies *“The biodiversity assessment for the preferred project was undertaken based on the assumption that all vegetation within the rail corridor would need to be removed to construct the preferred project”* Based on this assessment whilst the above table is anticipated numbers within each station precinct, the SPIR acknowledges that the final number is not finite.

Further to this it should be acknowledged that the boundaries for each station precinct as assessed by GHD which created the follow on to the SPIR, does not align to the station project boundaries with respect the Stage 3 design package and the Metro Service Building footprints. As a result, the number of trees identified in the SPIR for the reduced volumes per station in **Figure 9** above does not consider a number of Metro Service Building Locations which sit within the “corridor” and not the precinct boundary as assessed by GHD.

On this understanding it is considered that for Package 5 and Package 6 the anticipated number of trees to be impacted as noted in **Figure 9** of this document (within the station precinct) shall be combined with the total anticipated within the corridor as per **Figure 8** of this document.

In accordance with the Project approvals CSSI 8256 the combination of the above shall demonstrate the total tree count for impact for the Project. Following confirmation of the total tree count for all stations and prior to operational handover Downer shall implement replacement planting for all trees not able to be replaced within the project boundary in consultation with council’s in a ratio of 2:1, as per CoA E4.

Essentially this report shall present the number of trees impacted by the Project within the GHD assigned precinct boundary and those which sit within the “corridor”. The total numbers for each area are less than those noted above in **Figure 8** and **Figure 9** of this document, demonstrating consistency to the CSSI 8256.

4 SITE INSPECTIONS

As part of the design development (by others) the Sydney Metro design contract (METRON T2N) commissioned Arboricultural Impact Assessment (AIA) for each station (Package 5 and Package 6) by Urban Arbor. Revision B & Revision C available to Downer are as follows:

Belmore: Belmore Station Arborist Report Revision B - SMCSWSWM-MTM-WBS-LA-REP-211000

Wiley Park: Wiley Park Station Arborist Report Revision B - SMCSWSWM-MTM-WWP-LA-REP-231000

Hurlstone Park: Hurlstone Park Station Arborist Report Revision C - SMCSWSWM-MTM-WHP-LA-REP-131000-C

Dulwich Hill: Dulwich Hill Station Arborist Report Revision B - SMCSWSWM-MTM-WDH-LA-REP-121000

Campsie: Campsie Station Arborist Report Revision D - SMCSWSWM-MTM-WCS-LA-REP-151000

Punchbowl: Punchbowl Station Arborist Report Revision C - SMCSWSWM-MTM-WPS-LA-REP-241000

The above AIA were based on site inspections conducted by Urban Arbor between 2019 and 2021 to identify the total number of trees to be impacted for the entire design scope of each station.

Downer has identified a number of omissions in the reports produced by Urban Arbor, notably the departure from the definition of a tree as per the planning approval: *Sydney Metro City &*

Southwest Sydenham to Bankstown Instrument of Approval, a tree is defined as “Long lived woody perennial plant greater than (or usually greater than) 3 m in height with one or relatively few main stems or trunks”. The reports produced by Urban Arbor to facilitate the detailed design development have been based on “significant trees” as defined by Urban Arbor as trees greater than 5m in height” (refer to Section 2.1.1 of each report).

To satisfy the Planning Approval E5 Downer has subsequently engaged Consulting Arborist Owen Tebbutt of Plateau Trees to conduct a gap analysis for the total number of trees greater than 3m for the total design inclusive of those originally identified by Urban Arbor. The intent of this exercise is to conclusively satisfy the requirements of E5 for the latest iteration of Detailed Design and ensure all trees which meet the *Sydney Metro City & Southwest Sydenham to Bankstown* definition of a tree have been accounted within this report.

A copy of the latest available Urban Arbor AIA's is detailed within the appendices (Appendix 1,3,5,7, 9 and 11) of this document. To support the Urban Arbor reports, the updated reports by Consulting Arborist Owen Tebbutt & Colin Curtis of Plateau Trees can also be found in the appendices of this report (Appendix 2, 2.1,2.2, 4, 4.1, 4.2, 4.3, 6, 6.1, 6.2, 8, 8.1, 8.2, 10, 10.1, 10.2, 12, 12.1, 12.2, 12.3,12.4 & 12.5)

A combination of both reports per station demonstrates the total number of trees to be removed and trimmed for each station precinct and adjacent MSB.

5 INSPECTION RESULTS

As stated in the Urban Arbor reports and Plateau Trees reports vegetation has been inspected within a number of zones across the Projects. The below provides a summary of the trees and vegetation to be impacted as a result of each Project, within Package 5 and Packages 6 as a result of design alignment or construction areas. All trees and vegetation are consistent with the assessed mix of planted native and exotic species as detailed in the EIS and SPIR. No trees or species are considered as endangered or threatened ecological communities.

Detailed results can be found in the arborist reports per station within the appendices of this document.

Table 1: Vegetation impact per Project

Key:

■ **Trees to be cleared contributing to Total Impact (Column 5)**

■ **Trees to be pruned contributing to Total Impact (Column 5)**

Project	Number to be removed / trimmed assessed in Urban Arbor Revision A design package reports: refer to Section 9 of each report	Number to be removed / trimmed assessed in Urban Arbor Revision B & C of design package reports: refer to Section 9 of each report	Additional gap analysis assessed in Plateau Trees reports to be trimmed / removed: refer to Appendix 1 of each report.	Total impact (at date of this report) Total = all trees and vegetation, native and exotic.
Belmore	Document location in this report: Superseded 5 trees	Document location in this report: Appendix 1 Revision B of the Urban Arbor arborist report identifies 8 trees for removal (5 additional trees not assessed for removal in revision A; tree 663, 667, 2267, 2268, 2268).	Document location in this report: Appendix 2 & Appendix 2.1 12 additional trees 4 trees to be pruned {Appendix 2} 2 trees (additional trees not assessed in the Urban Arbor	24 trees 10 trees to be pruned (excluded from total tree count) Total vegetation to be impacted: 754 m2 (vegetation includes all trees and shrubs)

Tree Impact Assessment Report

City and Southwest Metro Station Upgrade Works
Package 5 and 6

		<p>1 Tree (657) identified within revision A of Urban Arbor report for removal is assessed within revision B for retention.</p> <p>3 trees (663, 667 & 2267) have not been assessed for removal within the gap analysis completed by Plateau Trees.</p> <p>In total, 6 trees are required to be removed detailed within Revision B of the Urban Arbor Report and not accounted for within the Plateau tree report (658, 659, 660, 663, 667 & 2267).</p>	<p>report are required for removal and assessed in the Plateau Report for removal).</p> <p>6 trees to be pruned {Appendix 2.1}</p> <p>3 additional trees not assessed for removal 660, 665 and 666, in the Urban Arbor report are required for removal along with 1 additional trees detailed in Plateau Report {Appendix 2.2}</p>	
Wiley Park	<p>Document location in this report: Superseded</p> <p>9 trees</p>	<p>Document location in this report: Appendix 3</p> <p>Revision B of the Urban Arbor arborist report identifies 44 trees for removal (35 additional trees not assessed for removal in revision A; tree 691, 693, 694, 707, 708, 3325, 3330, 3337, 3339, 3345, 689, 690, 3286, 3287, 3288, 3289, 3321, 3322,</p>	<p>Document location in this report: Appendix 4, Appendix 4.1 & Appendix 4.2</p> <p>80 trees plus 1 tree to be pruned {Appendix 4.0}</p> <p>7 additional trees not assessed for removal 689, 690, 691, 693,</p>	<p>112 trees</p> <p>1 tree to be pruned (excluded from total tree count)</p> <p>Total vegetation to be impacted: 1206m2 (vegetation includes all trees and shrubs)</p>

Tree Impact Assessment Report

City and Southwest Metro Station Upgrade Works
Package 5 and 6

		<p>3323, 3324, 3326, 3327, 3328, 3329, 3331, 3332, 3333, 3334, 3335, 3336, 3338, 3340, 3341, 3342, 3343, 3344).</p> <p>1 Tree (669) identified within revision A for removal is assessed within revision B for retention.</p> <p>In total, 8 trees are required to be removed detailed within Revision B of the Urban Arbor Report and not accounted for within the Plateau tree report.</p>	<p>694, 707 & 708 in the Urban Arbor report are required for removal along with 4 additional trees (Tree 1-4) detailed in Plateau Report</p> <p>{Appendix 4.1}</p> <p>1 tree, tree 711 assessed in the Urban Arbor report is required for removal and detailed in Plateau Report – hasn't been reassessed, simply identified for removal).</p> <p>{Appendix 4.2}</p> <p>12 trees (additional trees not assessed in the Urban Arbor report are required for removal and assessed in the Aura Tree Services Report for removal).</p> <p>{Appendix 4.3}</p>	
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Tree Impact Assessment Report

City and Southwest Metro Station Upgrade Works
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Hurlstone Park	<p>Document location in this report: Superseded</p> <p>14 trees and one group, G3 comprising of 6 trees.</p>	<p>Document location in this report: Appendix 5</p> <p>Revision C of the Urban Arbor arborist report identifies 29 trees and one group, G3 comprising of 6 trees for removal (15 additional trees not assessed for removal in revision A; tree 194, 196, 198, 199, 183, 184, 185, 186, 189, 190, 191, 192, 193, 195, 197, 200, 201, 202, 203, 204, 205).</p> <p>Revision C of the Urban Arbor arborist report identifies 3 trees not assessed for removal in revision A; tree 203, 204 & 205.</p> <p>In total 17 trees and one group, G3 comprising of 6 trees assessed within the Urban Arbor reports are not assessed for clearing by the Plateau Arborist reports and are required for removal.</p>	<p>Document location in this report: Appendix 6 & Appendix 6.1</p> <p>56 trees plus (3 additional trees not assessed for removal 194, 198 & 199 in the Urban Arbor report are required for removal and detailed in Plateau Report).</p> <p>6 trees to be pruned. {Appendix 6}</p> <p>2 Additional trees not assessed for removal (Tree 1 & 2) in the Urban Arbor report are required for removal and detailed within the Plateau Report.</p> <p>1 tree to be pruned. {Appendix 6.1}</p> <p>1 tree to be pruned. {Appendix 6.2}</p>	<p>84 trees</p> <p>8 trees to be pruned (excluded from total tree count)</p> <p>Total vegetation to be impacted: 496m2 (vegetation includes all trees and shrubs)</p>
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Tree Impact Assessment Report

City and Southwest Metro Station Upgrade Works
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Campsie	<p>Document location in this report: Superseded</p> <p>0 trees identified for clearing in Appendix 7.</p>	<p>Document location in this report: Appendix 7</p> <p>Revision C (Superseded) of the Urban Arbor arborist report identifies 6 trees not assessed for removal in revision A; tree 523, 524, 637, 638, 639 & 640.</p> <p>Trees 637, 638, 639 & 640 have not been assessed for removal within the gap analysis completed by Plateau Trees.</p> <p>In total, 4 trees are required to be removed detailed within Revision C of the Urban Arbor Report and not accounted for within the Plateau tree report (637, 638, 639 & 640).</p> <p>Revision D of the Urban Arbor arborist report identifies 1 tree not assessed for removal in revision C; tree 611.</p>	<p>Document location in this report: Appendix 8, Appendix 8.1 & Appendix 8.2</p> <p>3 additional trees, trees not assessed for removal 523, 524 & 525 in the Urban Arbor report are required for removal and detailed within the Plateau report.</p> <p>{Appendix 8}</p> <p>21 additional trees, trees not assessed for removal 515, 516, 517, 519, 615, 616, 620, 621, 622, 623, 624, 625, 626, 628, 629, 630, 631, 633, 634, 635 & 636 in the Urban Arbor report are required for removal and detailed within the Plateau Report.</p> <p>{Appendix 8.1}</p> <p>6 additional trees, trees not assessed for removal 614, 627 & 632 in the Urban Arbor report are required for removal along with 3 additional trees (Tree 1-3) detailed in the Plateau Report.</p>	<p>35 trees</p> <p>1 tree to be pruned (excluded from total tree count)</p> <p>Total vegetation to be impacted: 1044 m2 (vegetation includes all trees and shrubs)</p>
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Tree Impact Assessment Report

City and Southwest Metro Station Upgrade Works
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			<p>{Appendix 8.2}</p> <p>1 tree to be pruned.</p> <p>{Appendix 8.3}</p>	
Dulwich Hill	<p>Document location in this report: Superseded</p> <p>9 trees</p>	<p>Document location in this report: Appendix 9</p> <p>Revision C of the Urban Arbor arborist report identifies 12 trees for removal (3 additional trees not assessed for removal in revision A; tree 93, 564, 565).</p> <p>1 tree, tree 565 hasn't been assessed for removal within the gap analysis completed by Plateau Trees.</p> <p>In total, 10 trees are required to be removed detailed within Revision C of the Urban Arbor Report and not accounted for within the Plateau Arborist tree reports.</p>	<p>Document location in this report: Appendix 10, Appendix 10.1 & Appendix 10.2</p> <p>5 trees</p> <p>1 tree to be relocated under IW endorsement was unable to be relocated and will be removed.</p> <p>{Appendix 10}</p> <p>1 additional tree not assessed for removal 573 (Tree A Plateau Report) in the Urban Arbor report are required for removal along with 1 additional tree (Tree B) detailed in Plateau Report.</p> <p>{Appendix 10.1}</p> <p>1 tree (additional tree assessed in the Urban Arbor report are required for removal and detailed in Plateau Report –</p>	<p>19 trees</p> <p>Total vegetation to be impacted: 326m2 (vegetation includes all trees and shrubs)</p>

Tree Impact Assessment Report

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			these have not been reassessed, simply identified for removal). {Appendix 10.2}	
Punchbowl	Document location in this report: Superseded 4 trees	Document location in this report: Appendix 11 Revision B of the Urban Arbor arborist report identifies 18 trees and one group, G15 comprising of 5 trees for removal (14 additional trees and one group not assessed for removal in revision A; tree 730, 731, G15, 3346, 3347, 3349, 3350, 3352, 3355, 3359, 3361, 3363, 3356, 3360, 3365). All trees identified within revision B of the Urban Arbor arborist report have been identified for removal within the existing Plateau reports. 1 Tree (733) identified within revision B for removal is assessed within revision C for retention.	Document location in this report: Appendix 12, Appendix 12.1, Appendix 12.2, Appendix 12.3 & Appendix 12.4 2 trees (additional trees not assessed for removal 729 and 730 in Urban Arbor report are required for removal and detailed in Plateau Report – these have not been reassessed, simply identified for removal with data reflected in Urban Arbor reports) {Appendix 12} 15 trees (additional trees not assessed in the Urban Arbor report are required for removal and assessed in the Plateau Report for removal). {Appendix 12.1} 8 trees (additional trees assessed in the Urban Arbor	36 trees 1 tree to be pruned (excluded from total tree count) Total vegetation to be impacted: 1388 m2 (vegetation includes all trees and shrubs)

Tree Impact Assessment Report

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		<p>In total, 3 trees are required to be removed detailed within Revision C of the Urban Arbor Report and not accounted for within the Plateau Arborist tree reports.</p>	<p>report are required for removal and detailed in Plateau Report – these have not been reassessed, simply identified for removal). {Appendix 12.2}</p> <p>1 tree (additional tree assessed in the Urban Arbor report are required for removal and detailed in Plateau Report – these have not been reassessed, simply identified for removal). {Appendix 12.3}</p> <p>5 trees as part of group G15 (additional trees assessed in the Urban Arbor report are required for removal and detailed in Plateau Report – these have not been reassessed, simply identified for removal). {Appendix 12.4}</p> <p>2 trees (additional trees not assessed in the Urban Arbor report are required for removal</p>	
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Tree Impact Assessment Report

City and Southwest Metro Station Upgrade Works
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			and assessed in the Plateau Report for removal). {Appendix 12.5} 1 tree to be pruned. {Appendix 12.6}	
	Aggregated total trees and vegetation across all stations and MSB locations.			310 trees Total vegetation removal: ~5214 m2 (vegetation includes all trees and shrubs)

6 ALTERNATIVES TO DESIGN

Section 8 and Section 9 of each Station specific Urban Arbor Arboricultural Impact Assessment as detailed within Appendix 1,3,5,7,9 and 11 of this Report identifies why these trees and vegetation must be removed. This is further supported by the main body of text for each Plateau Trees report.

The majority of tree removal for the Project sites predominately relates to the designed locations for the Metro Service Buildings with minor amounts relating to general station wide service relocations and or installations. These design components are integral to the functionality of the new Sydney Metro line and have been subject to evaluation and assessment by others (Sydney Metro design contract).

Due to limited space within the project boundary, existing services and the access track, it is not feasible or reasonable to move these design components to accommodate the existing trees and vegetation.

In accordance with the Sydney Metro Sydenham to Bankstown Tree Management Strategy tree and vegetation removal has been limited through detailed design and construction planning.

Avoidance of impacts to trees and vegetation on the project during the detailed design phase has been undertaken based on the following hierarchy;

1. Avoid impacts to tree, ensuring design and construction falls outside the tree protection zone
2. Impacts within the tree protection zone, but no trimming or removal
3. Trimming of trees with visual or amenity value (including privacy screening)
4. Removal of trees with visual or amenity value (including privacy screening)
5. Trimming of trees with ecological value (habitat, threatened vegetation communities, threatened flora species)
6. Removal of trees with ecological value (habitat, threatened vegetation communities, threatened flora species)

It is noted that a number of trees within the corridor and at access gates will be trimmed to accommodate the design components and construction requirements. Where trenching may impact trees, tree sensitive service installation methods will be reviewed to determine if alternative methods of service installation (such as non-destructive digging trench excavation of underbores) are practicable and feasible to undertake. Further investigation of these methods will be undertaken for trees located adjacent to proposed services buildings locations. Some tree roots may be removed in consultation with an Arborist as required.

6.1 Considerations and restrictions

It is noted that the considerations, restrictions and design optioneering for the total impact of trees per station Project site has been reviewed and implemented by others. Trees are all generally within the existing stations precinct as assessed in the EIS and SPIR and detailed in **Figure 7** and **Figure 9** of this report and or within the adjacent corridor networks as assessed in the EIS and detailed in **Figure 8** of this report. There is no departure from the total trees assessed (by tree count) and cumulative impacts as presented in this report in comparison to the EIS; GHD report: *Sydney Metro: Sydenham to Bankstown tree count dated 21 August 2017* and the total impact assessed in SPIR Appendix B, demonstrating compliance to the CSSI 8256.

6.1.1 Hurlstone Park Station

Two trees as assessed in the Urban Arbor report and Plateau reports at Hurlstone Park is not within the Project boundary or the rail corridor. The trees are identified as tree 198 & 199 and must be removed to accommodate the new MSB permanent access road. The design optioneering to realign this access road to retain the trees is understood to have been

considered and deemed unachievable during the detailed design stage, hence the unavoidable need for removal. The trees have been identified for removal in accordance with the Stage 3 Demolition Plans for Hurlstone Park: SMCSWSWM-MTM-WHP-LA-PKG-131000. As the trees sit within CCBC owned land, approval was sought and obtained from the CCBC on the 20th May 2021 for the removal of the two trees, see Appendix 6.1 of this document.

6.1.2 Wiley Park Station

Additionally, three trees have been identified in the Wiley Park Plateau reports (Tree 2-4) for removal outside of the Project boundary and rail corridor. These trees were not assessed in the Urban Arbor reports provided by Sydney Metro design contract, however, have been identified for removal in the Stage 3 Demolition Plans for Wiley Park: SMCSWSWM-MTM-WWP-LA-DWG-231703 & SMCSWSWM-MTM-WWP-LA-DWG-231704. As the trees sit within CCBC owned land, approval was sought and obtained from the CCBC on the 15th May 2021 for the removal of the three trees, see Appendix 4.2 of this document.

6.1.3 Dulwich Hill Station

Seven trees at Dulwich Hill are additionally located outside of the rail corridor, five of which are also outside the Project boundary. These trees were not assessed in the Urban Arbor reports provided by Sydney Metro design contract, however, have been identified for removal in the landscape design package Stage 3 Dulwich Hill Station Landscape Drawing Package SMCSWSWM-MTM-WDH-LA-PKG-121000. The design optioneering to retain these trees is understood to of been considered and deemed unachievable during the detailed design stage, hence the unavoidable need for removal. To capture this omission the two Plateau reports for Dulwich Hill: *Downer Group - Southwest Metro Package - additional tree removals Dulwich Hill Station* has identified these six trees (Appendix 10 & 10.1). As the trees sit within Inner West owned land, approval was sought and obtained from the Inner West Council on the 28th May 2021 & 15th of June 2021 for the removal of all trees except tree 2 (Appendix 10), see Appendix 10.3 of this document. Further council approval will be required prior to any impact to Tree 2. As the trees were assessed as part of the “stations precinct” in GHD’s report: Sydney Metro: Sydenham to Bankstown tree count dated 21 August 2017 and noted in **Figure 7** of this document, they are consistent with the EIS in terms of assessed impacts. The impact to these trees would also maintain consistency with the total number as assessed in the subsequent SPIR “estimated number of trees to be removed per station” as detailed in **Figure 9**.

6.1.4 Belmore Station

Moreover, Belmore has identified a number of trees which are required for removal which all sit within CCBC owned and managed land. This consists of seven trees, five of which are the five trees identified in the Urban Arbor in Appendix 1. Two additional trees are identified in the Plateau arborist report in Appendix 2.1. Whilst they are in the Project boundary and consistent with the CSSI8256, approval from CCBC would be required prior to any impact. Approval from CCBC was obtained on the 23rd April 2021 for the removal of the five trees identified in the Urban Arbor report, see Appendix 2.1 of this document. In regard to the remaining trees residing within CCBC owned land, further council approvals and all other authority approvals shall be sought prior to any impact to the trees.

In addition, one tree is required to be pruned at Belmore. The tree requiring pruning is identified in the Plateau Report in Appendix 2 of this document and identified as Tree 14 (T14).

T14 is situated directly outside the existing Project boundary (three meters from the Project boundary). Whilst it is outside of the Project boundary it is within the “station precinct” consistent with the tree count and those assessed as part of the station precinct in the GHD report Sydney

Metro: Sydenham to Bankstown tree count dated 21 August 2017 and noted in Figure 7 of this document.

The pruning of the limb of T14 would not impact or contribute to the total tree loss count for Belmore as identified in the EIS. T14 is consistent with the EIS in terms of assessed impacts against CSSI8256. As T14 sits within CCBC owned and managed land, approval from CCBC would be required prior to any pruning. Approval was obtained from CCBC on the 23rd April 2021, see Appendix 2.1 of this document.

The requirement of the pruning is to provide sufficient clearance for heavy goods vehicles to safely access the site through the pre-existing Sydney Trains rail corridor access gate on Redman Parade at the entrance of Metro Service Building. Currently the limb identified for pruning sits at two meters in height from ground level and crosses the access gate. The required clearance to facilitate the safe access and egress into the MSB for oversized machinery (cranes, frannas etc) is 3.2 meters. An alternative option has been explored to gain access to the site for oversized vehicles however this option is only via a small access gate in the corner of the Redman Parade commuter car park. This option would require the ongoing closure of the car park and the access gate is directly adjacent to a sensitive receiver by way of the Australian Foundation for Disability.

This potential alternative option is not considered reasonable or feasible based on the significant disturbance through lack of amenity of the car park and increased noise impacts to the Australian Foundation for Disability. The option to maintain access through the already established Sydney trains rail corridor is considered the least impactful method of safe access and egress into the site for oversized vehicles.

Tree 14 is a Eucalyptus Robusta (Swamp Mahogany) the identified pruning involves the removal of one first order branch at 2m height. The branch is approximately 300mm in diameter and constitutes 30% of the total canopy volume of the tree. The removal of the branch is not considered to significantly affect local amenity or have any increase impact to visual impact to the rail corridor. The pruning of the limb identified as T14 would not have any impact on any fauna as it does not provide any existing habitat or foraging opportunities.

T14 is situated outside of the Belmore SHR curtilage posing no impacts from a heritage perspective and further impacts such as waste, water, noise, air quality, land contamination, socio-economic impacts are considered inconsequential.

Further to the original scope of pruning required at Belmore Station, an additional five trees requiring pruning have been identified in the Plateau Report in Appendix 21 of this document and identified as Tree 4, 5, 6, 7 & 8.

All branches assessed for pruning in Appendix 2.1 will be pruned in accordance with Australian Standard AS 4373-2007, the branches are 150 mm or less in diameter. As such, pruning works to be conducted by Downer EDI & its associated sub-contractors are exempt from the Bankstown & Canterbury Council Tree Management Orders, under exemption 2.4 (g), (Bankstown Development Control Plan 2015–Part B11 5 March 2015 (Amended December 2019)) and B3.4 (g), (Tree Management Order – Canterbury Development Control Plan 2012).

6.1.5 Campsie Station

To date no clearing of trees is required outside of the City and Southwest Metro Station Upgrade Works Package 5 and 6 Project Boundary. As such, no additional consideration or restrictions apply for clearing activities at Campsie Station, as all trees identified for clearing are within the Project boundary and accounted for in the original SSI & EIS.

6.1.6 Punchbowl Station

Thirteen additional trees have been identified in the Punchbowl Plateau report (Appendix 12.2 & 12.4) that require removal outside of the Project boundary and rail corridor. These trees were not assessed in the Urban Arbor reports provided by the Sydney Metro design contract,

however, have been identified for removal in the Approved for Construction (AFC) Civil Engineering Plans for Punchbowl: SMCSWSWM-MTM-WPS-CE-DWG-4931560. As the trees reside within CCBC owned land, further council approvals and all other authority approvals shall be sought prior to any impact to the trees.

7 MITIGATION MEASURES

Downer and Sydney Metro design contract will implement a number of measures to ensure the design development and construction processes ensure the correct vegetation and trees are removed and to mitigate the risk of damage to trees and vegetation that will remain. These mitigation measures include;

- Undertake all Protection Measures as identified within the appendices of this report (protection measures as stated in Urban Arbor reports and Plateau reports specific to each Project site and detailed in the appendices of this report)
- The project has / will be designed to minimise impacts to trees where possible. This will include a review of design impacts and construction impacts on trees.
- Relevant Councils and the DPIE will be consulted in regard to replacement tree planting locations. Relevant Councils will be consulted in regard to appropriate sizes for replacement trees.
- Downer's Vegetation Disturbance Permit will be implemented in accordance with the Downer EMS and CEMP.
- All existing trees to be retained within the site area must be protected in accordance with Australian Standard AS 4970 'Tree protection in development sites' to avoid and minimise impacts
- All trees to be removed or trimmed will be appropriately demarcated
- Qualified and experienced tree loppers will be engaged to removed and trim trees
- Where works will occur in the vicinity of trees that are to remain intact, demarcation or barriers will be put in place around the tree at the extent of the structural root zone
- Access tracks will be clearly delineated and defined within the Environmental Control Maps
- Staff and workers to be educated on vegetation trimming and removal requirements
- A copy of the Tree Report must be submitted to the Secretary for information before the removal, damage and/or pruning of any trees, including those affected by the site establishment works.
- All recommendations of the Tree Report must be implemented by the Proponent, unless otherwise agreed by the Secretary.
- Downer will consult with the relevant Council in regard to the timing of removal of trees on council land, as required. Downer shall implement any conditions of approval as set out by the council as part of any removal or pruning of trees on council land.
- Downer will consult with the relevant landowner's in regard to the trimming of branches that overhang into the rail corridor.
- Detailed design and construction planning would avoid direct impacts to vegetation mapped as threatened ecological communities or native plant community types, specifically Downy Wattle Turpentine - Grey Ironbark open forest on shale, Degraded Turpentine - Grey Ironbark open forest on shale and Broad-leaved Ironbark – Grey Box in accordance with **REMM B1**. There is no impact anticipated for the duration of the Project.
- Pre-clearing surveys and inspections for endangered and threatened flora and fauna species would be undertaken by qualified ecologists prior to any clearing occurring in accordance with **REMM B2**.
- Impacts to Downy Wattle Turpentine - Grey Ironbark open forest on shale, Degraded Turpentine - Grey Ironbark open forest on shale and Broad-leaved Ironbark – Grey Box would be avoided. The locations of these species and communities would be marked on plans, fenced on site, and avoided in accordance with **REMM B4**.

- Equipment storage and stockpiling would be restricted to identified compound sites and already cleared land in accordance with **REMM B5**.
- A trained ecologist would be present during the clearing of native vegetation or removal of potential fauna habitat to avoid impacts on resident fauna and to salvage habitat resources as far as is practicable in accordance with **REMM B6**.

In addition, Downer will maintain a Tree and Vegetation Removal Register. The register will track which tree have been removed or trimmed (based on the number within the tree report) and the area of vegetation cleared as part of the works. The Downer Vegetation Disturbance Permit will prompt the Environmental Manager (or delegate) to record these factors during the permit authorisation site inspection.

This report will be submitted to the Secretary for information prior to the removal, damage and/or pruning of any trees.

APPENDIX 1 – BELMORE AIA (URBAN ARBOR)



Arboricultural Impact Assessment Report

Site location:
South West Metro
Belmore Station
Belmore NSW

Prepared for:
Metron T2M

Prepared by: Jack Williams and
Bryce Claassens
Urban Arbor Pty Ltd
Date: 23 December 2020
Ref: 201223-SWMBS-AIA
Rev: B

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SMCSWSWM-MTM-WBS-LA-REP-211000

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1. INTRODUCTION

- 1.1 Urban Arbor have been instructed by Metron T2M to provide an Arboricultural Impact Assessment Report for trees located within the site and adjoining sites in relation to a proposed development.
- 1.2 Below is a list of all documents and information provided to Urban Arbor to assist in preparing this report.
- 1.3 Below is a list of all documents and information provided to Urban Arbor to assist in preparing this report.
 - A) Belmore Landscape Drawings, Metron T2M, Rev E, Including Sheet No: 4, 6 and 7, 9 October 2020.
 - B) Civil Engineering Package No. 213, Metron T2M, Rev D, 111 Pages in total, 29 May 2020.
 - C) Belmore Station Service Building, Metron T2M, Rev C, 3 November 2020.
- 1.4 The trees were inspected on 16 December 2019 and 17 December 2020. Access was available to the subject site and the adjoining public areas only. All tree data contained in this report was collected during these site inspections.

2. SCOPE OF THE REPORT

- 2.1 This report has been undertaken to meet the following objectives.
 - 2.1.1 Conduct a visual assessment of all significant trees located within 10 metres of development works from ground level. For the purpose of this report, a significant tree is a tree with a height equal to or greater than 5 metres.
 - 2.1.2 Determine the trees estimated contribution years and remaining, useful life expectancy and award the trees a retention value.
 - 2.1.3 Provide an assessment of the potential impact the proposed development is likely to cause to the condition of the subject trees in accordance with AS4970 Protection of trees on development sites (2009).
 - 2.1.4 Specify tree protection measures for trees to be retained in accordance with AS4970-2009.

3. LIMITATIONS

- 3.1 The observations and recommendations are based on the site inspections identified in the introduction (section 1) and the access available at the time of inspection. Findings of this report are based on the observations and site conditions at the time inspection.
- 3.2 All of the observations were carried out from ground level and none of the surrounding surfaces were lifted or removed during the inspection. No tests were carried out to the subject trees or surrounding area during the inspection.
- 3.3 Root decay can sometimes be present with no visual indication above ground. It is also impossible to know the extent of any root damage caused by mechanical damage such as underground root cutting during the installation of services without undertaking detailed root investigation. Any form of tree failure due to these activities is beyond the scope of this assessment.
- 3.4 The report reflects the subject tree(s) as found on the day of inspection. Any changes to the growing environment of the subject tree, or tree management works beyond those recommended in this report may alter the findings of the report. There is no warranty, expressed or implied, that problems or deficiencies relating to the subject tree, or subject site may not arise in the future.
- 3.5 Tree identification is based on accessible visual characteristics at the time of inspection. As key identifying features are not always available the accuracy of identification is not guaranteed. Where tree species is unknown, it is indicated with an *spp.*
- 3.6 All diagrams, plans and photographs included in this report are visual aids only, and are not to scale unless otherwise indicated.
- 3.7 Urban Arbor neither guarantees, nor is it responsible for, the accuracy of information provided by others that is contained within this report.
- 3.8 While an assessment of the subject trees estimated useful life expectancy is included in this report, no specific tree risk assessment has been undertaken for any of trees at the site.
- 3.9 The ultimate safety of any tree cannot be categorically guaranteed. Even trees apparently free of defects can collapse or partially collapse in extreme weather conditions. Trees are dynamic, biological entities subject to changes in their environment, the presence of pathogens and the effects of ageing. These factors reinforce the need for regular inspections. It is generally accepted that hazards can only be identified from distinct defects or from other failure-prone characteristics of a tree or its locality.
- 3.10 Alteration of this report invalidates the entire report.

4. METHODOLOGY

- 4.1 The following information was collected during the assessment of the subject tree(s).
- 4.1.1 Tree common name
 - 4.1.2 Tree botanical name
 - 4.1.3 Tree age class
 - 4.1.4 DBH (Trunk/Stem diameter at breast height/1.4m above ground level) - millimetres.
 - 4.1.5 Estimated height - metres
 - 4.1.6 Estimated crown spread (diameter of crown) - metres
 - 4.1.7 Health
 - 4.1.8 Structural condition
 - 4.1.9 Amenity value
 - 4.1.10 Estimated remaining contribution years (SULE)¹
 - 4.1.11 Retention value (Tree AZ)²
 - 4.1.12 Notes/comments
- 4.2 An assessment of the trees condition was made using the visual tree assessment (VTA) model (Mattheck & Breloer, 1994).³
- 4.3 Tree diameter was measured using a DBH tape or in some cases estimated. Tree height and tree canopy spread was measured with a clinometer or in some cases estimated. All other measurements were estimations unless otherwise stated. The other tools used during the assessment were a nylon mallet, compass, camera and a steel probe.
- 4.4 All information was imported into our computerised geographical information system (GIS) PT-mapper pro. This software was used to measure/calculate all encroachment estimates included in this report.
- 4.5 All DBH measurements, tree protection zones, and structural root zones were calculated in accordance with methods set out in AS4970 Protection of trees on development sites (2009) ⁴ and in some cases estimated. See appendices for information.
- 4.6 Details of how the observations in this report have been assessed are listed in the appendices.

¹ Barrell Tree Consultancy, *SULE: Its use and status into the New Millennium*, TreeAZ/03/2001, <http://www.treeaz.com/>.

² Barrell Tree Consultancy, *Tree AZ version 10.04-ANZ*, <http://www.treeaz.com/>.

³ Mattheck, C. & Breloer, H., *The body language of trees - A handbook for failure analysis*, The Stationary Office, London, England (2015).

⁴ Council Of Standards Australia, *AS4970 Protection of trees on development sites* (2009).

5. SITE LOCATION AND BRIEF DESCRIPTION

- 5.1 The site is located in the suburb of Belmore, New South Wales, which is located in the Canterbury Bankstown Local Government Area (LGA). The trees are subject to protection under the Canterbury Local Environmental Plan (LEP) 2012⁵ and Development Control Plan (DCP) 2012.⁶ The site is identified as a heritage item (I11 and I29) in the LEP heritage maps.⁷

6. GENERAL INFORMATION IN RELATION TO PROTECTING TREES ON DEVELOPMENT SITES

- 6.1 **Tree protection zone (TPZ):** The TPZ is the principle means of protecting trees on development sites and is an area required to maintain the viability of trees during development. It is commonly observed that tree roots will extend significantly further than the indicative TPZ, however the TPZ is an area identified in AS4970-2009 to be the area where root loss or disturbance will generally impact the viability of the tree. The TPZ is identified as a restricted area to prevent damage to trees either above or below ground during a development. Where trees are intended to be retained proposed developments must provide an adequate TPZ around trees. The TPZ is set aside for the tree's root zone, trunk and crown and it is essential for the stability and longevity of the tree. The TPZ also incorporates the SRZ (see below for more information about the SRZ). The TPZ is calculated by multiplying the DBH by twelve, with the exception of palms, other monocots, cycads and tree ferns, the TPZ of which have been calculated at one metre outside the crown projection. Additional information about the TPZ is included in Appendix 3.
- 6.2 **Structural Root Zone (SRZ):** This is the area around the base of a tree required for the trees stability in the ground. An area larger than the SRZ always needs to be maintained to preserve a viable tree. The SRZ is calculated using the following formula; $(DAB \times 50)^{0.42} \times 0.64$. There are several factors that can vary the SRZ which include height, crown area, soil type and soil moisture. It can also be influenced by other factors such as natural or built structures. Generally, work within the SRZ should be avoided. Soil level changes should also generally be avoided inside the SRZ of trees to be retained. Palms, other monocots, cycads and tree ferns do not have an SRZ. See the appendices for more information about the SRZ.

⁵ Canterbury Local Environmental Plan 2012, <https://www.legislation.nsw.gov.au/#/view/EPI/2012/673>, accessed 23 December 2020.

⁶ Canterbury Development Control Plan 2012, <https://www.cbcity.nsw.gov.au/development/planning-control-policies/canterbury-development-control-plan-2012>, accessed 23 December 2020.

⁷ Canterbury Local Environmental Plan Heritage Map - Sheet HER_004, https://www.legislation.nsw.gov.au/maps/f6a186a6-97fb-6dac-9d90-acfc8774137b/1550_COM_HER_004_010_20121105.pdf, 23 December 2020.

6.3 Minor encroachment into TPZ: Sometimes encroachment into the TPZ is unavoidable. Encroachment includes but is not limited to activities such as excavation, compacted fill and machine trenching. Minor encroachment of up to 10% of the overall TPZ area is normally considered acceptable, providing there is space adjacent to the TPZ for the tree to compensate and the tree is displaying adequate vigour/health to tolerate changes to its growing environment.

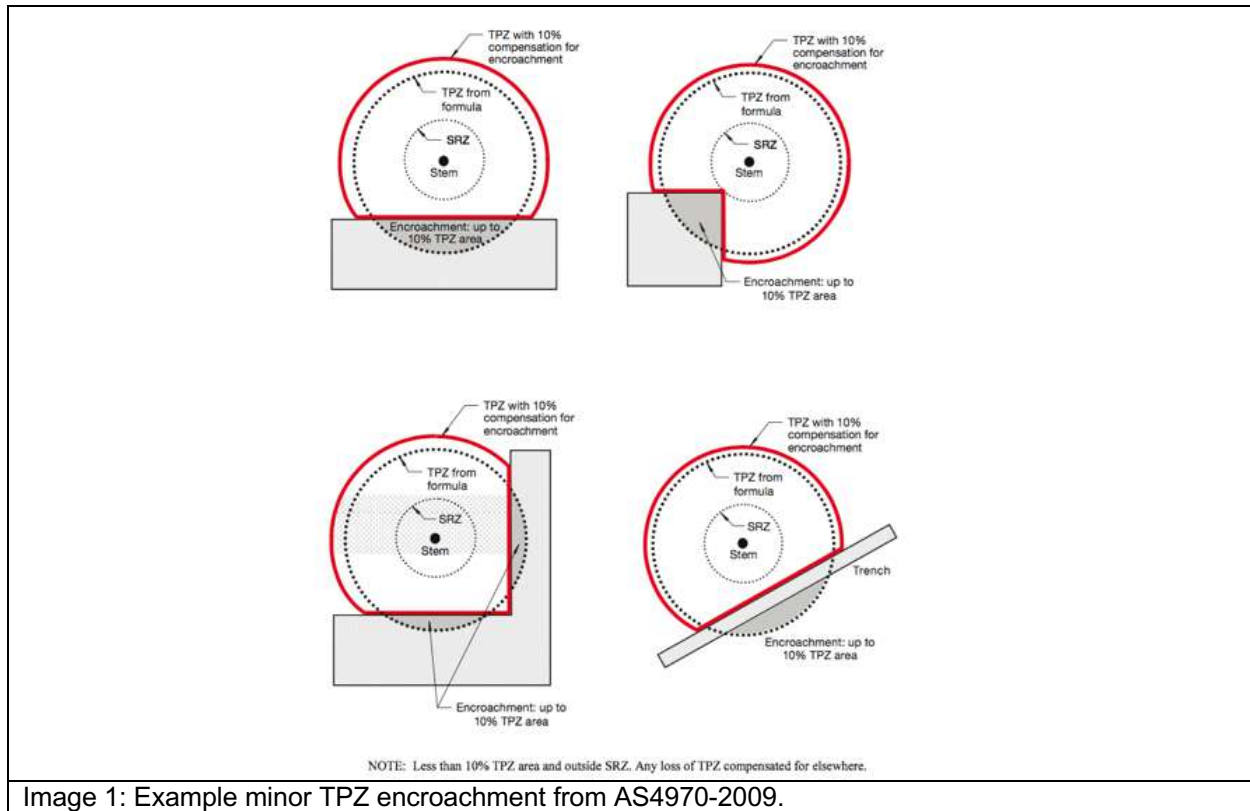


Image 1: Example minor TPZ encroachment from AS4970-2009.

6.4 Major encroachment into TPZ: Where encroachment of more than 10% of the overall TPZ area is proposed the project Arborist must investigate and demonstrate that the tree will remain in a viable condition. In some cases, tree sensitive construction methods such as pier and beam footings, suspended slabs, or cantilevered sections, can be utilised to allow additional encroachment into the TPZ by bridging over roots and minimising root disturbance. Major encroachment is only possible if it can be undertaken without severing significant size roots, or if it can be demonstrated that significant roots will not be impacted. Root investigations may be required to identify roots that will be impacted during major TPZ encroachment (see Appendix 3 for more information in relation to root investigations).

7. OBSERVATIONS

- 7.1 **Tree information:** Details of each individual tree assessed, including the observations taken during the site inspection can be found in the tree inspection schedule in Appendix 2, where the indicative tree protection zone (TPZ) for the subject trees has been calculated. The TPZ and SRZ should be measured in radius from the centre of the trunk. The subject trees have been awarded a retention value based on the observations during the site inspection. The system used to award the retention value is Tree AZ. Tree AZ is used to identify higher value trees worthy of being a constraint to development and lower value trees that should generally not be a constraint to the development. The Tree AZ categories sheet (Barrell Tree Consultancy) has been included in the appendices to assist with understanding the retention values. The retention value that has been allocated to the subject trees in this report is not definitive and should only be used as a guideline. This information has been summarised below.
- 7.2 **Site Plan:** Three site plans have been included in Appendix 1, where the indicative TPZ and SRZ of the trees have been overlaid onto the received plans provided by the client. The following plans are included in Appendix 1;
- Appendix 1A: Proposed Plan North
 - Appendix 1B: Proposed Plan South
 - Appendix 1C: Proposed Service Building

8. ASSESSMENT OF CONSTRUCTION IMPACTS

8.1 Table 1: In the table below, the impact of the proposed development has been assessed for all trees included in the report. The assessed TPZ encroachments include proposed structures and hard landscaping only. All soft landscaping should be completed in accordance with section 11.10.

Tree ID	Species	Retention value	TPZ radius (m)	TPZ area (m ²)	SRZ radius (m)	TPZ encroachment	Discussion/ Conclusion	Recommendation
646	<i>Tristaniaopsis laurina</i>	A1	3.3	34.2	2.3	None	No proposed TPZ encroachment.	Retain and protect
647	<i>Callistemon viminalis</i>	Z1	2.9	26.4	1.8	None	No proposed TPZ encroachment.	Retain and protect
648	<i>Tristaniaopsis laurina</i>	A1	3.8	45.4	2.2	None	No proposed TPZ encroachment.	Retain and protect
649	<i>Tristaniaopsis laurina</i>	A1	3.4	36.3	2.2	None	No proposed TPZ encroachment.	Retain and protect
650	<i>Callistemon viminalis</i>	Z1	2.0	12.6	1.7	None	No proposed TPZ encroachment.	Retain and protect
651	<i>Tristaniaopsis laurina</i>	Z1	2.0	12.6	1.5	None	No proposed TPZ encroachment.	Retain and protect
652	<i>Tristaniaopsis laurina</i>	Z1	2.0	12.6	1.5	None	No proposed TPZ encroachment.	Retain and protect
653	<i>Robinia pseudoacacia</i>	Z3	2.8	24.6	1.9	None	No proposed TPZ encroachment.	Retain and protect
654	<i>Robinia pseudoacacia</i>	Z3	2.3	16.6	1.7	None	No proposed TPZ encroachment.	Retain and protect
655	<i>Cinnamomum camphora</i>	A1	6.0	113.1	2.6	None	No proposed TPZ encroachment.	Retain and protect
656	<i>Brachychiton acerifolius</i>	A1	3.8	45.4	2.1	None	No proposed TPZ encroachment.	Retain and protect

Tree ID	Species	Retention value	TPZ radius (m)	TPZ area (m ²)	SRZ radius (m)	TPZ encroachment	Discussion/ Conclusion	Recommendation
657	<i>Robinia pseudoacacia</i>	Z3	2.9	26.4	2.1	None	No proposed TPZ encroachment.	Retain and protect
658	<i>Cinnamomum camphora</i>	Z4	10.9	373.3	3.0	Footprint	The tree has been marked for removal in the received plans. The trunk of the tree is located within the footprint of the proposed hard surface pathway.	Remove
659	<i>Robinia pseudoacacia</i> 'Frisia'	Z3	2.2	15.2	1.7	Footprint	The tree has been marked for removal in the received plans. The trunk of the tree is located within the footprint of the proposed hard surface pathway.	Remove
660	<i>Robinia pseudoacacia</i> 'Frisia'	Z3	2.0	12.6	1.6	Footprint	The tree has been marked for removal in the received plans. The trunk of the tree is located within the footprint of the proposed hard surface pathway.	Remove
661	<i>Robinia pseudoacacia</i> 'Frisia'	Z3	2.0	12.6	1.7	Minor	The proposed hard surfacing will encroach into the TPZ by 4% (0.5m ²) but not into the SRZ. This is considered to be a minor and acceptable TPZ encroachment and the proposed hard surfacing will not significantly impact the condition of the tree.	Retain and protect
662	<i>Robinia pseudoacacia</i> 'Frisia'	Z3	2.4	18.1	1.8	None	No proposed TPZ encroachment.	Retain and protect
663	<i>Robinia pseudoacacia</i> 'Frisia'	Z3	2.2	15.2	1.8	Footprint	The trunk of the tree is located within the footprint of the proposed hard surface pathway.	Remove
664	<i>Eucalyptus spp</i>	A1	10.4	339.8	3.3	Major	The proposed hard surfacing will encroach into the TPZ by 27% (92.2m ²) but not into the SRZ. This is considered to be a major TPZ encroachment and the proposed works could potentially impact the condition of the tree. To reduce the impact to the tree, the proposed hard surfacing must be constructed on or above existing grades and in accordance with section 9.2.1 of this report.	Retain and protect*
665	<i>Robinia pseudoacacia</i> 'Frisia'	Z3	2.0	12.6	1.6	None	No proposed TPZ encroachment.	Retain and protect

 Site Address: Belmore Station, Belmore, NSW.

Prepared for: Metron T2M.

Prepared by: Jack Williams & Bryce Claassens, Urban Arbor Pty Ltd, sales@urbanarbor.com.au, (02) 8004 2802.

Date of prepared: 23 December 2020. Rev: B.

Tree ID	Species	Retention value	TPZ radius (m)	TPZ area (m ²)	SRZ radius (m)	TPZ encroachment	Discussion/ Conclusion	Recommendation
666	<i>Robinia pseudoacacia</i> 'Frisia'	Z3	3.4	36.3	2.0	None	No proposed TPZ encroachment.	Retain and protect
667	<i>Robinia pseudoacacia</i> 'Frisia'	Z4	3.9	47.8	2.3	Footprint	The trunk of the tree is located within the footprint of the proposed kiss and ride shelter.	Remove
668	<i>Lophostemon confertus</i>	A1	6.2	120.8	2.6	Major	The proposed palisade fencing will encroach into the TPZ by 42% (51.0m ²) and into the SRZ. This is considered to be a major TPZ encroachment and the proposed works could potentially impact the condition and stability of the tree. To reduce the impact to the tree, the proposed fencing must be completed in accordance with section 9.2.2 of this report.	Retain and protect*
669	<i>Callistemon viminalis</i>	A2	9.4	277.6	3.3	None	No proposed TPZ encroachment.	Retain and protect
670	<i>Lophostemon confertus</i>	A1	3.6	40.7	2.3	Major	The proposed palisade fencing will encroach into the TPZ by 37% (15.0m ²) and into the SRZ. This is considered to be a major TPZ encroachment and the proposed works could potentially impact the condition and stability of the tree. To reduce the impact to the tree, the proposed fencing must be completed in accordance with section 9.2.2 of this report.	Retain and protect*
671	<i>Callistemon viminalis</i>	A1	5.0	78.5	2.3	None	No proposed TPZ encroachment.	Retain and protect
672	<i>Callistemon viminalis</i>	A1	8.3	216.4	3.0	Minor	The proposed palisade fencing will encroach into the TPZ by 4% (7.9m ²) but not into the SRZ. This is considered to be a minor and acceptable TPZ encroachment and the proposed works will not significantly impact the condition of the tree.	Retain and protect
673	<i>Leptospermum petersonii</i>	A1	3.0	28.3	2.0	Major	The proposed palisade fencing will encroach into the TPZ by 47% (13.2m ²) and into the SRZ. This is considered to be a major TPZ encroachment and the proposed works could potentially impact the condition and stability of the tree. To reduce the impact to the tree, the proposed fencing must be completed in accordance with section 9.2.2 of this report.	Retain and protect*

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Tree ID	Species	Retention value	TPZ radius (m)	TPZ area (m ²)	SRZ radius (m)	TPZ encroachment	Discussion/ Conclusion	Recommendation
674	<i>Callistemon viminalis</i>	A1	9.6	289.5	3.0	Major	The proposed palisade fencing will encroach into the TPZ by 49% (142.6m ²) and into the SRZ. This is considered to be a major TPZ encroachment and the proposed works could potentially impact the condition and stability of the tree. To reduce the impact to the tree, the proposed fencing must be completed in accordance with section 9.2.2 of this report.	Retain and protect*
2260	Unknown spp	Z9	3.8	46.4	2.3	None	No proposed TPZ encroachment.	Retain and protect
2261	<i>Callistemon viminalis</i>	Z1	2.4	18.1	1.7	Major	The tree is located outside the site boundary. The proposed safety rail fence will encroach into the TPZ by 19% (3.4m ²) and into the SRZ. This is considered to be a major TPZ encroachment and the proposed works could potentially impact the condition and stability of the tree. To reduce the impact to the tree, the proposed fencing must be completed in accordance with section 9.2.2 of this report.	Retain and protect*
2262	Unknown spp	Z1	2.0	12.6	1.6	None	No proposed TPZ encroachment.	Retain and protect
2263	<i>Melaleuca styphelioides</i>	A1	5.6	99.9	2.5	Major	The tree is located outside the site boundary. The proposed safety rail fence and hard surfacing will encroach into the TPZ by 34% (33.8m ²) and into the SRZ. This is considered to be a major TPZ encroachment and the proposed works could potentially impact the condition and stability of the tree. To reduce the impact to the tree, the proposed fencing and hard surfacing must be completed in accordance with section 9.2 of this report.	Retain and protect*
2264	<i>Callistemon viminalis</i>	A1	3.1	30.8	2.0	Major	The tree is located outside the site boundary. The proposed safety rail fence and hard surfacing will encroach into the TPZ by 23% (7m ²) and into the SRZ. This is considered to be a major TPZ encroachment and the proposed works could potentially impact the condition and stability of the tree. To reduce the impact to the tree, the proposed fencing and hard surfacing must be completed in accordance with section 9.2 of this report.	Retain and protect*

Tree ID	Species	Retention value	TPZ radius (m)	TPZ area (m ²)	SRZ radius (m)	TPZ encroachment	Discussion/ Conclusion	Recommendation
2265	Melaleuca quinquenervia	A1	10.3	268.2	3.1	Minor	The proposed safety rail fencing and hard surfacing will encroach into the TPZ by less than 10% and not into the SRZ. This is considered to be a minor and acceptable TPZ encroachment and the proposed works will not significantly impact the condition of the tree.	Retain and protect
2266	Eucalyptus botryoides	A1	6.0	113.1	2.6	None	No proposed TPZ encroachment.	Retain and protect
2267	Afrocarpus falcatus	A1	6.0	113.1	2.5	Footprint	The trunk of the tree is located within the footprint of the proposed service building access area.	Remove
2268	Morus nigra	Z1	2.0	12.6	1.5	Footprint	The trunk of the tree is located within the footprint of the proposed service building access area.	Remove
2269	Eucalyptus robusta	A1	7.2	162.9	2.8	Footprint	The trunk of the tree is located within the footprint of the proposed service building access area.	Remove
2270	Eucalyptus spp	Z1	2.0	12.6	2.0	None	No proposed TPZ encroachment.	Retain and protect
3316	Murraya paniculata	Z1	3.0	28.3	1.8	Major	Located within the community centre. The proposed fencing, retaining wall and service building construction will encroach into the TPZ by 30% (8.5m ²) and into the SRZ. This is considered to be a major TPZ encroachment, however, there is an existing retaining wall located along the boundary. The existing retaining wall appears to be restricting root growth into corridor. Therefore the proposed works will not significantly impact the tree. Canopy reduction pruning may be required to install the new fence. The pruning will result in the removal of less than 10% of the overall live foliage area of the tree and will not significantly impact the tree.	Retain and protect

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Tree ID	Species	Retention value	TPZ radius (m)	TPZ area (m ²)	SRZ radius (m)	TPZ encroachment	Discussion/ Conclusion	Recommendation
3317	<i>Murraya paniculata</i>	Z1	2.4	18.1	1.7	Major	Located within the community centre. The proposed fencing, retaining wall and service building construction will encroach into the TPZ by 20% (3.6m ²) and into the SRZ. This is considered to be a major TPZ encroachment, however, there is an existing retaining wall located along the boundary. The existing retaining wall appears to be restricting root growth into corridor. Therefore the proposed works will not significantly impact the tree. Canopy reduction pruning may be required to install the new fence. The pruning will result in the removal of less than 10% of the overall live foliage area of the tree and will not significantly impact the tree.	Retain and protect
3318	<i>Callistemon viminalis</i>	A1	4.8	72.4	2.5	Major	Located within the community centre. The proposed fencing, retaining wall and service building construction will encroach into the TPZ by 36% (26.1m ²) and into the SRZ. This is considered to be a major TPZ encroachment, however, there is an existing retaining wall located along the boundary. The existing retaining wall appears to be restricting root growth into corridor. Therefore the proposed works will not significantly impact the tree. No canopy pruning will be required.	Retain and protect
3319	<i>Murraya paniculata</i>	Z1	2.4	18.1	1.7	Major	Located within the community centre. The proposed fencing, retaining wall and service building construction will encroach into the TPZ by 19% (3.4m ²) and into the SRZ. This is considered to be a major TPZ encroachment, however, there is an existing retaining wall located along the boundary. The existing retaining wall appears to be restricting root growth into corridor. Therefore the proposed works will not significantly impact the tree. Canopy reduction pruning may be required to install the new fence. The pruning will result in the removal of less than 10% of the overall live foliage area of the tree and will not significantly impact the tree.	Retain and protect

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Tree ID	Species	Retention value	TPZ radius (m)	TPZ area (m ²)	SRZ radius (m)	TPZ encroachment	Discussion/ Conclusion	Recommendation
3320	<i>Murraya paniculata</i>	Z1	3.0	28.3	1.8	Major	Located within the community centre. The proposed fencing, retaining wall and service building construction will encroach into the TPZ by 26% (7.3m ²) and into the SRZ. This is considered to be a major TPZ encroachment, however, there is an existing retaining wall located along the boundary. The existing retaining wall appears to be restricting root growth into corridor. Therefore the proposed works will not significantly impact the tree. Canopy reduction pruning may be required to install the new fence. The pruning will result in the removal of less than 10% of the overall live foliage area of the tree and will not significantly impact the tree.	Retain and protect

Notes

TPZ Encroachment Percentage: TPZ encroachment percentages are based on new structures and hard surfaces only. New soft landscaping, such as turf or amenity planting areas have not been included in the calculation for TPZ encroachment.

Retain and protect*: The proposed construction must be completed in accordance with section 9.2 to reduce the impact to the tree.

9. CONCLUSIONS

9.1 **Table 2:** Summary of the impact to trees during the development;

Impact	Reason	Category A	Category Z	Total
		A	Z	
Trees to be removed	Building construction, new surfacing and/or proximity, or trees in poor condition.	2267, 2269 (Two trees)	658, 659, 660, 663, 667, 2268 (Six trees)	8 trees
Trees subject to TPZ encroachment greater than 10% requiring tree sensitive design and construction to be retained	Removal of existing surfacing/structures and/or installation of new surfacing/structures.	664, 668, 670, 673, 674, 2263, 2264 (Seven trees)	2261 (One tree)	8 trees
Retained trees subject to TPZ encroachment of 10% or less	Removal of existing surfacing/structures and/or installation of new surfacing/structures.	646, 648, 649, 655, 656, 669, 671, 672, 2265, 2266, 3318 (Eleven trees)	647, 650, 651, 652, 653, 654, 657, 661, 662, 665, 666, 2260, 2262, 2270, 3316, 3317, 3319, 3320 (Eighteen trees)	29 trees

9.2 Construction Design/Specification Requirements: The proposed construction will encroach into the TPZ and SRZ of seven trees, including tree 664, 668, 670, 673, 674, 2261, 2263 and 2264. To ensure the trees are not adversely impacted by the construction, it must be demonstrated the following design and construction specifications can be implemented within the TPZ of the trees. If the construction cannot be completed in accordance with these specifications, the trees may not be viable for retention.

9.2.1 Hard Surfacing: Areas of the proposed hard surfacing will be replacing the existing hard surfacing. To ensure that tree root systems are not significantly impacted, the proposed hard surfacing must be constructed on or above the existing sub base of the existing hard surfacing. Where the proposed hard surfacing is located outside the footprint of the existing hard surfacing, it should be constructed above existing soil grades. Compaction of lowest sub base materials must be minimised, as this can cause soil compaction and impact the health of trees. The diagram below (Image A) gives an example of a no-dig method for constructing hard surfacing close to trees, retaining pegs avoiding significant roots.

If excavations are essential, they must not exceed 100mm below the existing grades. The excavations should be supervised by a project Arborist with a minimum AQF level 5 qualification. All excavations for the hard surfacing should be carried out manually to avoid impacting retained tree roots. All tree roots greater than 40mm in diameter should be retained, unless the project arborist has assessed and advised that the pruning/severing of the root will not impact the condition or stability of the tree. Manual excavation may include the use of pneumatic and hydraulic tools, high-pressure air or a combination of high-pressure water and a vacuum device.

Where tree roots greater than 40mm are encountered that must be retained, the hard surfacing should be elevated over the individual tree root to allow for its retention. Examples of methods that can be used to bridge individual tree roots have been included below (Image B and C). Using pier and beam bridges as per image C is the recommended/preferred method, as it will allow for future growth of the tree roots, reducing future damage to the pavement from the roots.

9.2.2 Fencing: The proposed fencing will be installed using the tree sensitive method of post and rail type construction. To ensure the trees are not significantly impacted by the works, all post holes must be excavated manually. The post location must be flexible to avoid the severance of significant roots 40mm and greater in diameter. No posts are to be located within the SRZ or root investigations will be required to determine the post location. See Appendix 3 for more information in regards to root investigations. All rails/horizontal materials are to be located on or above existing soil grades. This will allow for the majority of the root system to be retained between the posts, minimising root loss.

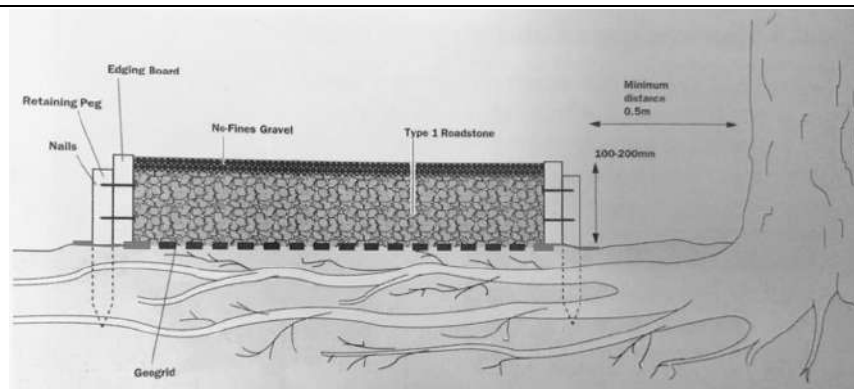


Image A: An image from 'Tree Roots in the Built Environment'⁸, showing how to construct hard surfacing above a trees root system without excavation. Type 1 Roadstones are an example of blue metal or crushed sandstone.

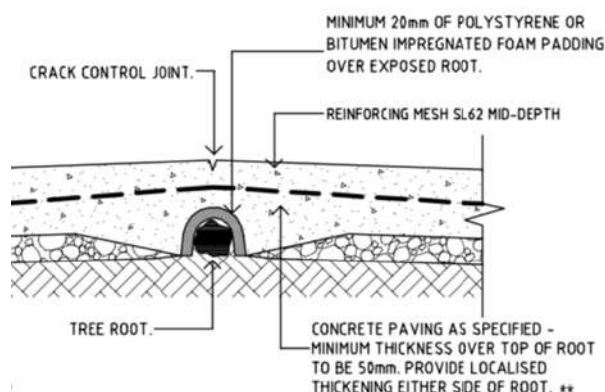


Image B: Example method for bridging concrete footpaths over tree roots provided in the Canterbury Bankstown Council standard drawings.⁹

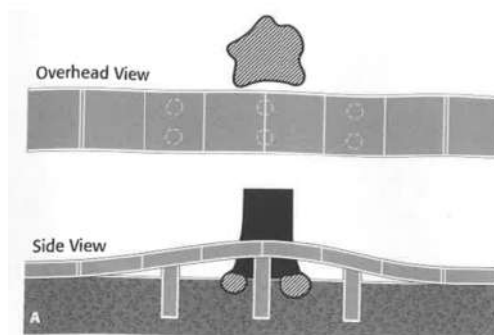


Image C: Example method from Reducing infrastructure damage by tree roots: A compendium of strategies.¹⁰

⁸ Roberts, J., Jackson, N., & Smith, M., *Tree Roots in the Built Environment*, The Stationary Office, London, England (2006). Page 305 & 306.

⁹ Canterbury Bankstown Council standard drawing S-209 Existing street tree treatments, <https://www.cbcity.nsw.gov.au/development/planning-control-policies/council-standard-drawings>, accessed 3 October 2019.

¹⁰ Costello, L. R., & Jones, K. S., *Reducing infrastructure damage by tree roots: A compendium of strategies*, Western Chapter of the International Society of Arboriculture, 31883 Success Valley Drive, Porterville, CA (2003), page 27.

9.3 Photographs



Image 1: Looking West towards tree 664 and 667. The proposed construction must be completed in accordance with section 9.2 to ensure tree 664 is not significantly impacted by the proposed works. Tree 667 is in poor health/advanced stages of decline and is recommended for removal due to its current condition and impacts from the proposed development.



Image 2: Looking towards tree 3316, 3317, 3318, 3319 and 3320, showing the existing boundary retaining wall. The existing boundary retaining wall appears to be restricting root growth into the corridor, therefore, the proposed works within the corridor will not impact the trees. Minor canopy pruning may be required for tree 3316, 3317, 3319 and 3320. The proposed canopy pruning will result in the removal of less than 10% of the live foliage area of the trees and will not significantly impact the trees.

10. RECOMMENDATIONS

- 10.1 This report assesses the impact of a proposed development at the subject site to forty-five (45) trees located within the site and adjoining sites, in accordance with AS4970 Protection of trees on development sites (2009).
- 10.2 Site plans have been included in Appendix 1, where the indicative TPZ and SRZ of the trees have been overlaid onto the received plan provided by the client. The following plans are included in Appendix 1;
 - Appendix 1A: Proposed Plan North
 - Appendix 1B: Proposed Plan South
 - Appendix 1C: Proposed Service Building
- 10.3 Eight (8) trees have been recommended for removal within this report, including tree 658, 659, 660, 663, 667, 2267, 2268 and 2269. Tree 2267 and 2269 are higher value category A retention value trees. Tree 658, 659, 660, 663, 667 and 2268 are lower value category Z retention value trees that are generally should not be a constraint to development works.
- 10.4 Eight (8) trees have been recommended to be retained that will be subject to TPZ encroachments greater than 10%, including tree 664, 668, 670, 673, 674, 2261, 2263 and 2264. To reduce the impact to the trees, the proposed construction within the TPZ of the trees must be completed in accordance with section 9.2 of this report.
- 10.5 The remaining twenty-nine (29) trees will be subject to minor and acceptable TPZ encroachments of 10% or less and can be retained in a viable condition, including tree 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 661, 662, 665, 666, 669, 671, 672, 2260, 2262, 2265, 2266, 2270, 3316, 3317, 3318, 3319 and 3320.
- 10.6 All trees to be retained must be protected for the duration of development, (including demolition and landscaping, in accordance with AS4970-2009). See section 11 for more information.
- 10.7 See section 11.10 for general landscape guidance when working within the TPZ of trees to be retained.
- 10.8 Where possible underground services must be located outside the TPZ of trees to be retained. All underground services located inside the TPZ of any tree to be retained must be installed in accordance with section 11.11.
- 10.9 This report does not provide approval for tree removal or pruning works. All recommendations in this report are subject to approval by the relevant authorities and/or tree owners. This report should be submitted as supporting evidence with any tree removal/pruning or development application.

11. TREE PROTECTION REQUIREMENTS

- 11.1 Use of this report:** All contractors must be made aware of the tree protection requirements prior to commencing works at the site. This report and a copy of the site plan (Appendix 1) drawings must also be made available to any contractor prior to works commencing and during any on site operations.
- 11.2 Project Arborist:** Prior to any works commencing at the site a project Arborist should be appointed. The project Arborist should be qualified to a minimum AQF level 5 and/or equivalent qualifications and experience, and should assist with any development issues relating to trees that may arise. If at any time it is not feasible to carryout works in accordance with this, an alternative must be agreed in writing with the project Arborist.
- 11.3 Tree work:** All tree work must be carried out by a qualified and experienced Arborist with a minimum of AQF level 2 in arboriculture, in accordance with NSW Work Cover Code of Practice for the Amenity Tree Industry (1998) and AS4373 Pruning of amenity trees (2007).
- 11.4 Initial site meeting/on-going regular inspections:** The project Arborist is to hold a pre-construction site meeting with principal contractor to discuss methods and importance of tree protection measures and resolve any issues in relation to tree protection that may arise. In accordance with AS4970-2009, the project Arborist should carryout regular site inspections to ensure works are carried out in accordance with this document throughout the development process. Site inspections are recommended on a one-month frequency.
- 11.5 Site Specific Tree Protection Recommendations:** The table below provides recommendations for each tree, including site specific tree protection requirements. All trees to be retained must be protected in accordance with general requirements of AS4970-2009 for the duration of the development, details of which are discussed in further details in this section of the report.

Tree ID	Tree Species	TPZ Radius (m)	SRZ Radius (m)	Recommendations
646	<i>Tristaniopsis laurina</i>	3.3	2.3	Retain and protect. Tree protection fencing is to create a combined exclusion zone for tree 646, 647, 648, 649, 650 and 651. The fencing is to run along the edge of the existing hard surfacing and is to encompass the garden bed area adjacent to the trees. TPZ signage is required on the fencing and mulch is required within the fenced area. The fencing can only be moved upon the approval of the project arborist.
647	<i>Callistemon viminalis</i>	2.9	1.8	Retain and protect. See tree protection for tree 646.
648	<i>Tristaniopsis laurina</i>	3.8	2.2	Retain and protect. See tree protection for tree 646.
649	<i>Tristaniopsis laurina</i>	3.4	2.2	Retain and protect. See tree protection for tree 646.

Site Address: Belmore Station, Belmore, NSW.

Prepared for: Metron T2M.

Prepared by: Jack Williams & Bryce Claassens, Urban Arbor Pty Ltd, sales@urbanarbor.com.au, (02) 8004 2802.

Date of prepared: 23 December 2020. Rev: B.

650	<i>Callistemon viminalis</i>	2.0	1.7	Retain and protect. See tree protection for tree 646.
651	<i>Tristaniopsis laurina</i>	2.0	1.5	Retain and protect. See tree protection for tree 646.
652	<i>Tristaniopsis laurina</i>	2.0	1.5	Retain and protect. Tree protection fencing is to run along the edge of the existing hard surfacing and is to encompass the garden bed area adjacent to the tree. TPZ signage is required on the fencing and mulch is required within the fenced area. The fencing can only be moved upon the approval of the project arborist.
653	<i>Robinia pseudoacacia</i>	2.8	1.9	Retain and protect. Tree protection fencing is to create a combined exclusion zone for tree 653 and 654. The fencing is to run along the edge of the existing hard surfacing and is to encompass the garden bed area adjacent to the trees. TPZ signage is required on the fencing and mulch is required within the fenced area. The fencing can only be moved upon the approval of the project arborist.
654	<i>Robinia pseudoacacia</i>	2.3	1.7	Retain and protect. See tree protection for tree 653.
655	<i>Cinnamomum camphora</i>	6.0	2.6	Retain. Set back from the proposed works. The existing fence will be sufficient for tree protection.
656	<i>Brachychiton acerifolius</i>	3.8	2.1	Retain. Set back from the proposed works. The existing fence will be sufficient for tree protection.
657	<i>Robinia pseudoacacia</i>	2.9	2.1	Retain and protect. Tree protection fencing is to encompass the TPZ perimeter within the site. TPZ signage is required on the fencing.
658	<i>Cinnamomum camphora</i>	10.9	3.0	Remove.
659	<i>Robinia pseudoacacia</i> 'Frisia'	2.2	1.7	Remove.
660	<i>Robinia pseudoacacia</i> 'Frisia'	2.0	1.6	Remove.
661	<i>Robinia pseudoacacia</i> 'Frisia'	2.0	1.7	Retain and protect. Tree protection fencing is to create a combined exclusion zone for tree 661 and 662. The fencing is to run along the edge of the proposed hard surfacing and is run along the TPZ perimeter of the trees. TPZ signage is required on the fencing and mulch is required within the fenced area. The fencing can only be moved upon the approval of the project arborist.
662	<i>Robinia pseudoacacia</i> 'Frisia'	2.4	1.8	Retain and protect. See tree protection for tree 661.
663	<i>Robinia pseudoacacia</i> 'Frisia'	2.2	1.8	Remove.

664	<i>Eucalyptus spp</i>	10.4	3.3	Retain and protect. Tree protection fencing is to create a combined exclusion zone for tree 664, 665 and 666. The fencing is to run along the edge of the proposed hard surfacing and existing hard surfacing and is to encompass as much of the TPZ area as practical. TPZ signage is required on the fencing and mulch is required within the fenced area. The fencing can only be moved upon the approval of the project arborist.
665	<i>Robinia pseudoacacia 'Frisia'</i>	2.0	1.6	Retain and protect. See tree protection for tree 664.
666	<i>Robinia pseudoacacia 'Frisia'</i>	3.4	2.0	Retain and protect. See tree protection for tree 664.
667	<i>Robinia pseudoacacia 'Frisia'</i>	3.9	2.3	Remove.
668	<i>Lophostemon confertus</i>	6.2	2.6	Retain and protect. Tree protection fencing is to run along the edge of the existing hard surfacing and is to encompass the garden bed area adjacent to the tree. TPZ signage is required on the fencing and mulch is required within the fenced area. The fencing can only be moved upon the approval of the project arborist.
669	<i>Callistemon viminalis</i>	9.4	3.3	Retain. Set back from works. No tree protection required.
670	<i>Lophostemon confertus</i>	3.6	2.3	Retain and protect. Tree protection fencing is to run along the edge of the existing hard surfacing and is to encompass the garden bed area adjacent to the tree. TPZ signage is required on the fencing and mulch is required within the fenced area. The fencing can only be moved upon the approval of the project arborist.
671	<i>Callistemon viminalis</i>	5.0	2.3	Retain. Set back from works. No tree protection required.
672	<i>Callistemon viminalis</i>	8.3	3.0	Retain and protect. Tree protection fencing is to encompass the drip line of the tree. TPZ signage is required on the fencing and mulch is required within the fenced area. The fencing can only be moved upon the approval of the project arborist.
673	<i>Leptospermum petersonii</i>	3.0	2.0	Retain and protect. Tree protection fencing is to create a combined exclusion zone for tree 673 and 674. The fencing is to act as trunk protection during the installation of the palisade fencing. TPZ signage is required on the fencing and mulch is required within the fenced area. The fencing can only be moved upon the approval of the project arborist.
674	<i>Callistemon viminalis</i>	9.6	3.0	Retain and protect. See tree protection for tree 673.
2260	<i>Unknown spp</i>	3.8	2.3	Retain and protect. Tree protection fencing is to create a combined exclusion zone for tree 2260, 2261 and 2262. The fencing is to encompass as much of the TPZ area as practical. TPZ signage is required on the fencing.
2261	<i>Callistemon viminalis</i>	2.4	1.7	Retain and protect. See tree protection for tree 2260.

Site Address: Belmore Station, Belmore, NSW.

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Date of prepared: 23 December 2020. Rev: B.

2262	<i>Unknown spp</i>	2.0	1.6	Retain and protect. See tree protection for tree 2260.
2263	<i>Melaleuca styphelioides</i>	5.6	2.5	Retain and protect. Tree protection fencing is to create a combined exclusion zone for tree 2263, 2264, 2265 and 2266. The fencing is to encompass as much of the TPZ area as practical. TPZ signage is required on the fencing.
2264	<i>Callistemon viminalis</i>	3.1	2.0	Retain and protect. See tree protection for tree 2263.
2265	<i>Melaleuca quinquenervia</i>	10.3	3.1	Retain and protect. See tree protection for tree 2263.
2266	<i>Eucalyptus botryoides</i>	6.0	2.6	Retain and protect. See tree protection for tree 2263.
2267	<i>Afrocarpus falcatus</i>	6.0	2.5	Remove.
2268	<i>Morus nigra</i>	2.0	1.5	Remove.
2269	<i>Eucalyptus robusta</i>	7.2	2.8	Remove.
2270	<i>Eucalyptus spp</i>	2.0	2.0	Retain. Set back from works, no tree protection required.
3316	<i>Murraya paniculata</i>	3.0	1.8	Retain. The existing retaining wall and fencing will be sufficient for tree protection.
3317	<i>Murraya paniculata</i>	2.4	1.7	Retain. The existing retaining wall and fencing will be sufficient for tree protection.
3318	<i>Callistemon viminalis</i>	4.8	2.5	Retain. The existing retaining wall and fencing will be sufficient for tree protection.
3319	<i>Murraya paniculata</i>	2.4	1.7	Retain. The existing retaining wall and fencing will be sufficient for tree protection.
3320	<i>Murraya paniculata</i>	3.0	1.8	Retain. The existing retaining wall and fencing will be sufficient for tree protection.

11.6 Tree protection Specifications: It is the responsibility of the principal contractor to install tree protection prior to works commencing at the site (prior to demolition works) and to ensure that the tree protection remains in adequate condition for the duration of the development. The tree protection must not be moved without prior agreement of the project Arborist. The project Arborist must inspect that the tree protection has been installed in accordance with this document and AS4970-2009 prior to works commencing.

11.6.1 Protective fencing: Site specific tree protection requirements are in section 11.5. Where it is not feasible to install fencing at the specified location due to factors such as restricting access to areas of the site or for constructing new structures, an alternative location and protection specification must be agreed with the project Arborist. Where the installation of fencing is unfeasible due to restrictions on space, trunk and branch protection will be required (see below). The protective fencing must be constructed of 1.8 metre 'cyclone chainmesh fence'. The fencing must only be removed for the landscaping phase and must be authorised by the project Arborist. Any modifications to the fencing locations must be approved by the project Arborist.

11.6.2 TPZ signage: Tree protection signage is to be attached to the protective fencing, displayed in a prominent position and the sign repeated at 10 metres intervals or closer where the fence changes direction. Each sign shall contain in a clearly legible form, the following information:

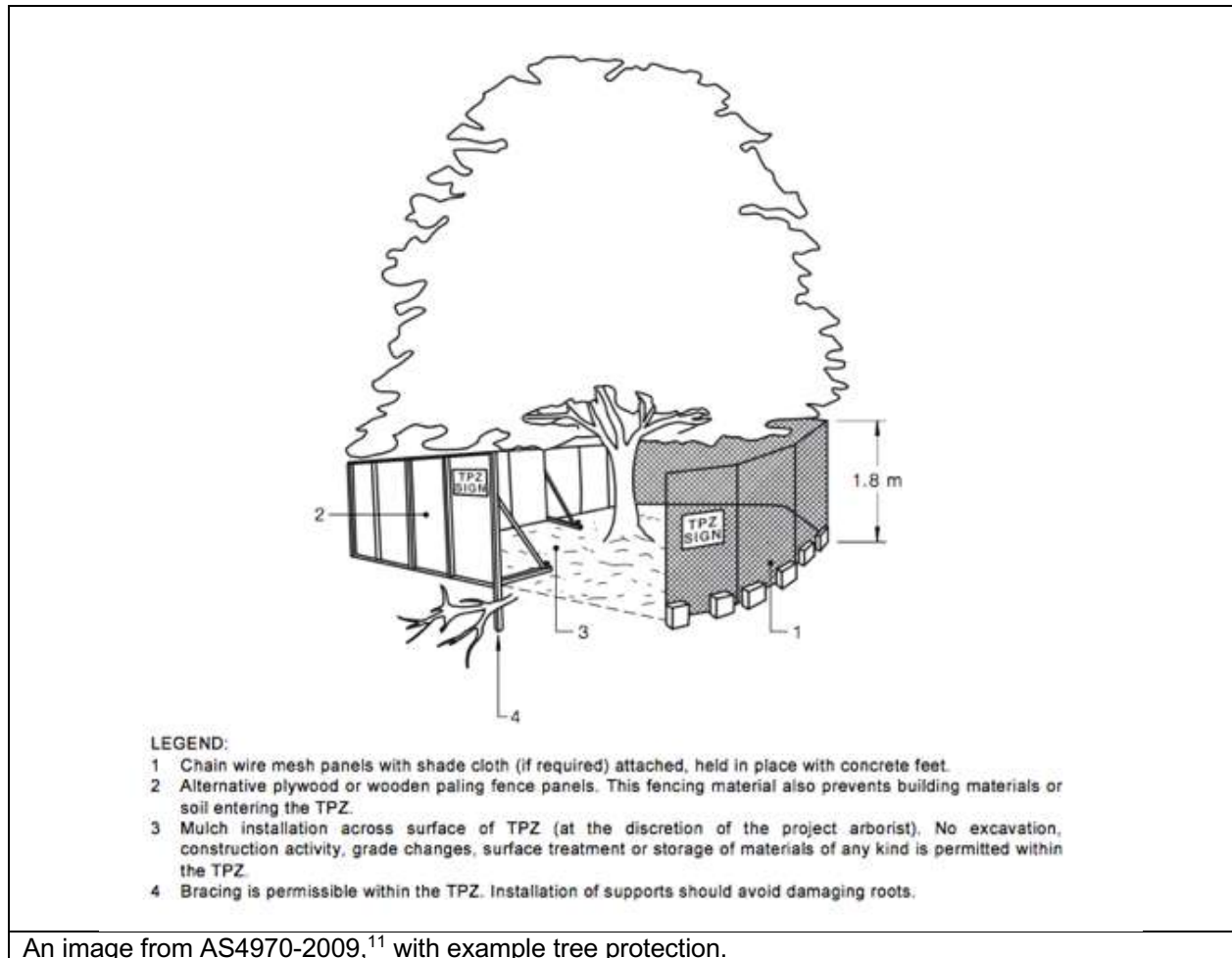
- Tree protection zone/No access.
- This fence has been installed to prevent damage to the tree/s and their growing environment both above and below ground. Do not move fencing or enter TPZ without the agreement of the project Arborist.
- The name, address, and telephone number of the developer/builder and project Arborist

11.6.3 Trunk and Branch Protection: The trunk must be protected by wrapped hessian or similar material to limit damage. Timber planks (50mm x 100mm or similar) should then be placed around tree trunk. The timber planks should be spaced at 100mm intervals, and must be fixed against the trunk with tie wire, or strapping and connections finished or covered to protect pedestrians from injury. The hessian and timber planks must not be fixed to the tree in any instance. The trunk and branch protection shall be installed prior to any work commencing on site and shall be maintained in good condition for the entire development period.

11.6.4 Mulch: Any areas of the TPZ located inside the subject site (only trees to be retained directly adjacent to site works must be mulched to a depth of 75mm with good quality composted wood chip/leaf mulch.

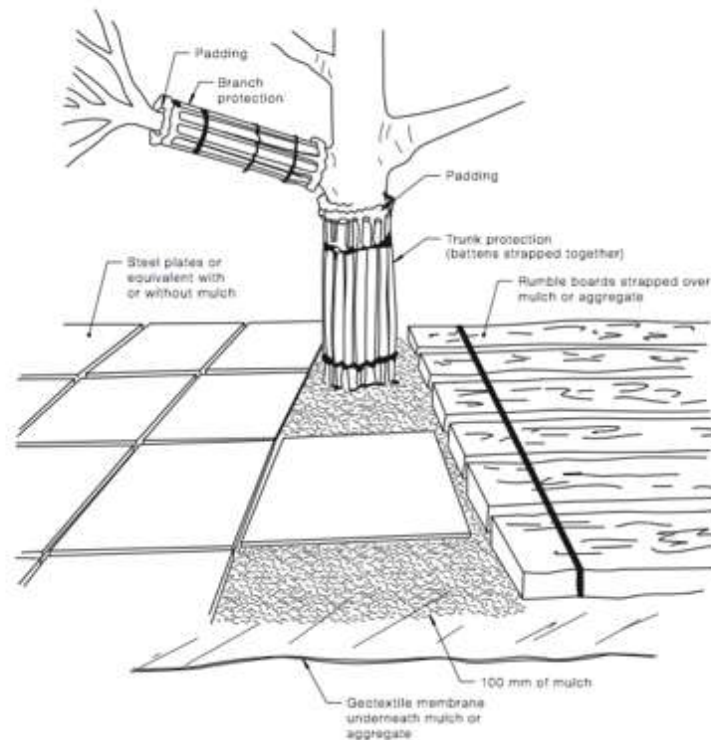
11.6.5 Ground Protection: Ground protection is required to protect the underlying soil structure and root system in areas where it is not practical to restrict access to whole TPZ, while allowing space for construction. Ground protection must consist of good quality composted wood chip/leaf mulch to a depth of between 150-300mm, laid on top of geo textile fabric. If vehicles are to be using the area, additional protection will be required such as rumble boards or track mats to spread the weight of the vehicle and avoid load points. Ground protection is to be specified by the project Arborist as required.

11.6.6 Temporary irrigation: Temporary irrigation should be set up in the TPZ of all trees to be retained, and should distribute water evenly throughout the area of the TPZ. The irrigation should be used for at minimum one hour daily throughout all stages of the development.



An image from AS4970-2009,¹¹ with example tree protection.

¹¹ Council Of Standards Australia, *AS4970 Protection of trees on development sites* (2009), page 16.



NOTES:

- 1 For trunk and branch protection use boards and padding that will prevent damage to bark. Boards are to be strapped to trees, not nailed or screwed.
- 2 Rumble boards should be of a suitable thickness to prevent soil compaction and root damage.

An image from AS4970-2009,¹² with example tree protection.

11.7 Restricted activities inside TPZ: The following activities must be avoided inside the TPZ of all trees to be retained unless approved by the project Arborist. If at any time these activities cannot be avoided an alternative must be agreed in writing with the project Arborist to minimise the impact to the tree.

- A) Machine excavation.
- B) Ripping or cultivation of soil.
- C) Storage of spoil, soil or any such materials
- D) Preparation of chemicals, including preparation of cement products.
- E) Refuelling.
- F) Dumping of waste.
- G) Wash down and cleaning of equipment.
- H) Placement of fill.
- I) Lighting of fires.
- J) Soil level changes.
- K) Any physical damage to the crown, trunk, or root system.
- L) Parking of vehicles.

¹² Council Of Standards Australia, *AS4970 Protection of trees on development sites* (2009), page 17.

- 11.8 Demolition:** The demolition of all existing structures inside or directly adjacent to the TPZ of trees to be retained must be undertaken in consultation with the project Arborist. Any machinery is to work from inside the footprint of the existing structures or outside the TPZ, reaching in to minimise soil disturbance and compaction. If it is not feasible to locate demolition machinery outside the TPZ of trees to be retained, ground protection will be required. The demolition should be undertaken inwards into the footprint of the existing structures, sometimes referred to as the 'top down, pull back' method.
- 11.9 Excavations:** The project Arborist must supervise and certify that all excavations and root pruning are in accordance with AS4373-2007 and AS4970-2009. For continuous strip footings, first manual excavation is required along the edge of the structures closest to the subject trees. Manual excavation should be a depth of 1 metre (or to unfavourable root growth conditions such as bed rock or heavy clay, if agreed by project Arborist). Next roots must be pruned back in accordance with AS4373-2007. After all root pruning is completed, machine excavation is permitted within the footprint of the structure. For tree sensitive footings, such as pier and beam, all excavations inside the TPZ must be manual. Manual excavation may include the use of pneumatic and hydraulic tools, high-pressure air or a combination of high-pressure water and a vacuum device. No pruning of roots greater 30mm in diameter is to be carried out without approval of the project arborist. All pruning of roots greater than 30mm in diameter must be carried out by a qualified Arborist/Horticulturalist with a minimum AQF level 3. Root pruning is to be a clean cut with a sharp tool in accordance with AS4373 Pruning of amenity trees (2007).¹³ The tree root is to be pruned back to a branch root if possible. Make a clean cut and leave as small a wound as possible.
- 11.10 Landscaping:** All landscaping works within the TPZ of trees to be retained are to be undertaken in consultation with a consulting Arborist to minimize the impact to trees. General guidance is provided below to minimise the impact of new landscaping to trees to be retained.
- Level changes should be minimised. The existing ground levels within the landscape areas should not be lowered by more than 100mm or increased by more than 100mm (300mm increase is acceptable if using a coarse free draining material) without assessment by a consulting Arborist.
 - New retaining walls should be avoided. Where new retaining walls are proposed inside the TPZ of trees to be retained, they should be constructed from tree sensitive material, such as timber sleepers, that require minimal footings/excavations. If brick retaining walls are proposed inside the TPZ, considerer pier and beam type footings to bridge significant roots that are critical to the trees condition. Retaining walls must be located outside the SRZ and sleepers/beams located above existing soil grades.

¹³ Council Of Standards Australia, AS 4373 *Pruning of amenity trees* (2007) page 18

- New footpaths and hard surfaces should be minimised, as they can limit the availability of water, nutrients and air to the trees root system. Where they are proposed, they should be constructed on or above existing soil grades to minimise root disturbance and consider using a permeable surface. Footpaths should be located outside the SRZ where possible.
- Where fill/sub base is used inside the TPZ, fill material should be a coarse granular material that does not restrict the flow of water and air to the root system below. This type of material will also reduce the impact of soil compaction during construction.
- The location of new plantings inside the TPZ of trees to be retained should be flexible to avoid unnecessary damage to tree roots greater than 30mm in diameter.

- 11.11 **Underground Services:** Where possible underground services should be located outside the TPZ of trees to be retained. All underground services located inside the TPZ of any tree to be retained must be installed via tree sensitive techniques. This should include either directional drilling methods or manual excavations to minimise the impact to trees identified for retention. No roots greater than 40mm in diameter should be severed during the installation of service pipes unless approved in writing by the project Arborist.
- 11.12 **Sediment and Contamination:** All contamination run off from the development such as but not limited to concrete, sediment and toxic wastes must be prevented from entering the TPZ at all times.
- 11.13 **Tree Wounding/Injury:** Any wounding or injury that occurs to a tree during the construction process will require the project Arborist to be contacted for an assessment of the injury and provide mitigation/remediation advice. It is generally accepted that trees may take many years to decline and eventually die from root damage. All repair work is to be carried out by the project Arborist, at the contractor's expense.
- 11.14 **Completion of Development Works:** After all construction works are complete the project Arborist should assess that the subject trees have been retained in the same condition and vigour. If changes to condition are identified the project Arborist should provide recommendations for remediation.

12. CONSTRUCTION HOLD POINTS FOR TREE PROTECTION

12.1 Hold Points: Below is a sequence of hold points requiring project Arborist certification throughout the development process. It provides a list of hold points that must be checked and certified. All certification must be provided in written format upon completion of the development. The final certification must include details of any instructions for remediation undertaken during the development. The principal contractor should be responsible for implementing all tree protection requirements.

Hold Point	Stage	Date Completed and Signature of Project Arborist Responsible
Project Arborist to hold pre construction site meeting with principal contractor to discuss methods and importance of tree protection measures and resolve any issues in relation to feasibility of tree protection requirements that may arise. Project Arborist to mark all trees approved for removal under DA consent.	Prior to development work commencing	
Project Arborist to assess and certify that tree protection has been installed in accordance with AS4970-2009 prior to works commencing at site.	Prior to development work commencing.	
In accordance with AS4970-2009 the project arborist should carryout regular site inspections to ensure works are carried out in accordance with the recommendations. Site inspections are recommended on a monthly frequency.	On-going throughout the development	
The removal of existing structures inside the TPZ of any tree to be retained, such as the existing buildings and hard surfaces must be supervised by the project Arborist.	Demolition	
Project Arborist to supervise all manual excavations and root pruning inside the TPZ of any tree to be retained. Project Arborist to approve all pruning of roots greater than 30mm inside TPZ. All root pruning of roots greater than 30mm in diameter must be carried out by a qualified Arborist/Horticulturalist with a minimum AQF level 3.	Construction	
Project Arborist to certify that all underground services including storm water inside TPZ of any tree to be retained have been installed in accordance with AS4970-2009.	Construction	
All landscaping works within the TPZ of trees to be retained are to be undertaken in consultation with the project Arborist to minimise the impact to trees.	Construction/ Landscape	
After all demolition, construction and landscaping works are complete the project Arborist should assess that the subject trees have been retained in the same condition and vigour. If changes to condition are identified the project Arborist should provide recommendations for remediation.	Upon completion of development	

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- *Canterbury Development Control Plan 2012*,
<https://www.cbcity.nsw.gov.au/development/planning-control-policies/canterbury-development-control-plan-2012>.

14. LIST OF APPENDICES

The following are included in the appendices:

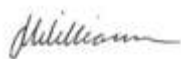
Appendix 1A - Proposed Plan North

Appendix 1B - Proposed Plan South

Appendix 1C - Proposed Service Building

Appendix 2 - Tree Inspection Schedule

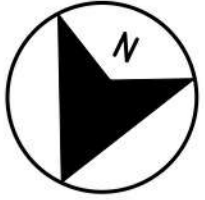
Appendix 3 - Further information of methodology



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Quantified Tree Risk Assessment (QTRA)
ISA Tree Risk Assessment Qualification (TRAQ)

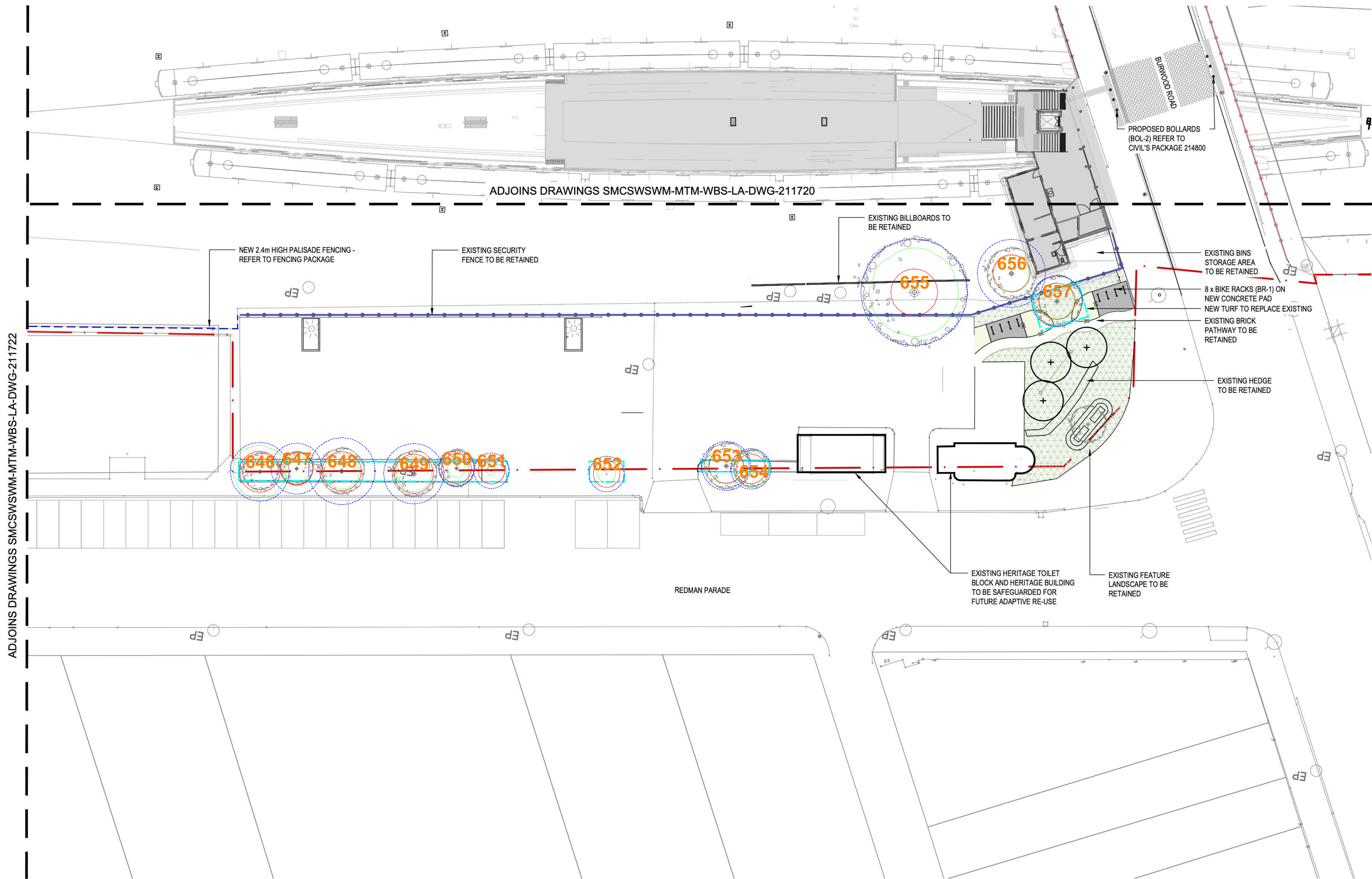


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QTRA
TRAQ



TO SYDNEY

TO BANKSTOWN



LEGEND

GENERAL

RAILCORP PROPERTY BOUNDARY

FENCING

NEW 2.4m HIGH PALISADE SECURITY FENCE

PROPOSED THROW SCREEN REFER TO URBAN DESIGN PACKAGE 211810

EXISTING PALISADE FENCE

TREES

EXISTING TREES TO BE RETAINED

PROPOSED TREES

LANDSCAPE

PROPOSED PLANTING

NEW TURF TO REPLACE EXISTING

EXISTING PLANTING

HARDSCAPE

REFER TO MATERIAL SCHEDULE DRAWING NO. SMCSWSWM-MTM-WBS-LA-DWG-211771

PROPOSED CONCRETE

STREET FURNITURE

PROPOSED BIKE PARKING (RACKS)

PROPOSED SAFETY BOLLARDS REFER TO THE BRIDGE PACKAGE DWG - 214800

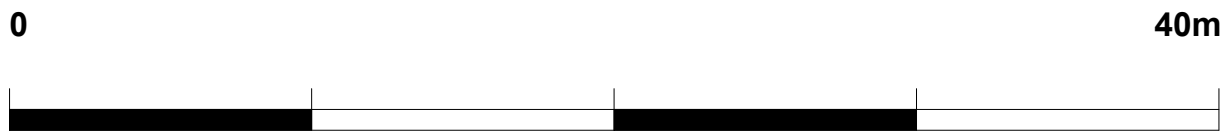
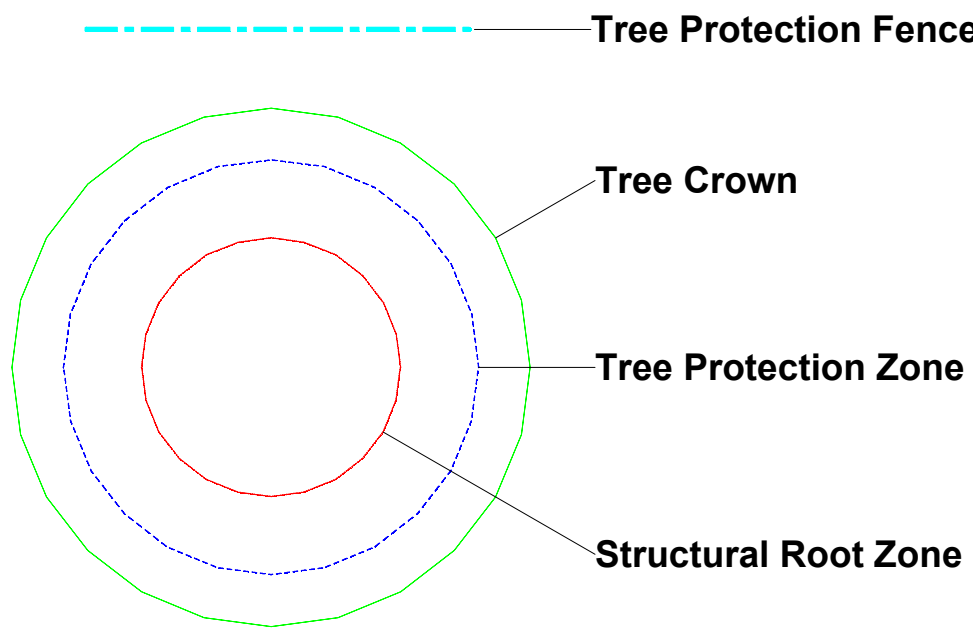
STREETSCAPE

EXISTING POWER POLES / CCTV POLES

NOTES:

- THE DESIGN IS BASED ON SYDNEY METRO CHAINAGE. PLEASE REFER TO CIVIL DRAWINGS FOR SYDNEY METRO CHAINAGE ALIGNMENT (PACKAGE NO. 103).
- REFER TO CIVIL DESIGN PACKAGE 213 FOR ALL FOOTPATH LEVELS.
- REFER TO FENCING PACKAGE 213 FOR ALL FENCING SET OUT AND LOCATIONS.
- REFER TO UTILITIES PACKAGE 213 FOR ALL SERVICES LAYOUTS.
- REFER TO ARCHITECTURAL PACKAGE 211 FOR ALL STATION

Tree Legend



Urban Arbor Pty Ltd

PO Box 450, Turrumurra, NSW, 2074
sales@urbanarbor.com.au, (02) 8004 2802

Site Location: Belmore Station, Belmore, NSW

SCALE :
1 : 250

@ A1

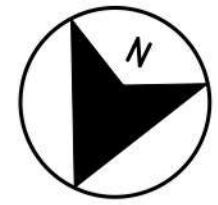
DATE :
23/12/2020

URBAN ARBOR
The Trusted Name in Tree Management

Appendix 1A: Proposed Plan North

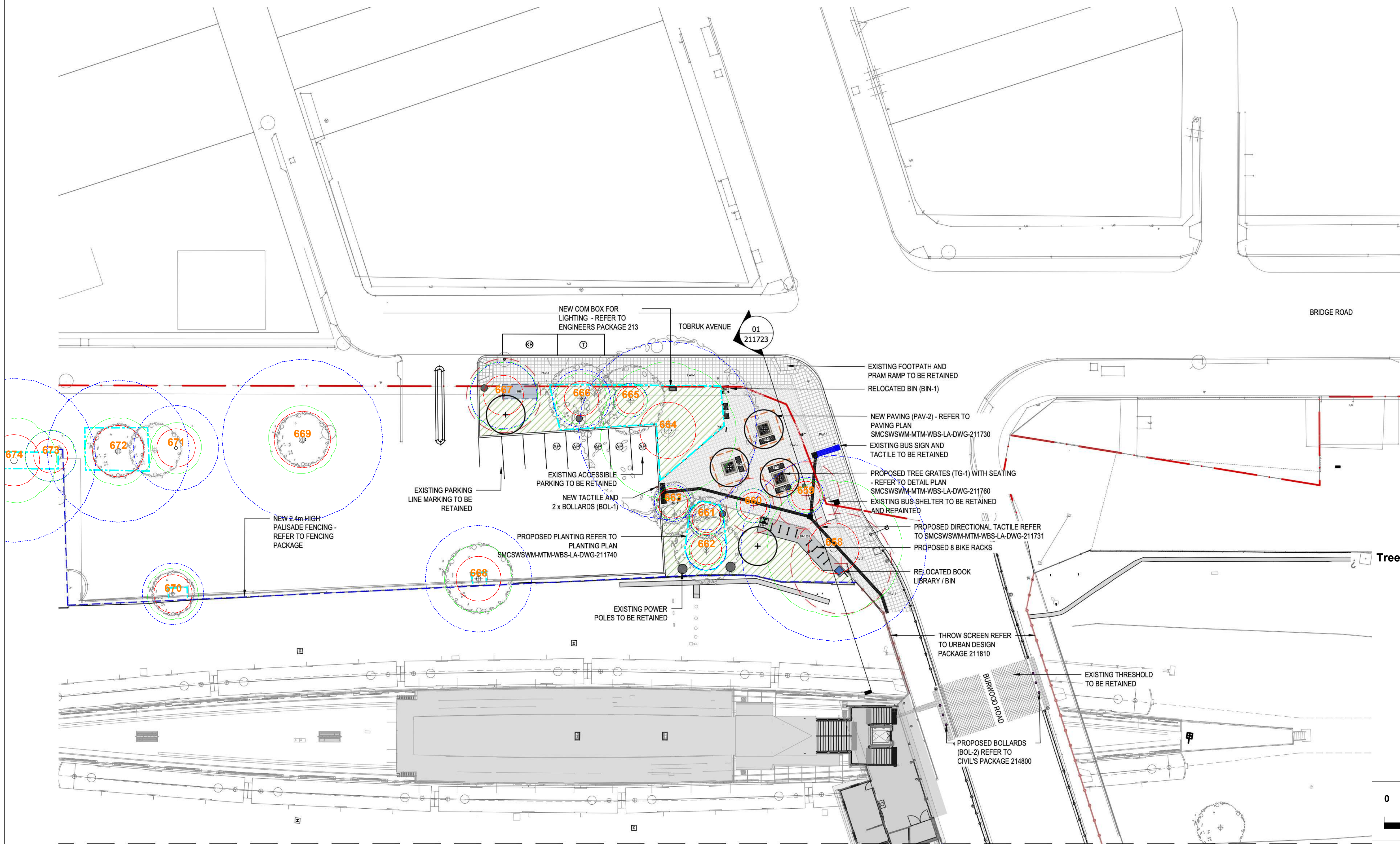
Prepared by: Bryce Claassens

DRAWING COLOUR CODED - PRINT ALL COPIES IN COLOUR



TO SYDNEY

TO BANKSTOWN



ADJOINS DRAWINGS SMCSWSWM-MTM-WBS-LA-DWG-211721

LEGEND

GENERAL

RAILCORP PROPERTY BOUNDARY

FENCING

NEW 2.4m HIGH PALISADE SECURITY FENCE
PROPOSED THROW SCREEN REFER TO URBAN DESIGN PACKAGE 211810
EXISTING PALISADE FENCE

TREES

EXISTING TREES TO BE RETAINED
PROPOSED TREES

LANDSCAPE

PROPOSED PLANTING
EXISTING PLANTING

HARDSCAPE

REFER TO MATERIAL SCHEDULE DRAWING NO. SMCSWSWM-MTM-WBS-LA-DWG-211771
EXISTING PAVING

PAV-1

PAV-2

CHARCOAL COLOUR UNITPAVING IN STACK BOND TO MATCH EXISTING (400 x 400 x 40mm)
EXTENT OF STRATAVAULT
PROPOSED CONCRETE

STREET FURNITURE

REFER TO MATERIAL SCHEDULE DRAWING NO. SMCSWSWM-MTM-WBS-LA-DWG-211771
PROPOSED K&R SHELTER (SHE-1)

ST-1

TG-1

BR-1

TI-1 / TI-2

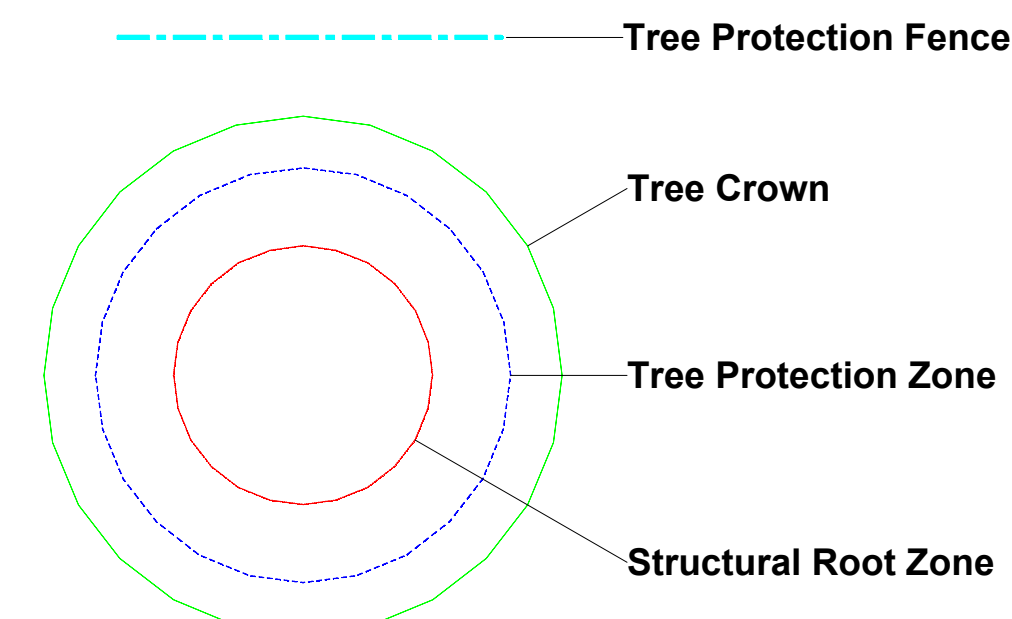
EXISTING TACTILE INDICATORS

RELOCATED BIN

BIN-1

MOBILE BOOK LIBRARY

Tree Legend



Urban Arbor Pty Ltd

PO Box 450, Turrumurra, NSW, 2074
sales@urbanarbor.com.au, (02) 8004 2802

Site Location: Belmore Station, Belmore, NSW

SCALE :
1 : 250

@ A1

DATE :
23/12/2020

URBAN ARBOR
The Trusted Name in Tree Management

Appendix 1B: Proposed Plan South

Prepared by: Bryce Claassens

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Appendix 2 - Tree Inspection Schedule

Tree ID	Common Name	Botanical Name	Age Class	Height (m)	Canopy Spread Radius (m)	Stem 1	Stem 2	Stem 3	Stem 4	Stem 5	DBH (mm)	DAB (mm)	Health	Structure	Amenity Value	SULE	Retention Value	TPZ Radius (m)	SRZ Radius (m)	Notes
646	Water Gum	<i>Tristaniaopsis laurina</i>	Mature	5	3	200	100	100	90	90	276	420	Good	Fair	Medium	2. Medium	A1	3.3	2.3	Multi stem tree. Deadwood in lower crown.
647	Weeping Bottlebrush	<i>Callistemon viminalis</i>	Semi-mature	2.5	1.5	150	120	100	100		239	250	Good	Good	Low	5. Small/Young	Z1	2.9	1.8	None.
648	Water Gum	<i>Tristaniaopsis laurina</i>	Mature	5	2	230	160	100	100		314	380	Good	Fair	Medium	2. Medium	A1	3.8	2.2	Multi stem tree. Deadwood in lower crown.
649	Water Gum	<i>Tristaniaopsis laurina</i>	Mature	5	2	200	200				283	380	Good	Good	Medium	1. Long	A1	3.4	2.2	Co-dominant stems.
650	Weeping Bottlebrush	<i>Callistemon viminalis</i>	Young	2	1	120	100				156	200	Good	Good	Low	5. Small/Young	Z1	2.0	1.7	None.
651	Water Gum	<i>Tristaniaopsis laurina</i>	Young	1	0.5	80					80	90	Good	Good	Low	5. Small/Young	Z1	2.0	1.5	None.
652	Water Gum	<i>Tristaniaopsis laurina</i>	Young	2	1	100					100	110	Good	Good	Low	5. Small/Young	Z1	2.0	1.5	None.
653	Robinia	<i>Robinia pseudoacacia</i>	Mature	5	2	230					230	280	Good	Good	Low	2. Medium	Z3	2.8	1.9	Exempt species.
654	Robinia	<i>Robinia pseudoacacia</i>	Semi-mature	5	2	190					190	200	Good	Good	Low	2. Medium	Z3	2.3	1.7	Exempt species.
655	Camphor Laurel	<i>Cinnamomum camphora</i>	Mature	11	5	500					500	580	Good	Fair	Medium	2. Medium	A1	6.0	2.6	Located within corridor. DBH estimated.
656	Illawarra Flame	<i>Brachychiton acerifolius</i>	Mature	8	2	320					320	340	Good	Good	Medium	2. Medium	A1	3.8	2.1	Located within corridor. DBH estimated.
657	Robinia	<i>Robinia pseudoacacia</i>	Mature	5	2	200	130				239	320	Good	Good	Low	2. Medium	Z3	2.9	2.1	Exempt species.
658	Camphor Laurel	<i>Cinnamomum camphora</i>	Mature	9	8	670	610				906	780	Fair	Fair	Low	3. Short	Z4	10.9	3.0	Apical dieback. Large diameter deadwood. Tree is in decline.
659	Golden Robinia	<i>Robinia pseudoacacia</i> 'Frisia'	Semi-mature	5	2	180					180	200	Good	Fair	Low	2. Medium	Z3	2.2	1.7	Exempt species. Co-dominant stems with tight union.
660	Golden Robinia	<i>Robinia pseudoacacia</i> 'Frisia'	Semi-mature	4	2	150					150	170	Fair	Fair	Low	2. Medium	Z3	2.0	1.6	Exempt species. Apical dieback.
661	Golden Robinia	<i>Robinia pseudoacacia</i> 'Frisia'	Semi-mature	5	2	170					170	200	Good	Good	Low	2. Medium	Z3	2.0	1.7	Exempt species.
662	Golden Robinia	<i>Robinia pseudoacacia</i> 'Frisia'	Semi-mature	5	2	200					200	230	Fair	Fair	Low	3. Short	Z3	2.4	1.8	Exempt species. Dieback of S stem.
663	Golden Robinia	<i>Robinia pseudoacacia</i> 'Frisia'	Semi-mature	5	2	180					180	220	Good	Fair	Low	2. Medium	Z3	2.2	1.8	Exempt species.
664	Eucalypt	<i>Eucalyptus spp</i>	Mature	16	8	870					870	990	Good	Good	Very High	1. Long	A1	10.4	3.3	Minor deadwood.
665	Golden Robinia	<i>Robinia pseudoacacia</i> 'Frisia'	Semi-mature	5	2	160					160	180	Good	Fair	Low	2. Medium	Z3	2.0	1.6	Exempt species. Suppressed.
666	Golden Robinia	<i>Robinia pseudoacacia</i> 'Frisia'	Mature	5	3	260	110				282	310	Fair	Fair	Low	3. Short	Z3	3.4	2.0	Exempt species. In decline.
667	Golden Robinia	<i>Robinia pseudoacacia</i> 'Frisia'	Mature	5	4	240	170	140			326	440	Poor	Poor	Low	4. Remove	Z4	3.9	2.3	Exempt species. Tree is in advanced stages of decline.
668	Queensland Brushbox	<i>Lophostemon confertus</i>	Mature	6	4	520					520	580	Good	Good	Medium	1. Long	A1	6.2	2.6	None.
669	Weeping Bottlebrush	<i>Callistemon viminalis</i>	Mature	8	4	550	400	250	300		784	1000	Fair	Fair	Medium	2. Medium	A2	9.4	3.3	Minor apical dieback. Monitor tree health.
670	Queensland Brushbox	<i>Lophostemon confertus</i>	Mature	4.5	3	300					300	400	Good	Fair	Medium	2. Medium	A1	3.6	2.3	None.
671	Weeping Bottlebrush	<i>Callistemon viminalis</i>	Mature	6	3	270	260	180			416	400	Good	Good	Medium	1. Long	A1	5.0	2.3	None.
672	Weeping Bottlebrush	<i>Callistemon viminalis</i>	Mature	8	4	550	300	220	200		693	800	Good	Good	Medium	2. Medium	A1	8.3	3.0	Fire damage on trunk.
673	Lemon Scented Tea Tree	<i>Leptospermum petersonii</i>	Mature	5	3	190	160				248	300	Good	Fair	Medium	2. Medium	A1	3.0	2.0	Co-dominant stems at base with indicators of instability.
674	Weeping Bottlebrush	<i>Callistemon viminalis</i>	Mature	9	5	800					800	800	Good	Good	Medium	1. Long	A1	9.6	3.0	None.
2260	Unknown	<i>Unknown spp</i>	Semi-mature	9	3	250	200				320	400	Good	Fair	Medium	3. Short	Z9	3.8	2.3	Loss of cambium and evidence of decay on stems.
2261	Weeping Bottlebrush	<i>Callistemon viminalis</i>	Semi-mature	5	1	200					200	200	Good	Fair	Low	5. Small/Young	Z1	2.4	1.7	None.
2262	Unknown	<i>Unknown spp</i>	Young	5	1	150					150	180	Good	Fair	Low	5. Small/Young	Z1	1.8	1.6	None.
2263	Prickly Leaved Paperbark	<i>Melaleuca styphelioides</i>	Mature	11	5	470					470	500	Good	Good	High	1. Long	A1	5.6	2.5	Canopy extends into corridor.
2264	Weeping Bottlebrush	<i>Callistemon viminalis</i>	Mature	7	2	220	140				261	310	Good	Fair	Medium	2. Medium	A1	3.1	2.0	Asymmetric crown shape. Suppressed by adjacent tree.
2265	Broad Leaved Paperbark	<i>Melaleuca quinquenervia</i>	Mature	15	7	770					770	850	Good	Good	High	1. Long	A1	9.2	3.1	None.
2266	Bangalay	<i>Eucalyptus botryoides</i>	Mature	14	5	500					500	550	Good	Good	High	1. Long	A1	6.0	2.6	None.
2267	Plum Fruited Yew	<i>Afrocarpus falcatus</i>	Mature	8	4	500					500	500	Good	Good	Medium	1. Long	A1	6.0	2.5	None.
2268	Common or Black Mulberry	<i>Morus nigra</i>	Young	5	1	80					80	100	Good	Fair	Low	5. Small/Young	Z1	1.0	1.5	None.
2269	Swamp Mahogany	<i>Eucalyptus robusta</i>	Mature	12	6	600					600	660	Good	Fair	High	2. Medium	A1	7.2	2.8	Asymmetric crown shape.

Appendix 2 - Tree Inspection Schedule

Tree ID	Common Name	Botanical Name	Age Class	Height (m)	Canopy Spread Radius (m)	Stem 1	Stem 2	Stem 3	Stem 4	Stem 5	DBH (mm)	DAB (mm)	Health	Structure	Amenity Value	SULE	Retention Value	TPZ Radius (m)	SRZ Radius (m)	Notes
2270	Eucalypt	<i>Eucalyptus spp</i>	Semi-mature	6	2	110	110				156	300	Good	Fair	Low	5. Small/Young	Z1	1.9	2.0	Regrowth from stump.
3316	Murraya	<i>Murraya paniculata</i>	Semi-mature	5	2	250					250	250	Good	Fair	Low	5. Small/Young	Z1	3.0	1.8	Located within community center. Retaining wall along boundary is restricting root growth into corridor.
3317	Murraya	<i>Murraya paniculata</i>	Young	4	1	200					200	200	Good	Fair	Low	5. Small/Young	Z1	2.4	1.7	Located within community center. Retaining wall along boundary is restricting root growth into corridor.
3318	Weeping Bottlebrush	<i>Callistemon viminalis</i>	Mature	9	4	400					400	520	Good	Good	High	1. Long	A1	4.8	2.5	Located within community center. Retaining wall along boundary is restricting root growth into corridor.
3319	Murraya	<i>Murraya paniculata</i>	Young	4	1	200					200	200	Good	Fair	Low	5. Small/Young	Z1	2.4	1.7	Located within community center. Retaining wall along boundary is restricting root growth into corridor.
3320	Murraya	<i>Murraya paniculata</i>	Semi-mature	4	2	250					250	250	Good	Fair	Low	5. Small/Young	Z1	3.0	1.8	Located within community center. Retaining wall along boundary is restricting root growth into corridor.

Explanatory Notes

Tree Species - Common name followed by botanical name. Where species is unknown it is indicated with an 'spp'.

Age Class - Over mature (OM), Mature (M), Early mature (EM), Semi mature (SM), Young (Y).

Diameter at Breast Height (DBH) - Measured with a DBH tape or estimated at approximately 1.4m above ground level.

Diameter Above root Buttresses (DAB): Measured with a DBH tape or estimated above root buttresses (DAB) for calculating the SRZ.

Height - Height from ground level to top of crown. All heights are estimated unless otherwise indicated.

Spread - Radius of crown at widest section. All tree spreads are estimated unless otherwise indicated.

Tree Protection Zone (TPZ) - DBH x 12. Measured in radius from the centre of the trunk. Rounded to nearest 0.1m. For monocots, the TPZ is set at 1 metre outside the crown projection.

Structural Root Zone (SRZ) - $(DAB \times 50)^{0.42} \times 0.64$. Measured in radius from the centre of the trunk. Rounded up to nearest 0.1m.

Health - Good/Fair/Poor/Dead

Structure - Good/Fair/Poor

Safe Useful Life Expectancy (SULE) - 1. Long (40+years), 2. Medium (15 - 40 years), 3. Short (5 - 15 years), 4. Remove (under 5 years), 5. Small/young.

Amenity Value - Very High/High/Medium/Low/Very Low.

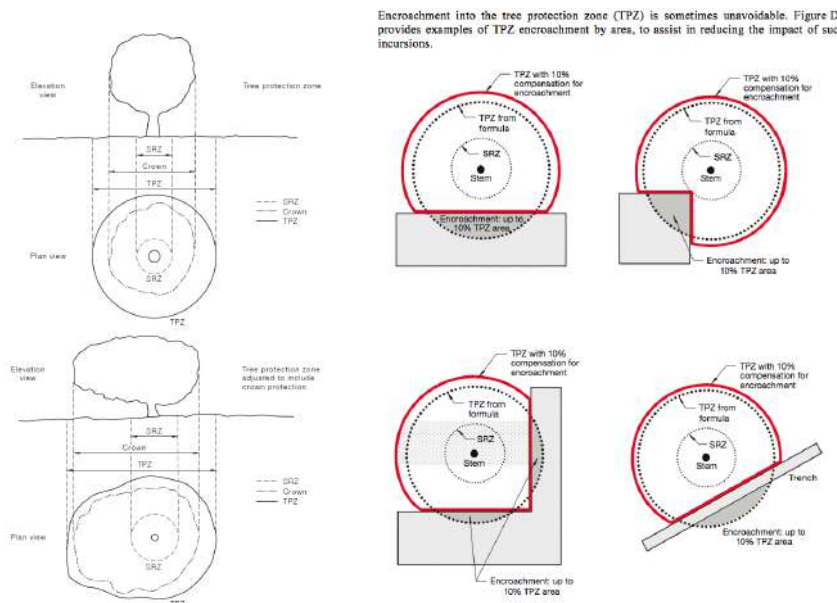
Retention Value: Tree AZ, see appendix 3 for categories.

Appendix 3 - Further Information of Methodology

1. **Tree Protection Zone:** The tree protection zone (TPZ) is the principle means of protecting trees on development sites. The TPZ is a combination of the root area and crown area requiring protection. It is an area isolated from construction disturbance, so that the tree remains viable. The radius of the TPZ is calculated for each tree by multiplying its DBH x 12. The derived value is measured in radius from the centre of the stem/trunk at ground level. A TPZ should not be less than 2.0 metres nor greater than 15 metres (except where crown protection is required). It is commonly observed that tree roots will extend significant further than the indicative TPZ, however the TPZ is an area identified AS4970-2009 to be extent where root loss or disturbance will generally not impact the viability of the tree. The TPZ is identified as a restricted area to prevent damage to trees either above or below ground during a development. Where trees are intended to be retained proposed developments must provide an adequate TPZ around trees. The TPZ is set aside for the tree's root zone, trunk and crown and it is essential for the stability and longevity of the tree. The tree protection also incorporates the SRZ (see below for more information about the SRZ). I have calculated the TPZ of palms, other monocots, cycads and tree ferns at one metre outside the crown projection. See appendices for additional information about the TPZ including information about calculating the TPZ and examples of TPZ encroachment.

Minor encroachment into TPZ: Sometimes encroachment into the TPZ is unavoidable. Encroachment includes but is not limited to activities such as excavation, compacted fill and machine trenching. Minor encroachment of up to 10% of the overall TPZ area is normally considered acceptable, providing there is space adjacent to the TPZ for the tree to compensate and the tree is displaying adequate vigour/health to tolerate changes to its growing environment.

Major encroachment into TPZ: Where encroachment of more than 10% of the overall TPZ area is proposed the project Arborist must investigate and demonstrate that the tree will remain in a viable condition. In some cases, tree sensitive construction methods such as pier and beam footings, suspended slabs, or cantilevered sections, can be utilised to allow additional encroachment into the TPZ by bridging over roots and minimising root disturbance. Major encroachment is only possible if it can be undertaken without severing significant size roots, or if it can be demonstrated that significant roots will not be impacted.



2. **Structural Root Zone:** This is the area around the base of a tree required for the trees stability in the ground. An area larger than the SRZ always need to be maintained to preserve a viable tree as it will only have a minor effect on the trees vigour and health. There are several factors that determine the SRZ which include height, crown area, soil type and soil moisture. It can also be influenced by other factors such as natural or built structures. Generally work within the SRZ should be avoided.

An indicative SRZ radius can be determined from the diameter of the trunk measured immediately above the root buttresses. Root investigation could provide more information about the extent of the SRZ. The following formula should be used to calculate the SRZ.

SRZ radius = $(D \times 50)^{0.42} \times 0.64$ (D = Diameter above root buttress).

3. **Tree Age Class:** It can be difficult to determine the age of a tree without carrying out invasive tests that may damage the tree, so we have categorised there likely age class which is defined below;
 - Young/Newly planted: Young or recently planted tree.
 - Semi Mature: Up to 20% of the usual life expectancy for the species.
 - Early mature/Mature: Between 20%-80% of the usual life expectancy for the species.
 - Over mature: Over 80% of the usual life expectancy for the species.
 - Dead: Tree is dead or almost dead.

4. **Health/Physiological Condition:** Below are examples conditions used when assigning a category for tree health.

Category	Example condition	Summary
Good	<ul style="list-style-type: none"> • Crown has good foliage density for species. • Tree shows no or minimal signs of pathogens that are unlikely to have an effect on the health of the tree. • Tree is displaying good vigour and reactive growth development. 	<ul style="list-style-type: none"> • The tree is in above average health and condition and no remedial works are required.
Fair	<ul style="list-style-type: none"> • The tree may be starting to dieback or have over 25% deadwood. • Tree may have slightly reduced crown density or thinning. • There may be some discolouration of foliage. • Average reactive growth development. • There may be early signs of pathogens which may further deteriorate the health of the tree. • There may be epicormic growth indicating increased levels of stress within the tree. 	<ul style="list-style-type: none"> • The tree is in below average health and condition and may require remedial works to improve the trees health.
Poor	<ul style="list-style-type: none"> • The tree may be in decline, have extensive dieback or have over 30% deadwood. • The canopy may be sparse or the leaves may be unusually small for species. • Pathogens or pests are having a significant detrimental effect on the tree health. 	<ul style="list-style-type: none"> • The tree is displaying low levels of health and removal or remedial works may be required.
Dead	<ul style="list-style-type: none"> • The tree is dead or almost dead. 	<ul style="list-style-type: none"> • The tree should generally be removed.

5. **Structural Condition:** Below are examples conditions used when assigning a category for structural condition.

Category	Example condition	Summary
Good	<ul style="list-style-type: none"> • Branch unions appear to be strong with no sign of defects. • There are no significant cavities. • The tree is unlikely to fail in usual conditions. • The tree has a balanced crown shape and form. 	<ul style="list-style-type: none"> • The tree is considered structurally good with well developed form.
Fair	<ul style="list-style-type: none"> • The tree may have minor structural defects within the structure of the crown that could potentially develop into more significant defects. • The tree may have a cavity that is currently unlikely to fail but may deteriorate in the future. • The tree is an unbalanced shape or leans significantly. • The tree may have minor damage to its roots. • The root plate may have moved in the past but the tree has now compensated for this. • Branches may be rubbing or crossing. 	<ul style="list-style-type: none"> • The identified defects are unlikely cause major failure. • Some branch failure may occur in usual conditions. • Remedial works can be undertaken to alleviate potential defects.
Poor	<ul style="list-style-type: none"> • The tree has significant structural defects. • Branch unions may be poor or weak. • The tree may have a cavity or cavities with excessive levels of decay that could cause catastrophic failure. • The tree may have root damage or is displaying signs of recent movement. • The tree crown may have poor weight distribution which could cause failure. 	<ul style="list-style-type: none"> • The identified defects are likely to cause either partial or whole failure of the tree.

6. **Amenity Value:** To determine the amenity value of a tree we assess a number of different factors, which include but are not limited to the information below.

- The visibility of the tree to adjacent sites.
- The relationship between the tree and the site.
- Whether the tree is protected by any statutory conditions.
- The habitat value of the tree.
- Whether the tree is considered a noxious weed species.

The amenity value is rated using one of the following values.

- Very High
- High
- Moderate
- Low
- Very Low

7. **Safe Useful Life Expectancy (SULE), (Barrel, 2001):** A tree's safe useful life expectancy is determined by assessing a number of different factors including the health and vitality, estimated age in relation to expected life expectancy for the species, structural defects, and remedial works that could allow retention in the existing situation.

Category	Description
1. Long - Over 40 years	(a) Structurally sound trees located in positions that can accommodate future growth. (b) Trees that could be made suitable for retention in the long term by remedial tree care. (c) Trees of special significance for historical, commemorative or rarity reasons that would warrant extraordinary efforts to secure their long term retention.
2. Medium - 15 to 40 years	(a) Trees that may only live between 15 and 40 more years. (b) Trees that could live for more than 40 years but may be removed for safety or nuisance reasons. (c) Trees that could live for more than 40 years but may be removed to prevent interference with more suitable individuals or to provide space for new planting. (d) Trees that could be made suitable for retention in the medium term by remedial tree care.
3. Short - 5 to 15 years	(a) Trees that may only live between 5 and 15 more years. (b) Trees that could live for more than 15 years but may be removed for safety or nuisance reasons. (c) Trees that could live for more than 15 years but may be removed to prevent interference with more suitable individuals or to provide space for new planting. (d) Trees that require substantial remedial tree care and are only suitable for retention in the short term.
4. Remove - Under 5 years	(a) Dead, dying, suppressed or declining trees because of disease or inhospitable conditions. (b) Dangerous trees because of instability or recent loss of adjacent trees. (c) Dangerous trees because of structural defects including cavities, decay, included bark, wounds or poor form. (d) Damaged trees that are clearly not safe to retain. (e) Trees that could live for more than 5 years but may be removed to prevent interference with more suitable individuals or to provide space for new planting. (f) Trees that are damaging or may cause damage to existing structures within 5 years. (g) Trees that will become dangerous after removal of other trees for the reasons given in (a) to (f). (h) Trees in categories (a) to (g) that have a high wildlife habitat value and, with appropriate treatment, could be retained subject to regular review.
5. Small/Young	(a) Small trees less than 5m in height. (b) Young trees less than 15 years old but over 5m in height. (c) Formal hedges and trees intended for regular pruning to artificially control growth.

8. **Root investigations:** The root investigations should identify roots greater than 30mm in diameter that are located along the edge of the structure's footprint or in the location of footings. Root investigations must be carried out using non-invasive methods (manual excavations). Any excavations for the root investigations must be carried out manually to avoid damaging the roots during excavations. Manual excavation may include the use of a high-pressure air/air knife, or a combination of high-pressure water and a vacuum device. When hand excavating carefully work around roots retaining as many as possible. Take care to not fray, wound, or cause damage to any roots during excavations as this may cause decay or infection from pathogens. It is essential that exposed roots are kept moist and the excavation back filled as soon as possible. The root investigations should be carried out by a qualified Arborist minimum AQF3. Once roots are exposed, a visual assessment can be carried out by a consulting Arborist to evaluate the potential impact of the proposed root loss on the health and stability of the tree. A root map/report should be prepared identifying the findings of investigations, including photographs as supporting evidence in the report.

9. **Retention Value:** The system I have used to award the retention value is Tree AZ. Tree AZ is used to identify higher value trees worthy of being a constraint to development and lower value trees that should generally not be a constraint to the development. The table below provides a brief description of each category.

TreeAZ Categories (Version 10.04-ANZ)

CAUTION: TreeAZ assessments must be carried out by a competent person qualified and experienced in arboriculture. The following category descriptions are designed to be a brief field reference and are not intended to be self-explanatory. They must be read in conjunction with the most current explanations published at www.TreeAZ.com.

Category Z: Unimportant trees not worthy of being a material constraint

Local policy exemptions: Trees that are unsuitable for legal protection for local policy reasons including size, proximity and species

- Z1** Young or insignificant small trees, i.e. below the local size threshold for legal protection, etc
- Z2** Too close to a building, i.e. exempt from legal protection because of proximity, etc
- Z3** Species that cannot be protected for other reasons, i.e. scheduled noxious weeds, out of character in a setting of acknowledged importance, etc

High risk of death or failure: Trees that are likely to be removed within 10 years because of acute health issues or severe structural failure

- Z4** Dead, dying, diseased or declining
- Z5** Severe damage and/or structural defects where a high risk of failure cannot be satisfactorily reduced by reasonable remedial care, i.e. cavities, decay, included bark, wounds, excessive imbalance, overgrown and vulnerable to adverse weather conditions, etc
- Z6** Instability, i.e. poor anchorage, increased exposure, etc
- Excessive nuisance:** Trees that are likely to be removed within 10 years because of unacceptable impact on people
- Z7** Excessive, severe and intolerable inconvenience to the extent that a locally recognized court or tribunal would be likely to authorize removal, i.e. dominance, debris, interference, etc
- Z8** Excessive, severe and intolerable damage to property to the extent that a locally recognized court or tribunal would be likely to authorize removal, i.e. severe structural damage to surfacing and buildings, etc

Good management: Trees that are likely to be removed within 10 years through responsible management of the tree population

- Z9** Severe damage and/or structural defects where a high risk of failure can be temporarily reduced by reasonable remedial care, i.e. cavities, decay, included bark, wounds, excessive imbalance, vulnerable to adverse weather conditions, etc
- Z10** Poor condition or location with a low potential for recovery or improvement, i.e. dominated by adjacent trees or buildings, poor architectural framework, etc
- Z11** Removal would benefit better adjacent trees, i.e. relieve physical interference, suppression, etc
- Z12** Unacceptably expensive to retain, i.e. severe defects requiring excessive levels of maintenance, etc

NOTE: Z trees with a high risk of death/failure (Z4, Z5 & Z6) or causing severe inconvenience (Z7 & Z8) at the time of assessment and need an urgent risk assessment can be designated as ZZ. ZZ trees are likely to be unsuitable for retention and at the bottom of the categorization hierarchy. In contrast, although Z trees are not worthy of influencing new designs, urgent removal is not essential and they could be retained in the short term, if appropriate.

Category A: Important trees suitable for retention for more than 10 years and worthy of being a material constraint

- A1** No significant defects and could be retained with minimal remedial care
- A2** Minor defects that could be addressed by remedial care and/or work to adjacent trees
- A3** Special significance for historical, cultural, commemorative or rarity reasons that would warrant extraordinary efforts to retain for more than 10 years
- A4** Trees that may be worthy of legal protection for ecological reasons (Advisory requiring specialist assessment)

NOTE: Category A1 trees that are already large and exceptional, or have the potential to become so with minimal maintenance, can be designated as AA at the discretion of the assessor. Although all A and AA trees are sufficiently important to be material constraints, AA trees are at the top of the categorization hierarchy and should be given the most weight in any selection process.

TreeAZ is designed by Barrell Tree Consultancy (www.barrelltreecare.co.uk) and is reproduced with their permission

Glossary of Terms

Abiotic - Pertaining to non-living agents; e.g. environmental factors

Adventitious shoots - Shoots that develop other than from apical, axillary or dormant buds; see also 'epicormic'

Anchorage - The system whereby a tree is fixed within the soil, involving cohesion between roots and soil and the development of a branched system of roots which withstands wind and gravitational forces transmitted from the aerial parts of the tree

Bark - A term usually applied to all the tissues of a woody plant lying outside the vascular cambium, thus including the phloem, cortex and periderm; occasionally applied only to the periderm or the phellem

Branch:

- **Primary**. A first order branch arising from a stem
- **Lateral**. A second order branch, subordinate to a primary branch or stem and bearing sub-lateral branches
- **Sub-lateral**. A third order branch, subordinate to a lateral or primary branch, or stem and usually bearing only twigs

Branch collar - A visible swelling formed at the base of a branch whose diameter growth has been disproportionately slow compared to that of the parent stem; a term sometimes applied also to the pattern of growth of the cells of the parent stem around the branch base

Brown-rot - A type of wood decay in which cellulose is degraded, while lignin is only modified

Buckling - An irreversible deformation of a structure subjected to a bending force

Buttress zone - The region at the base of a tree where the major lateral roots join the stem, with buttress-like formations on the upper side of the junctions

Cambium - Layer of dividing cells producing xylem (woody) tissue internally and phloem (bark) tissue externally

Canker - A persistent lesion formed by the death of bark and cambium due to colonisation by fungi or bacteria

Compartmentalisation - The confinement of disease, decay or other dysfunction within an anatomically discrete region of plant tissue, due to passive and/or active defences operating at the boundaries of the affected region

Compressive loading - Mechanical loading which exerts a positive pressure; the opposite to tensile loading

Condition - An indication of the physiological condition of the tree. Where the term 'condition' is used in a report, it should not be taken as an indication of the stability of the tree

Crown/Canopy - The main foliage bearing section of the tree

Crown lifting - The removal of limbs and small branches to a specified height above ground level

Crown thinning - The removal of a proportion of secondary branch growth throughout the crown to produce an even density of foliage around a well-balanced branch structure

Crown reduction/shaping - A specified reduction in crown size whilst preserving, as far as possible, the natural tree shape

DAB (Diameter Above Buttress) - Trunk diameter measured above the root buttress

Defect - In relation to tree hazards, any feature of a tree which detracts from the uniform distribution of mechanical stress, or which makes the tree mechanically unsuited to its environment

Dieback - The death of parts of a woody plant, starting at shoot-tips or root-tips

Disease - A malfunction in or destruction of tissues within a living organism, usually excluding mechanical damage; in trees, usually caused by pathogenic micro-organisms

Dominance - In trees, the tendency for a leading shoot to grow faster or more vigorously than the lateral shoots; also the tendency of a tree to maintain a taller crown than its neighbours

Dormant bud - An axial bud which does not develop into a shoot until after the formation of two or more annual wood increments; many such buds persist through the life of a tree and develop only if stimulated to do so

Dysfunction - In woody tissues, the loss of physiological function, especially water conduction, in sapwood

DBH (Diameter at Breast Height) - Stem diameter measured at a height of 1.4 metres or the nearest measurable point. Where measurement at a height of 1.4 metres is not possible, another height may be specified

Deadwood - Branch or stem wood bearing no live tissues. Retention of deadwood provides valuable habitat for a wide range of species and seldom represents a threat to the health of the tree. Removal of deadwood can result in the ingress of decay to otherwise sound tissues and climbing operations to access deadwood can cause significant damage to a tree. Removal of deadwood is generally recommended only where it represents an unacceptable level of hazard

Epicormic shoot - A shoot having developed from a dormant or adventitious bud and not having developed from a first year shoot

Flush-cut - A pruning cut which removes part of the branch bark ridge and or branch-collar

Girdling root - A root which circles and constricts the stem or roots possibly causing death of phloem and/or cambial tissue

Habit - The overall growth characteristics, shape of the tree and branch structure

Hazard beam - An upwardly curved part of a tree in which strong internal stresses may occur without being reduced by adaptive growth; prone to longitudinal splitting

Heartwood/false-heartwood - The dead central wood that has become dysfunctional as part of the aging processes and being distinct from the sapwood

Heave - A term mainly applicable to a shrinkable clay soil which expands due to re-wetting after the felling of a tree which was previously extracting moisture from the deeper layers; also the lifting of pavements and other structures by root diameter expansion; also the lifting of one side of a wind-rocked root-plate

Included bark (ingrown bark) - Bark of adjacent parts of a tree (usually forks, acutely joined branches or basal flutes) which is in face-to-face contact

Lever arm - A mechanical term denoting the length of the lever represented by a structure that is free to move at one end, such as a tree or an individual branch

Lignin - The hard, cement-like constituent of wood cells; deposition of lignin within the matrix of cellulose microfibrils in the cell wall is termed Lignification

Lions tailing - A term applied to a branch of a tree that has few if any side-branches except at its end, and is thus liable to snap due to end-loading

Loading - A mechanical term describing the force acting on a structure from a particular source; e.g. the weight of the structure itself or wind pressure

Mycelium - The body of a fungus, consisting of branched filaments (hyphae)

Occlusion - The process whereby a wound is progressively closed by the formation of new wood and bark around it

Pathogen - A micro-organism which causes disease in another organism

Photosynthesis - The process whereby plants use light energy to split hydrogen from water molecules, and combine it with carbon dioxide to form the molecular building blocks for synthesizing carbohydrates and other biochemical products

Probability - A statistical measure of the likelihood that a particular event might occur

Pruning - The removal or cutting back of twigs or branches, sometimes applied to twigs or small branches only, but often used to describe most activities involving the cutting of trees or shrubs

Radial - In the plane or direction of the radius of a circular object such as a tree stem

Reactive Growth/Reaction Wood - Production of woody tissue in response to altered mechanical loading; often in response to internal defect or decay and associated strength loss (cf. adaptive growth)

Ring-barking - The removal of a ring of bark and phloem around the circumference of a stem or branch, normally resulting in an inability to transport photosynthetic assimilates below the area of damage. Almost inevitably results in the eventual death of the affected stem or branch above the damage

Root-collar - The transitional area between the stem/s and roots

Sapwood - Living xylem tissues

Soft-rot - A kind of wood decay in which a fungus degrades cellulose within the cell walls, without any general degradation of the wall as a whole

Stem/s - Principle above-ground structural component(s) of a tree that supports its branches

Stress - In plant physiology, a condition under which one or more physiological functions are not operating within their optimum range, for example due to lack of water, inadequate nutrition or extremes of temperature

SRZ (Structural Root Zone) - The area around the base of the tree required for the trees stability in the ground

Subsidence - In relation to soil or structures resting in or on soil, a sinking due to shrinkage when certain types of clay soil dry out, sometimes due to extraction of moisture by tree roots

Taper - In stems and branches, the degree of change in girth along a given length

Targets - In tree risk assessment (with slight misuse of normal meaning) persons or property or other things of value which might be harmed by mechanical failure of the tree or by objects falling from it

Topping - In arboriculture, the removal of the crown of a tree, or of a major proportion of it

Transpiration - The evaporation of moisture from the surface of a plant, especially via the stomata of leaves; it exerts a suction which draws water up from the roots and through the intervening xylem cells

TPZ (Tree Protection Zone) - A specified area above and below ground and at a given distance from the trunk set aside for the protection of a tree's roots and crown to provide for the viability and stability of a tree to be retained where it is potentially subject to damage by development

Understory - This layer consists of younger individuals of the dominant trees, together with smaller trees and shrubs which are adapted to grow under lower light conditions

Veteran tree - Tree that, by recognised criteria, shows features of biological, cultural or aesthetic value that are characteristic of, but not exclusive to, individuals surviving beyond the typical age range for the species concerned. These characteristics might typically include a large girth, signs of crown retrenchment and hollowing of the stem

Vigour - The expression of carbohydrate expenditure to growth (in trees)

White-rot - A range of kinds of wood decay in which lignin, usually together with cellulose and other wood constituents, is degraded

Wind exposure - The degree to which a tree or other object is exposed to wind, both in terms of duration and velocity

Wind pressure - The force exerted by a wind on a particular object

Windthrow - The blowing over of a tree at its roots

APPENDIX 2 – BELMORE AIA (PLATEAU TREES)

Date: 28 September 2021

Re: Additional tree removal and pruning works at Belmore Station as part of the Southwest Metro Package.

At the request of Downer Group an onsite inspection was undertaken at Belmore Station. It has been asked to record additional tree removals and selective pruning works as part of the Southwest Metro Package. The assessed trees are not identified within the Arboricultural Impact Assessment (AIA) prepared by Urban Arbor, dated 17 December 2019, Ref 19/12/17/SWMMS. On the 7 April a site walkthrough was undertaken by myself under guidance of a Downer Group representative.

Twelve additional trees were identified for removal. These trees are in direct conflict with proposed piling (1), excavation works (2,3,4,6,8,9,10,11,12), realignment of the GST (7) and sewer (13). Two trees have been assessed for selective pruning works to create clearances to accommodate the works (5) and allow for site access (14). An aerial image of the site showing approximate tree locations can be found as Image 1. Tree data can be found as Appendix 1 of this report.

Trees identified for removal are considered to have low amenity and visual value given their size and location within the rail corridor. They are likely to be self-seeded specimens or regrowth off old stumps where previous tree removal works have been undertaken. Selective pruning works have been detailed in Appendix 3 of this report. All pruning works are to be undertaken by suitably qualified tree workers and meet the requirements of *AS4373-2007 Pruning of Amenity Trees*.

All appropriate approvals and consents are to be obtained prior to tree and vegetation removal works commencing. Given their size and location, it is felt that trees 2, 3, 4, 6, 7, 8, 9, 10, 11, 12 and 13 may be removed using an excavator without significant impact on tree 5.



Image 1: Aerial image of Belmore station showing approximate tree locations. Red dots indicate trees to be removed, green dots indicate trees to be pruned.

Tree 1 *Ligustrum sinensis* (Small-leafed Privet) is an identified species under the *Biosecurity Act 2015*. A general biosecurity duty exists within NSW to prevent, eliminate or minimise any biosecurity risk. The trees are not representative of a threatened or endangered species or ecological community.

Please feel free to contact me should you require any further assistance regarding this matter.

Regards.

Owen Tebbutt



Plateau Tree Service

Appendix 1: Tree assessment Schedule

Tree number	Tree name	Tree dimensions				Vigour	Condition	Age class	ULE	Amenity and Visual Value	Native or Exotic	TPZ (m)	SRZ (m)	Comments	Remove or Retain
	Botanical name Common name	Height (m)	Spread (m)	D.B.H. (mm)	D.A.B. (mm)										
1	<i>Ligustrum sinensis</i> (Small-leafed Privet)	5-10	2x2	200	300	N	F	M	R	L	E	2	1.5	Minimum TPZ and SRZ apply. Listed weed under Biosecurity Act 2015. Clash with Piling for anti-throw screens.	Remove
2	<i>Acacia</i> sp (Wattle)	<5	1x1	30,30	-	N	G	Y	S	L	N	2	1.5	Direct clash with permanent CSR route.	Remove
3	<i>Leptospermum</i> sp (Tee Tree)	<5	1x1	multi	-	N	G	Y	S	L	N	2	1.5	Direct clash with permanent CSR route.	Remove
4	<i>Unknown species</i>	<5	1x1	multi	-	N	G	Y	S	L	-	2	1.5	Direct clash with permanent CSR route.	Remove
5	<i>Acacia</i> sp (Wattle)	5-10	2x2	40,40,40	-	N	G	Y	S	L	N	2	1.5	Minimum TPZ and SRZ apply.	Retain and prune
6	<i>Acacia</i> sp (Wattle)	<5	1x1	20	-	N	G	Y	S	L	N	2	1.5	Direct clash with permanent CSR route.	Remove
7	<i>Eucalyptus robusta</i> (Swamp Mahogany)	5-10	2x2	90,90, 60,30,30	-	N	G	Y	S	L	N	2	1.5	Direct clash with permanent GST.	Remove
8	<i>Acacia</i> sp (Wattle)	<5	1x1	30,30	-	N	G	Y	S	L	N	2	1.5	Direct clash with permanent CSR route.	Remove
9	<i>Pittosporum undulatum</i> (Sweet Pittosporum)	<5	1x1	multi	-	N	G	Y	S	L	N	2	1.5	Direct clash with permanent CSR route.	Remove
10	<i>Acacia</i> sp (Wattle)	<5	1x1	20,20,20	-	N	G	Y	S	L	N	2	1.5	Direct clash with permanent CSR route.	Remove
11	<i>Acacia</i> sp (Wattle)	<5	1x1	15	-	N	G	Y	S	L	N	2	1.5	Direct clash with permanent CSR route.	Remove
12	<i>Acacia</i> sp (Wattle)	<5	1x1	40	-	N	G	Y	S	L	N	2	1.5	Direct clash with permanent CSR route.	Remove
13	<i>Eucalyptus robusta</i> (Swamp Mahogany)	5-10	2x2	60,60,40, 40	-	N	G	Y	S	L	N	2	1.5	Direct clash with permanent sewerage service.	Remove
14	<i>Eucalyptus robusta</i> (Swamp Mahogany)	10-15	7x7	450	550	N	G	M	M	M	N	5.4	2.57	Tree located within road reserve area adjacent rail corridor access gate	Retain and prune



CENTRAL / CITY

BANKSTOWN

TOBRUK AVENUE

BRIDGE ROAD

SITE BOUNDARY

Total impact to tree 1 due to direct clash with pile required for anti-throw screen.

PROVIDE NEW ANTI CLIMB SECURITY FENCE TO RAIL CORRIDOR REFER TO CE PNG 21300

REFER TO FOR LAND

PLATFORM 2

PLATFORM 1

EX. HERITAGE BUILDING

NEW ANTI-CLIMB SCREEN

EX. SAFETY RAIL

NEW ANTI-THROW SCREEN

EX. POWER TRAIN CURBING

EX. SAFETY RAIL

NEW ANTI-THROW SCREEN

EX. ROOF

EX. ADJUTMENT BOARD

EX. STAR CANOPY

REFER TO LANDSCAPE PNG 211000 FOR LANDSCAPE DESIGN

SITE BOUNDARY

REDMAN PARADE

LEGEND

- EXISTING WORKS TO BE RETAINED
- NEW WORKS - ARCHITECTURAL
- NEW WORKS - LANDSCAPE

NOTE:

- ALL CHANGES SHOWN ON THIS DRAWING REFER TO SYDNEY TRANS KILOMETRAGE.
- DRAWINGS MUST BE READ WITH THE HERITAGE INTERPRETATION PLAN AND HERITAGE IMPACT ASSESSMENT, AS WELL AS THE MITIGATION MEASURES IN THE A&P FOR CANTERBURY BASED ON ITS ARCHAEOLOGICAL POTENTIAL.
- CONSTRUCTION WOULD BE UNDERTAKEN IN ACCORDANCE WITH THE RELEVANT CONDITION OF APPROVAL (SSR) AND REVISED ENVIRONMENTAL MITIGATION MEASURES (SYDNEY) AND BANKSTOWN SUBMISSIONS AND PREPARED INFRASTRUCTURE REPORT.

FOR CONSTRUCTION

REV	DATE	DESCRIPTION	APPROVED FOR CONSTRUCTION	APPD
1	01/01/2020	ISSUED FOR CONSTRUCTION		
2	01/01/2020	ISSUED FOR CONSTRUCTION		
3	01/01/2020	ISSUED FOR CONSTRUCTION		
4	01/01/2020	ISSUED FOR CONSTRUCTION		
5	01/01/2020	ISSUED FOR CONSTRUCTION		
6	01/01/2020	ISSUED FOR CONSTRUCTION		
7	01/01/2020	ISSUED FOR CONSTRUCTION		
8	01/01/2020	ISSUED FOR CONSTRUCTION		
9	01/01/2020	ISSUED FOR CONSTRUCTION		
10	01/01/2020	ISSUED FOR CONSTRUCTION		

1:200 FULL SIZE A1

NOTE: Do not scale from this drawing

ALT. DRG NO. SMCSWSM/MTM/WBS-AT-DWG-211130

CLIENT



SERVICE PROVIDER
METRON T2M

DRAWN: J. DAVIS
DESIGNED: J. DAVIS
DRG CHECK: J. DAVIS
DESIGN CHECK: J. DAVIS
APPROVED: J. DAVIS

SYDNEY METRO

DELLAMORE STATION (13.688km to 14.028km Sydney Metro Kilometrage)

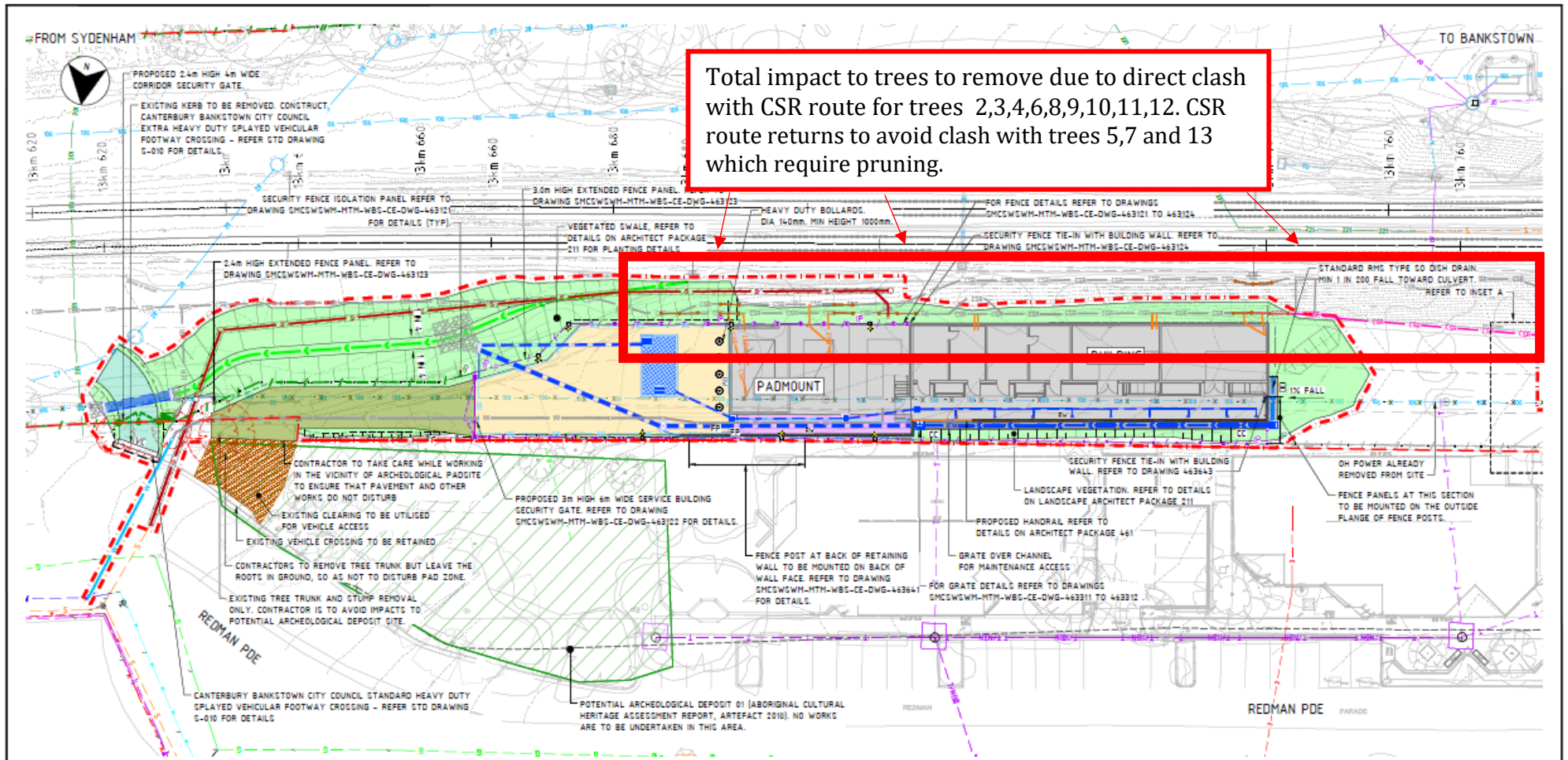
ARCHITECTURAL DIVISION
OVERALL ARRANGEMENT
SITE PLAN

STATUS: FOR CONSTRUCTION

DRG NO. SMCSWSM/MTM/WBS-AT-DWG-211120

SHEET 1 OF 1

REV 00

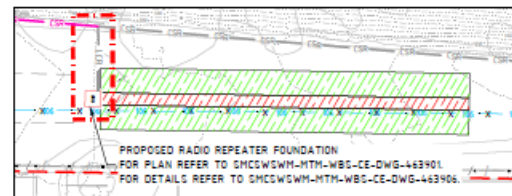


Total impact to trees to remove due to direct clash with CSR route for trees 2,3,4,6,8,9,10,11,12. CSR route returns to avoid clash with trees 5,7 and 13 which require pruning.

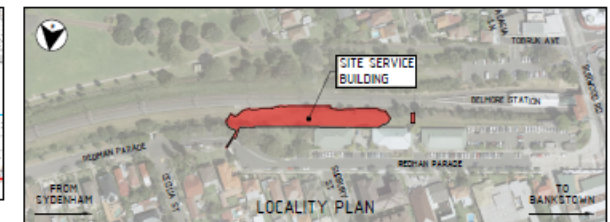
NOTES

- FOR GENERAL NOTES REFER TO DRAWINGS SMCSWSWM-MTH-WBS-CE-DWG-463104 TO 463107.
- FOR LEGEND REFER TO DRAWING SMCSWSWM-MTH-WBS-CE-DWG-463108 TO 463109.
- REFER TO STATION DESIGN PACKAGES FOR PLATFORM AND BUILDING WORKS.
- FOR PAVEMENT PLAN REFER TO DRAWING SMCSWSWM-MTH-WBS-CE-DWG-463161.
- FOR BULK EARTHWORKS CUT AND FILL PLAN REFER DRAWING SMCSWSWM-MTH-WBS-CE-DWG-463201.
- FOR BULK EARTHWORKS GRADING PLAN AND LONGITUDINAL SECTION REFER TO DRAWING SMCSWSWM-MTH-WBS-CE-DWG-463206.
- FOR DRAINAGE GENERAL ARRANGEMENT PLAN REFER TO DRAWING SMCSWSWM-MTH-WBS-CE-DWG-463301.
- FOR CSR GENERAL ARRANGEMENT PLAN REFER TO DRAWING SMCSWSWM-MTH-WBS-CE-DWG-463411. DO NOT REFER TO ANY OTHER GENERAL ARRANGEMENT PLANS FOR THE DESIGN AND EXTENTS OF CSR WORKS.
- FOR UTILITIES GENERAL ARRANGEMENT PLAN REFER TO DRAWING SMCSWSWM-MTH-WBS-CE-DWG-463501.
- FOR RETAINING WALL PLAN AND DETAILS, INCLUDING HANDRAIL DETAILS, REFER DRAWINGS SMCSWSWM-MTH-WBS-CE-DWG-463611 TO 464493.
- NO MACHINERY EXCAVATIONS ARE TO BE CARRIED OUT WITHIN 1M OFFSET FROM THE PAD (POTENTIAL ARCHEOLOGICAL DEPOSIT) ZONE.

PLAN
SCALE 1:500



INSET A
SCALE 1:200



REV	BY	DATE	DESCRIPTION	APPD
10	MC	31/03/2021	APPROVED FOR CONSTRUCTION	UP
11	MC	31/03/2021	APPROVED FOR CONSTRUCTION	UP
12	MC	31/03/2021	APPROVED FOR CONSTRUCTION	UP
13	MC	31/03/2021	APPROVED FOR CONSTRUCTION	UP
14	MC	31/03/2021	APPROVED FOR CONSTRUCTION	UP
15	MC	31/03/2021	APPROVED FOR CONSTRUCTION	UP
16	MC	31/03/2021	APPROVED FOR CONSTRUCTION	UP
17	MC	31/03/2021	APPROVED FOR CONSTRUCTION	UP
18	MC	31/03/2021	APPROVED FOR CONSTRUCTION	UP
19	MC	31/03/2021	APPROVED FOR CONSTRUCTION	UP
20	MC	31/03/2021	APPROVED FOR CONSTRUCTION	UP

SCALE	CLIENT
1:500 PULL SIZE A1	NSW sydney METRO
NOTE: Do not scale from this drawing	MT.DWG No: SMCSWSWM-MTH-WBS-CE-DWG-463110

DRAWING COLOUR CODED - PRINT ALL COPIES IN COLOUR

FOR CONSTRUCTION

SERVICE PROVIDERS	DESIGNER	CHECKER	APPROVED
METRON T2M	NSW	NSW	NSW
DESIGNED BY: G. LLOYD (C. STANFORD)	CHECKED BY: J. ALFORD	DESIGN CHECK: L. LEE	APPROVED: L. LEE

SYDNEY METRO	STATUS	SHEET	OF
BELMORE STATION - SERVICE BUILDING CIVIL ENGINEERING SERVICE BUILDING - CIVIL GENERAL ARRANGEMENT PLAN	FOR CONSTRUCTION	1	1
DWG No: SMCSWSWM-MTH-WBS-CE-DWG-463111	REV	00	

FROM SYDENHAM



PROPOSED 2.4m HIGH 4m WIDE
CORRIDOR SECURITY GATE.

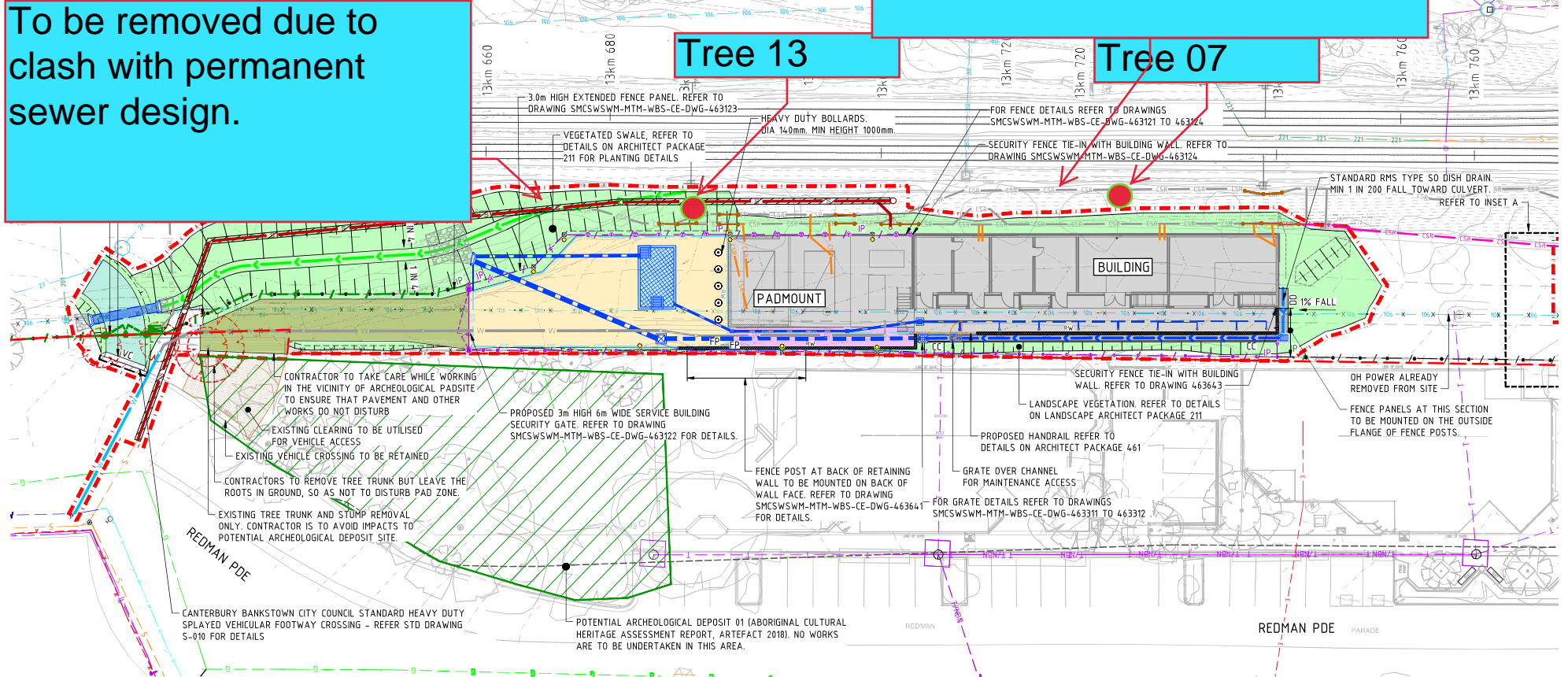
To be removed due to
clash with permanent
sewer design.

To be removed due to
permanent clash with GST.

Tree 13

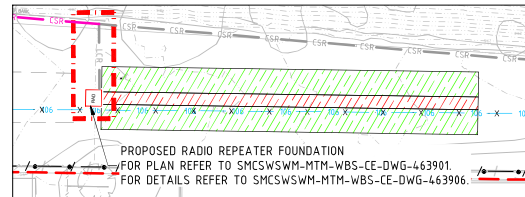
Tree 07

TO BANKSTOWN



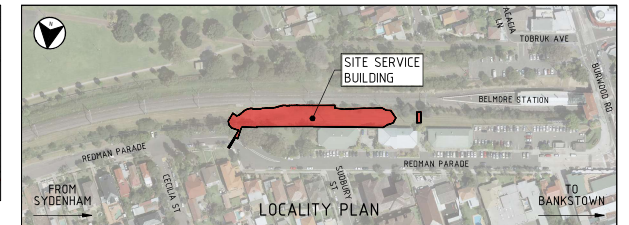
PLAN

SCALE 1:200



INSET A

SCALE 1:200



NOTES

- FOR GENERAL NOTES REFER TO DRAWINGS SMCSWSWM-MTM-WBS-CE-DWG-463104 TO 463107.
- FOR LEGEND REFER TO DRAWING SMCSWSWM-MTM-WBS-CE-DWG-463108 TO 463109.
- REFER TO STATION DESIGN PACKAGES FOR PLATFORM AND BUILDING WORKS.
- FOR PAVEMENT PLAN REFER TO DRAWING SMCSWSWM-MTM-WBS-CE-DWG-463161.
- FOR BULK EARTHWORKS CUT AND FILL PLAN REFER DRAWING SMCSWSWM-MTM-WBS-CE-DWG-463201.
- FOR BULK EARTHWORKS GRADING PLAN AND LONGITUDINAL SECTION REFER TO DRAWING SMCSWSWM-MTM-WBS-CE-DWG-463206.
- FOR DRAINAGE GENERAL ARRANGEMENT PLAN REFER TO DRAWING SMCSWSWM-MTM-WBS-CE-DWG-463301.
- FOR CSR GENERAL ARRANGEMENT PLAN REFER TO DRAWING SMCSWSWM-MTM-WBS-CE-DWG-463411. DO NOT REFER TO ANY OTHER GENERAL ARRANGEMENT PLANS FOR THE DESIGN AND EXTENTS OF CSR WORKS.
- FOR UTILITIES GENERAL ARRANGEMENT PLAN REFER TO DRAWING SMCSWSWM-MTM-WBS-CE-DWG-463501.
- FOR RETAINING WALL PLAN AND DETAILS, INCLUDING HANDRAIL DETAILS, REFER DRAWINGS SMCSWSWM-MTM-WBS-CE-DWG-463611 TO 464643.
- NO MACHINERY EXCAVATIONS ARE TO BE CARRIED OUT WITHIN 1M OFFSET FROM THE PAD (POTENTIAL ARCHEOLOGICAL DEPOSIT) ZONE.

SCALES



1:200 FULL SIZE A1

CLIENT



DRAWING COLOUR CODED - PRINT ALL COPIES IN COLOUR

FOR CONSTRUCTION

SERVICE PROVIDERS

METRON T2M

DRAWN: M. FORTU
DESIGNED: G. LUDLOE STANFORD
DRG CHECK: P. ALFORD
DESIGN CHECK: J. LEE
APPROVED: L. PALMER
21.03.2021

SYDNEY METRO

BELMORE STATION - SERVICE BUILDING
CIVIL ENGINEERING
SERVICE BUILDING - CIVIL
GENERAL ARRANGEMENT PLAN

STATUS: FOR CONSTRUCTION

SHEET 1 OF 1

DRG No: SMCSWSWM-MTM-WBS-CE-DWG-463111

REV: 00

REV	BY	DATE	DESCRIPTION	APPD
00	MC	31.03.2021	APPROVED FOR CONSTRUCTION	

A1 Original Co-ordinate System: MGA Zone 56 Height Datum: A.H.D. This sheet may be prepared using colour and may be incomplete if copied

NOTE: Do not scale from this drawing.

ALT.DWG No: SMCSWSWM-MTM-WBS-CE-DWG-463111 0

Appendix 2: Site Photographs

Photograph 1: Tree 1 *Ligustrum sinensis* (Small-leaved Privet) to be removed for pilling works adjacent rail bridge.



Photograph 2: Trees 2 *Acacia* sp (Wattle), 3 *Leptospermum* sp (Tee Tree) and 4 Unknown species to be removed for MSB works.



Photograph 3: Tree 5 *Acacia* sp (Wattle) to be selectively pruned for clearance along the embankment.



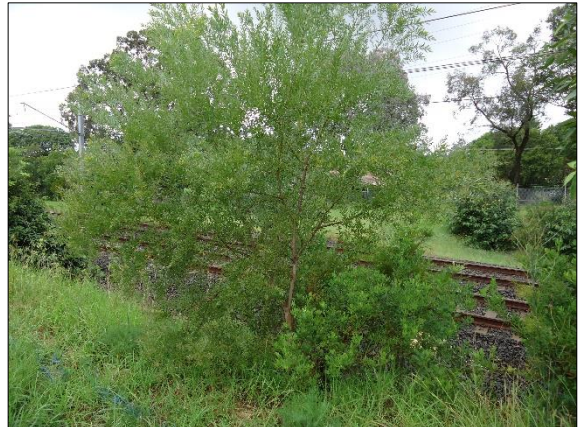
Photograph 4: Tree 6 *Acacia* sp (Wattle) to be removed for MSB works.



Photograph 5: Tree 7 *Eucalyptus robusta* (Swamp Mahogany) to be removed to accommodate the new GST alignment.



Photograph 6: Tree 8 *Acacia* sp (Wattle) to be removed for MSB works.



Photograph 7: Tree 9 *Pittorporum undulatum* (Sweet Pittosporum) to be removed for MSB works.



Photograph 8: Tree 10 *Acacia* sp (Wattle) to be removed for MSB works.



Photograph 9: Trees 11 and 12 *Acacia* sp (Wattle) to be removed for MSB works.



Photograph 10: Tree 13 *Eucalyptus robusta* (Swamp Mahogany) to be removed to accommodate the new sewer alignment.



Photograph 11: Tree 14 *Eucalyptus robusta* (Swamp Mahogany) located within road reserve to be selectively pruned for site access clearances.



Appendix 3: Identified Selective Pruning Works



Tree 5 *Acacia* sp (Wattle) identified pruning involves the removal of approximately four branches up to 20mm in diameter and constitutes <10% of the total canopy volume. The pruning is not expected to have a significant impact upon the remaining stems.



Tree 14 *Eucalyptus robusta* (Swamp Mahogany) identified pruning involves the removal of one first order branch at 2m height. The branch is approximately 300mm in diameter and constitutes 30% of the total canopy volume of the tree. A reduction in tree growth and physiological function can be expected as a result of the pruning works. Exposure of internal woody tissues at the site of the final pruning cut shall be susceptible to infection by decay causing fungi. The removal of the branch is not considered to significantly affect vocal amenity.

Appendix 4: Tree Assessment Criteria

Tree number: Identifying number given to individual (or group) trees.

Botanical Name: Latin name for tree showing genus and species.

Common Name: The common name given to the tree.

Tree Dimensions: The physical dimensions of the tree.

- **Height:** Estimated or measured height of tree in meters.
- **Spread:** Estimated or measured radial canopy spread of tree in meters.
- **Diameter at Breast Height (DBH):** The estimated or measured diameter of trunk given in mm measured at 1.4m from ground.
- **Diameter Above Base (DAB):** The estimated or measured diameter of trunk given in mm measured above the root flare. Used to calculate the structural root zone of the tree.

Age Class: An estimation of how old the tree is in relation to its life expectancy.

- **Young** – Age less than 20% of life expectancy of tree in situ
- **Mature** – Age 20% - 80% of life expectancy of tree in situ
- **Old** – Age greater than 80% of life expectancy of tree in situ
- **Dead** – Tree is dead

Vigour: Ability of a tree to sustain its life processes. This is independent of the condition of a tree but may impact upon it. Vigour can appear to alter rapidly with change of seasons (seasonality) e.g., dormant, deciduous or semi-deciduous trees. Vigour can be categorised as Dormant, Low, Normal and High.

- **Dormant Vigour** – Determined by the existing turgidity in the lower order branches in the outer extremity of the crown, with good bud set and formation, and where the last extension growth is distinct from those most recently preceding it, evident by bud scale scars. Normal vigour during dormancy is achieved when such growth is evident on a majority of branches throughout the crown.
- **Low Vigour** – Reduced ability of a tree to sustain its life processes. This may be evident by the atypical growth of leaves, reduced crown cover and reduced crown density, branches, roots and trunk, and a deterioration of their functions with reduced resistance to predation. This is independent of the condition of a tree but may impact upon it, and especially the ability of a tree to sustain itself against predation.
- **Normal Vigour** – Ability of a tree to maintain and sustain its life processes. This may be evident by the typical growth of leaves, crown cover and crown density, branches, roots and trunk and resistance to predation. This is independent of the condition of a tree but may impact upon it, and especially the ability of a tree to sustain itself against predation.
- **High Vigour** – Accelerated growth of a tree due to incidental or deliberate artificial changes to its growing environment that are seemingly beneficial, but may result in premature aging or failure if the favourable conditions cease, or promote prolonged senescence if the favourable conditions remain, e.g. water from a leaking pipe, water and nutrients from a leaking or disrupted sewer pipe, nutrients from animal waste, a tree growing next to a chicken coop, or a stock feed lot, or a regularly used stockyard, a tree subject to stringent watering and fertilisation program, or some trees may achieve an extended lifespan from continuous pollarding practices over the life of the tree.

Condition: A tree's crown form and growth habit, as modified by its environment (aspect, suppression by other trees, soils) the stability and viability of the root plate, trunk and structural branches (first (1st) and possibly (2nd) order branches), including structural defects such as wounds, cavities or hollows, crooked trunk or weak trunk/branch junctions and the effects of predation by pests and diseases. These may not be directly connected with vigour and it is possible for a tree to be of normal vigour but in poor condition. Condition can be categorised as Dead, Poor, Fair and Good.

- **Dead Condition** – Tree is no longer capable of performing any of the following processes or is exhibiting any of the following symptoms; Photosynthesis via its foliage crown (as indicated by the presence of moist, green or other coloured leaves), Osmosis (the ability of the roots system to take up water), Turgidity (the ability of the plant to sustain moisture pressure in its cells), Epicormic shoots or epicormic strands in Eucalypts (the production of new shoots as a response to stress, generated from latent or adventitious buds or from a lignotuber), Permanent leaf loss, Permanent leaf wilting (the loss of turgidity which is marked by desiccation of stems leaves and roots), Abscission of the epidermis (bark desiccates and peels off to the beginning of the sap wood).
- **Poor Condition** – Tree is of good habit or misshapen, a form that may be severely restricted for space and light, exhibits symptoms of advanced and irreversible decline such as fungal, or bacterial infestation, major die-back in the branch and foliage crown, structural deterioration from insect damage e.g. termite infestation, or storm damage or lightning strike, ring barking from borer activity in the trunk, root damage or instability of the tree, or damage from physical wounding impacts or abrasion, or from altered local environmental conditions and has been unable to adapt to such changes and may decline further to death regardless of remedial works or other modifications to the local environment that would normally be sufficient to provide for its basic survival if in good to fair condition. Deterioration physically, often characterised by a gradual and continuous reduction in vigour but may be independent of a change in vigour, but characterised by a proportionate increase in susceptibility to, and predation by pests and diseases against which the tree cannot be sustained. Such conditions may also be evident in trees of advanced senescence due to normal phenological processes, without modifications to the growing environment or physical damage having been inflicted upon the tree. This may be independent from, or contributed to by vigour.
- **Fair Condition** – Tree is of good habit or misshapen, a form not severely restricted for space and light, has some physical indication of decline due to the early effects of predation by pests and diseases, fungal, bacterial, or insect infestation, or has suffered physical injury to itself that may be contributing to instability or structural weaknesses, or is faltering due to the modification of the environment essential for its basic survival. Such a tree may recover with remedial works where appropriate, or without intervention may stabilise or improve over time, or in response to the implementation of beneficial changes to its local environment. This may be independent from, or contributed to by vigour.
- **Good Condition** – Tree is of good habit, with crown form not severely restricted for space and light, physically free from the adverse effects of predation by pests and diseases, obvious instability or structural weaknesses, fungal, bacterial or insect infestation and is expected to continue to live in much the same condition as at the time of inspection provided conditions around it for its basic survival do not alter greatly. This may be independent from, or contributed to by vigour.

Useful Life Expectancy (ULE) ULE is the length of time that the arborist assesses an individual tree can be retained with an acceptable level of risk based on the information available at the time of inspection. It is a snapshot in time of the potential an individual tree has for survival in the eyes of the assessor. ULE is not static – it is closely related to tree health and the surrounding conditions. Alterations in these variables may result in changes to the ULE assessment. Consequently, the reliability all ULE assessments have will decrease as time passes from the initial assessment and the potential for changes in variables increases.

- **Remove** – Trees that should be removed within the next 5 years
- **Short** – Trees that appear to be retainable at the time of the assessment for 5-15 years with an acceptable level of risk.
- **Medium** – Trees that appear to be retainable at the time of the assessment for 15-40 years with an acceptable level of risk.
- **Long** – Trees that appear to be retainable at the time of the assessment for 40+ years with an acceptable level of risk.

Amenity and Visual Value – For the purposes of assessing the visual and landscape value of each tree the IACA Significance of a Tree, Assessment Rating System (STARS) © (IACA 2010) © has been adopted. - The landscape significance of a tree is an essential criterion to establish the importance that a particular tree may have on a site. The system uses a scale of High, Medium and Low significance in the landscape.

High significance in landscape

- The tree is in good condition and good vigour
- The tree has a form typical for the species
- The tree is a remnant or is a planted locally indigenous specimen and/or is rare or uncommon in the local area or of botanical interest or of substantial age
- The tree is listed as a heritage item, threatened species or part of an endangered ecological community or listed on council's significant tree register
- The tree is visually prominent and visible from a considerable distance when viewed from most directions within the landscape due to its size and scale and makes a positive contribution to the local amenity
- The tree supports social and cultural sentiments or spiritual associations, reflected by the broader population or community group or has commemorative values
- The tree's growth is unrestricted by above and below ground influences, supporting its ability to reach dimensions typical for the taxa in situ – tree is appropriate to the site conditions

Medium significance in landscape

- The tree is in fair-good condition and good or low vigour
- The tree has form typical or atypical of the species
- The tree is a planted locally indigenous or a common species with its taxa commonly planted in the local area
- The tree is visible from surrounding properties, although not visually prominent as partially obstructed by other vegetation or buildings when viewed from the street
- The tree provides a fair contribution to the visual character and amenity of the local area
- The tree's growth is moderately restricted by above or below ground influences, reducing its ability to reach dimensions typical for the taxa in situ

Low significance in landscape

- The tree is in fair-poor condition and good or low vigour
- The tree has form atypical of the species
- The tree is not visible or is partly visible from the surrounding properties as obstructed by other vegetation or buildings
- The tree provides a minor contribution or has a negative impact on the visual character and amenity of the local area
- The tree is a young specimen which may or may not have reached dimensions to be protected by local Tree Preservation Orders or similar protection mechanisms and can easily be replaced with a suitable specimen
- The tree's growth is severely restricted by above or below ground influences, unlikely to reach dimensions typical for the taxa in situ – tree is inappropriate to the site conditions
- The tree is listed as exempt under the provisions of the local Council Tree Preservation Order or similar protection mechanisms
- The tree has a wound or defect that has the potential to become structurally unsound
- **Environmental Pest / Noxious Weed Species**
- The tree is an environmental pest species due to its invasiveness or poisonous/allergenic properties.
- The tree is a declared noxious weed by legislation
- **Hazardous / Irreversible Decline**
- The tree is structurally unsound and/or unstable and is considered potentially dangerous
- The tree is dead, or is in irreversible decline, or has the potential to fail or collapse in full or in part in the immediate to short term

The tree is to have a minimum of three (3) criteria in a category to be classified in that group.

In the development of this document IACA acknowledges the contribution and original concept of the Footprint Green Tree Significance & Retention Value Matrix, developed by Footprint Green Pty Ltd in June 2010.

The Australian Standard 4970-2009 Protection of Trees on Development Sites defines the requirements for assessing trees with respect to development. It provides the guidance on how to decide which trees are appropriate for retention and on the means of protecting them during construction works. It describes the areas and offsets, referred to as the Tree Protection Zone (TPZ) and Structural Root Zone (SRZ) required to be free from development works to maintain tree vitality and stability. This report has been prepared in accordance with the conditions set out within the standard.

- **Tree Protection Zone** – The tree protection zone is defined as a specified area above and below ground set aside for the protection of the tree's roots and crown. It is expressed as a radial measurement taken from the centre of the trunk at ground level.
- **Structural Root Zone** – The structural root zone is defined as a specified area around the base of a tree required to maintain its stability within the ground. It is expressed as a radial measurement taken from the center of the trunk at ground level. Excavation and development works are not recommended within the structural root zone unless additional investigation as to root size and location is undertaken

APPENDIX 2.1 – BELMORE AIA (PLATEAU TREES)

Date: 20 May 2021

Re: Additional tree removal and pruning works at Belmore Station as part of the Southwest Metro Package.

At the request of Downer Group an onsite inspection was undertaken at Belmore Station. It has been asked to record additional tree removals and selective pruning works as part of the Southwest Metro Package. The assessed trees are not identified within the Arboricultural Impact Assessment (AIA) prepared by Urban Arbor, dated 17 December 2019, Ref 19/12/17/SWMMS. On the 19 May a site walkthrough was undertaken by myself under guidance of a Downer Group representative.

Eight additional trees were assessed with respects to the proposed works. Their locations are shown within Figure 1. Trees 1 and 2 have been identified for removal. Trees 3, 4, 5, 6, 7 and 8 have been identified for selective pruning works. Additional controls with respects to undertaking excavation works within the TPZ of tree 3 have been provided. Tree data can be found as Appendix 1 of this report.

It was advised by Downer Group that two trees being a Swamp Mahogany, tree 1, and a Brown Pine, tree 2, are to be removed. Both trees were considered to be in good health and have medium useful life expectancies of 15 to 40 years. These trees are located within the road reserve area adjacent to the rail corridor and form part of the existing streetscape. Their removal, in particular the Swamp Mahogany is likely to be visually significant. The Swamp Mahogany and Brown Pine are not representative of an endangered or threatened species or ecological community. Photographs 1 and 2 show these trees.



Image 1: Aerial image of Belmore station showing the approximate locations of assessed trees. (Source: Six Maps accessed 20/05/2021).

The new GST is aligned past tree 3, Camphor Laurel and shall require the removal of the suckers and epicormics from around the base of its trunk. Any excavation within 6m of the trunk (refer to **Appendix 1** Tree Assessment Schedule for TPZ offset) to install the troughing posts is to be undertaken using methods that do not damage tree roots. There is to be enough flexibility in the GST's design and alignment to reposition posts if roots greater than 30mm in diameter are exposed within the excavations. Although commonly regarded as a weed species this specimen is protected under local tree preservation controls due to its height. Photographs 3 and 4 show the tree and suckering around the base of the trunk to be removed.

The placement of site sheds and amenities, adjacent the southern side of the rail corridor, is within the protection zones of trees 5, 6, 7, 8 and 9. Whilst their placement is not thought to pose a significant risk to the ongoing health and condition of the trees selective pruning works have been identified to remove and reduce overhanging branches. These pruning works are considered to be minor, require less than 10% of the total canopy volume of each individual tree to be removed and are restricted to branches less than

50mm in diameter. The pruning works shall allow for the removal of the sheds upon completion of the project. Additional selective pruning works are expected to be required to tree 8 to accommodate the installation of overhead electrical services. These pruning works are to be undertaken upon installation of the new pole within the compound area to ensure correct clearance requirements are met. Only the minimal amount of pruning is to be undertaken to achieve the required outcome. Photographs 5 to 9 shows each tree to be pruned. Where possible branches have been identified for removal within the photographs.

All appropriate approvals and consents are to be obtained prior to tree and vegetation removal works commencing. All tree pruning and removal works are to be undertaken by suitably qualified tree workers and in accordance with *AS4373-2007 Pruning of Amenity Trees* and the Safe Work Australia's Guide to Managing Risks of Tree Trimming and Removal Works.

Please feel free to contact me should you require any further assistance regarding this matter.

Regards.

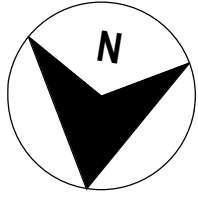
Owen Tebbutt



Consulting Arborist
Plateau Tree Service

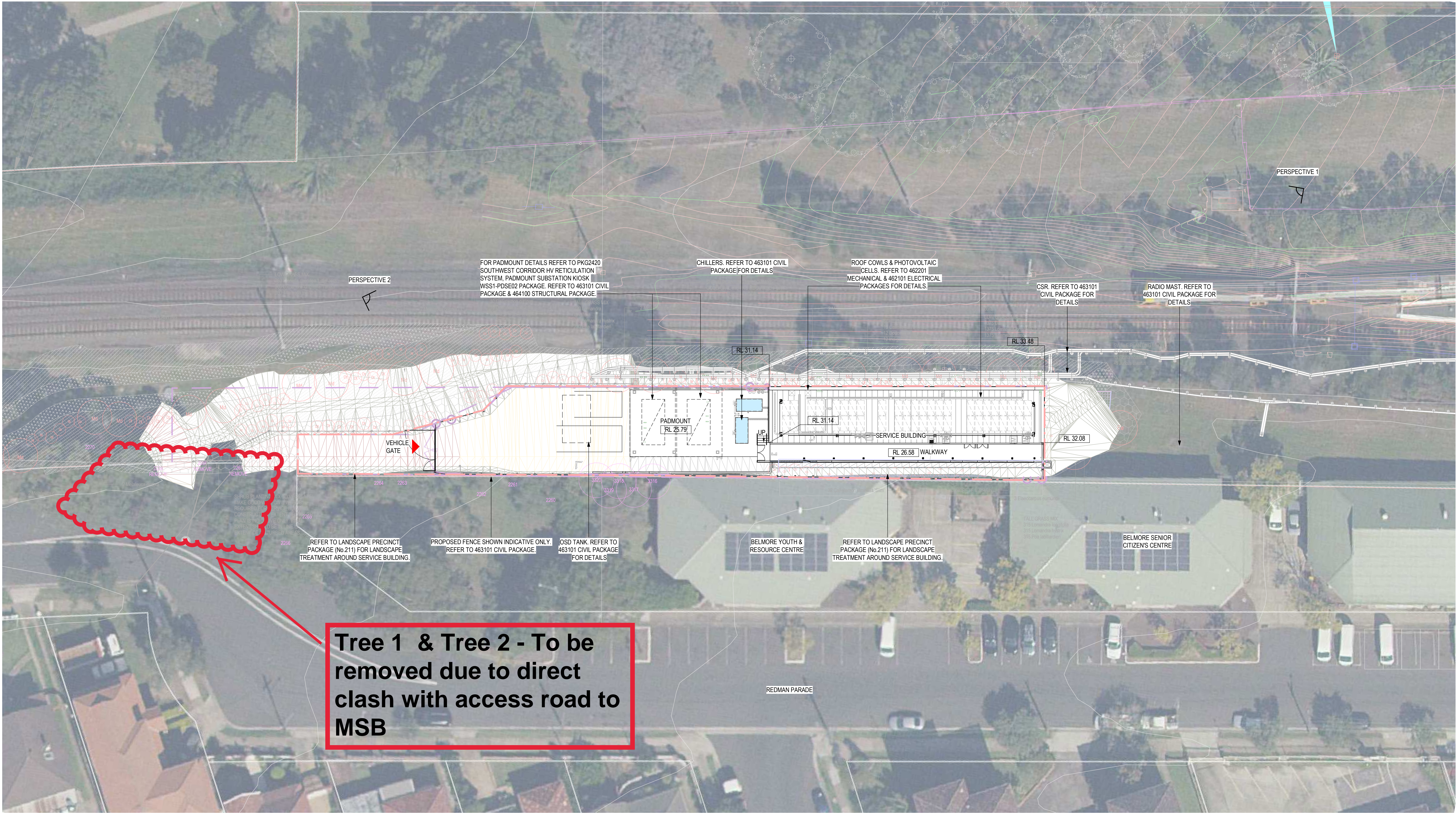
Appendix 1: Tree assessment Schedule

Tree number	Tree name	Tree dimensions				Vigour	Condition	Age class	ULE	Amenity and Visual Value	Native or Exotic	TPZ (m)	SRZ (m)	Comments	Remove or Retain
	Botanical name Common name	Height (m)	Spread (m)	D.B.H. (mm)	D.A.B. (mm)										
1	<i>Eucalyptus robusta</i> (Swamp Mahogany)	15-20	6x6	600	750	N	G	M	M	M	N	7.2	2.93	Tree located within road reserve area. Tree to be removed due to direct clash with permanent design access road to MSB.	Remove
2	<i>Podocarpus elatus</i> (Brown Pine)	10-15	3x3	200 230 250 300	500	N	G	M	M	M	N	6	2.47	Tree located within road reserve area. Tree to be removed due to direct clash with permanent design access road to MSB.	Remove
3	<i>Cinnamomum camphora</i> Camphor Laurel)	15-20	6x6	500	600	N	F	M	S	M	E	6	2.67	Negligible impacts of establishing site shed within TPZ.	Retain and prune
4	<i>Callistemon salignus</i> (Willow Bottlebrush)	5-10	4x4	300 200 400	800	N	G	M	S	M	N	6.48	3.01	Negligible impacts of establishing site shed within TPZ.	Retain and prune
5	<i>Leptospermum petersonii</i> (Lemon-scented Tee Tree)	5-10	3x3	200	300	N	G	M	S	M	N	2.4	2	Negligible impacts of establishing site shed within TPZ.	Retain and prune
6	<i>Leptospermum petersonii</i> (Lemon-scented Tee Tree)	5-10	3x3	300	400	N	G	M	S	M	N	3.6	2.25	Negligible impacts of establishing site shed within TPZ.	Retain and prune
7	<i>Leptospermum petersonii</i> (Lemon-scented Tee Tree)	5-10	3x3	150 150 150 200	500	N	G	M	S	M	N	4.32	2.47	Negligible impacts of establishing site shed within TPZ.	Retain and prune
8	<i>Leptospermum petersonii</i> (Lemon-scented Tee Tree)	1-5	2x2	200	250	N	G	M	S	M	N	2.4	1.85	Negligible impacts of establishing site shed within TPZ.	Retain and prune



CENTRAL / CITY

BANKSTOWN



FOR CONSTRUCTION

00	BN	31/03/2021	APPROVED FOR CONSTRUCTION	LP
REV	BY	DATE	DESCRIPTION	APPD.
A1	Original		Co-ordinate System: MGA Zone 56	
			Height Datum: A.H.D.	
			This sheet may be prepared using colour and may be incomplete if copied	



NOTE: Do not scale from this drawing. ALT. DRG No. SMCSWSWM-MTM-WBS-AT-DWG-461120

CLIENT



The information shown on this drawing is for the purposes of the Sydney Metro Project only. No warranty is given or implied as to its suitability for any other purpose. The Service Providers accept no liability arising from the use of this drawing and the information shown thereon for any purpose other than the Sydney Metro Project.

SERVICE PROVIDERS

METRON T2M

DRAWN: E. GUYOT
DESIGNED: B. NOVANTO
DRG CHECK: M. LODGE
DESIGN CHECK: G. DAVIES
APPROVED: L. PALMER

31/03/2021

SYDNEY METRO

BELMORE
ARCHITECTURAL
OVERALL ARRANGEMENT
SITE PLAN - SERVICE BUILDING

STATUS: FOR CONSTRUCTION

SHEET 1 OF 1

©

DRG No. SMCSWSWM-MTM-WBS-AT-DWG-461120

REV. 00

Appendix 2: Site Photographs

Photograph 1: Tree 1 *Eucalyptus robusta* (Swamp Mahogany) to be removed due to direct clash with permanent design access road to MSB.



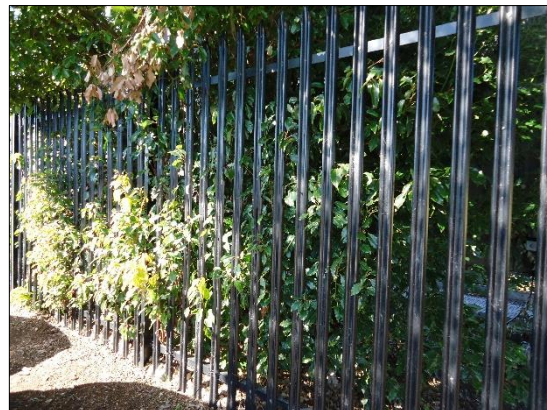
Photograph 2: Tree 2 *Podocarpus elatus* (Brown Pine) to be removed due to direct clash with permanent design access road to MSB.



Photograph 3: Tree 3 *Cinnamomum camphora* (Camphor Laurel) within northern side of rail corridor.



Photograph 4: Suckering around the base of tree 3 is to be removed to allow for the proposed alignment of the new GST.



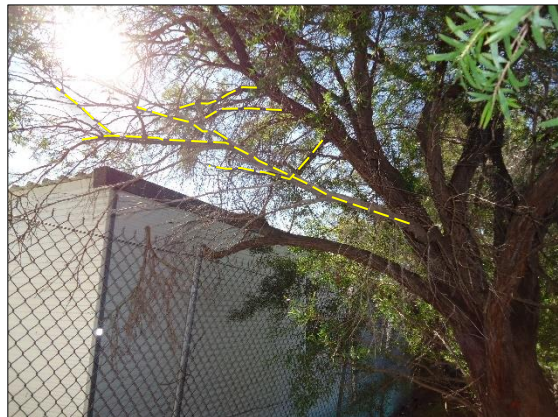
Photograph 5: Tree 4 *Callistemon slaignus* (Weeping Bottlebrush) to be selectively pruned to clear site sheds.



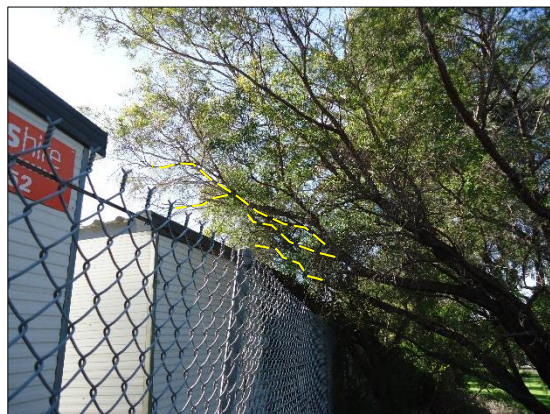
Photograph 6: Tree 5 *Leptospermum petersonii* (Lemon-scented Tee Tree) to be selectively pruned to clear site sheds.



Photograph 7: Tree 6 *Leptospermum petersonii* (Lemon-scented Tee Tree) to be selectively pruned to clear site sheds.



Photograph 8: Tree 7 *Leptospermum petersonii* (Lemon-scented Tee Tree) to be selectively pruned to clear site sheds. Additional pruning shall be required to provide clearances to new over head cabling.



Photograph 9: Tree 8 *Leptospermum petersonii* (Lemon-scented Tee Tree) to be selectively pruned to clear site sheds.



Appendix 3: Tree Assessment Criteria

Tree number: Identifying number given to individual (or group) trees.

Botanical Name: Latin name for tree showing genus and species.

Common Name: The common name given to the tree.

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- **Good Condition** – Tree is of good habit, with crown form not severely restricted for space and light, physically free from the adverse effects of predation by pests and diseases, obvious instability or structural weaknesses, fungal, bacterial or insect infestation and is expected to continue to live in much the same condition as at the time of inspection provided conditions around it for its basic survival do not alter greatly. This may be independent from, or contributed to by vigour.

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- The tree is in good condition and good vigour
- The tree has a form typical for the species
- The tree is a remnant or is a planted locally indigenous specimen and/or is rare or uncommon in the local area or of botanical interest or of substantial age
- The tree is listed as a heritage item, threatened species or part of an endangered ecological community or listed on council's significant tree register
- The tree is visually prominent and visible from a considerable distance when viewed from most directions within the landscape due to its size and scale and makes a positive contribution to the local amenity
- The tree supports social and cultural sentiments or spiritual associations, reflected by the broader population or community group or has commemorative values
- The tree's growth is unrestricted by above and below ground influences, supporting its ability to reach dimensions typical for the taxa in situ – tree is appropriate to the site conditions

Medium significance in landscape

- The tree is in fair-good condition and good or low vigour
- The tree has form typical or atypical of the species
- The tree is a planted locally indigenous or a common species with its taxa commonly planted in the local area
- The tree is visible from surrounding properties, although not visually prominent as partially obstructed by other vegetation or buildings when viewed from the street
- The tree provides a fair contribution to the visual character and amenity of the local area
- The tree's growth is moderately restricted by above or below ground influences, reducing its ability to reach dimensions typical for the taxa in situ

Low significance in landscape

- The tree is in fair-poor condition and good or low vigour
- The tree has form atypical of the species
- The tree is not visible or is partly visible from the surrounding properties as obstructed by other vegetation or buildings
- The tree provides a minor contribution or has a negative impact on the visual character and amenity of the local area
- The tree is a young specimen which may or may not have reached dimensions to be protected by local Tree Preservation Orders or similar protection mechanisms and can easily be replaced with a suitable specimen
- The tree's growth is severely restricted by above or below ground influences, unlikely to reach dimensions typical for the taxa in situ – tree is inappropriate to the site conditions
- The tree is listed as exempt under the provisions of the local Council Tree Preservation Order or similar protection mechanisms
- The tree has a wound or defect that has the potential to become structurally unsound
- **Environmental Pest / Noxious Weed Species**
- The tree is an environmental pest species due to its invasiveness or poisonous/allergenic properties.
- The tree is a declared noxious weed by legislation
- **Hazardous / Irreversible Decline**
- The tree is structurally unsound and/or unstable and is considered potentially dangerous
- The tree is dead, or is in irreversible decline, or has the potential to fail or collapse in full or in part in the immediate to short term

The tree is to have a minimum of three (3) criteria in a category to be classified in that group.

In the development of this document IACA acknowledges the contribution and original concept of the Footprint Green Tree Significance & Retention Value Matrix, developed by Footprint Green Pty Ltd in June 2010.

The Australian Standard 4970-2009 Protection of Trees on Development Sites defines the requirements for assessing trees with respect to development. It provides the guidance on how to decide which trees are appropriate for retention and on the means of protecting them during construction works. It describes the areas and offsets, referred to as the Tree Protection Zone (TPZ) and Structural Root Zone (SRZ) required to be free from development works to maintain tree vitality and stability. This report has been prepared in accordance with the conditions set out within the standard.

- **Tree Protection Zone** – The tree protection zone is defined as a specified area above and below ground set aside for the protection of the tree's roots and crown. It is expressed as a radial measurement taken from the centre of the trunk at ground level.
- **Structural Root Zone** – The structural root zone is defined as a specified area around the base of a tree required to maintain its stability within the ground. It is expressed as a radial measurement taken from the center of the trunk at ground level. Excavation and development works are not recommended within the structural root zone unless additional investigation as to root size and location is undertaken

APPENDIX 2.2 – BELMORE AIA (PLATEAU TREES)

Downer
T3 Trinita Business Campus
39 Delhi Road
North Ryde
NSW 2113

Date: 27 April 2022

Re: Additional tree removal works at Belmore Station as part of the Southwest Metro Package.

At the request of Downer Group an onsite inspection was undertake at Belmore Station. It has been asked to record four additional tree removals associated with landscaping works as part of the Southwest Metro Package. Three of the assessed trees (660, 665 and 666) are identified within the Arboricultural Impact Assessment (AIA) prepared by Urban Arbor, dated 17 December 2019, Ref 19/12/17/SWMMS. One of the trees is not identified within the AIA.

On the 26 April a site walkthrough was undertaken by myself under guidance of a Downer Group representative. Trees 660, 665 and 666 were identified as *Robinia pseudoacacia* 'Frisia' (Golden Robinia). The remaining tree was identified as a *Grevillea* cultivar. The trees are identified for removal within the Landscape Design Demolition Plan, Sheet 1, drawing No SMCSWSWM-MTM-WBS-LA-DWG-21102.

The four trees are located at the corner of Burwood Road and Tobruk Avenue within the existing reserve/parkland area. Trees 660, 665 and 666 all showed indicators of declining health and condition, likely as a result of their species type,

age class and growing environment. As such they have been assessed as having a short useful life expectancy of 5 to 15 years. Although showing good health and condition the Grevillea has also been assessed as having a short useful life expectancy based upon its species type. Trees 660, 665 and 666 are considered to have medium amenity and visual value given their size and location. The Grevillea is considered to have low amenity and visual value based upon its size. Data collected during the site inspection can be found as Appendix 1, photographs of the trees can be found as Appendix 2. The criteria by which the trees have been assessed can be found as Appendix 3. The assessed trees are not representative of a threatened or endangered species or vegetation community.

All appropriate approvals and consents are to be obtained prior to tree and vegetation removal works commencing.

Please feel free to contact me should you require any further assistance regarding this matter.

Regards.

Owen Tebbutt



Plateau Tree Service

Appendix 1: Tree assessment Schedule

Tree number	Tree name	Tree dimensions				Vigour	Condition	Age class	ULE	Amenity and Visual Value	Native or Exotic	TPZ (m)	SRZ (m)	Comments	Remove or Retain
	Botanical name Common name	Height (m)	Spread (m)	D.B.H. (mm)	D.A.B. (mm)										
660	<i>Robinia pseudoacacia</i> 'Frisia' (Golden Robinia)	5-10	2x2	200	300	N	F	M	S	M	E	2.4	2	Dieback and deadwood indicate tree is under stress conditions and in initial stages of decline.	Remove
665	<i>Robinia pseudoacacia</i> 'Frisia' (Golden Robinia)	5-10	3x3	200	300	N	F	M	S	M	E	2.4	2	Dieback and deadwood indicate tree is under stress conditions and in initial stages of decline.	Remove
666	<i>Robinia pseudoacacia</i> 'Frisia' (Golden Robinia)	5-10	3x3	200 150	350	N	F	M	S	M	E	3	2.13	Wound are observed within trunk. Degraded and cracked internal woody tissues observed. Dieback and deadwood indicate tree is under stress conditions and is in a state of decline. Damage observed on stems.	Remove
-	<i>Grevillea</i> sp (Grevillia)	1-5	2x2	150	180	N	G	M	S	L	N	2	1.5	Tree not identified within existing arboricultural report. To removed due to clash with permanent landscape design.	Remove

Appendix 2: Site Photographs



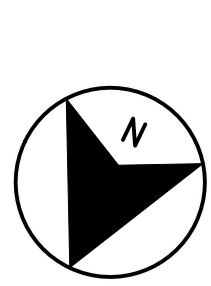
Photograph 1: Tree 665 and 666 as seen from within the site.



Photograph 2: Tree 660 and the Grevillea as seen from within the site.

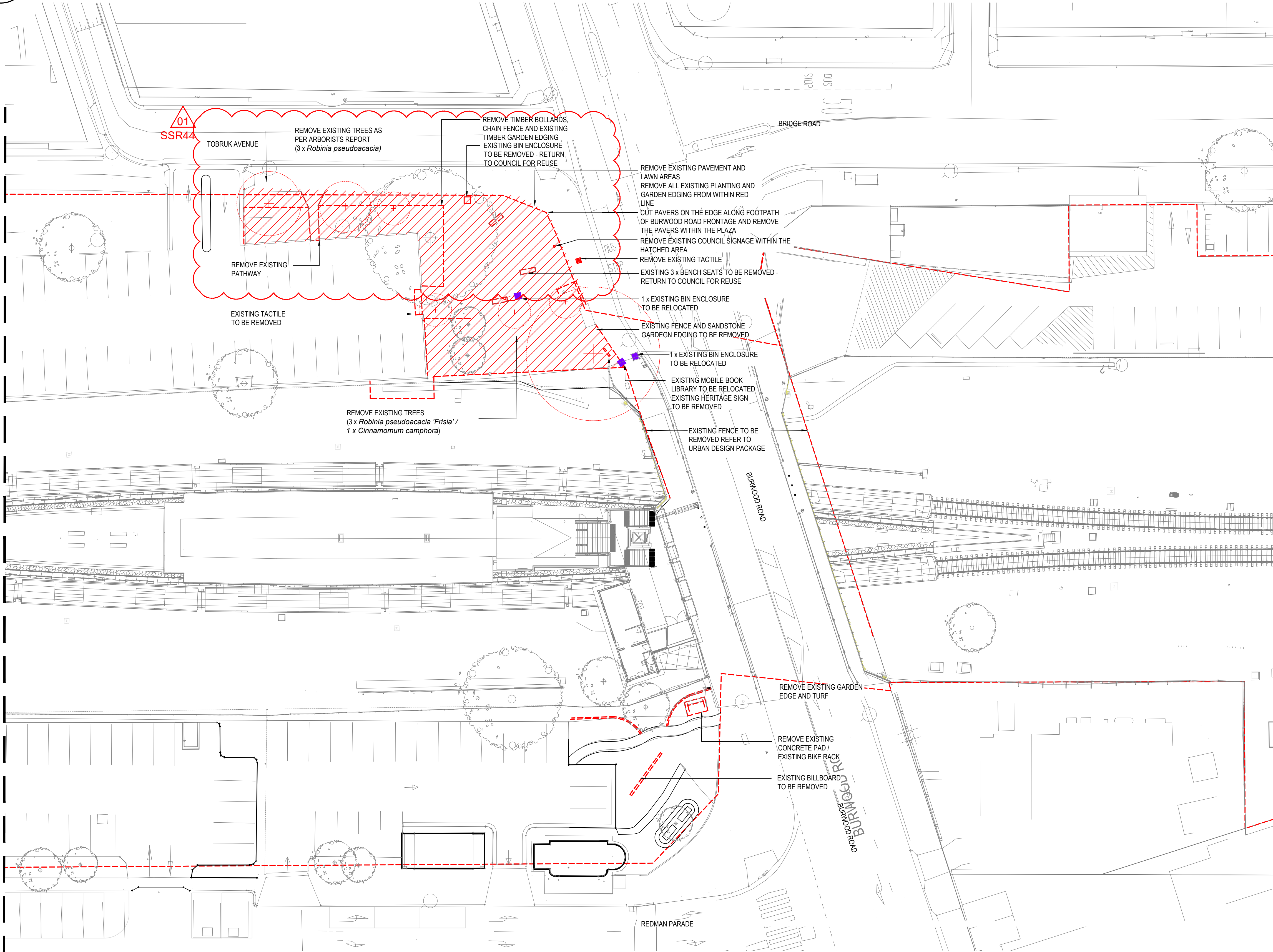
Plot Date: 26/11/21 - 11:48
Card File: X:\2. Projects\2018\18-67 Southwest Metro Design Services\02 CAD\77_WBS_Belmore\Plot\SMCSWSWM-MTM-WBS-LA-DWG-211702.dwg
100mm AT FULL SIZE

ADJOINS DRAWINGS SMCSWSWM-MTM-WCR-LA-DWG-211703



TO SYDNEY

TO BANKSTOWN



LEGEND

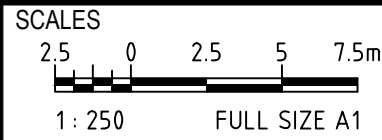
- RAILCORP PROPERTY BOUNDARY
- WORKS TO BE REMOVED
- EXISTING STREET FURNITURE / FENCE TO BE REMOVED
- EXISTING STREET FURNITURE TO BE RELOCATED
- EXISTING TREES TO BE RETAINED
- EXISTING TREES TO BE REMOVED

- NOTES:
- THE DESIGN IS BASED ON SYDNEY METRO CHAINAGE. PLEASE REFER TO CIVIL DRAWINGS FOR SYDNEY METRO CHAINAGE ALIGNMENT (PACKAGE NO. 103).
 - ALL HOOP STYLE FENCING TO BE REMOVED.
 - ALL EXISTING TREES TO BE RETAIN UNLESS STATED ON DRAWINGS
 - STRIP EXISTING TOPSOIL TO 200MM DEPTH WHERE VEGETATION IS BEING REMOVED.
 - WORKS TO STATION PLATFORMS, BUILDINGS AND CONCOURSE ARE INCLUDED IN THE ARCHITECTURAL PACKAGE - REFER TO ARCHITECTURAL DESIGN PACKAGE 211.
 - EXISTING PAVERS FROM THE DEMOLITION AREA SHOULD BE RECYCLED AND REUSED WHERE FEASIBLE TO THE NEW PLAZA PAVING
 - REFER TO ARBORIST'S ARBORICULTURAL IMPACT ASSESSMENT REPORT FOR TREE PROTECTION WORKS

DRAWING COLOUR CODED - PRINT ALL COPIES IN COLOUR

FOR CONSTRUCTION

REV.	BY	DATE	DESCRIPTION	APPD.
01	ME	26/11/2021	UPDATED APPROVED FOR CONSTRUCTION - SSR44	LP
00	ME	31/03/2021	APPROVED FOR CONSTRUCTION	LP



A1 Original Co-ordinate System: MGA Zone 56 Height Datum: A.H.D. This sheet may be prepared using colour and may be incomplete if copied

NOTE: Do not scale from this drawing.

ALT. DRG No: SMCSWSWM-MTM-WBS-LA-DWG-211702 P01

CLIENT



The information shown on this drawing is for the purposes of the Sydney Metro Project only. No warranty is given or implied as to its suitability for any other purpose. The Service Providers accept no liability arising from the use of this drawing and the information shown thereon for any purpose other than the Sydney Metro Project.

SERVICE PROVIDERS

METRON T2M

DRAWN	W.LI	26/11/2021
DESIGNED	M. ENOCH	26/11/2021
DRG CHECK	M. ENOCH	26/11/2021
DESIGN CHECK	G. DAVIES	26/11/2021
APPROVED	L. PALMER	26/11/2021

SYDNEY METRO
BELMORE (13.688km to 14.029km)
LANDSCAPE DESIGN
DEMOLITION PLAN
SHEET 1

STATUS: FOR CONSTRUCTION	SHEET 3 of 25	©
DRG No: SMCSWSWM-MTM-WBS-LA-DWG-211702	REV.	01

Appendix 3: Tree Assessment Criteria

Tree number: Identifying number given to individual (or group) trees.

Botanical Name: Latin name for tree showing genus and species.

Common Name: The common name given to the tree.

Tree Dimensions: The physical dimensions of the tree.

- **Height:** Estimated or measured height of tree in meters.
- **Spread:** Estimated or measured radial canopy spread of tree in meters.
- **Diameter at Breast Height (DBH):** The estimated or measured diameter of trunk given in mm measured at 1.4m from ground.
- **Diameter Above Base (DAB):** The estimated or measured diameter of trunk given in mm measured above the root flare. Used to calculate the structural root zone of the tree.

Age Class: An estimation of how old the tree is in relation to its life expectancy.

- **Young** – Age less than 20% of life expectancy of tree in situ
- **Mature** – Age 20% - 80% of life expectancy of tree in situ
- **Old** – Age greater than 80% of life expectancy of tree in situ
- **Dead** – Tree is dead

Vigour: Ability of a tree to sustain its life processes. This is independent of the condition of a tree but may impact upon it. Vigour can appear to alter rapidly with change of seasons (seasonality) e.g., dormant, deciduous or semi-deciduous trees. Vigour can be categorised as Dormant, Low, Normal and High.

- **Dormant Vigour** – Determined by the existing turgidity in the lower order branches in the outer extremity of the crown, with good bud set and formation, and where the last extension growth is distinct from those most recently preceding it, evident by bud scale scars. Normal vigour during dormancy is achieved when such growth is evident on a majority of branches throughout the crown.
- **Low Vigour** – Reduced ability of a tree to sustain its life processes. This may be evident by the atypical growth of leaves, reduced crown cover and reduced crown density, branches, roots and trunk, and a deterioration of their functions with reduced resistance to predation. This is independent of the condition of a tree but may impact upon it, and especially the ability of a tree to sustain itself against predation.
- **Normal Vigour** – Ability of a tree to maintain and sustain its life processes. This may be evident by the typical growth of leaves, crown cover and crown density, branches, roots and trunk and resistance to predation. This is independent of the condition of a tree but may impact upon it, and especially the ability of a tree to sustain itself against predation.
- **High Vigour** – Accelerated growth of a tree due to incidental or deliberate artificial changes to its growing environment that are seemingly beneficial, but may result in premature aging or failure if the favourable conditions cease, or promote prolonged senescence if the favourable conditions remain, e.g. water from a leaking pipe, water and nutrients from a leaking or disrupted sewer pipe, nutrients from animal waste, a tree growing next to a chicken coop, or a stock feed lot, or a regularly used stockyard, a tree subject to stringent watering and fertilisation program, or some trees may achieve an extended lifespan from continuous pollarding practices over the life of the tree.

Condition: A tree's crown form and growth habit, as modified by its environment (aspect, suppression by other trees, soils) the stability and viability of the root plate, trunk and structural branches (first (1st) and possibly (2nd) order branches), including structural defects such as wounds, cavities or hollows, crooked trunk or weak trunk/branch junctions and the effects of predation by pests and diseases. These may not be directly connected with vigour and it is possible for a tree to be of normal vigour but in poor condition. Condition can be categorised as Dead, Poor, Fair and Good.

- **Dead Condition** – Tree is no longer capable of performing any of the following processes or is exhibiting any of the following symptoms; Photosynthesis via its foliage crown (as indicated by the presence of moist, green or other coloured leaves), Osmosis (the ability of the roots system to take up water), Turgidity (the ability of the plant to sustain moisture pressure in its cells), Epicormic shoots or epicormic strands in Eucalypts (the production of new shoots as a response to stress, generated from latent or adventitious buds or from a lignotuber), Permanent leaf loss, Permanent leaf wilting (the loss of turgidity which is marked by desiccation of stems leaves and roots), Abscission of the epidermis (bark desiccates and peels off to the beginning of the sap wood).
- **Poor Condition** – Tree is of good habit or misshapen, a form that may be severely restricted for space and light, exhibits symptoms of advanced and irreversible decline such as fungal, or bacterial infestation, major die-back in the branch and foliage crown, structural deterioration from insect damage e.g. termite infestation, or storm damage or lightning strike, ring barking from borer activity in the trunk, root damage or instability of the tree, or damage from physical wounding impacts or abrasion, or from altered local environmental conditions and has been unable to adapt to such changes and may decline further to death regardless of remedial works or other modifications to the local environment that would normally be sufficient to provide for its basic survival if in good to fair condition. Deterioration physically, often characterised by a gradual and continuous reduction in vigour but may be independent of a change in vigour, but characterised by a proportionate increase in susceptibility to, and predation by pests and diseases against which the tree cannot be sustained. Such conditions may also be evident in trees of advanced senescence due to normal phenological processes, without modifications to the growing environment or physical damage having been inflicted upon the tree. This may be independent from, or contributed to by vigour.
- **Fair Condition** – Tree is of good habit or misshapen, a form not severely restricted for space and light, has some physical indication of decline due to the early effects of predation by pests and diseases, fungal, bacterial, or insect infestation, or has suffered physical injury to itself that may be contributing to instability or structural weaknesses, or is faltering due to the modification of the environment essential for its basic survival. Such a tree may recover with remedial works where appropriate, or without intervention may stabilise or improve over time, or in response to the implementation of beneficial changes to its local environment. This may be independent from, or contributed to by vigour.
- **Good Condition** – Tree is of good habit, with crown form not severely restricted for space and light, physically free from the adverse effects of predation by pests and diseases, obvious instability or structural weaknesses, fungal, bacterial or insect infestation and is expected to continue to live in much the same condition as at the time of inspection provided conditions around it for its basic survival do not alter greatly. This may be independent from, or contributed to by vigour.

Useful Life Expectancy (ULE) ULE is the length of time that the arborist assesses an individual tree can be retained with an acceptable level of risk based on the information available at the time of inspection. It is a snapshot in time of the potential an individual tree has for survival in the eyes of the assessor. ULE is not static – it is closely related to tree health and the surrounding conditions. Alterations in these variables may result in changes to the ULE assessment. Consequently, the reliability all ULE assessments have will decrease as time passes from the initial assessment and the potential for changes in variables increases.

- **Remove** – Trees that should be removed within the next 5 years
- **Short** – Trees that appear to be retainable at the time of the assessment for 5-15 years with an acceptable level of risk.
- **Medium** – Trees that appear to be retainable at the time of the assessment for 15-40 years with an acceptable level of risk.
- **Long** – Trees that appear to be retainable at the time of the assessment for 40+ years with an acceptable level of risk.

Amenity and Visual Value – For the purposes of assessing the visual and landscape value of each tree the IACA Significance of a Tree, Assessment Rating System (STARS) © (IACA 2010) © has been adopted. - The landscape significance of a tree is an essential criterion to establish the importance that a particular tree may have on a site. The system uses a scale of High, Medium and Low significance in the landscape.

High significance in landscape

- The tree is in good condition and good vigour
- The tree has a form typical for the species
- The tree is a remnant or is a planted locally indigenous specimen and/or is rare or uncommon in the local area or of botanical interest or of substantial age
- The tree is listed as a heritage item, threatened species or part of an endangered ecological community or listed on council's significant tree register
- The tree is visually prominent and visible from a considerable distance when viewed from most directions within the landscape due to its size and scale and makes a positive contribution to the local amenity
- The tree supports social and cultural sentiments or spiritual associations, reflected by the broader population or community group or has commemorative values
- The tree's growth is unrestricted by above and below ground influences, supporting its ability to reach dimensions typical for the taxa in situ – tree is appropriate to the site conditions

Medium significance in landscape

- The tree is in fair-good condition and good or low vigour
- The tree has form typical or atypical of the species
- The tree is a planted locally indigenous or a common species with its taxa commonly planted in the local area
- The tree is visible from surrounding properties, although not visually prominent as partially obstructed by other vegetation or buildings when viewed from the street
- The tree provides a fair contribution to the visual character and amenity of the local area
- The tree's growth is moderately restricted by above or below ground influences, reducing its ability to reach dimensions typical for the taxa in situ

Low significance in landscape

- The tree is in fair-poor condition and good or low vigour
- The tree has form atypical of the species
- The tree is not visible or is partly visible from the surrounding properties as obstructed by other vegetation or buildings
- The tree provides a minor contribution or has a negative impact on the visual character and amenity of the local area
- The tree is a young specimen which may or may not have reached dimensions to be protected by local Tree Preservation Orders or similar protection mechanisms and can easily be replaced with a suitable specimen
- The tree's growth is severely restricted by above or below ground influences, unlikely to reach dimensions typical for the taxa in situ – tree is inappropriate to the site conditions
- The tree is listed as exempt under the provisions of the local Council Tree Preservation Order or similar protection mechanisms
- The tree has a wound or defect that has the potential to become structurally unsound
- **Environmental Pest / Noxious Weed Species**
- The tree is an environmental pest species due to its invasiveness or poisonous/allergenic properties.
- The tree is a declared noxious weed by legislation
- **Hazardous / Irreversible Decline**
- The tree is structurally unsound and/or unstable and is considered potentially dangerous
- The tree is dead, or is in irreversible decline, or has the potential to fail or collapse in full or in part in the immediate to short term

The tree is to have a minimum of three (3) criteria in a category to be classified in that group.

In the development of this document IACA acknowledges the contribution and original concept of the Footprint Green Tree Significance & Retention Value Matrix, developed by Footprint Green Pty Ltd in June 2010.

The Australian Standard 4970-2009 Protection of Trees on Development Sites defines the requirements for assessing trees with respect to development. It provides the guidance on how to decide which trees are appropriate for retention and on the means of protecting them during construction works. It describes the areas and offsets, referred to as the Tree Protection Zone (TPZ) and Structural Root Zone (SRZ) required to be free from development works to maintain tree vitality and stability. This report has been prepared in accordance with the conditions set out within the standard.

- **Tree Protection Zone** – The tree protection zone is defined as a specified area above and below ground set aside for the protection of the tree's roots and crown. It is expressed as a radial measurement taken from the centre of the trunk at ground level.
- **Structural Root Zone** – The structural root zone is defined as a specified area around the base of a tree required to maintain its stability within the ground. It is expressed as a radial measurement taken from the center of the trunk at ground level. Excavation and development works are not recommended within the structural root zone unless additional investigation as to root size and location is undertaken

APPENDIX 2.3 CCBC APPROVAL FOR TREE REMOVAL AND PRUNING AT BELMORE

Gareth O'Brien

From: Peter D'Costa
Sent: Friday, 23 April 2021 4:50 PM
To: Sarah-ann Brennan; Kevin Cao
Cc: Gareth O'Brien; Madush Priyan; William Healy; Julie Henderson; Rachel Leet
Subject: FW: Tree removal and pruning -Belmore station
Attachments: S-201.pdf

Hi All

Please see approval below from council for Tree removal and Pruning at Belmore.

Regards

Peter D'Costa
Senior Project Engineer
Infrastructure Projects



T | 0478 074 294 M | 0478 074 294
E | Peter.D'Costa@Downergroup.com
T3, Trinita Business Campus, 39 Delhi Road
North Ryde NSW 2113
www.downergroup.com



Think before you print

From: James Magsipoc <James.Magsipoc@cbc.city.nsw.gov.au>
Sent: Friday, 23 April 2021 12:50 PM
To: Peter D'Costa <Peter.D'Costa@Downergroup.com>
Cc: Julie Henderson <Julie.Henderson@Downergroup.com>; Andrew Smith <Andrew.Smith2@downergroup.com>; Ash Jarvis <Ash.Jarvis2@transport.nsw.gov.au>; Ben Webb <Ben.Webb@cbc.city.nsw.gov.au>; Peter Anderson <Peter.ANDERSON@cbc.city.nsw.gov.au>
Subject: FW: Tree removal and pruning -Belmore station

[External Email] This email was sent from outside the organisation – be cautious, particularly with links and attachments.

Hi Peter,

The tree removal and pruning at Redman Parade ,Belmore had been approved subject to the conditions listed below.

Please return email if you had receive this email and its attachment with clarity.

Best regards,



James Magsipoc - Project Officer
T 02 9707 9771
E James.Magsipoc@cbc.city.nsw.gov.au
www.cbc.city.nsw.gov.au



@ourcbc
Like & follow us



From: Wayne Bromfield <Wayne.Bromfield@cbc.city.nsw.gov.au>
Sent: Friday, 23 April 2021 12:32 PM
To: James Magsipoc <James.Magsipoc@cbc.city.nsw.gov.au>
Subject: FW: Tree removal and pruning -Belmore station

Hello James,

Approval for the pruning and removal of the council trees identified in the attachments to facilitate the works required for the Metro project is approved.

Any trees removed will require replacement at councils standard rate of 3:1. The tree/s shall have a container size not less than 75 litres, shall comply with NATSPEC Specifying Trees: a guide to assessment of tree quality (2003) or Australian Standard AS 2303 – 2015 Tree stock for landscape use, and be planted and maintained in accordance with Councils street tree planting specifications Standard Drawing No. S-201.

The tree pruning and removal works are subject to the following conditions:

- All pruning and removal works must be carried out by a qualified arborist (minimum qualifications AQF Level 3 or equivalent);
- All pruning works shall comply with Australian Standard AS4373-2007 Pruning of amenity trees
- The tree pruning work must comply with the Amenity Tree Industry – Code of Practice, 1998 (Workcover, NSW) and the Guide to Managing Risks of Tree Trimming and Removal Work (Safe Work Australia 2016).
- The tree pruning contractor must hold a Public Liability Insurance Certificate of Currency with a minimum indemnity of \$20 million, together with a NSW Workers Compensation Insurance Certificate of Currency;
- All tree material shall be removed from site;
- The site must be maintained in a safe condition at all times;
- Appropriate hazard signage to be in place at all times during the tree pruning works.

Regards,

Wayne.

APPENDIX 3 WILEY PARK AIA (URBAN ARBOR)



Arboricultural Impact Assessment Report

Site location:

South West Metro
Wiley Park Station
Wiley Park NSW

Prepared for:

Metron T2M

Prepared by: Jack Williams and

Bryce Claassens

Urban Arbor Pty Ltd

Date: 23 December 2020

Ref: 201223-SWMWP-AIA

Rev: B

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1. INTRODUCTION

- 1.1 Urban Arbor have been instructed by Metron T2M to provide an Arboricultural Impact Assessment Report for trees located within the site and adjoining sites in relation to a proposed development.
- 1.2 Below is a list of all documents and information provided to Urban Arbor to assist in preparing this report.
 - A) Wiley Park Landscape Drawings, Metron T2M, Rev D, Including Sheet No: 6, 8, 9 and 11, 23 October 2020.
 - B) Civil Engineering Package No. 233, Metron T2M, Rev D, 137 Pages in total, 29 May 2020.
 - C) Wiley Park Station Service Building, Metron T2M, Rev C, 3 November 2020.
- 1.3 The trees were inspected on 16 December 2019 and 17 December 2020. Access was available to the subject site and the adjoining public areas only. All tree data contained in this report was collected during these site inspections.

2. SCOPE OF THE REPORT

- 2.1 This report has been undertaken to meet the following objectives.
 - 2.1.1 Conduct a visual assessment of all significant trees located within 10 metres of development works from ground level. For the purpose of this report, a significant tree is a tree with a height equal to or greater than 5 metres.
 - 2.1.2 Determine the trees estimated contribution years and remaining, useful life expectancy and award the trees a retention value.
 - 2.1.3 Provide an assessment of the potential impact the proposed development is likely to cause to the condition of the subject trees in accordance with AS4970 Protection of trees on development sites (2009).
 - 2.1.4 Specify tree protection measures for trees to be retained in accordance with AS4970-2009.

3. LIMITATIONS

- 3.1 The observations and recommendations are based on the site inspections identified in the introduction (section 1) and the access available at the time of inspection. Findings of this report are based on the observations and site conditions at the time inspection.
- 3.2 All of the observations were carried out from ground level and none of the surrounding surfaces were lifted or removed during the inspection. No tests were carried out to the subject trees or surrounding area during the inspection.
- 3.3 Root decay can sometimes be present with no visual indication above ground. It is also impossible to know the extent of any root damage caused by mechanical damage such as underground root cutting during the installation of services without undertaking detailed root investigation. Any form of tree failure due to these activities is beyond the scope of this assessment.
- 3.4 The report reflects the subject tree(s) as found on the day of inspection. Any changes to the growing environment of the subject tree, or tree management works beyond those recommended in this report may alter the findings of the report. There is no warranty, expressed or implied, that problems or deficiencies relating to the subject tree, or subject site may not arise in the future.
- 3.5 Tree identification is based on accessible visual characteristics at the time of inspection. As key identifying features are not always available the accuracy of identification is not guaranteed. Where tree species is unknown, it is indicated with an *spp.*
- 3.6 All diagrams, plans and photographs included in this report are visual aids only, and are not to scale unless otherwise indicated.
- 3.7 Urban Arbor neither guarantees, nor is it responsible for, the accuracy of information provided by others that is contained within this report.
- 3.8 While an assessment of the subject trees estimated useful life expectancy is included in this report, no specific tree risk assessment has been undertaken for any of trees at the site.
- 3.9 The ultimate safety of any tree cannot be categorically guaranteed. Even trees apparently free of defects can collapse or partially collapse in extreme weather conditions. Trees are dynamic, biological entities subject to changes in their environment, the presence of pathogens and the effects of ageing. These factors reinforce the need for regular inspections. It is generally accepted that hazards can only be identified from distinct defects or from other failure-prone characteristics of a tree or its locality.
- 3.10 Alteration of this report invalidates the entire report.

4. METHODOLOGY

- 4.1 The following information was collected during the assessment of the subject tree(s).
- 4.1.1 Tree common name
 - 4.1.2 Tree botanical name
 - 4.1.3 Tree age class
 - 4.1.4 DBH (Trunk/Stem diameter at breast height/1.4m above ground level) - millimetres.
 - 4.1.5 Estimated height - metres
 - 4.1.6 Estimated crown spread (diameter of crown) - metres
 - 4.1.7 Health
 - 4.1.8 Structural condition
 - 4.1.9 Amenity value
 - 4.1.10 Estimated remaining contribution years (SULE)¹
 - 4.1.11 Retention value (Tree AZ)²
 - 4.1.12 Notes/comments
- 4.2 An assessment of the trees condition was made using the visual tree assessment (VTA) model (Mattheck & Breloer, 1994).³
- 4.3 Tree diameter was measured using a DBH tape or in some cases estimated. Tree height and tree canopy spread was measured with a clinometer or in some cases estimated. All other measurements were estimations unless otherwise stated. The other tools used during the assessment were a nylon mallet, compass, camera and a steel probe.
- 4.4 All information was imported into our computerised geographical information system (GIS) PT-mapper pro. This software was used to measure/calculate all encroachment estimates included in this report.
- 4.5 All DBH measurements, tree protection zones, and structural root zones were calculated in accordance with methods set out in AS4970 Protection of trees on development sites (2009) ⁴ and in some cases estimated. See appendices for information.
- 4.6 Details of how the observations in this report have been assessed are listed in the appendices.

¹ Barrell Tree Consultancy, *SULE: Its use and status into the New Millennium*, TreeAZ/03/2001, <http://www.treeaz.com/>.

² Barrell Tree Consultancy, *Tree AZ version 10.04-ANZ*, <http://www.treeaz.com/>.

³ Mattheck, C. & Breloer, H., *The body language of trees - A handbook for failure analysis*, The Stationary Office, London, England (2015).

⁴ Council Of Standards Australia, *AS4970 Protection of trees on development sites* (2009).

5. SITE LOCATION AND BRIEF DESCRIPTION

- 5.1 The site is located in the Canterbury Bankstown Local Government Area (LGA). The trees are subject to protection under the Canterbury Local Environmental Plan (LEP) 2012⁵ and Development Control Plan (DCP) 2012.⁶ The site is identified as a heritage item (number I159) in the LEP heritage maps.⁷

6. GENERAL INFORMATION IN RELATION TO PROTECTING TREES ON DEVELOPMENT SITES

- 6.1 **Tree protection zone (TPZ):** The TPZ is the principle means of protecting trees on development sites and is an area required to maintain the viability of trees during development. It is commonly observed that tree roots will extend significantly further than the indicative TPZ, however the TPZ is an area identified in AS4970-2009 to be the area where root loss or disturbance will generally impact the viability of the tree. The TPZ is identified as a restricted area to prevent damage to trees either above or below ground during a development. Where trees are intended to be retained proposed developments must provide an adequate TPZ around trees. The TPZ is set aside for the tree's root zone, trunk and crown and it is essential for the stability and longevity of the tree. The TPZ also incorporates the SRZ (see below for more information about the SRZ). The TPZ is calculated by multiplying the DBH by twelve, with the exception of palms, other monocots, cycads and tree ferns, the TPZ of which have been calculated at one metre outside the crown projection. Additional information about the TPZ is included in Appendix 3.
- 6.2 **Structural Root Zone (SRZ):** This is the area around the base of a tree required for the trees stability in the ground. An area larger than the SRZ always needs to be maintained to preserve a viable tree. The SRZ is calculated using the following formula; $(DAB \times 50)^{0.42} \times 0.64$. There are several factors that can vary the SRZ which include height, crown area, soil type and soil moisture. It can also be influenced by other factors such as natural or built structures. Generally, work within the SRZ should be avoided. Soil level changes should also generally be avoided inside the SRZ of trees to be retained. Palms, other monocots, cycads and tree ferns do not have an SRZ. See the appendices for more information about the SRZ.

⁵ Canterbury Local Environmental Plan 2012, <https://www.legislation.nsw.gov.au/#/view/EPI/2012/673>, accessed 23 December 2020.

⁶ Canterbury Development Control Plan 2012, <https://www.cbcity.nsw.gov.au/development/planning-control-policies/canterbury-development-control-plan-2012>, accessed 23 December 2020.

⁷ Canterbury Local Environmental Plan Heritage Map - Sheet HER_004, https://www.legislation.nsw.gov.au/maps/f6a186a6-97fb-6dac-9d90-acfc8774137b/1550_COM_HER_004_010_20121105.pdf, 23 December 2020.

6.3 Minor encroachment into TPZ: Sometimes encroachment into the TPZ is unavoidable. Encroachment includes but is not limited to activities such as excavation, compacted fill and machine trenching. Minor encroachment of up to 10% of the overall TPZ area is normally considered acceptable, providing there is space adjacent to the TPZ for the tree to compensate and the tree is displaying adequate vigour/health to tolerate changes to its growing environment.

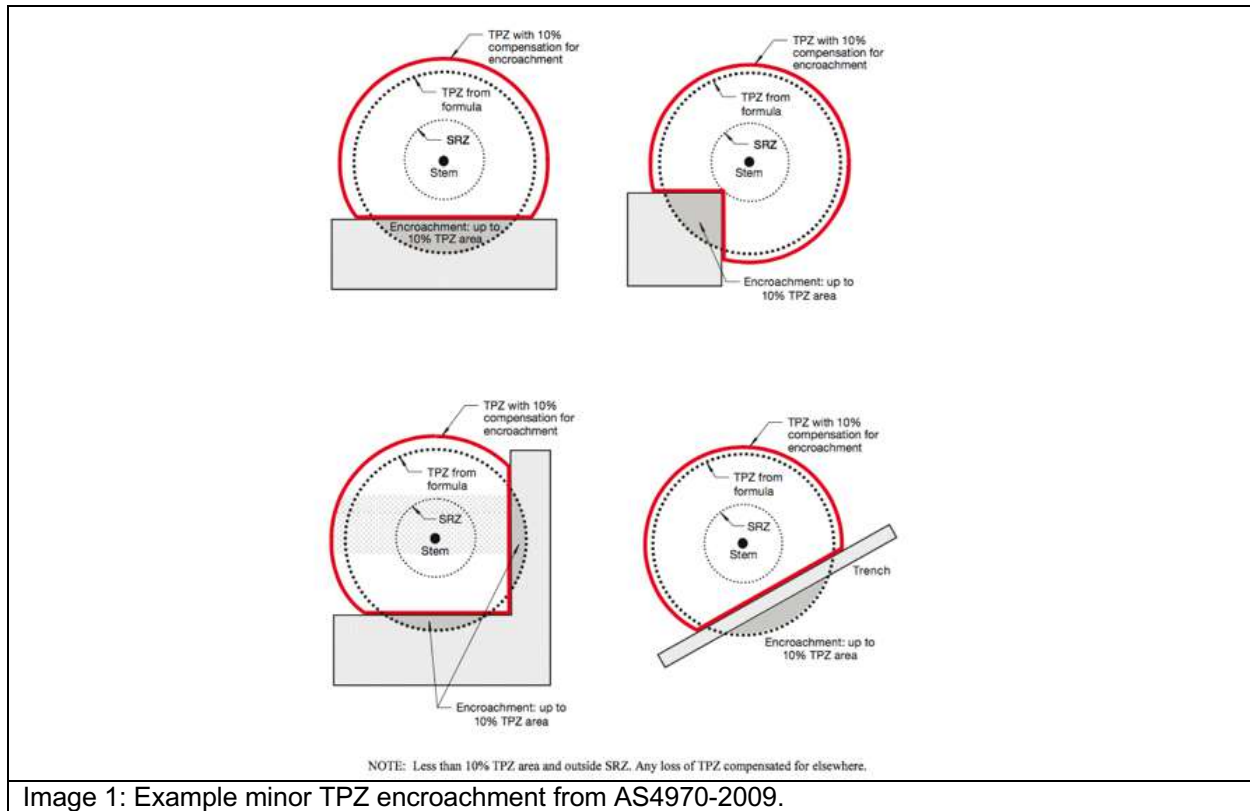


Image 1: Example minor TPZ encroachment from AS4970-2009.

6.4 Major encroachment into TPZ: Where encroachment of more than 10% of the overall TPZ area is proposed the project Arborist must investigate and demonstrate that the tree will remain in a viable condition. In some cases, tree sensitive construction methods such as pier and beam footings, suspended slabs, or cantilevered sections, can be utilised to allow additional encroachment into the TPZ by bridging over roots and minimising root disturbance. Major encroachment is only possible if it can be undertaken without severing significant size roots, or if it can be demonstrated that significant roots will not be impacted. Root investigations may be required to identify roots that will be impacted during major TPZ encroachment (see Appendix 3 for more information in relation to root investigations).

7. OBSERVATIONS

- 7.1 **Tree information:** Details of each individual tree assessed, including the observations taken during the site inspection can be found in the tree inspection schedule in Appendix 2, where the indicative tree protection zone (TPZ) for the subject trees has been calculated. The TPZ and SRZ should be measured in radius from the centre of the trunk. The subject trees have been awarded a retention value based on the observations during the site inspection. The system used to award the retention value is Tree AZ. Tree AZ is used to identify higher value trees worthy of being a constraint to development and lower value trees that should generally not be a constraint to the development. The Tree AZ categories sheet (Barrell Tree Consultancy) has been included in the appendices to assist with understanding the retention values. The retention value that has been allocated to the subject trees in this report is not definitive and should only be used as a guideline. This information has been summarised below.
- 7.2 **Site Plan:** Site plans have been included in Appendix 1, where the indicative TPZ and SRZ of the trees have been overlaid onto the proposed plans provided by the client. The following plans are included in Appendix 1;
- Appendix 1A: Proposed Site Plan Overview
 - Appendix 1B: Proposed Service Building

8. ASSESSMENT OF CONSTRUCTION IMPACTS

8.1 Table 1: In the table below, the impact of the proposed development has been assessed for all trees included in the report. The assessed TPZ encroachments include proposed structures and hard landscaping only. All soft landscaping should be completed in accordance with section 11.10.

Tree ID	Species	Retention value	TPZ radius (m)	TPZ area (m ²)	SRZ radius (m)	TPZ encroachment	Discussion/ Conclusion	Recommendation
683	<i>Ficus spp</i>	Z1	2.2	14.7	1.7	Footprint	The trunk is located within the footprint of new hard surfacing.	Remove
684	<i>Pittosporum undulatum</i>	Z1	2.4	18.1	1.7	Footprint	The trunk is within the footprint of new wire mesh area and the tree is proposed to be removed.	Remove
685	<i>Grevillea spp</i>	Z1	2.0	12.6	1.8	None	No encroachment into the TPZ.	Retain and protect
686	<i>Leptospermum petersonii</i>	A1	2.6	21.9	1.8	None	No encroachment into the TPZ.	Retain and protect
687	<i>Quercus robur</i>	A1	5.5	95.7	2.5	Footprint	The trunk is located within the footprint of a proposed platform building.	Remove
688	<i>Unknown spp</i>	Z4	2.6	21.2	2.1	Footprint	The trunk is located within the footprint of new hard surfacing.	Remove
689	<i>Nerium oleander</i>	Z1	2.4	18.1	1.7	Footprint	The trunk is located within the footprint of a proposed platform building.	Remove
690	<i>Pittosporum undulatum</i>	Z1	2.0	12.6	1.6	Footprint	The trunk is located directly adjacent to a proposed platform building and new hard surfacing.	Remove
691	<i>Quercus robur</i>	A1	2.3	16.3	1.8	Footprint	The trunk is located directly adjacent to a proposed platform building.	Remove

Tree ID	Species	Retention value	TPZ radius (m)	TPZ area (m ²)	SRZ radius (m)	TPZ encroachment	Discussion/ Conclusion	Recommendation
692	<i>Schinus molle</i>	A1	12.6	498.8	3.6	Major	The proposed fencing and service installation will encroach into the TPZ and SRZ. This is considered to be a major TPZ encroachment and the proposed works could potentially impact the condition and stability of the tree. To reduce the impact to the tree, the proposed fencing and services must be installed in accordance with section 9.2 of this report.	Retain and protect*
693	<i>Triadica sebifera</i>	A1	3.3	34.7	2.4	Footprint	The trunk of the tree is located within the footprint of the proposed service installation.	Remove
694	<i>Triadica sebifera</i>	A1	4.1	52.3	2.3	Footprint	The trunk of the tree is located within the footprint of the proposed service installation.	Remove
695	<i>Schinus molle</i>	A1	5.7	103.0	2.8	Footprint	The trunk of the tree is located within the footprint of the proposed service building.	Remove
696	<i>Schinus molle</i>	A1	7.5	175.3	3.0	Footprint	The trunk of the tree is located within the footprint of the proposed service building.	Remove
697	<i>Schinus molle</i>	A1	6.0	113.1	2.6	Footprint	The trunk of the tree is located within the footprint of the proposed service building.	Remove
698	<i>Callistemon viminalis</i>	A1	3.1	30.6	2.0	Major	A proposed welded mesh fence encroaches into the TPZ by 7% (2m ²) and into the SRZ. If significant roots are severed in the SRZ, the stability of the tree could be impacted. To retain the tree in a viable condition, the fence must be installed in accordance with section 9.2.	Retain and protect*
699	<i>Auranticarpa rhombifolia</i>	Z4	2.0	12.0	1.7	None	No proposed TPZ encroachment.	Retain and protect
700	<i>Auranticarpa rhombifolia</i>	Z9	2.8	23.9	1.8	None	No proposed TPZ encroachment.	Retain and protect
701	<i>Quercus robur</i>	A1	6.5	131.9	2.7	Major	A proposed welded mesh fence will encroach into the TPZ and SRZ. This is considered to be a major TPZ encroachment and the proposed works could potentially impact the condition and stability of the tree. To reduce the impact to the tree, the proposed fencing must be installed in accordance with section 9.2 of this report.	Retain and protect*

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Prepared by: Jack Williams & Bryce Claassens, Urban Arbor Pty Ltd, sales@urbanarbor.com.au, (02) 8004 2802.

Date of prepared: 23 December 2020. Rev: B.

Tree ID	Species	Retention value	TPZ radius (m)	TPZ area (m ²)	SRZ radius (m)	TPZ encroachment	Discussion/ Conclusion	Recommendation
702	<i>Auranticarpa rhombifolia</i>	A1	2.4	18.1	1.8	None	No proposed TPZ encroachment.	Retain and protect
703	<i>Arbutus unedo</i>	Z1	3.6	40.7	2.4	Major	A proposed welded mesh fence will encroach into the TPZ and SRZ. This is considered to be a major TPZ encroachment and the proposed works could potentially impact the condition and stability of the tree. To reduce the impact to the tree, the proposed fencing must be installed in accordance with section 9.2 of this report.	Retain and protect*
704	<i>Quercus robur</i>	A2	7.9	197.1	3.0	Major	A proposed welded mesh fence will encroach into the TPZ and SRZ. This is considered to be a major TPZ encroachment and the proposed works could potentially impact the condition and stability of the tree. To reduce the impact to the tree, the proposed fencing must be installed in accordance with section 9.2 of this report.	Retain and protect*
705	<i>Quercus robur</i>	A1	4.1	52.1	2.6	Major	A proposed welded mesh fence will encroach into the TPZ and SRZ. This is considered to be a major TPZ encroachment and the proposed works could potentially impact the condition and stability of the tree. To reduce the impact to the tree, the proposed fencing must be installed in accordance with section 9.2 of this report.	Retain and protect*
706	<i>Quercus robur</i>	A1	5.9	108.6	2.6	Major	A proposed awning encroaches into the TPZ by 38% (41.6m ²) and into the SRZ. The impact to trees root system within this area could be mitigated through tree sensitive measures. However, more than 30% of the overall crown will need to be removed to accommodate the awning, which will significantly modify the shape/form of the tree and adversely impact the tree condition. The tree is therefore recommended to be removed.	Remove
707	<i>Quercus robur</i>	A1	3.1	30.6	2.0	Footprint	The trunk/crown of the tree is located within the footprint of the proposed awning.	Remove
708	<i>Quercus robur</i>	A1	3.8	46.3	2.2	Footprint	The trunk/crown of the tree is located within the footprint of the proposed awning.	Remove

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Tree ID	Species	Retention value	TPZ radius (m)	TPZ area (m ²)	SRZ radius (m)	TPZ encroachment	Discussion/ Conclusion	Recommendation
709	<i>Quercus robur</i>	A1	2.3	16.3	1.8	Major	The proposed fencing and service installation will encroach into the TPZ and SRZ. This is considered to be a major TPZ encroachment and the proposed works could potentially impact the condition and stability of the tree. To reduce the impact to the tree, the proposed fencing and services must be installed in accordance with section 9.2 of this report.	Retain and protect*
710	<i>Quercus robur</i>	A1	2.6	21.9	2.0	Major	The proposed fencing and service installation will encroach into the TPZ and SRZ. This is considered to be a major TPZ encroachment and the proposed works could potentially impact the condition and stability of the tree. To reduce the impact to the tree, the proposed fencing and services must be installed in accordance with section 9.2 of this report.	Retain and protect*
711	<i>Quercus robur</i>	A1	4.9	74.0	2.5	Major	The proposed fencing and service installation will encroach into the TPZ and SRZ. This is considered to be a major TPZ encroachment and the proposed works could potentially impact the condition and stability of the tree. To reduce the impact to the tree, the proposed fencing and services must be installed in accordance with section 9.2 of this report.	Retain and protect*
712	<i>Quercus robur</i>	A1	4.2	56.1	2.5	Major	The proposed fencing and service installation will encroach into the TPZ and SRZ. This is considered to be a major TPZ encroachment and the proposed works could potentially impact the condition and stability of the tree. To reduce the impact to the tree, the proposed fencing and services must be installed in accordance with section 9.2 of this report.	Retain and protect*
713	<i>Quercus robur</i>	A1	3.6	40.7	2.1	Major	The proposed fencing and service installation will encroach into the TPZ and SRZ. This is considered to be a major TPZ encroachment and the proposed works could potentially impact the condition and stability of the tree. To reduce the impact to the tree, the proposed fencing and services must be installed in accordance with section 9.2 of this report.	Retain and protect*

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Tree ID	Species	Retention value	TPZ radius (m)	TPZ area (m ²)	SRZ radius (m)	TPZ encroachment	Discussion/ Conclusion	Recommendation
714	<i>Quercus robur</i>	A1	2.6	21.9	1.9	Major	The proposed fencing and service installation will encroach into the TPZ and SRZ. This is considered to be a major TPZ encroachment and the proposed works could potentially impact the condition and stability of the tree. To reduce the impact to the tree, the proposed fencing and services must be installed in accordance with section 9.2 of this report.	Retain and protect*
715	<i>Quercus robur</i>	A1	5.0	79.8	2.5	Major	The proposed fencing and service installation will encroach into the TPZ and SRZ. This is considered to be a major TPZ encroachment and the proposed works could potentially impact the condition and stability of the tree. To reduce the impact to the tree, the proposed fencing and services must be installed in accordance with section 9.2 of this report.	Retain and protect*
716	<i>Corymbia eximia</i>	A1	3.7	43.5	2.2	None	No encroachment into the TPZ.	Retain and protect
717	<i>Quercus robur</i>	Z9	4.8	72.6	2.4	Major	The proposed fencing and service installation will encroach into the TPZ and SRZ. This is considered to be a major TPZ encroachment and the proposed works could potentially impact the condition and stability of the tree. To reduce the impact to the tree, the proposed fencing and services must be installed in accordance with section 9.2 of this report.	Retain and protect*
718	<i>Eucalyptus paniculata</i>	A1	10.2	326.9	3.4	Major	The proposed fencing and service installation will encroach into the TPZ and SRZ. This is considered to be a major TPZ encroachment and the proposed works could potentially impact the condition and stability of the tree. To reduce the impact to the tree, the proposed fencing and services must be installed in accordance with section 9.2 of this report.	Retain and protect*
719	<i>Quercus robur</i>	A1	5.0	78.3	2.5	Major	The proposed fencing and service installation will encroach into the TPZ and SRZ. This is considered to be a major TPZ encroachment and the proposed works could potentially impact the condition and stability of the tree. To reduce the impact to the tree, the proposed fencing and services must be installed in accordance with section 9.2 of this report.	Retain and protect*

Tree ID	Species	Retention value	TPZ radius (m)	TPZ area (m ²)	SRZ radius (m)	TPZ encroachment	Discussion/ Conclusion	Recommendation
720	<i>Eucalyptus saligna</i>	A1	8.3	215.4	3.1	Major	A proposed welded mesh fence will encroach into the TPZ and SRZ. This is considered to be a major TPZ encroachment and the proposed works could potentially impact the condition and stability of the tree. To reduce the impact to the tree, the proposed fencing must be installed in accordance with section 9.2 of this report.	Retain and protect*
721	<i>Populus nigra</i>	Z3	4.8	72.4	2.4	None	No encroachment into the TPZ.	Retain and protect
3286	<i>Eucalyptus saligna</i>	Z10	7.1	158.4	2.8	Major	The proposed service installation and services building construction will encroach into the TPZ by 29% (45.5m ²) and into the SRZ. This is considered to be a major TPZ encroachment and the proposed works could potentially impact the condition and stability of the tree. The canopy of the tree is asymmetric in shape due to significant powerline clearance. The whole canopy is weighted to the North. The proposed service installation will be completed to the South side of the tree, where roots under tensile loading force are likely to be severed. These roots are critical to the stability of the tree. Therefore, the tree has been recommended for removal due to impacts from the proposed development.	Remove
3287	<i>Eucalyptus botryoides</i>	Z10	6.6	136.8	2.6	Major	The proposed service installation, heavy duty crossover and services building construction will encroach into the TPZ by 45% (61.3m ²) and into the SRZ. This is considered to be a major TPZ encroachment and the proposed works could potentially impact the condition and stability of the tree. The canopy of the tree is asymmetric in shape due to significant powerline clearance. The whole canopy is weighted to the North. The proposed service installation will be completed to the South side of the tree, where roots under tensile loading force are likely to be severed. These roots are critical to the stability of the tree. Therefore, the tree has been recommended for removal due to impacts from the proposed development.	Remove
3288	<i>Eucalyptus scoparia</i>	Z10	4.8	72.4	2.4	Footprint	The trunk of the tree is located within the footprint of the proposed heavy duty crossover hard surfacing.	Remove

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3289	<i>Eucalyptus botryoides</i>	Z10	5.0	78.5	2.4	Major	The proposed service installation, heavy duty crossover and services building construction will encroach into the TPZ by 33% (25.8m ²) and into the SRZ. This is considered to be a major TPZ encroachment and the proposed works could potentially impact the condition and stability of the tree. The canopy of the tree is asymmetric in shape due to significant powerline clearance. The whole canopy is weighted to the North. The proposed service installation will be completed to the South side of the tree, where roots under tensile loading force are likely to be severed. These roots are critical to the stability of the tree. Therefore, the tree has been recommended for removal due to impacts from the proposed development.	Remove
3321	<i>Ligustrum lucidum</i>	Z3	6.0	113.1	2.5	Footprint	The trunk of the tree is located within the footprint of the proposed service building construction.	Remove
3322	<i>Phoenix canariensis</i>	Z3	3.0	28.3	NA	Footprint	The trunk of the tree is located within the footprint of the proposed service building construction.	Remove
3323	<i>Ligustrum lucidum</i>	Z3	6.0	113.1	2.5	Footprint	The trunk of the tree is located within the footprint of the proposed service building construction.	Remove
3324	<i>Ligustrum lucidum</i>	Z3	5.4	91.6	2.4	Footprint	The trunk of the tree is located within the footprint of the proposed service building construction.	Remove
3325	<i>Schinus molle</i>	A1	5.5	95.0	2.7	Footprint	The trunk of the tree is located within the footprint of the proposed service building construction.	Remove
3326	<i>Ligustrum lucidum</i>	Z3	2.4	18.1	2.3	Footprint	The trunk of the tree is located within the footprint of the proposed service building construction.	Remove
3327	<i>Ligustrum lucidum</i>	Z3	5.4	91.6	2.4	Footprint	The trunk of the tree is located within the footprint of the proposed service building construction.	Remove
3328	<i>Schinus molle</i>	Z10	5.2	84.9	2.5	Footprint	The trunk of the tree is located within the footprint of the proposed service building construction.	Remove
3329	<i>Ligustrum lucidum</i>	Z3	2.1	13.9	2.3	Footprint	The trunk of the tree is located within the footprint of the proposed service building construction.	Remove

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3330	<i>Angophora costata</i>	A2	5.0	78.5	2.5	Footprint	The trunk of the tree is located within the footprint of the proposed service building construction.	Remove
3331	<i>Ligustrum lucidum</i>	Z3	4.8	72.4	2.3	Footprint	The trunk of the tree is located within the footprint of the proposed service building construction.	Remove
3332	<i>Ligustrum lucidum</i>	Z3	6.0	113.1	2.5	Footprint	The trunk of the tree is located within the footprint of the proposed service building construction.	Remove
3333	<i>Ligustrum lucidum</i>	Z3	4.8	72.4	2.3	Footprint	The trunk of the tree is located within the footprint of the proposed service building construction.	Remove
3334	<i>Ligustrum lucidum</i>	Z3	6.0	113.1	2.5	Footprint	The trunk of the tree is located within the footprint of the proposed service building construction.	Remove
3335	<i>Schinus molle</i>	Z10	7.8	191.1	2.8	Footprint	The trunk of the tree is located within the footprint of the proposed service building construction.	Remove
3336	<i>Ligustrum lucidum</i>	Z3	3.6	40.7	2.0	Footprint	The trunk of the tree is located within the footprint of the proposed service building construction.	Remove
3337	<i>Schinus molle</i>	A1	7.4	172.0	4.0	Footprint	The trunk of the tree is located within the footprint of the proposed service building construction, service and retaining wall area.	Remove
3338	<i>Ligustrum lucidum</i>	Z3	4.2	55.4	2.1	Footprint	The trunk of the tree is located within the footprint of the proposed service building construction and retaining wall area.	Remove
3339	<i>Schinus molle</i>	A1	6.7	141.0	3.2	Footprint	The trunk of the tree is located within the footprint of the proposed service building construction and retaining wall area.	Remove
3340	<i>Ligustrum lucidum</i>	Z3	5.4	91.6	2.4	Footprint	The trunk of the tree is located within the footprint of the proposed service building construction and retaining wall area.	Remove
3341	<i>Schinus molle</i>	Z10	6.8	145.3	2.8	Footprint	The trunk of the tree is located within the footprint of the proposed service building construction and retaining wall area.	Remove
3342	<i>Phoenix canariensis</i>	Z3	2.0	12.6	NA	Footprint	The trunk of the tree is located within the footprint of the proposed service building construction and retaining wall area.	Remove

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Tree ID	Species	Retention value	TPZ radius (m)	TPZ area (m ²)	SRZ radius (m)	TPZ encroachment	Discussion/ Conclusion	Recommendation
3343	<i>Ligustrum lucidum</i>	Z3	7.2	162.9	2.7	Footprint	The trunk of the tree is located within the footprint of the proposed service building construction and retaining wall area.	Remove
3344	<i>Schinus molle</i>	Z10	7.2	162.9	2.8	Footprint	The trunk of the tree is located within the footprint of the proposed service building construction and retaining wall area.	Remove
3345	<i>Schinus molle</i>	A1	11.0	380.1	4.0	Footprint	The trunk of the tree is located within the footprint of the proposed service building construction and retaining wall area.	Remove

Notes

TPZ Encroachment Percentage: TPZ encroachment percentages are based on new structures and hard surfaces only. New soft landscaping, such as turf or amenity planting areas have not been included in the calculation for TPZ encroachment.

Retain and protect*: The proposed construction must be completed in accordance with section 9.2 to reduce the impact to the tree.

9. CONCLUSIONS

9.1 **Table 2:** Summary of the impact to trees during the development;

Impact	Reason	Category A	Category Z	Total
		A	Z	
Trees to be removed	Building construction, new surfacing and/or proximity, or trees in poor condition.	687, 691, 693, 694, 695, 696, 697, 706, 707, 708, 3325, 3330, 3337, 3339, 3345 (Fifteen trees)	683, 684, 688, 689, 690, 3286, 3287, 3288, 3289, 3321, 3322, 3323, 3324, 3326, 3327, 3328, 3329, 3331, 3332, 3333, 3334, 3335, 3336, 3338, 3340, 3341, 3342, 3343, 3344 (Twenty-nine trees)	44 trees
Trees subject to TPZ encroachment greater than 10% requiring tree sensitive design and construction to be retained	Removal of existing surfacing/structures and/or installation of new surfacing/structures.	692, 698, 701, 704, 705, 709, 710, 711, 712, 713, 714, 715, 718, 719, 720 (Fifteen trees)	703, 707 (Two trees)	17 trees
Retained trees subject to TPZ encroachment of 10% or less	Removal of existing surfacing/structures and/or installation of new surfacing/structures.	686, 702, 716 (Three trees)	685, 699, 700, 721 (Four trees)	7 trees

9.2 Construction Design/Specification Requirements: The proposed construction will encroach into the TPZ and SRZ of fourteen trees, including tree 692, 698, 701, 703, 704, 705, 709, 710, 711, 712, 713, 714, 715, 717, 718, 719 and 720. To ensure the trees are not adversely impacted by the construction, it must be demonstrated the following design and construction specifications can be implemented within the TPZ of the trees. If the construction cannot be completed in accordance with these specifications, the trees may not be viable for retention.

9.2.1 Welded mesh Fence: The proposed welded mesh fence will be installed using the tree sensitive method of post and rail type construction. To ensure the trees are not significantly impacted by the works, all post holes must be excavated manually. The post location must be flexible to avoid the severance of significant roots 40mm and greater in diameter. No posts are to be located within the SRZ or root investigations will be required to determine the post location. See Appendix 3 for more information in regards to root investigations. All rails/horizontal materials are to be located on or above existing soil grades. This will allow for the majority of the root system to be retained between the posts, minimising root loss.

9.2.2 Underground Services: AS4970 Protection of trees on development sites (2009) recommends that all underground services located inside the TPZ of any tree to be retained should be installed via tree sensitive techniques. This should include either directional drilling methods or manual excavations to minimise the impact to trees identified for retention.

If directional drilling is proposed, section 4.5.5 of AS4970-2009 says that 'The directional drilling bore should be at least 600 mm deep. The project Arborist should assess the likely impacts of boring and bore pits on retained trees'.⁸ The feasibility of sub-surface boring/directional drilling will need to be investigated by a sub-surface boring/directional drilling specialist. The project Arborist should provide advice and supervise excavations for bore pits, which must be carried out manually if located within the TPZ. The top of the pipe must be at least 600mm below the existing soil grade. The location of bore pits should be flexible in the TPZ to avoid significant roots, the project Arborist should assess and advise in writing the impact of any significant root severance to the condition of the tree.

If manual excavations are proposed, all excavations for the services should be carried out manually under the supervision of the project Arborist (minimum qualification AQF 5). Manual excavation may include the use of pneumatic and hydraulic tools, high-pressure air or a combination of high-pressure water and a vacuum device. All roots greater than 40mm in diameter should be retained in the service trench. The service pipe should then be threaded below the retained roots where practical. Roots greater than 40mm within the alignment of the service pipe should only be severed/pruned under the approval of the project Arborist. All root pruning should be in accordance with AS4373 Pruning of amenity trees (2007).

⁸ Council Of Standards Australia, AS 4970 Protection of trees on development sites (2009) page 18.

10. RECOMMENDATIONS

- 10.1 This report assesses the impact of a proposed development at the subject site to sixty-eight (68) trees located within the site and adjoining sites, in accordance with AS4970 Protection of trees on development sites (2009).
- 10.2 Site plans have been included in Appendix 1, where the indicative TPZ and SRZ of the trees have been overlaid onto the proposed plans provided by the client. The following plans are included in Appendix 1;
 - Appendix 1A: Proposed Site Plan Overview
 - Appendix 1B: Proposed Service Building
- 10.3 Forty-four (44) trees have been recommended for removal within this report, including tree 683, 684, 687, 688, 689, 690, 691, 693, 694, 695, 696, 697, 706, 707, 708, 3286, 3287, 3288, 3289, 3321, 3322, 3323, 3324, 3325, 3326, 3327, 3328, 3329, 3330, 3331, 3332, 3333, 3334, 3335, 3336, 3337, 3338, 3339, 3340, 3341, 3342, 3343, 3344 and 3345. Tree 687, 691, 693, 694, 695, 696, 697, 706, 707, 708, 3325, 3330, 3337, 3339 and 3345 are higher value category A retention value trees. Tree 683, 684, 688, 689, 690, 3286, 3287, 3288, 3289, 3321, 3322, 3323, 3324, 3326, 3327, 3328, 3329, 3331, 3332, 3333, 3334, 3335, 3336, 3338, 3340, 3341, 3342, 3343 and 3344 are lower value category Z retention value trees that generally should not be a constraint to development works.
- 10.4 Seventeen (17) trees have been recommended to be retained and will be subject to TPZ encroachments greater than 10%, including tree 692, 698, 701, 703, 704, 705, 709, 710, 711, 712, 713, 714, 715, 717, 718, 719 and 720. To reduce the impact to trees, the proposed construction within the TPZ of the trees must be completed in accordance with section 9.2 of this report.
- 10.5 The remaining seven (7) trees will be subject to minor and acceptable TPZ encroachments of 10% or less and can be retained in a viable condition, including tree 685, 686, 699, 700, 702, 716 and 721.
- 10.6 All trees to be retained must be protected for the duration of development, (including demolition and landscaping, in accordance with AS4970-2009). See section 11 for more information.
- 10.7 See section 11.10 for general landscape guidance when working within the TPZ of trees to be retained.
- 10.8 Where possible underground services must be located outside the TPZ of trees to be retained. All underground services located inside the TPZ of any tree to be retained must be installed in accordance with section 11.11.
- 10.9 This report does not provide approval for tree removal or pruning works. All recommendations in this report are subject to approval by the relevant authorities and/or tree owners. This report should be submitted as supporting evidence with any tree removal/pruning or development application.

11. TREE PROTECTION REQUIREMENTS

- 11.1 Use of this report:** All contractors must be made aware of the tree protection requirements prior to commencing works at the site. This report and a copy of the site plan (Appendix 1) drawings must also be made available to any contractor prior to works commencing and during any on site operations.
- 11.2 Project Arborist:** Prior to any works commencing at the site a project Arborist should be appointed. The project Arborist should be qualified to a minimum AQF level 5 and/or equivalent qualifications and experience, and should assist with any development issues relating to trees that may arise. If at any time it is not feasible to carryout works in accordance with this, an alternative must be agreed in writing with the project Arborist.
- 11.3 Tree work:** All tree work must be carried out by a qualified and experienced Arborist with a minimum of AQF level 2 in arboriculture, in accordance with NSW Work Cover Code of Practice for the Amenity Tree Industry (1998) and AS4373 Pruning of amenity trees (2007).
- 11.4 Initial site meeting/on-going regular inspections:** The project Arborist is to hold a pre-construction site meeting with principal contractor to discuss methods and importance of tree protection measures and resolve any issues in relation to tree protection that may arise. In accordance with AS4970-2009, the project Arborist should carryout regular site inspections to ensure works are carried out in accordance with this document throughout the development process. Site inspections are recommended on a one-month frequency.
- 11.5 Site Specific Tree Protection Recommendations:** The table below provides recommendations for each tree, including site specific tree protection requirements. All trees to be retained must be protected in accordance with general requirements of AS4970-2009 for the duration of the development, details of which are discussed in further details in this section of the report.

Tree ID	Tree Species	TPZ Radius (m)	SRZ Radius (m)	Recommendations
683	<i>Ficus spp</i>	2.2	1.7	Remove.
684	<i>Pittosporum undulatum</i>	2.4	1.7	Remove.
685	<i>Grevillea spp</i>	2.0	1.8	Retain and protect. Tree protection fencing is to encompass the TPZ perimeter. TPZ signage is required on the fencing.
686	<i>Leptospermum petersonii</i>	2.6	1.8	Retain. Set back from works. No tree protection required.
687	<i>Quercus robur</i>	5.5	2.5	Remove.
688	<i>Unknown spp</i>	2.6	2.1	Remove.
689	<i>Nerium oleander</i>	2.4	1.7	Remove.
690	<i>Pittosporum undulatum</i>	2.0	1.6	Remove.
691	<i>Quercus robur</i>	2.3	1.8	Remove.

Site Address: Wiley Park Station, Wiley Park, NSW.

Prepared for: Metron T2M.

Prepared by: Jack Williams & Bryce Claassens, Urban Arbor Pty Ltd, sales@urbanarbor.com.au, (02) 8004 2802.

Date of prepared: 23 December 2020. Rev: B.

692	<i>Schinus molle</i>	12.6	3.6	Retain and protect. Tree protection fencing is to encompass the TPZ perimeter where practical and is to be set back from the proposed construction by 1m. TPZ signage is required on the fencing.
693	<i>Triadica sebifera</i>	3.3	2.4	Remove.
694	<i>Triadica sebifera</i>	4.1	2.3	Remove.
695	<i>Schinus molle</i>	5.7	2.8	Remove.
696	<i>Schinus molle</i>	7.5	3.0	Remove.
697	<i>Schinus molle</i>	6.0	2.6	Remove.
698	<i>Callistemon viminalis</i>	3.1	2.0	Retain and protect. Tree protection fencing is to encompass the TPZ perimeter where practical and is to be set back from the proposed construction by 1m. TPZ signage is required on the fencing.
699	<i>Auranticarpa rhombifolia</i>	2.0	1.7	Retain and protect. Tree protection fencing is to encompass the TPZ perimeter. TPZ signage is required on the fencing.
700	<i>Auranticarpa rhombifolia</i>	2.8	1.8	Retain and protect. Tree protection fencing is to encompass the TPZ perimeter. TPZ signage is required on the fencing.
701	<i>Quercus robur</i>	6.5	2.7	Retain and protect. Protective fencing should be installed to create a combined TPZ exclusion zone for tree 701, 702 and 703. Protective fencing should be aligned at the extent of the TPZ radius of each tree or as close to the proposed fence as practical. TPZ signage on fencing.
702	<i>Auranticarpa rhombifolia</i>	2.4	1.8	Retain and protect. See tree 701 for tree protection requirements.
703	<i>Arbutus unedo</i>	3.6	2.4	Retain and protect. See tree 701 for tree protection requirements.
704	<i>Quercus robur</i>	7.9	3.0	Retain and protect. Protective fencing should be installed to create a combined TPZ exclusion zone for tree 704 and 705. Protective fencing should be aligned at the extent of the TPZ radius of each tree or as close to the proposed fence as practical. TPZ signage on fencing.
705	<i>Quercus robur</i>	4.1	2.6	Retain and protect. See tree 704 for tree protection requirements.
706	<i>Quercus robur</i>	5.9	2.6	Remove.
707	<i>Quercus robur</i>	3.1	2.0	Remove.
708	<i>Quercus robur</i>	3.8	2.2	Remove.
709	<i>Quercus robur</i>	2.3	1.8	Retain and protect. Protective fencing should be installed to create a combined TPZ exclusion zone for tree 709-719. Protective fencing should be aligned at the extent of the TPZ radius of each tree or as close to the proposed fence as practical. TPZ signage on fencing.
710	<i>Quercus robur</i>	2.6	2.0	Retain and protect. See tree 709 for tree protection requirements.
711	<i>Quercus robur</i>	4.9	2.5	Retain and protect. See tree 709 for tree protection requirements.
712	<i>Quercus robur</i>	4.2	2.5	Retain and protect. See tree 709 for tree protection requirements.

713	<i>Quercus robur</i>	3.6	2.1	Retain and protect. See tree 709 for tree protection requirements.
714	<i>Quercus robur</i>	2.6	1.9	Retain and protect. See tree 709 for tree protection requirements.
715	<i>Quercus robur</i>	5.0	2.5	Retain and protect. See tree 709 for tree protection requirements.
716	<i>Corymbia eximia</i>	3.7	2.2	Retain and protect. See tree 709 for tree protection requirements.
717	<i>Quercus robur</i>	4.8	2.4	Retain and protect. See tree 709 for tree protection requirements.
718	<i>Eucalyptus paniculata</i>	10.2	3.4	Retain and protect. See tree 709 for tree protection requirements.
719	<i>Quercus robur</i>	5.0	2.5	Retain and protect. See tree 709 for tree protection requirements.
720	<i>Eucalyptus saligna</i>	8.3	3.1	Retain and protect. Tree protection fencing is to encompass the TPZ perimeter where practical and is to be set back from the proposed construction by 1m. TPZ signage is required on the fencing.
721	<i>Populus nigra</i>	4.8	2.4	Retain and protect. Tree protection fencing is to encompass the TPZ perimeter. TPZ signage is required on the fencing.
3286	<i>Eucalyptus saligna</i>	7.1	2.8	Remove.
3287	<i>Eucalyptus botryoides</i>	6.6	2.6	Remove.
3288	<i>Eucalyptus scoparia</i>	4.8	2.4	Remove.
3289	<i>Eucalyptus botryoides</i>	5.0	2.4	Remove.
3321	<i>Ligustrum lucidum</i>	6.0	2.5	Remove.
3322	<i>Phoenix canariensis</i>	3.0	NA	Remove.
3323	<i>Ligustrum lucidum</i>	6.0	2.5	Remove.
3324	<i>Ligustrum lucidum</i>	5.4	2.4	Remove.
3325	<i>Schinus molle</i>	5.5	2.7	Remove.
3326	<i>Ligustrum lucidum</i>	2.4	2.3	Remove.
3327	<i>Ligustrum lucidum</i>	5.4	2.4	Remove.
3328	<i>Schinus molle</i>	5.2	2.5	Remove.
3329	<i>Ligustrum lucidum</i>	2.1	2.3	Remove.
3330	<i>Angophora costata</i>	5.0	2.5	Remove.
3331	<i>Ligustrum lucidum</i>	4.8	2.3	Remove.
3332	<i>Ligustrum lucidum</i>	6.0	2.5	Remove.
3333	<i>Ligustrum lucidum</i>	4.8	2.3	Remove.
3334	<i>Ligustrum lucidum</i>	6.0	2.5	Remove.
3335	<i>Schinus molle</i>	7.8	2.8	Remove.
3336	<i>Ligustrum lucidum</i>	3.6	2.0	Remove.
3337	<i>Schinus molle</i>	7.4	4.0	Remove.
3338	<i>Ligustrum lucidum</i>	4.2	2.1	Remove.
3339	<i>Schinus molle</i>	6.7	3.2	Remove.
3340	<i>Ligustrum lucidum</i>	5.4	2.4	Remove.
3341	<i>Schinus molle</i>	6.8	2.8	Remove.
3342	<i>Phoenix canariensis</i>	2.0	NA	Remove.

Site Address: Wiley Park Station, Wiley Park, NSW.

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Date of prepared: 23 December 2020. Rev: B.

3343	<i>Ligustrum lucidum</i>	7.2	2.7	Remove.
3344	<i>Schinus molle</i>	7.2	2.8	Remove.
3345	<i>Schinus molle</i>	11.0	4.0	Remove.

11.6 Tree protection Specifications: It is the responsibility of the principal contractor to install tree protection prior to works commencing at the site (prior to demolition works) and to ensure that the tree protection remains in adequate condition for the duration of the development. The tree protection must not be moved without prior agreement of the project Arborist. The project Arborist must inspect that the tree protection has been installed in accordance with this document and AS4970-2009 prior to works commencing.

11.6.1 Protective fencing: Site specific tree protection requirements are in section 11.5. Where it is not feasible to install fencing at the specified location due to factors such as restricting access to areas of the site or for constructing new structures, an alternative location and protection specification must be agreed with the project Arborist. Where the installation of fencing is unfeasible due to restrictions on space, trunk and branch protection will be required (see below). The protective fencing must be constructed of 1.8 metre 'cyclone chainmesh fence'. The fencing must only be removed for the landscaping phase and must be authorised by the project Arborist. Any modifications to the fencing locations must be approved by the project Arborist.

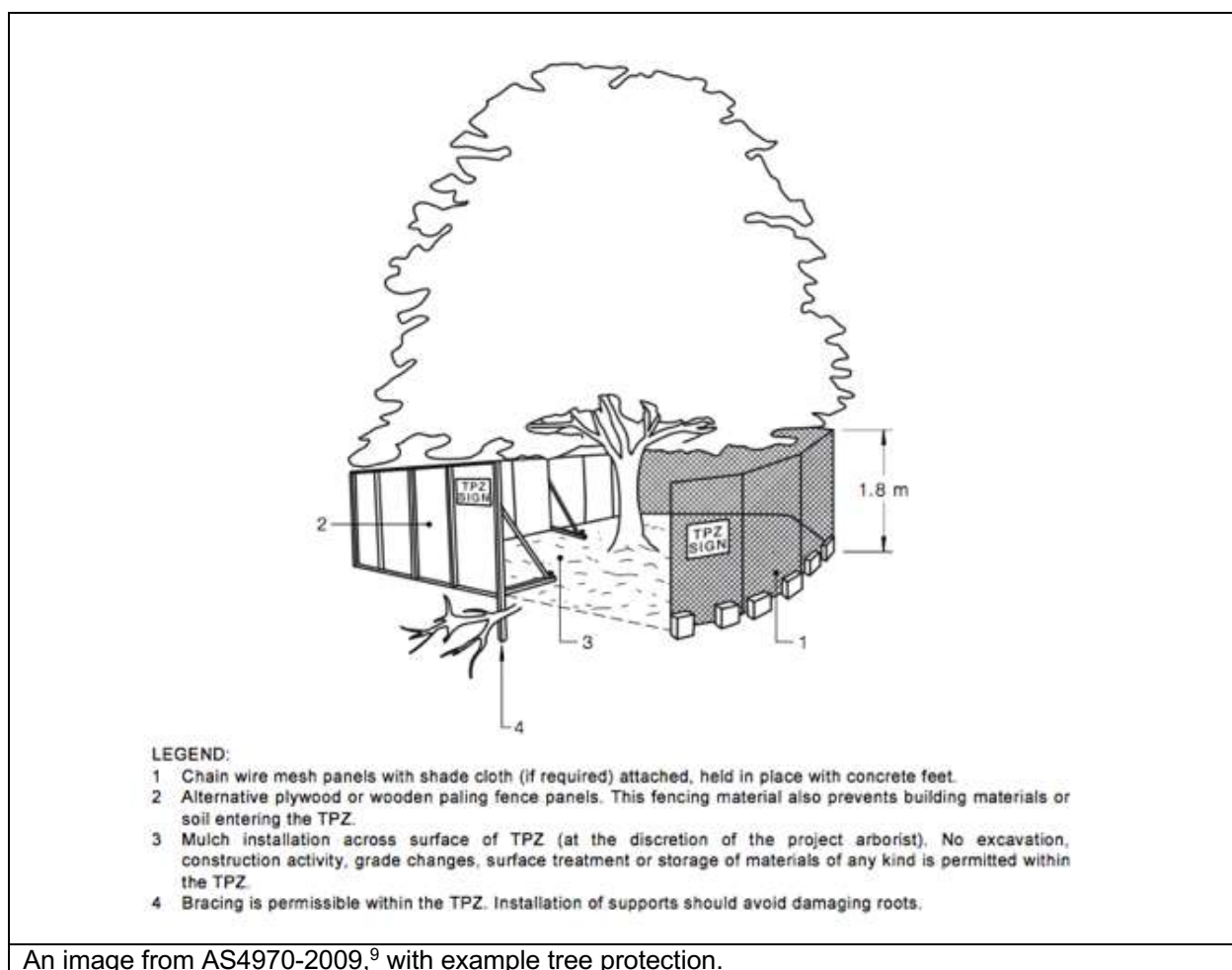
11.6.2 TPZ signage: Tree protection signage is to be attached to the protective fencing, displayed in a prominent position and the sign repeated at 10 metres intervals or closer where the fence changes direction. Each sign shall contain in a clearly legible form, the following information:

- Tree protection zone/No access.
- This fence has been installed to prevent damage to the tree/s and their growing environment both above and below ground. Do not move fencing or enter TPZ without the agreement of the project Arborist.
- The name, address, and telephone number of the developer/builder and project Arborist

11.6.3 Trunk and Branch Protection: The trunk must be protected by wrapped hessian or similar material to limit damage. Timber planks (50mm x 100mm or similar) should then be placed around tree trunk. The timber planks should be spaced at 100mm intervals, and must be fixed against the trunk with tie wire, or strapping and connections finished or covered to protect pedestrians from injury. The hessian and timber planks must not be fixed to the tree in any instance. The trunk and branch protection shall be installed prior to any work commencing on site and shall be maintained in good condition for the entire development period.

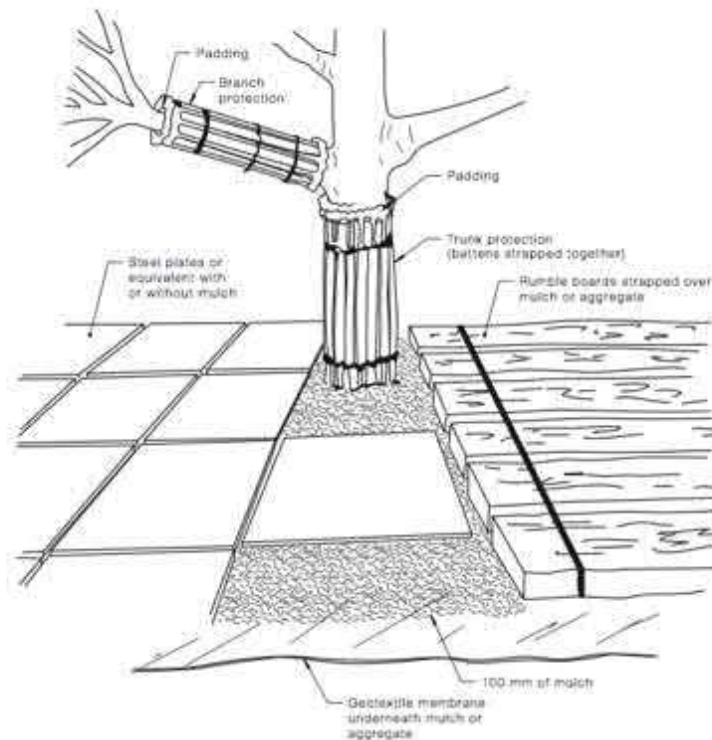
11.6.4 Mulch: Any areas of the TPZ located inside the subject site (only trees to be retained directly adjacent to site works must be mulched to a depth of 75mm with good quality composted wood chip/leaf mulch.

- 11.6.5 Ground Protection: Ground protection is required to protect the underlying soil structure and root system in areas where it is not practical to restrict access to whole TPZ, while allowing space for construction. Ground protection must consist of good quality composted wood chip/leaf mulch to a depth of between 150-300mm, laid on top of geo textile fabric. If vehicles are to be using the area, additional protection will be required such as rumble boards or track mats to spread the weight of the vehicle and avoid load points. Ground protection is to be specified by the project Arborist as required.
- 11.6.6 Temporary irrigation: Temporary irrigation should be set up in the TPZ of all trees to be retained, and should distribute water evenly throughout the area of the TPZ. The irrigation should be used for at minimum one hour daily throughout all stages of the development.



An image from AS4970-2009,⁹ with example tree protection.

⁹ Council Of Standards Australia, *AS4970 Protection of trees on development sites* (2009), page 16.


NOTES:

- 1 For trunk and branch protection use boards and padding that will prevent damage to bark. Boards are to be strapped to trees, not nailed or screwed.
- 2 Rumble boards should be of a suitable thickness to prevent soil compaction and root damage.

An image from AS4970-2009,¹⁰ with example tree protection.

11.7 Restricted activities inside TPZ: The following activities must be avoided inside the TPZ of all trees to be retained unless approved by the project Arborist. If at any time these activities cannot be avoided an alternative must be agreed in writing with the project Arborist to minimise the impact to the tree.

- A) Machine excavation.
- B) Ripping or cultivation of soil.
- C) Storage of spoil, soil or any such materials
- D) Preparation of chemicals, including preparation of cement products.
- E) Refuelling.
- F) Dumping of waste.
- G) Wash down and cleaning of equipment.
- H) Placement of fill.
- I) Lighting of fires.
- J) Soil level changes.
- K) Any physical damage to the crown, trunk, or root system.
- L) Parking of vehicles.

¹⁰ Council Of Standards Australia, *AS4970 Protection of trees on development sites* (2009), page 17.

- 11.8 Demolition:** The demolition of all existing structures inside or directly adjacent to the TPZ of trees to be retained must be undertaken in consultation with the project Arborist. Any machinery is to work from inside the footprint of the existing structures or outside the TPZ, reaching in to minimise soil disturbance and compaction. If it is not feasible to locate demolition machinery outside the TPZ of trees to be retained, ground protection will be required. The demolition should be undertaken inwards into the footprint of the existing structures, sometimes referred to as the 'top down, pull back' method.
- 11.9 Excavations:** The project Arborist must supervise and certify that all excavations and root pruning are in accordance with AS4373-2007 and AS4970-2009. For continuous strip footings, first manual excavation is required along the edge of the structures closest to the subject trees. Manual excavation should be a depth of 1 metre (or to unfavourable root growth conditions such as bed rock or heavy clay, if agreed by project Arborist). Next roots must be pruned back in accordance with AS4373-2007. After all root pruning is completed, machine excavation is permitted within the footprint of the structure. For tree sensitive footings, such as pier and beam, all excavations inside the TPZ must be manual. Manual excavation may include the use of pneumatic and hydraulic tools, high-pressure air or a combination of high-pressure water and a vacuum device. No pruning of roots greater 30mm in diameter is to be carried out without approval of the project arborist. All pruning of roots greater than 30mm in diameter must be carried out by a qualified Arborist/Horticulturalist with a minimum AQF level 3. Root pruning is to be a clean cut with a sharp tool in accordance with AS4373 Pruning of amenity trees (2007).¹¹ The tree root is to be pruned back to a branch root if possible. Make a clean cut and leave as small a wound as possible.
- 11.10 Landscaping:** All landscaping works within the TPZ of trees to be retained are to be undertaken in consultation with a consulting Arborist to minimize the impact to trees. General guidance is provided below to minimise the impact of new landscaping to trees to be retained.
- Level changes should be minimised. The existing ground levels within the landscape areas should not be lowered by more than 100mm or increased by more than 100mm (300mm increase is acceptable if using a coarse free draining material) without assessment by a consulting Arborist.
 - New retaining walls should be avoided. Where new retaining walls are proposed inside the TPZ of trees to be retained, they should be constructed from tree sensitive material, such as timber sleepers, that require minimal footings/excavations. If brick retaining walls are proposed inside the TPZ, considerer pier and beam type footings to bridge significant roots that are critical to the trees condition. Retaining walls must be located outside the SRZ and sleepers/beams located above existing soil grades.

¹¹ Council Of Standards Australia, AS 4373 *Pruning of amenity trees* (2007) page 18

- New footpaths and hard surfaces should be minimised, as they can limit the availability of water, nutrients and air to the trees root system. Where they are proposed, they should be constructed on or above existing soil grades to minimise root disturbance and consider using a permeable surface. Footpaths should be located outside the SRZ where possible.
- Where fill/sub base is used inside the TPZ, fill material should be a coarse granular material that does not restrict the flow of water and air to the root system below. This type of material will also reduce the impact of soil compaction during construction.
- The location of new plantings inside the TPZ of trees to be retained should be flexible to avoid unnecessary damage to tree roots greater than 30mm in diameter.

- 11.11 **Underground Services:** Where possible underground services should be located outside the TPZ of trees to be retained. All underground services located inside the TPZ of any tree to be retained must be installed via tree sensitive techniques. This should include either directional drilling methods or manual excavations to minimise the impact to trees identified for retention. No roots greater than 40mm in diameter should be severed during the installation of service pipes unless approved in writing by the project Arborist.
- 11.12 **Sediment and Contamination:** All contamination run off from the development such as but not limited to concrete, sediment and toxic wastes must be prevented from entering the TPZ at all times.
- 11.13 **Tree Wounding/Injury:** Any wounding or injury that occurs to a tree during the construction process will require the project Arborist to be contacted for an assessment of the injury and provide mitigation/remediation advice. It is generally accepted that trees may take many years to decline and eventually die from root damage. All repair work is to be carried out by the project Arborist, at the contractor's expense.
- 11.14 **Completion of Development Works:** After all construction works are complete the project Arborist should assess that the subject trees have been retained in the same condition and vigour. If changes to condition are identified the project Arborist should provide recommendations for remediation.

12. CONSTRUCTION HOLD POINTS FOR TREE PROTECTION

12.1 Hold Points: Below is a sequence of hold points requiring project Arborist certification throughout the development process. It provides a list of hold points that must be checked and certified. All certification must be provided in written format upon completion of the development. The final certification must include details of any instructions for remediation undertaken during the development. The principal contractor should be responsible for implementing all tree protection requirements.

Hold Point	Stage	Date Completed and Signature of Project Arborist Responsible
Project Arborist to hold pre construction site meeting with principal contractor to discuss methods and importance of tree protection measures and resolve any issues in relation to feasibility of tree protection requirements that may arise. Project Arborist to mark all trees approved for removal under DA consent.	Prior to development work commencing	
Project Arborist to assess and certify that tree protection has been installed in accordance with AS4970-2009 prior to works commencing at site.	Prior to development work commencing.	
In accordance with AS4970-2009 the project arborist should carryout regular site inspections to ensure works are carried out in accordance with the recommendations. Site inspections are recommended on a monthly frequency.	On-going throughout the development	
The removal of existing structures inside the TPZ of any tree to be retained, such as the existing buildings and hard surfaces must be supervised by the project Arborist.	Demolition	
Project Arborist to supervise all manual excavations and root pruning inside the TPZ of any tree to be retained. Project Arborist to approve all pruning of roots greater than 30mm inside TPZ. All root pruning of roots greater than 30mm in diameter must be carried out by a qualified Arborist/Horticulturalist with a minimum AQF level 3.	Construction	
Project Arborist to certify that all underground services including storm water inside TPZ of any tree to be retained have been installed in accordance with AS4970-2009.	Construction	
All landscaping works within the TPZ of trees to be retained are to be undertaken in consultation with the project Arborist to minimise the impact to trees.	Construction/ Landscape	
After all demolition, construction and landscaping works are complete the project Arborist should assess that the subject trees have been retained in the same condition and vigour. If changes to condition are identified the project Arborist should provide recommendations for remediation.	Upon completion of development	

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- *Canterbury Development Control Plan 2012*,
<https://www.cbcity.nsw.gov.au/development/planning-control-policies/canterbury-development-control-plan-2012>.

14. LIST OF APPENDICES


The following are included in the appendices:

Appendix 1A - Proposed Site Plan Overview

Appendix 1B - Proposed Service Building

Appendix 2 - Tree Inspection Schedule

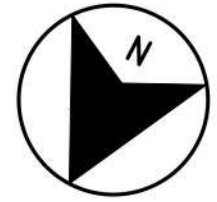
Appendix 3 - Further information of methodology



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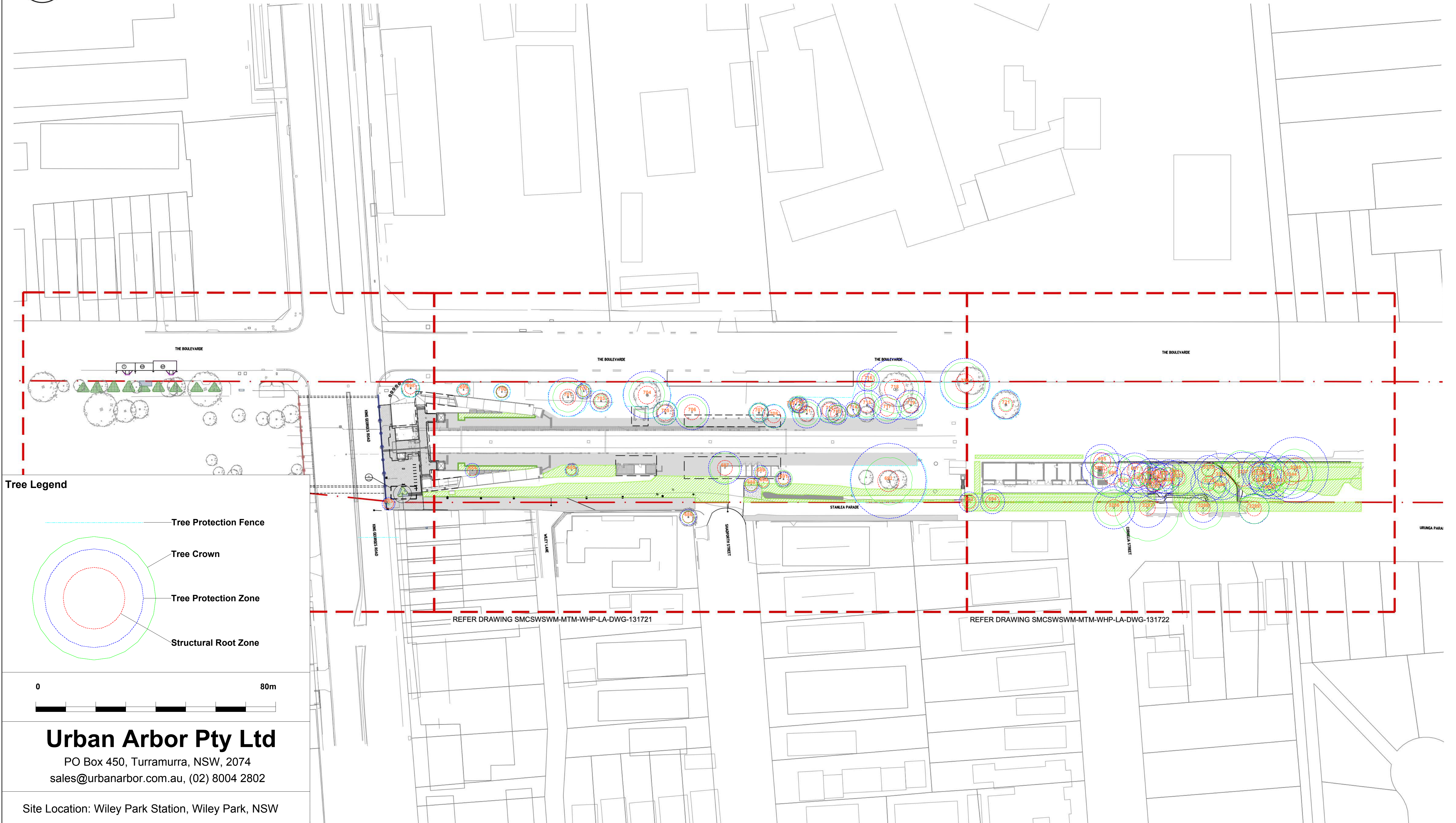


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TRAQ

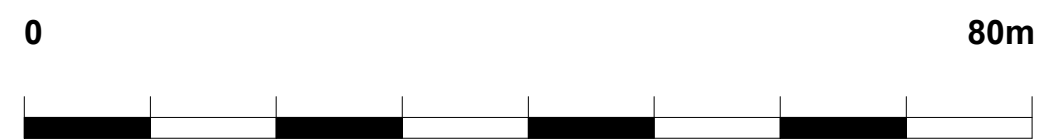
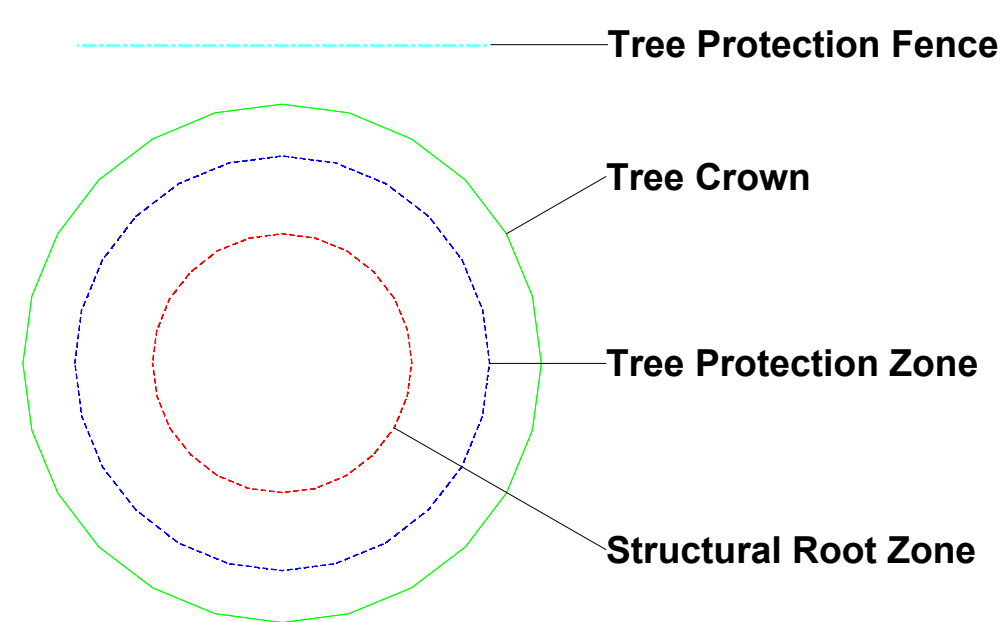


TO SYDNEY

TO BANKSTOWN



Tree Legend



Urban Arbor Pty Ltd

PO Box 450, Turramurra, NSW, 2074
sales@urbanarbor.com.au, (02) 8004 2802

Site Location: Wiley Park Station, Wiley Park, NSW

SCALE :
1 : 600 @ A1

DATE :
23/12/2020

URBAN ARBOR
The Trusted Name in Tree Management

Appendix 1A: Proposed Site Plan Overview

Prepared by: Bryce Claassens

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NOT FOR CONSTRUCTION

Appendix 2 - Tree Inspection Schedule

Tree ID	Common Name	Botanical Name	Age Class	Height (m)	Canopy Spread Radius (m)	Stem 1	Stem 2	Stem 3	Stem 4	Stem 5	DBH (mm)	DAB (mm)	Health	Structure	Amenity Value	SULE	Retention Value	TPZ Radius (m)	SRZ Radius (m)	Notes
683	Fig	<i>Ficus spp</i>	Semi-mature	2	0.5	180					180	200	Good	Fair	Low	5. Small/Young	Z1	2.2	1.7	Leaning on tree guard.
684	Sweet Pittosporum	<i>Pittosporum undulatum</i>	Semi-mature	4	2	200					200	200	Good	Fair	Low	5. Small/Young	Z1	2.4	1.7	Located within corridor.
685	Grevillea 'Moonlight'	<i>Grevillea spp</i>	Semi-mature	3	1.5	100	50				112	220	Good	Good	Low	5. Small/Young	Z1	2.0	1.8	None.
686	Lemon Scented Tea Tree	<i>Leptospermum petersonii</i>	Mature	6	2	220					220	250	Good	Good	Medium	1. Long	A1	2.6	1.8	None.
687	Common Oak	<i>Quercus robur</i>	Mature	10	5	460					460	520	Good	Good	Medium	1. Long	A1	5.5	2.5	None.
688	Unknown	<i>Unknown spp</i>	Dead	5	2	120	180				216	350	Dead	Poor	Low	4. Remove	Z4	2.6	2.1	Dead tree.
689	Oleander	<i>Nerium oleander</i>	Semi-mature	5	2	200					200	200	Good	Fair	Low	5. Small/Young	Z1	2.4	1.7	Located within corridor.
690	Sweet Pittosporum	<i>Pittosporum undulatum</i>	Semi-mature	5	2	150					150	180	Good	Fair	Low	5. Small/Young	Z1	2.0	1.6	Located within corridor.
691	Common Oak	<i>Quercus robur</i>	Semi-mature	7	3	190					190	220	Good	Good	Medium	1. Long	A1	2.3	1.8	Located within corridor.
692	Peppercorn	<i>Schinus molle</i>	Mature	10	8	1050					1050	1200	Good	Good	Medium	1. Long	A1	12.6	3.6	Located within corridor.
693	Chinese Tallo	<i>Triadica sebifera</i>	Mature	5	2	160	160	160			277	450	Good	Good	Medium	2. Medium	A1	3.3	2.4	Located within corridor.
694	Chinese Tallo	<i>Triadica sebifera</i>	Mature	6	3	340					340	410	Good	Good	Medium	1. Long	A1	4.1	2.3	Located within corridor.
695	Peppercorn	<i>Schinus molle</i>	Mature	9	4	260	400				477	700	Good	Fair	Medium	2. Medium	A1	5.7	2.8	Located within corridor. DBH estimated. Surrounded by weed species.
696	Peppercorn	<i>Schinus molle</i>	Mature	9	7	450	430				622	800	Good	Fair	Medium	2. Medium	A1	7.5	3.0	Located within corridor. DBH estimated. Surrounded by weed species.
697	Peppercorn	<i>Schinus molle</i>	Mature	9	5	500					500	550	Good	Fair	Medium	2. Medium	A1	6.0	2.6	Located within corridor. DBH estimated. Surrounded by weed species.
698	Weeping Bottlebrush	<i>Callistemon viminalis</i>	Mature	7	3	260					260	290	Good	Good	Medium	1. Long	A1	3.1	2.0	None.
699	Diamond Leaf Pittosporum	<i>Auranticarpa rhombifolia</i>	Semi-mature	6	2	120	110				163	200	Fair	Fair	Low	3. Short	Z4	2.0	1.7	Low foliage density for power. Tree in decline. Rhombifolia.
700	Diamond Leaf Pittosporum	<i>Auranticarpa rhombifolia</i>	Mature	5	2	230					230	250	Good	Fair	Medium	3. Short	Z9	2.8	1.8	Large cambium wound to north.
701	Common Oak	<i>Quercus robur</i>	Mature	10	5	540					540	590	Good	Good	Medium	1. Long	A1	6.5	2.7	None.
702	Diamond Leaf Pittosporum	<i>Auranticarpa rhombifolia</i>	Mature	6	2	200					200	250	Good	Good	Medium	1. Long	A1	2.4	1.8	None.
703	Strawberry Tree	<i>Arbutus unedo</i>	Mature	4	2	240	180				300	450	Good	Fair	Medium	5. Small/Young	Z1	3.6	2.4	Wound on trunk.
704	Common Oak	<i>Quercus robur</i>	Mature	9	6	660					660	780	Good	Fair	Medium	2. Medium	A2	7.9	3.0	Loss of central leader.
705	Common Oak	<i>Quercus robur</i>	Mature	9	4	240	240				339	560	Good	Good	Medium	1. Long	A1	4.1	2.6	Co-dominant stems.
706	Common Oak	<i>Quercus robur</i>	Mature	10	5	490					490	540	Good	Good	Medium	1. Long	A1	5.9	2.6	None.
707	Common Oak	<i>Quercus robur</i>	Semi-mature	8	3	260					260	300	Good	Good	Medium	1. Long	A1	3.1	2.0	Located within corridor.
708	Common Oak	<i>Quercus robur</i>	Mature	9	4	320					320	390	Good	Good	Medium	1. Long	A1	3.8	2.2	Located within corridor. DBH estimated.
709	Common Oak	<i>Quercus robur</i>	Semi-mature	6	2	190					190	220	Good	Fair	Medium	2. Medium	A1	2.3	1.8	Located within corridor. DBH estimated. Suppressed by adjacent trees.
710	Common Oak	<i>Quercus robur</i>	Semi-mature	8	3	220					220	290	Good	Good	Medium	1. Long	A1	2.6	2.0	Located within corridor. DBH estimated.
711	Common Oak	<i>Quercus robur</i>	Mature	9	4	220	240	240			404	500	Good	Good	Medium	1. Long	A1	4.9	2.5	Located within corridor. DBH estimated.
712	Common Oak	<i>Quercus robur</i>	Mature	9	4	200	210	200			352	500	Good	Fair	Medium	2. Medium	A1	4.2	2.5	Located within corridor. DBH estimated. Co-dominant stems with bark inclusion.
713	Common Oak	<i>Quercus robur</i>	Mature	9	3	300					300	330	Good	Good	Medium	1. Long	A1	3.6	2.1	Located within corridor. DBH estimated.
714	Common Oak	<i>Quercus robur</i>	Semi-mature	7	2	220					220	280	Good	Good	Medium	1. Long	A1	2.6	1.9	Located within corridor. DBH estimated.
715	Common Oak	<i>Quercus robur</i>	Mature	9	4	420					420	490	Good	Good	Medium	1. Long	A1	5.0	2.5	Located within corridor. DBH estimated.
716	Yellow Bloodwood	<i>Corymbia eximia</i>	Mature	9	3	310					310	360	Good	Good	High	1. Long	A1	3.7	2.2	None.
717	Common Oak	<i>Quercus robur</i>	Mature	9	4	160	180	320			400	450	Fair	Fair	Medium	3. Short	Z9	4.8	2.4	Located within corridor. DBH estimated. Dieback with large deadwood.
718	Grey Ironbark	<i>Eucalyptus paniculata</i>	Mature	25	8	850					850	1050	Good	Good	Very High	1. Long	A1	10.2	3.4	Located within corridor. DBH estimated.
719	Common Oak	<i>Quercus robur</i>	Mature	8	4	230	240	250			416	500	Good	Fair	Medium	2. Medium	A1	5.0	2.5	Suppressed by adjacent tree.
720	Sydney Blue Gum	<i>Eucalyptus saligna</i>	Mature	19	7	690					690	840	Good	Good	Very High	1. Long	A1	8.3	3.1	None.
721	Lombardy Poplar	<i>Populus nigra</i>	Mature	19	2	400					400	450	Good	Fair	Low	2. Medium	Z3	4.8	2.4	Located within corridor. DBH estimated. Exempt species.

Appendix 2 - Tree Inspection Schedule

Tree ID	Common Name	Botanical Name	Age Class	Height (m)	Canopy Spread Radius (m)	Stem 1	Stem 2	Stem 3	Stem 4	Stem 5	DBH (mm)	DAB (mm)	Health	Structure	Amenity Value	SULE	Retention Value	TPZ Radius (m)	SRZ Radius (m)	Notes
3286	Sydney Blue Gum	<i>Eucalyptus saligna</i>	Mature	14	6	590					590	650	Good	Fair	High	3. Short	Z10	7.1	2.8	Located within nature strip. Significantly pruned for power line clearance. Asymmetric crown shape. Low potential for recovery.
3287	Bangalay	<i>Eucalyptus botryoides</i>	Mature	11	6	550					550	580	Good	Fair	High	3. Short	Z10	6.6	2.6	Located within nature strip. Significantly pruned for power line clearance. Asymmetric crown shape. Low potential for recovery.
3288	Wallangarra White Gum	<i>Eucalyptus scoparia</i>	Mature	11	7	400					400	450	Good	Fair	High	3. Short	Z10	4.8	2.4	Located within nature strip. Significantly pruned for power line clearance. Asymmetric crown shape. Low potential for recovery.
3289	Bangalay	<i>Eucalyptus botryoides</i>	Mature	10	5	420					420	480	Good	Fair	High	3. Short	Z10	5.0	2.4	Located within nature strip. Significantly pruned for power line clearance. Asymmetric crown shape. Low potential for recovery.
3321	Broad Leaved Privet	<i>Ligustrum lucidum</i>	Mature	6	3	500					500	500	Good	Fair	Very Low	2. Medium	Z3	6.0	2.5	Noxious weed.
3322	Canary Palm	<i>Phoenix canariensis</i>	Semi-mature	4	2	250					250	NA	Good	Good	Low	5. Small/Young	Z3	3.0	NA	Exempt species.
3323	Broad Leaved Privet	<i>Ligustrum lucidum</i>	Mature	6	2	500					500	500	Good	Fair	Very Low	2. Medium	Z3	6.0	2.5	Noxious weed. DBH measured at base. Ibis nest.
3324	Broad Leaved Privet	<i>Ligustrum lucidum</i>	Mature	6	2	450					450	450	Good	Fair	Very Low	2. Medium	Z3	5.4	2.4	Noxious weed. DBH measured at base.
3325	Peppercorn Tree	<i>Schinus molle</i>	Mature	10	4	460					460	600	Good	Good	Medium	1. Long	A1	5.5	2.7	None.
3326	Broad Leaved Privet	<i>Ligustrum lucidum</i>	Semi-mature	7	2	100	100	100	100		200	400	Good	Fair	Very Low	2. Medium	Z3	2.4	2.3	Noxious weed.
3327	Broad Leaved Privet	<i>Ligustrum lucidum</i>	Mature	6	2	450					450	450	Good	Fair	Very Low	2. Medium	Z3	5.4	2.4	Noxious weed. DBH measured at base.
3328	Peppercorn Tree	<i>Schinus molle</i>	Mature	9	4	430					430	510	Fair	Fair	Medium	3. Short	Z10	5.2	2.5	Pruned for power line clearance. Poor overall form.
3329	Broad Leaved Privet	<i>Ligustrum lucidum</i>	Semi-mature	5	2	110	100	90			174	400	Good	Fair	Very Low	5. Small/Young	Z3	2.1	2.3	Noxious weed.
3330	Smooth Barked Apple	<i>Angophora costata</i>	Mature	17	4	420					420	530	Good	Fair	High	2. Medium	A2	5.0	2.5	Cambium damage to trunk and base. Monitor wounding.
3331	Broad Leaved Privet	<i>Ligustrum lucidum</i>	Semi-mature	5	2	400					400	400	Good	Fair	Very Low	5. Small/Young	Z3	4.8	2.3	Noxious weed. DBH measured at base.
3332	Broad Leaved Privet	<i>Ligustrum lucidum</i>	Mature	8	3	500					500	500	Good	Fair	Very Low	2. Medium	Z3	6.0	2.5	Noxious weed. DBH measured at base.
3333	Broad Leaved Privet	<i>Ligustrum lucidum</i>	Semi-mature	6	2	400					400	400	Good	Fair	Very Low	2. Medium	Z3	4.8	2.3	Noxious weed. DBH measured at base.
3334	Broad Leaved Privet	<i>Ligustrum lucidum</i>	Mature	7	2	500					500	500	Good	Fair	Very Low	2. Medium	Z3	6.0	2.5	Noxious weed. DBH measured at base.
3335	Peppercorn Tree	<i>Schinus molle</i>	Mature	10	5	650					650	700	Fair	Fair	Medium	3. Short	Z10	7.8	2.8	Pruned for power line clearance. Poor overall form.
3336	Broad Leaved Privet	<i>Ligustrum lucidum</i>	Semi-mature	7	2	300					300	300	Good	Fair	Very Low	2. Medium	Z3	3.6	2.0	Noxious weed. DBH measured at base.
3337	Peppercorn Tree	<i>Schinus molle</i>	Mature	10	8	250	150	380	390		618	1600	Good	Fair	Medium	2. Medium	A1	7.4	4.0	Could not access base of tree. DBH estimated.
3338	Broad Leaved Privet	<i>Ligustrum lucidum</i>	Semi-mature	6	2	350					350	350	Good	Fair	Very Low	2. Medium	Z3	4.2	2.1	Noxious weed. DBH measured at base.
3339	Peppercorn Tree	<i>Schinus molle</i>	Mature	10	5	500	250				559	890	Good	Fair	Medium	2. Medium	A1	6.7	3.2	Co-dominant stems with minor wound near base.
3340	Broad Leaved Privet	<i>Ligustrum lucidum</i>	Semi-mature	6	2	450					450	450	Good	Fair	Very Low	2. Medium	Z3	5.4	2.4	Noxious weed. DBH measured at base.
3341	Peppercorn Tree	<i>Schinus molle</i>	Mature	9	5	570					570	650	Fair	Fair	Medium	3. Short	Z10	6.8	2.8	Pruned for power line clearance. Poor overall form.
3342	Canary Palm	<i>Phoenix canariensis</i>	Young	3	1	400					400	NA	Good	Fair	Low	5. Small/Young	Z3	2.0	NA	Exempt species.
3343	Broad Leaved Privet	<i>Ligustrum lucidum</i>	Mature	6	3	600					600	600	Good	Fair	Very Low	2. Medium	Z3	7.2	2.7	Noxious weed. DBH measured at base.
3344	Peppercorn Tree	<i>Schinus molle</i>	Mature	8	6	600					600	700	Fair	Fair	Medium	3. Short	Z10	7.2	2.8	Apical dieback. significantly pruned. Poor overall form.
3345	Peppercorn Tree	<i>Schinus molle</i>	Mature	10	7	700	420	420			918	1600	Good	Fair	Medium	2. Medium	A1	11.0	4.0	Peppercorn. Large deformity on primary stem.

Explanatory Notes

Tree Species - Common name followed by botanical name. Where species is unknown it is indicated with an 'spp'.

Age Class - Over mature (OM), Mature (M), Early mature (EM), Semi mature (SM), Young (Y).

Diameter at Breast Height (DBH) - Measured with a DBH tape or estimated at approximately 1.4m above ground level.

Diameter Above root Buttresses (DAB) - Measured with a DBH tape or estimated above root buttresses (DAB) for calculating the SRZ.

Height - Height from ground level to top of crown. All heights are estimated unless otherwise indicated.

Spread - Radius of crown at widest section. All tree spreads are estimated unless otherwise indicated.

Tree Protection Zone (TPZ) - DBH x 12. Measured in radius from the centre of the trunk. Rounded to nearest 0.1m. For monocots, the TPZ is set at 1 metre outside the crown projection.

Structural Root Zone (SRZ) - (DAB x 50)^{0.42} x 0.64. Measured in radius from the centre of the trunk. Rounded up to nearest 0.1m.

Health - Good/Fair/Poor/Dead

Structure - Good/Fair/Poor

Safe Useful Life Expectancy (SULE) - 1. Long (40+years), 2. Medium (15 - 40 years), 3. Short (5 - 15 years), 4. Remove (under 5 years), 5. Small/young.

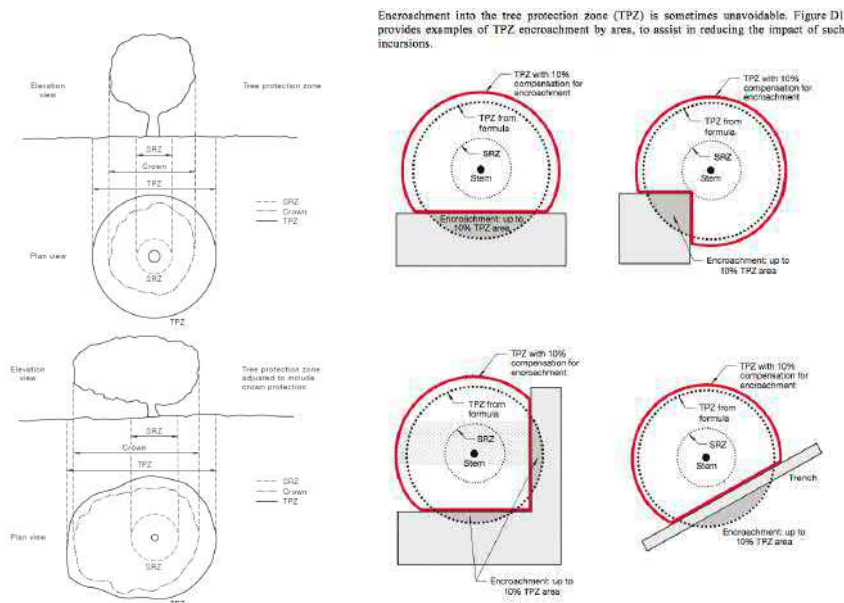
Amenity Value - Very High/High/Medium/Low/Very Low.

Appendix 3 - Further Information of Methodology

1. **Tree Protection Zone:** The tree protection zone (TPZ) is the principle means of protecting trees on development sites. The TPZ is a combination of the root area and crown area requiring protection. It is an area isolated from construction disturbance, so that the tree remains viable. The radius of the TPZ is calculated for each tree by multiplying its DBH x 12. The derived value is measured in radius from the centre of the stem/trunk at ground level. A TPZ should not be less than 2.0 metres nor greater than 15 metres (except where crown protection is required). It is commonly observed that tree roots will extend significant further than the indicative TPZ, however the TPZ is an area identified AS4970-2009 to be extent where root loss or disturbance will generally not impact the viability of the tree. The TPZ is identified as a restricted area to prevent damage to trees either above or below ground during a development. Where trees are intended to be retained proposed developments must provide an adequate TPZ around trees. The TPZ is set aside for the tree's root zone, trunk and crown and it is essential for the stability and longevity of the tree. The tree protection also incorporates the SRZ (see below for more information about the SRZ). I have calculated the TPZ of palms, other monocots, cycads and tree ferns at one metre outside the crown projection. See appendices for additional information about the TPZ including information about calculating the TPZ and examples of TPZ encroachment.

Minor encroachment into TPZ: Sometimes encroachment into the TPZ is unavoidable. Encroachment includes but is not limited to activities such as excavation, compacted fill and machine trenching. Minor encroachment of up to 10% of the overall TPZ area is normally considered acceptable, providing there is space adjacent to the TPZ for the tree to compensate and the tree is displaying adequate vigour/health to tolerate changes to its growing environment.

Major encroachment into TPZ: Where encroachment of more than 10% of the overall TPZ area is proposed the project Arborist must investigate and demonstrate that the tree will remain in a viable condition. In some cases, tree sensitive construction methods such as pier and beam footings, suspended slabs, or cantilevered sections, can be utilised to allow additional encroachment into the TPZ by bridging over roots and minimising root disturbance. Major encroachment is only possible if it can be undertaken without severing significant size roots, or if it can be demonstrated that significant roots will not be impacted.



2. **Structural Root Zone:** This is the area around the base of a tree required for the trees stability in the ground. An area larger than the SRZ always need to be maintained to preserve a viable tree as it will only have a minor effect on the trees vigour and health. There are several factors that determine the SRZ which include height, crown area, soil type and soil moisture. It can also be influenced by other factors such as natural or built structures. Generally work within the SRZ should be avoided.

An indicative SRZ radius can be determined from the diameter of the trunk measured immediately above the root buttresses. Root investigation could provide more information about the extent of the SRZ. The following formula should be used to calculate the SRZ.

SRZ radius = $(D \times 50)^{0.42} \times 0.64$ (D = Diameter above root buttress).

3. **Tree Age Class:** If can be difficult to determine the age of a tree without carrying out invasive tests that may damage the tree, so we have categorised there likely age class which is defined below;
 - Young/Newly planted: Young or recently planted tree.
 - Semi Mature: Up to 20% of the usual life expectancy for the species.
 - Early mature/Mature: Between 20%-80% of the usual life expectancy for the species.
 - Over mature: Over 80% of the usual life expectancy for the species.
 - Dead: Tree is dead or almost dead.

4. **Health/Physiological Condition:** Below are examples conditions used when assigning a category for tree health.

Category	Example condition	Summary
Good	<ul style="list-style-type: none"> • Crown has good foliage density for species. • Tree shows no or minimal signs of pathogens that are unlikely to have an effect on the health of the tree. • Tree is displaying good vigour and reactive growth development. 	<ul style="list-style-type: none"> • The tree is in above average health and condition and no remedial works are required.
Fair	<ul style="list-style-type: none"> • The tree may be starting to dieback or have over 25% deadwood. • Tree may have slightly reduced crown density or thinning. • There may be some discolouration of foliage. • Average reactive growth development. • There may be early signs of pathogens which may further deteriorate the health of the tree. • There may be epicormic growth indicating increased levels of stress within the tree. 	<ul style="list-style-type: none"> • The tree is in below average health and condition and may require remedial works to improve the trees health.
Poor	<ul style="list-style-type: none"> • The tree may be in decline, have extensive dieback or have over 30% deadwood. • The canopy may be sparse or the leaves may be unusually small for species. • Pathogens or pests are having a significant detrimental effect on the tree health. 	<ul style="list-style-type: none"> • The tree is displaying low levels of health and removal or remedial works may be required.
Dead	<ul style="list-style-type: none"> • The tree is dead or almost dead. 	<ul style="list-style-type: none"> • The tree should generally be removed.

5. **Structural Condition:** Below are examples conditions used when assigning a category for structural condition.

Category	Example condition	Summary
Good	<ul style="list-style-type: none"> • Branch unions appear to be strong with no sign of defects. • There are no significant cavities. • The tree is unlikely to fail in usual conditions. • The tree has a balanced crown shape and form. 	<ul style="list-style-type: none"> • The tree is considered structurally good with well developed form.
Fair	<ul style="list-style-type: none"> • The tree may have minor structural defects within the structure of the crown that could potentially develop into more significant defects. • The tree may have a cavity that is currently unlikely to fail but may deteriorate in the future. • The tree is an unbalanced shape or leans significantly. • The tree may have minor damage to its roots. • The root plate may have moved in the past but the tree has now compensated for this. • Branches may be rubbing or crossing. 	<ul style="list-style-type: none"> • The identified defects are unlikely cause major failure. • Some branch failure may occur in usual conditions. • Remedial works can be undertaken to alleviate potential defects.
Poor	<ul style="list-style-type: none"> • The tree has significant structural defects. • Branch unions may be poor or weak. • The tree may have a cavity or cavities with excessive levels of decay that could cause catastrophic failure. • The tree may have root damage or is displaying signs of recent movement. • The tree crown may have poor weight distribution which could cause failure. 	<ul style="list-style-type: none"> • The identified defects are likely to cause either partial or whole failure of the tree.

6. **Amenity Value:** To determine the amenity value of a tree we assess a number of different factors, which include but are not limited to the information below.

- The visibility of the tree to adjacent sites.
- The relationship between the tree and the site.
- Whether the tree is protected by any statutory conditions.
- The habitat value of the tree.
- Whether the tree is considered a noxious weed species.

The amenity value is rated using one of the following values.

- Very High
- High
- Moderate
- Low
- Very Low

7. **Safe Useful Life Expectancy (SULE), (Barrel, 2001):** A trees safe useful life expectancy is determined by assessing a number of different factors including the health and vitality, estimated age in relation to expected life expectancy for the species, structural defects, and remedial works that could allow retention in the existing situation.

Category	Description
1. Long - Over 40 years	(a) Structurally sound trees located in positions that can accommodate future growth. (b) Trees that could be made suitable for retention in the long term by remedial tree care. (c) Trees of special significance for historical, commemorative or rarity reasons that would warrant extraordinary efforts to secure their long term retention.
2. Medium - 15 to 40 years	(a) Trees that may only live between 15 and 40 more years. (b) Trees that could live for more than 40 years but may be removed for safety or nuisance reasons. (c) Trees that could live for more than 40 years but may be removed to prevent interference with more suitable individuals or to provide space for new planting. (d) Trees that could be made suitable for retention in the medium term by remedial tree care.
3. Short - 5 to 15 years	(a) Trees that may only live between 5 and 15 more years. (b) Trees that could live for more than 15 years but may be removed for safety or nuisance reasons. (c) Trees that could live for more than 15 years but may be removed to prevent interference with more suitable individuals or to provide space for new planting. (d) Trees that require substantial remedial tree care and are only suitable for retention in the short term.
4. Remove - Under 5 years	(a) Dead, dying, suppressed or declining trees because of disease or inhospitable conditions. (b) Dangerous trees because of instability or recent loss of adjacent trees. (c) Dangerous trees because of structural defects including cavities, decay, included bark, wounds or poor form. (d) Damaged trees that are clearly not safe to retain. (e) Trees that could live for more than 5 years but may be removed to prevent interference with more suitable individuals or to provide space for new planting. (f) Trees that are damaging or may cause damage to existing structures within 5 years. (g) Trees that will become dangerous after removal of other trees for the reasons given in (a) to (f). (h) Trees in categories (a) to (g) that have a high wildlife habitat value and, with appropriate treatment, could be retained subject to regular review.
5. Small/Young	(a) Small trees less than 5m in height. (b) Young trees less than 15 years old but over 5m in height. (c) Formal hedges and trees intended for regular pruning to artificially control growth.

8. **Root investigations:** The root investigations should identify roots greater than 30mm in diameter that are located along the edge of the structures footprint or in the location of footings. Root investigations must be carried out using non-invasive methods (manual excavations). Any excavations for the root investigations must be carried out manually to avoid damaging the roots during excavations. Manual excavation may include the use of a high-pressure air/air knife, or a combination of high-pressure water and a vacuum device. When hand excavating carefully work around roots retaining as many as possible. Take care to not fray, wound, or cause damage to any roots during excavations as this may cause decay or infection from pathogens. It is essential that exposed roots are kept moist and the excavation back filled as soon as possible. The root investigations should be carried out by a qualified Arborist minimum AQF3. Once roots are exposed, a visual assessment can be carried out by a consulting Arborist to evaluate the potential impact of the proposed root loss on the health and stability of the tree. A root map/report should be prepared identifying the findings of investigations, including photographs as supporting evidence in the report.

9. **Retention Value:** The system I have used to award the retention value is Tree AZ. Tree AZ is used to identify higher value trees worthy of being a constraint to development and lower value trees that should generally not be a constraint to the development. The table below provides a brief description of each category.

TreeAZ Categories (Version 10.04-ANZ)

CAUTION: TreeAZ assessments must be carried out by a competent person qualified and experienced in arboriculture. The following category descriptions are designed to be a brief field reference and are not intended to be self-explanatory. They must be read in conjunction with the most current explanations published at www.TreeAZ.com.

Category Z: Unimportant trees not worthy of being a material constraint

Local policy exemptions: Trees that are unsuitable for legal protection for local policy reasons including size, proximity and species

- Z1** Young or insignificant small trees, i.e. below the local size threshold for legal protection, etc
- Z2** Too close to a building, i.e. exempt from legal protection because of proximity, etc
- Z3** Species that cannot be protected for other reasons, i.e. scheduled noxious weeds, out of character in a setting of acknowledged importance, etc

High risk of death or failure: Trees that are likely to be removed within 10 years because of acute health issues or severe structural failure

- Z4** Dead, dying, diseased or declining
- Z5** Severe damage and/or structural defects where a high risk of failure cannot be satisfactorily reduced by reasonable remedial care, i.e. cavities, decay, included bark, wounds, excessive imbalance, overgrown and vulnerable to adverse weather conditions, etc
- Z6** Instability, i.e. poor anchorage, increased exposure, etc
- Excessive nuisance:** Trees that are likely to be removed within 10 years because of unacceptable impact on people
- Z7** Excessive, severe and intolerable inconvenience to the extent that a locally recognized court or tribunal would be likely to authorize removal, i.e. dominance, debris, interference, etc
- Z8** Excessive, severe and intolerable damage to property to the extent that a locally recognized court or tribunal would be likely to authorize removal, i.e. severe structural damage to surfacing and buildings, etc

Good management: Trees that are likely to be removed within 10 years through responsible management of the tree population

- Z9** Severe damage and/or structural defects where a high risk of failure can be temporarily reduced by reasonable remedial care, i.e. cavities, decay, included bark, wounds, excessive imbalance, vulnerable to adverse weather conditions, etc
- Z10** Poor condition or location with a low potential for recovery or improvement, i.e. dominated by adjacent trees or buildings, poor architectural framework, etc
- Z11** Removal would benefit better adjacent trees, i.e. relieve physical interference, suppression, etc
- Z12** Unacceptably expensive to retain, i.e. severe defects requiring excessive levels of maintenance, etc

NOTE: Z trees with a high risk of death/failure (Z4, Z5 & Z6) or causing severe inconvenience (Z7 & Z8) at the time of assessment and need an urgent risk assessment can be designated as ZZ. ZZ trees are likely to be unsuitable for retention and at the bottom of the categorization hierarchy. In contrast, although Z trees are not worthy of influencing new designs, urgent removal is not essential and they could be retained in the short term, if appropriate.

Category A: Important trees suitable for retention for more than 10 years and worthy of being a material constraint

- A1** No significant defects and could be retained with minimal remedial care
- A2** Minor defects that could be addressed by remedial care and/or work to adjacent trees
- A3** Special significance for historical, cultural, commemorative or rarity reasons that would warrant extraordinary efforts to retain for more than 10 years
- A4** Trees that may be worthy of legal protection for ecological reasons (Advisory requiring specialist assessment)

NOTE: Category A1 trees that are already large and exceptional, or have the potential to become so with minimal maintenance, can be designated as AA at the discretion of the assessor. Although all A and AA trees are sufficiently important to be material constraints, AA trees are at the top of the categorization hierarchy and should be given the most weight in any selection process.

TreeAZ is designed by Barrell Tree Consultancy (www.barrelltreecare.co.uk) and is reproduced with their permission

Glossary of Terms

Abiotic - Pertaining to non-living agents; e.g. environmental factors

Adventitious shoots - Shoots that develop other than from apical, axillary or dormant buds; see also 'epicormic'

Anchorage - The system whereby a tree is fixed within the soil, involving cohesion between roots and soil and the development of a branched system of roots which withstands wind and gravitational forces transmitted from the aerial parts of the tree

Bark - A term usually applied to all the tissues of a woody plant lying outside the vascular cambium, thus including the phloem, cortex and periderm; occasionally applied only to the periderm or the phellem

Branch:

- **Primary**. A first order branch arising from a stem
- **Lateral**. A second order branch, subordinate to a primary branch or stem and bearing sub-lateral branches
- **Sub-lateral**. A third order branch, subordinate to a lateral or primary branch, or stem and usually bearing only twigs

Branch collar - A visible swelling formed at the base of a branch whose diameter growth has been disproportionately slow compared to that of the parent stem; a term sometimes applied also to the pattern of growth of the cells of the parent stem around the branch base

Brown-rot - A type of wood decay in which cellulose is degraded, while lignin is only modified

Buckling - An irreversible deformation of a structure subjected to a bending load

Buttress zone - The region at the base of a tree where the major lateral roots join the stem, with buttress-like formations on the upper side of the junctions

Cambium - Layer of dividing cells producing xylem (woody) tissue internally and phloem (bark) tissue externally

Canker - A persistent lesion formed by the death of bark and cambium due to colonisation by fungi or bacteria

Compartmentalisation - The confinement of disease, decay or other dysfunction within an anatomically discrete region of plant tissue, due to passive and/or active defences operating at the boundaries of the affected region

Compressive loading - Mechanical loading which exerts a positive pressure; the opposite to tensile loading

Condition - An indication of the physiological condition of the tree. Where the term 'condition' is used in a report, it should not be taken as an indication of the stability of the tree

Crown/Canopy - The main foliage bearing section of the tree

Crown lifting - The removal of limbs and small branches to a specified height above ground level

Crown thinning - The removal of a proportion of secondary branch growth throughout the crown to produce an even density of foliage around a well-balanced branch structure

Crown reduction/shaping - A specified reduction in crown size whilst preserving, as far as possible, the natural tree shape

DAB (Diameter Above Buttress) - Trunk diameter measured above the root buttress

Defect - In relation to tree hazards, any feature of a tree which detracts from the uniform distribution of mechanical stress, or which makes the tree mechanically unsuited to its environment

Dieback - The death of parts of a woody plant, starting at shoot-tips or root-tips

Disease - A malfunction in or destruction of tissues within a living organism, usually excluding mechanical damage; in trees, usually caused by pathogenic micro-organisms

Dominance - In trees, the tendency for a leading shoot to grow faster or more vigorously than the lateral shoots; also the tendency of a tree to maintain a taller crown than its neighbours

Dormant bud - An axial bud which does not develop into a shoot until after the formation of two or more annual wood increments; many such buds persist through the life of a tree and develop only if stimulated to do so

Dysfunction - In woody tissues, the loss of physiological function, especially water conduction, in sapwood

DBH (Diameter at Breast Height) - Stem diameter measured at a height of 1.4 metres or the nearest measurable point. Where measurement at a height of 1.4 metres is not possible, another height may be specified

Deadwood - Branch or stem wood bearing no live tissues. Retention of deadwood provides valuable habitat for a wide range of species and seldom represents a threat to the health of the tree. Removal of deadwood can result in the ingress of decay to otherwise sound tissues and climbing operations to access deadwood can cause significant damage to a tree. Removal of deadwood is generally recommended only where it represents an unacceptable level of hazard

Epicormic shoot - A shoot having developed from a dormant or adventitious bud and not having developed from a first year shoot

Flush-cut - A pruning cut which removes part of the branch bark ridge and or branch-collar

Girdling root - A root which circles and constricts the stem or roots possibly causing death of phloem and/or cambial tissue

Habit - The overall growth characteristics, shape of the tree and branch structure

Hazard beam - An upwardly curved part of a tree in which strong internal stresses may occur without being reduced by adaptive growth; prone to longitudinal splitting

Heartwood/false-heartwood - The dead central wood that has become dysfunctional as part of the aging processes and being distinct from the sapwood

Heave - A term mainly applicable to a shrinkable clay soil which expands due to re-wetting after the felling of a tree which was previously extracting moisture from the deeper layers; also the lifting of pavements and other structures by root diameter expansion; also the lifting of one side of a wind-rocked root-plate

Included bark (ingrown bark) - Bark of adjacent parts of a tree (usually forks, acutely joined branches or basal flutes) which is in face-to-face contact

Lever arm - A mechanical term denoting the length of the lever represented by a structure that is free to move at one end, such as a tree or an individual branch

Lignin - The hard, cement-like constituent of wood cells; deposition of lignin within the matrix of cellulose microfibrils in the cell wall is termed Lignification

Lions tailing - A term applied to a branch of a tree that has few if any side-branches except at its end, and is thus liable to snap due to end-loading

Loading - A mechanical term describing the force acting on a structure from a particular source; e.g. the weight of the structure itself or wind pressure

Mycelium - The body of a fungus, consisting of branched filaments (hyphae)

Occlusion - The process whereby a wound is progressively closed by the formation of new wood and bark around it

Pathogen - A micro-organism which causes disease in another organism

Photosynthesis - The process whereby plants use light energy to split hydrogen from water molecules, and combine it with carbon dioxide to form the molecular building blocks for synthesizing carbohydrates and other biochemical products

Probability - A statistical measure of the likelihood that a particular event might occur

Pruning - The removal or cutting back of twigs or branches, sometimes applied to twigs or small branches only, but often used to describe most activities involving the cutting of trees or shrubs

Radial - In the plane or direction of the radius of a circular object such as a tree stem

Reactive Growth/Reaction Wood - Production of woody tissue in response to altered mechanical loading; often in response to internal defect or decay and associated strength loss (cf. adaptive growth)

Ring-barking - The removal of a ring of bark and phloem around the circumference of a stem or branch, normally resulting in an inability to transport photosynthetic assimilates below the area of damage. Almost inevitably results in the eventual death of the affected stem or branch above the damage

Root-collar - The transitional area between the stem/s and roots

Sapwood - Living xylem tissues

Soft-rot - A kind of wood decay in which a fungus degrades cellulose within the cell walls, without any general degradation of the wall as a whole

Stem/s - Principle above-ground structural component(s) of a tree that supports its branches

Stress - In plant physiology, a condition under which one or more physiological functions are not operating within their optimum range, for example due to lack of water, inadequate nutrition or extremes of temperature

SRZ (Structural Root Zone) - The area around the base of the tree required for the trees stability in the ground

Subsidence - In relation to soil or structures resting in or on soil, a sinking due to shrinkage when certain types of clay soil dry out, sometimes due to extraction of moisture by tree roots

Taper - In stems and branches, the degree of change in girth along a given length

Targets - In tree risk assessment (with slight misuse of normal meaning) persons or property or other things of value which might be harmed by mechanical failure of the tree or by objects falling from it

Topping - In arboriculture, the removal of the crown of a tree, or of a major proportion of it

Transpiration - The evaporation of moisture from the surface of a plant, especially via the stomata of leaves; it exerts a suction which draws water up from the roots and through the intervening xylem cells

TPZ (Tree Protection Zone) - A specified area above and below ground and at a given distance from the trunk set aside for the protection of a tree's roots and crown to provide for the viability and stability of a tree to be retained where it is potentially subject to damage by development

Understory - This layer consists of younger individuals of the dominant trees, together with smaller trees and shrubs which are adapted to grow under lower light conditions

Veteran tree - Tree that, by recognised criteria, shows features of biological, cultural or aesthetic value that are characteristic of, but not exclusive to, individuals surviving beyond the typical age range for the species concerned. These characteristics might typically include a large girth, signs of crown retrenchment and hollowing of the stem

Vigour - The expression of carbohydrate expenditure to growth (in trees)

White-rot - A range of kinds of wood decay in which lignin, usually together with cellulose and other wood constituents, is degraded

Wind exposure - The degree to which a tree or other object is exposed to wind, both in terms of duration and velocity

Wind pressure - The force exerted by a wind on a particular object

Windthrow - The blowing over of a tree at its roots

APPENDIX 4 WILEY PARK AIA (PLATEAU TREES)

Date: 17 March 2021

Re: Additional tree removals at Wiley Park Station as part of the Southwest Metro Package.

At the request of Downer Group an onsite inspection was undertaken at Wiley Park Station. It has been asked to identify and record additional tree removals beyond those recommended within the Arboricultural Impact Assessment (AIA) prepared by Urban Arbor, dated 15 January 2020, Ref20/01/15/SWMWP. On the 1 March a site walkthrough was undertaken by myself and representatives from Downer Group. Additional tree removals were identified with respects to the proposed Southwest Metro Package works. The data for these additional trees can be found as Appendix 1 of this report.

Based upon the information, rational and justification provided within the AIA Report I can confirm that trees 683, 684, 687, 688, 695, 696, 697, 699 and 706 shall require removal to accommodate the proposed works. Reference should be made to the AIA report for their respective tree data.

The additional tree removals where there is a direct design clash and 100% encroachment into the TPZ and SRZ consist of seventeen *Schinus molle* (Peppercorn Tree), one *Eucalyptus scoparia* (Wallangarra White Gum) which constitute the significant trees within the site. Understory plants totaling sixty-two individual specimens were also identified. All trees are located along the rail embankment adjacent Urunga Parade. Image 1 shows the area of assessment and approximate locations of significant trees (trees 1-18). The Peppercorn trees are typically arranged in a line suggesting a landscape planting. The Wallangarra White Gum is likely to be a self-seeded specimen.

The understory consists of forty-five *Ligustrum lucidum* (Broad-leafed Privet) trees 19 to 63, ten *Pittosporum undulatum* (Sweet Pittosporum) trees 64 to 73, four *Phoenix canariensis* (Canary Island Date Palm) trees 74 to 77 and three *Camellia* sp (Camellia) trees 78 to 80. Although meeting the requirement of a tree under the *Sydney Metro City & Southwest Sydenham to Bankstown Instrument of Approval* these species are commonly considered to be weeds or have low retention value with respects to the proposed works. Broad-leafed Privet is an identified species under the *Biosecurity Act 2015*. A general biosecurity duty exists within NSW to prevent, eliminate or minimise any biosecurity risk. The understory generally ranges in height between 3 and 10m and has been previously managed through selective pruning, lopping and removal works. Its significance has been assessed under the Pre-clearance Assessment prepared by Cumberland Ecology dated 14 March 2021.

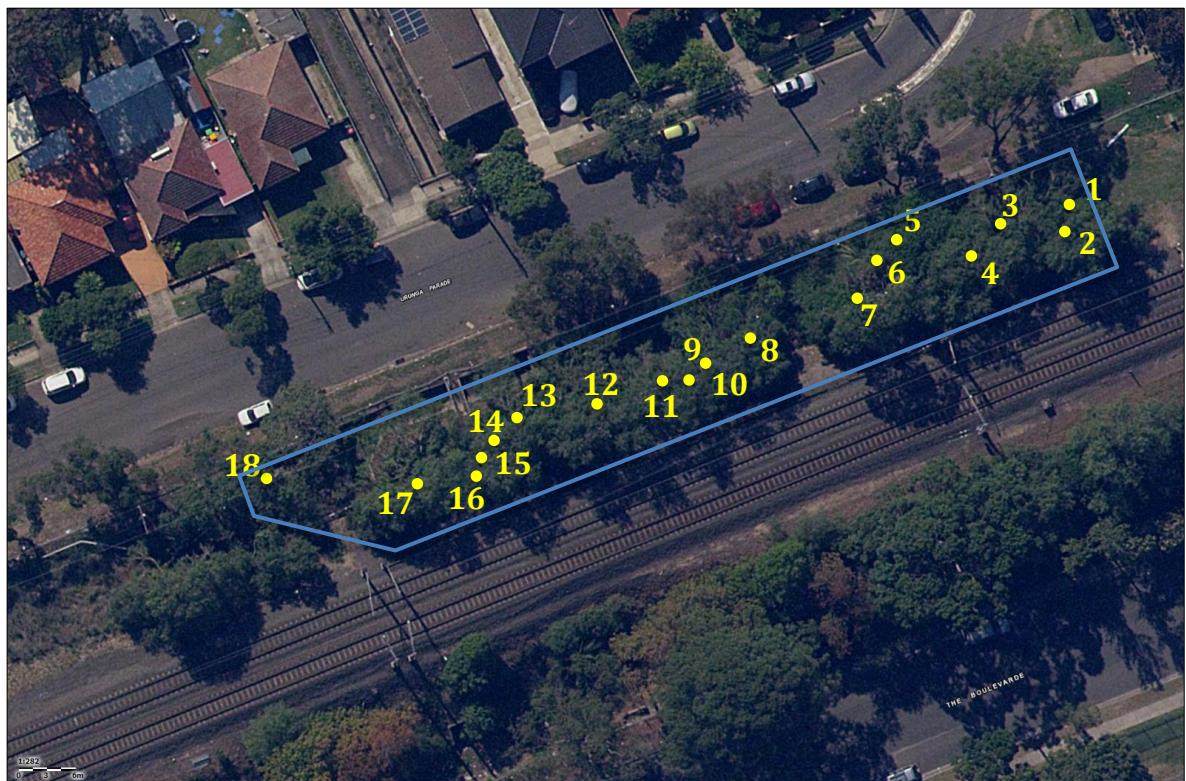


Image 1: Aerial image showing the proposed vegetation clearance area (blue outline) and approximate locations of significant trees (1 to 18).

The Peppercorn trees are considered to have a medium useful life expectancy of 15 to 40 years and medium landscape significance they are readily seen from the eastern end of Urunga Parade and the immediate surrounds. They provide screening from the rail corridor and its associated infrastructure. Each of these trees has been photographed and

can be found as Appendix 2 of this report. The understory species would generally be considered as having a short useful life expectancy and low landscape significance. It provides minor screening from the rail corridor.

Based on an assessment of the provided plans:

- Trees 1, 2 and 3 are positioned within the footprint of the pad mounted substation kiosk and cannot be retained
- Trees 4 and 5 are located within the footprint of the car park and cannot be retained
- Trees 6 and 7 are located within the area of the proposed OSD tank and access for retaining wall works and cannot be retained
- Trees 8, 9, 10, 11, 12, 13, 14, 15, 16 and 17 are located within the footprint required to undertake access, battering and pilling works associated with the retaining wall and cannot be retained
- The canopy of tree 18 potentially encroaches within the proposed works area due to the lean of the tree. The removal of a significant portion of the trees live canopy is likely to affect its health and condition reducing its useful life expectancy necessitating its removal
- Associated understory plants, trees 19 to 80, are within the footprint of works and cannot be retained

Pruning works were identified to be undertaken on tree 692 *Schinus molle* (Peppercorn Tree) to provide clearance along the rail corridor access track for plant and equipment. It is envisioned that pruning works shall involve the reduction and removal of selected branches up to 100mm in diameter and constitute approximately 25-30% of the total live canopy volume of the tree. Based upon the current health and condition of the tree these pruning works are considered to be significant and shall likely result in a reduction of tree growth and physiological function. All pruning works are to be undertaken by suitably qualified tree workers and meet the requirements of *AS4373-2007 Pruning of Amenity Trees*. Image 2 shows the tree and branches that overhang the access road.



Image 2: Yellow outline indicates branches from Tree 692, *Schinus molle* (Peppercorn Tree), that shall require selective removal to provide clearances along the rail corridor access track.

The additional Peppercorn trees are not representative of an endangered or threatened species or ecological community. The single Wallangarra White Gum is located out of its natural range and is not considered to be significant (refer to Pre-clearance Assessment prepared by Cumberland Ecology).

All appropriate approvals and consents are to be obtained prior to tree and vegetation removal works commencing. All tree removal works are to be undertaken by suitably qualified tree workers and in accordance with Safe Work Australia's Guide to Managing Risks of Tree Trimming and Removal Works.

Please feel free to contact me should you require any further assistance regarding this matter.

Regards.

Owen Tebbutt



Consulting Arborist
Plateau Tree Service

Appendix 1: Tree Assessment Schedule

Tree number	Tree name	Tree dimensions				Vigour	Condition	Age class	ULE	Amenity and Visual Value	Native or Exotic	TPZ (m)	SRZ (m)	Comments	Remove or Retain
	Botanical name Common name	Height (m)	Spread (m)	D.B.H. (mm)	D.A.B. (mm)										
1	<i>Schinus molle</i> (Peppercorn Tree)	10-15	6x6	450 300	600	N	F	M	M	M	E	6.48	2.67	Direct clash with MSB	Remove
2	<i>Schinus molle</i> (Peppercorn Tree)	10-15	5x5	400	500	N	F	M	M	M	E	4.80	2.47	Direct clash with MSB	Remove
3	<i>Schinus molle</i> (Peppercorn Tree)	10-15	3x3	450 300	550 400	N	F	M	M	M	E	6.48	2.87	Twin-stemmed specimen. Cavity observed within trunk. Direct clash with MSB.	Remove
4	<i>Schinus molle</i> (Peppercorn Tree)	10-15	4x4	400	500	N	F	M	M	M	E	4.80	2.47	Direct clash with MSB	Remove
5	<i>Schinus molle</i> (Peppercorn Tree)	10-15	5x5	400	500	N	F	M	M	M	E	4.80	2.47	Direct clash with MSB	Remove
6	<i>Schinus molle</i> (Peppercorn Tree)	10-15	6x6	400	500	N	F	M	M	M	N	3.60	2.37	Direct clash with MSB	Remove
7	<i>Eucalyptus scoparia</i> (Wallangarra White Gum)	15-20	9x9	300	450	N	F	M	M	M	E	5.16	2.57	Pruning for overhead electrical wires has resulted in a flattened skewed canopy. Direct clash with MSB	Remove
8	<i>Schinus molle</i> (Peppercorn Tree)	10-15	5x5	350 250	550	N	F	M	M	M	E	6.24	2.71	A portion of the canopy appears dead. Direct clash with MSB.	Remove
9	<i>Schinus molle</i> (Peppercorn Tree)	10-15	5x5	200 150	-	N	F	M	M	M	E	6.00	-	Twin-stemmed specimen. Direct clash with MSB	Remove
10	<i>Schinus molle</i> (Peppercorn Tree)	10-15	5x5	350 300	-	N	F	M	M	M	E	5.52	-	Twin-stemmed specimen. Direct clash with MSB	
11	<i>Schinus molle</i> (Peppercorn Tree)	10-15	4x4	300 400	-	N	F	M	M	M	E	5.40	-	Direct clash with MSB	Remove
12	<i>Schinus molle</i> (Peppercorn Tree)	10-15	4x4	450	550	N	F	M	M	M	E	4.80	2.47	Direct clash with MSB	Remove
13	<i>Schinus molle</i> (Peppercorn Tree)	5-10	6x6	400	500	N	F	M	M	M	E	7.20	2.85	Direct clash with MSB	Remove

Tree number	Tree name	Tree dimensions				Vigour	Condition	Age class	ULE	Amenity and Visual Value	Native or Exotic	TPZ (m)	SRZ (m)	Comments	Remove or Retain
	Botanical name Common name	Height (m)	Spread (m)	D.B.H. (mm)	D.A.B. (mm)										
14	<i>Schinus molle</i> (Peppercorn Tree)	10-15	6x6	600	700	N	F	M	M	M	E	5.88	2.65	Direct clash with MSB	Remove
15	<i>Schinus molle</i> (Peppercorn Tree)	10-15	4x4	350 350	-	N	F	M	M	M	E	3.60	-	Twin-stemmed specimen. Direct clash with MSB	Remove
16	<i>Schinus molle</i> (Peppercorn Tree)	5-10	3x3	300	400	N	F	M	M	M	E	6.00	2.67	Direct clash with MSB	Remove
17	<i>Schinus molle</i> (Peppercorn Tree)	10-15	5x5	500	600	N	F	M	M	M	E	7.68	2.67	Direct clash with MSB	Remove
18	<i>Schinus molle</i> (Peppercorn Tree)	10-15	5x5	450 450	600	N	F	M	M	M	E	6.48	2.67	Direct clash with MSB	Remove
19	<i>Ligustrum lucidum</i> (Broad-leafed Privet)	5-10	1x1	100	200	N	G	M	S	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – Direct clash with MSB	Remove
20	<i>Ligustrum lucidum</i> (Broad-leafed Privet)	5-10	1x1	100	200	N	G	M	S	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – Direct clash with MSB	Remove
21	<i>Ligustrum lucidum</i> (Broad-leafed Privet)	5-10	1x1	100	200	N	G	M	S	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – Direct clash with MSB	Remove
22	<i>Ligustrum lucidum</i> (Broad-leafed Privet)	5-10	1x1	100	200	N	G	M	S	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – Direct clash with MSB	Remove
23	<i>Ligustrum lucidum</i> (Broad-leafed Privet)	5-10	1x1	100	200	N	G	M	S	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – Direct clash with MSB	Remove
24	<i>Ligustrum lucidum</i> (Broad-leafed Privet)	5-10	1x1	100	200	N	G	M	S	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – Direct clash with MSB	Remove
25	<i>Ligustrum lucidum</i> (Broad-leafed Privet)	5-10	1x1	50	80	N	G	M	S	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – Direct clash with MSB	Remove
26	<i>Ligustrum lucidum</i> (Broad-leafed Privet)	5-10	1x1	50	80	N	G	M	S	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – Direct clash with MSB	Remove

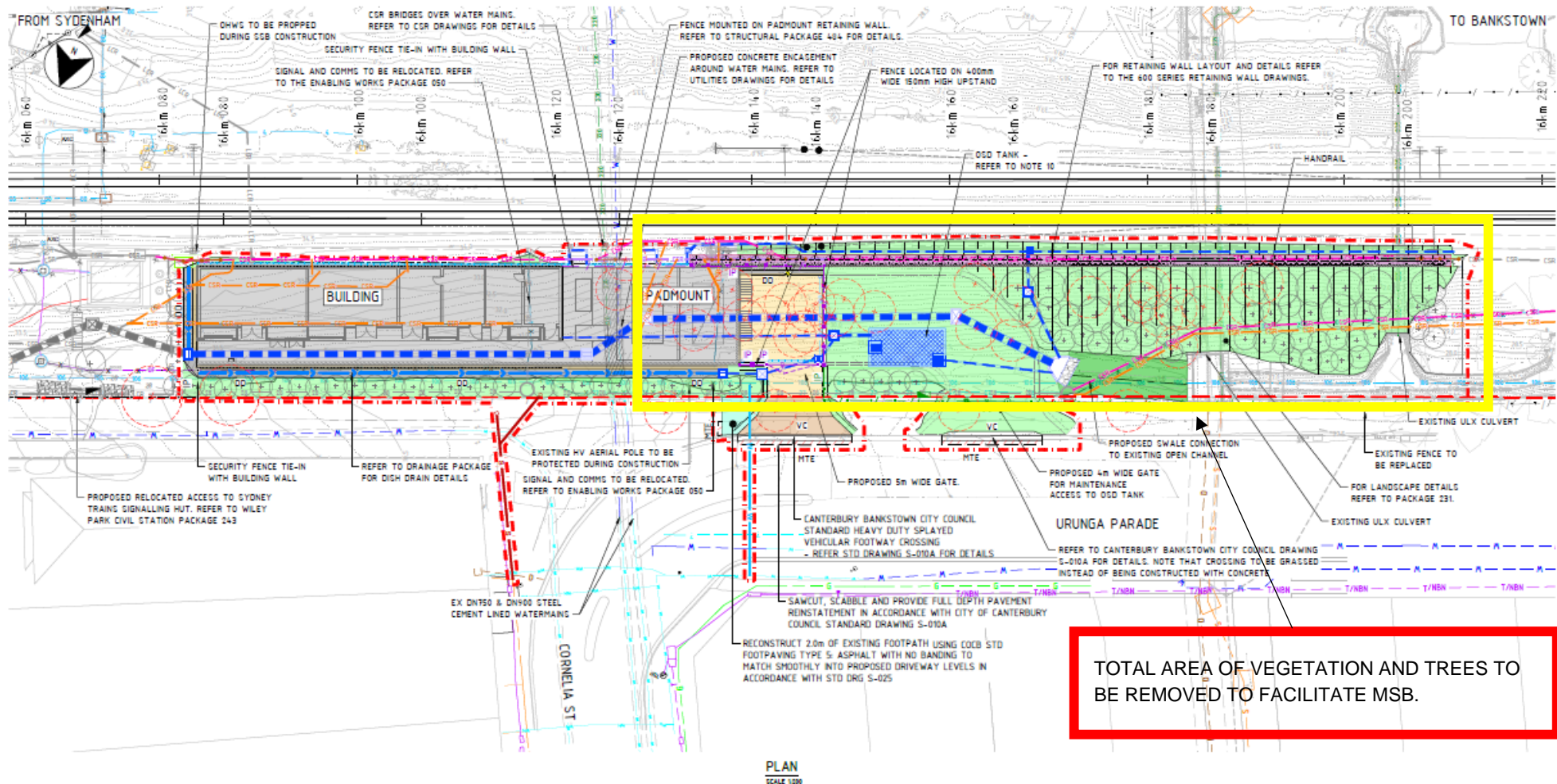
Tree number	Tree name	Tree dimensions				Vigour	Condition	Age class	ULE	Amenity and Visual Value	Native or Exotic	TPZ (m)	SRZ (m)	Comments	Remove or Retain
	Botanical name Common name	Height (m)	Spread (m)	D.B.H. (mm)	D.A.B. (mm)										
27	<i>Ligustrum lucidum</i> (Broad-leafed Privet)	5-10	1x1	50	80	N	G	M	S	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – Direct clash with MSB	Remove
28	<i>Ligustrum lucidum</i> (Broad-leafed Privet)	5-10	1x1	50	80	N	G	M	S	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – Direct clash with MSB	Remove
29	<i>Ligustrum lucidum</i> (Broad-leafed Privet)	5-10	1x1	50	80	N	G	M	S	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – Direct clash with MSB	Remove
30	<i>Ligustrum lucidum</i> (Broad-leafed Privet)	5-10	1x1	50	80	N	G	M	S	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – Direct clash with MSB	Remove
31	<i>Ligustrum lucidum</i> (Broad-leafed Privet)	5-10	1x1	50	80	N	G	M	S	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – Direct clash with MSB	Remove
32	<i>Ligustrum lucidum</i> (Broad-leafed Privet)	5-10	1x1	50	80	N	G	M	S	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – Direct clash with MSB	Remove
33	<i>Ligustrum lucidum</i> (Broad-leafed Privet)	5-10	1x1	50	80	N	G	M	S	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – Direct clash with MSB	Remove
34	<i>Ligustrum lucidum</i> (Broad-leafed Privet)	5-10	1x1	50	80	N	G	M	S	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – Direct clash with MSB	Remove
35	<i>Ligustrum lucidum</i> (Broad-leafed Privet)	5-10	1x1	50	80	N	G	M	S	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – Direct clash with MSB	Remove
36	<i>Ligustrum lucidum</i> (Broad-leafed Privet)	5-10	1x1	50	80	N	G	M	S	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – Direct clash with MSB	Remove
37	<i>Ligustrum lucidum</i> (Broad-leafed Privet)	5-10	1x1	50	80	N	G	M	S	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – Direct clash with MSB	Remove
38	<i>Ligustrum lucidum</i> (Broad-leafed Privet)	5-10	1x1	50	80	N	G	M	S	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – Direct clash with MSB	Remove
39	<i>Ligustrum lucidum</i> (Broad-leafed Privet)	5-10	1x1	50	80	N	G	M	S	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – Direct clash with MSB	Remove

Tree number	Tree name	Tree dimensions				Vigour	Condition	Age class	ULE	Amenity and Visual Value	Native or Exotic	TPZ (m)	SRZ (m)	Comments	Remove or Retain
	Botanical name Common name	Height (m)	Spread (m)	D.B.H. (mm)	D.A.B. (mm)										
40	<i>Ligustrum lucidum</i> (Broad-leafed Privet)	5-10	1x1	50	80	N	G	M	S	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – Direct clash with MSB	Remove
41	<i>Ligustrum lucidum</i> (Broad-leafed Privet)	5-10	1x1	50	80	N	G	M	S	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – Direct clash with MSB	Remove
42	<i>Ligustrum lucidum</i> (Broad-leafed Privet)	5-10	1x1	50	80	N	G	M	S	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – Direct clash with MSB	Remove
43	<i>Ligustrum lucidum</i> (Broad-leafed Privet)	5-10	1x1	50	80	N	G	M	S	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – Direct clash with MSB	Remove
44	<i>Ligustrum lucidum</i> (Broad-leafed Privet)	5-10	1x1	50	80	N	G	M	S	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – Direct clash with MSB	Remove
45	<i>Ligustrum lucidum</i> (Broad-leafed Privet)	5-10	1x1	100	200	N	G	M	S	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – Direct clash with MSB	Remove
46	<i>Ligustrum lucidum</i> (Broad-leafed Privet)	5-10	1x1	100	200	N	G	M	S	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – Direct clash with MSB	Remove
47	<i>Ligustrum lucidum</i> (Broad-leafed Privet)	5-10	1x1	100	200	N	G	M	S	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – Direct clash with MSB	Remove
48	<i>Ligustrum lucidum</i> (Broad-leafed Privet)	5-10	1x1	100	200	N	G	M	S	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – Direct clash with MSB	Remove
49	<i>Ligustrum lucidum</i> (Broad-leafed Privet)	5-10	1x1	100	200	N	G	M	S	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – Direct clash with MSB	Remove
50	<i>Ligustrum lucidum</i> (Broad-leafed Privet)	5-10	1x1	100	200	N	G	M	S	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – Direct clash with MSB	Remove
51	<i>Ligustrum lucidum</i> (Broad-leafed Privet)	5-10	1x1	100	200	N	G	M	S	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – Direct clash with MSB	Remove
52	<i>Ligustrum lucidum</i> (Broad-leafed Privet)	5-10	1x1	100	200	N	G	M	S	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – Direct clash with MSB	Remove

Tree number	Tree name	Tree dimensions				Vigour	Condition	Age class	ULE	Amenity and Visual Value	Native or Exotic	TPZ (m)	SRZ (m)	Comments	Remove or Retain
	Botanical name Common name	Height (m)	Spread (m)	D.B.H. (mm)	D.A.B. (mm)										
53	<i>Ligustrum lucidum</i> (Broad-leafed Privet)	5-10	1x1	100	200	N	G	M	S	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – Direct clash with MSB	Remove
54	<i>Ligustrum lucidum</i> (Broad-leafed Privet)	5-10	1x1	100	200	N	G	M	S	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – Direct clash with MSB	Remove
55	<i>Ligustrum lucidum</i> (Broad-leafed Privet)	5-10	1x1	100	200	N	G	M	S	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – Direct clash with MSB	Remove
56	<i>Ligustrum lucidum</i> (Broad-leafed Privet)	5-10	1x1	100	200	N	G	M	S	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – Direct clash with MSB	Remove
57	<i>Ligustrum lucidum</i> (Broad-leafed Privet)	5-10	1x1	100	200	N	G	M	S	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – Direct clash with MSB	Remove
58	<i>Ligustrum lucidum</i> (Broad-leafed Privet)	5-10	1x1	50	80	N	G	M	S	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – Direct clash with MSB	Remove
59	<i>Ligustrum lucidum</i> (Broad-leafed Privet)	5-10	1x1	50	80	N	G	M	S	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – Direct clash with MSB	Remove
60	<i>Ligustrum lucidum</i> (Broad-leafed Privet)	5-10	1x1	50	80	N	G	M	S	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – Direct clash with MSB	Remove
61	<i>Ligustrum lucidum</i> (Broad-leafed Privet)	5-10	1x1	50	80	N	G	M	S	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – Direct clash with MSB	Remove
62	<i>Ligustrum lucidum</i> (Broad-leafed Privet)	5-10	1x1	50	80	N	G	M	S	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – Direct clash with MSB	Remove
63	<i>Ligustrum lucidum</i> (Broad-leafed Privet)	5-10	1x1	50	80	N	G	M	S	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – Direct clash with MSB	Remove
64	<i>Pittosporum undulatum</i> (Sweet pittosporum)	1-5	2x2	50	80	N	G	M	S	L	N	2	1.5	Understorey specimen. Direct clash with MSB	Remove
65	<i>Pittosporum undulatum</i> (Sweet pittosporum)	1-5	2x2	50	80	N	G	M	S	L	N	2	1.5	Understorey specimen. Direct clash with MSB	Remove

Tree number	Tree name	Tree dimensions				Vigour	Condition	Age class	ULE	Amenity and Visual Value	Native or Exotic	TPZ (m)	SRZ (m)	Comments	Remove or Retain
	Botanical name Common name	Height (m)	Spread (m)	D.B.H. (mm)	D.A.B. (mm)										
66	<i>Pittosporum undulatum</i> (Sweet pittosporum)	1-5	2x2	50	80	N	G	M	S	L	N	2	1.5	Understorey specimen. Direct clash with MSB	Remove
67	<i>Pittosporum undulatum</i> (Sweet pittosporum)	5-10	2x2	50	80	N	G	M	S	L	N	2	1.5	Understorey specimen. Direct clash with MSB	Remove
68	<i>Pittosporum undulatum</i> (Sweet pittosporum)	5-10	2x2	50	80	N	G	M	S	L	N	2	1.5	Understorey specimen. Direct clash with MSB	Remove
69	<i>Pittosporum undulatum</i> (Sweet pittosporum)	5-10	2x2	100	200	N	G	M	S	L	N	2	1.5	Understorey specimen. Direct clash with MSB	Remove
70	<i>Pittosporum undulatum</i> (Sweet pittosporum)	5-10	2x2	100	200	N	G	M	S	L	N	2	1.5	Understorey specimen. Direct clash with MSB	Remove
71	<i>Pittosporum undulatum</i> (Sweet pittosporum)	5-10	2x2	150	250	N	G	M	S	L	N	2	1.5	Understorey specimen. Direct clash with MSB	Remove
72	<i>Pittosporum undulatum</i> (Sweet pittosporum)	5-10	2x2	50	80	N	G	M	S	L	N	2	1.5	Understorey specimen. Direct clash with MSB	Remove
73	<i>Pittosporum undulatum</i> (Sweet pittosporum)	5-10	2x2	50	80	N	G	M	S	L	N	2	1.5	Understorey specimen. Direct clash with MSB	Remove
74	<i>Phoenix canariensis</i> (Canary Island Date Palm)	1-5	3x3	400	500	N	G	M	M	L	E	4	1.5	Understorey specimen. Direct clash with MSB	Remove
75	<i>Phoenix canariensis</i> (Canary Island Date Palm)	1-5	3x3	400	500	N	G	M	M	L	E	4	1.5	Understorey specimen. Direct clash with MSB	Remove
76	<i>Phoenix canariensis</i> (Canary Island Date Palm)	1-5	3x3	150	250	N	G	M	M	L	E	4	1.5	Understorey specimen. Direct clash with MSB	Remove
77	<i>Phoenix canariensis</i> (Canary Island Date Palm)	1-5	3x3	150	250	N	G	M	M	L	E	4	1.5	Understorey specimen. Direct clash with MSB	Remove
78	<i>Camellia</i> sp (Camellia)	1-5	1x1	50	80	N	G	M	S	L	E	2	1.5	Understorey specimen. Direct clash with MSB	Remove

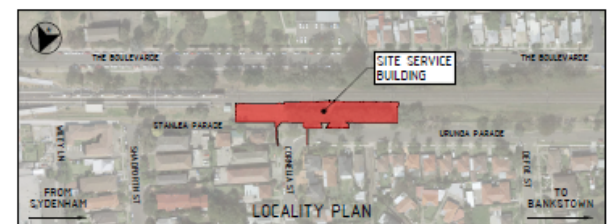
Tree number	Tree name	Tree dimensions				Vigour	Condition	Age class	ULE	Amenity and Visual Value	Native or Exotic	TPZ (m)	SRZ (m)	Comments	Remove or Retain
	Botanical name Common name	Height (m)	Spread (m)	D.B.H. (mm)	D.A.B. (mm)										
79	<i>Camellia</i> sp (Camellia)	1-5	1x1	50	80	N	G	M	S	L	E	2	1.5	Understorey specimen. Direct clash with MSB	Remove
80	<i>Camellia</i> sp (Camellia)	1-5	1x1	50	80	N	G	M	S	L	E	2	1.5	Understorey specimen. Direct clash with MSB	Remove




TOTAL AREA OF VEGETATION AND TREES TO BE REMOVED TO FACILITATE MSB.

NOTES

1. FOR GENERAL NOTES REFER TO DRAWINGS SMC6CW5WM-HTM-WWP-CE-DWG-493104 TO 493107.
2. FOR LEGEND REFER TO DRAWINGS SMC6CW5WM-HTM-WWP-CE-DWG-493108 TO 493109.
3. FOR PAVEMENT PLAN REFER TO DRAWINGS SMC6CW5WM-HTM-WWP-CE-DWG-493161.
4. FOR FINISHED SURFACE PLAN REFER TO DRAWINGS SMC6CW5WM-HTM-WWP-CE-DWG-493193.
5. FOR BULK EARTHWORKS CUT AND FILL PLAN REFER DRAWING SMC6CW5WM-HTM-WWP-CE-DWG-493201.
6. FOR BULK EARTHWORKS GRADING PLAN AND LONGITUDINAL SECTION REFER TO DRAWING SMC6CW5WM-HTM-WWP-CE-DWG-493206.
7. FOR DRAINAGE GENERAL ARRANGEMENT PLAN REFER TO DRAWING SMC6CW5WM-HTM-WWP-CE-DWG-493301.
8. FOR CSR GENERAL ARRANGEMENT PLAN REFER TO DRAWINGS SMC6CW5WM-HTM-WWP-CE-DWG-493311 TO 493412. DO NOT REFER TO ANY OTHER GENERAL ARRANGEMENT PLANS FOR THE DESIGN AND EXTENTS OF CSR WORKS.
9. FOR UTILITIES GENERAL ARRANGEMENT PLAN REFER TO DRAWING SMC6CW5WM-HTM-WWP-CE-DWG-493501.
10. FOR RETAINING WALL GENERAL ARRANGEMENT PLAN AND DETAILS, INCLUDING HANDRAIL DETAILS, REFER DRAWINGS SMC6CW5WM-HTM-WWP-CE-DWG-493601 TO 494633.
11. FOR OSD DETAILS REFER TO DRAINAGE DRAWING SMC6CW5WM-HTM-WWP-CE-DWG-493921.
12. FOR MEP CONDUTS REFER TO PACKAGE 402. NOTE THAT MEP CONDUTS ARE NOT SHOWN ON CIVIL GA.



DRAWING COLOUR CODED - PRINT ALL COPIES IN COLOUR **FOR CONSTRUCTION**

						 			<p>SYDNEY METRO WILEY PARK STATION - SERVICE BUILDING CIVIL ENGINEERING SERVICE BUILDING - CIVIL GENERAL ARRANGEMENT PLAN</p>		
00	MC	31/03/2021	APPROVED FOR CONSTRUCTION	LP		<p>NOTE: Do not scale from this drawing.</p>			<p>STATUS: FOR CONSTRUCTION</p>		
REV	BY	DATE	DESCRIPTION	APPRO		<p>AL7.DWG NO: SMCSWSWVA-MTM-WWP-CE-DWG-483111-0</p>			<p>ORIGINAL: SMCSWSWVA-MTM-WWP-CE-DWG-483111</p>		
<p>Coordinate System: MGA Zone 56 Height Datum: A.H.D. This sheet may be prepared using colour and may be incomplete if copied</p>						<p>31/03/2021</p>			<p>SHEET 1 OF 1</p>		

Appendix 2: Site Photographs



Photograph 1: Trees 1 and 2 *Schinus molle* (Peppercorn Tree) to be removed.



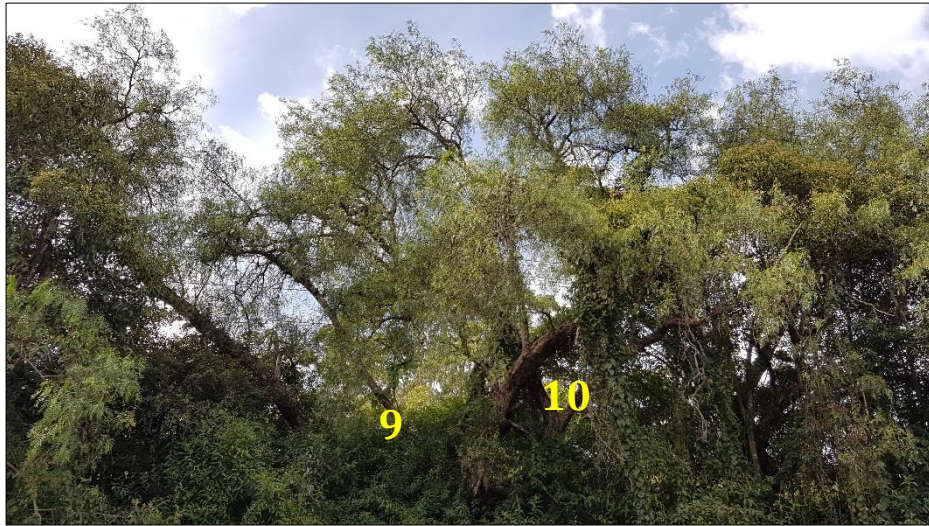
Photograph 2: Trees 3 and 4 *Schinus molle* (Peppercorn Tree) to be removed.



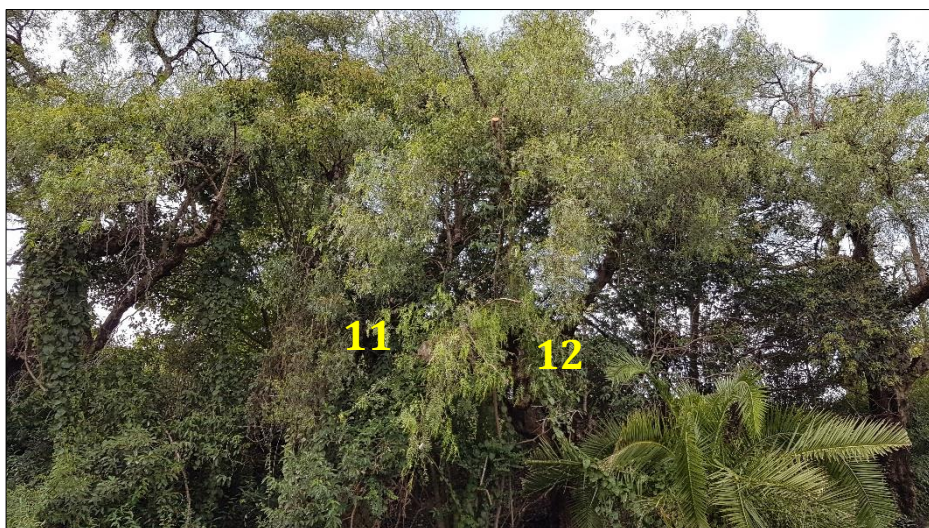
Photograph 3: Trees 5, 6 and 7 *Schinus molle* (Peppercorn Tree) to be removed.



Photograph 4: Tree 8 *Schinus molle* (Peppercorn Tree) to be removed.



Photograph 5: Trees 9 and 10 *Schinus molle* (Peppercorn Tree) to be removed.



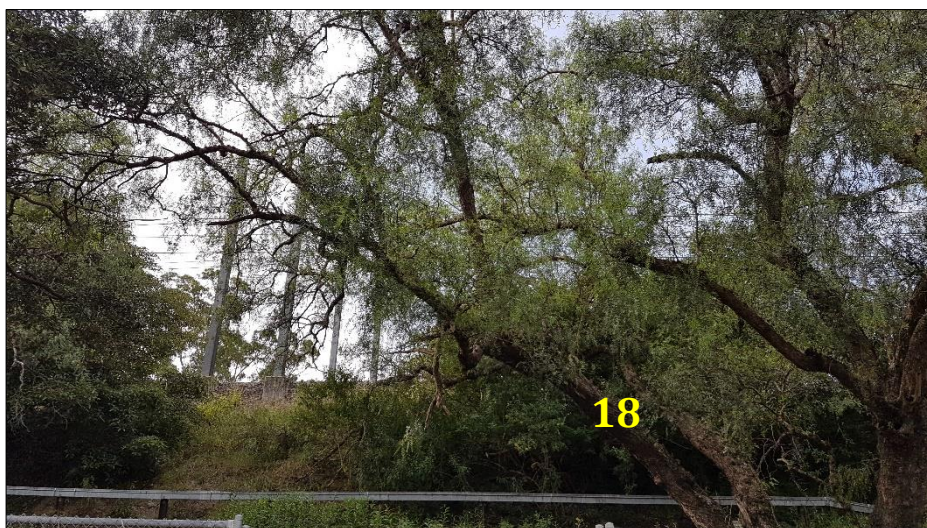
Photograph 6: Trees 11 and 12 *Schinus molle* (Peppercorn Tree) to be removed.



Photograph 7: Trees 13, 14, 15 and 16 *Schinus molle* (Peppercorn Tree) to be removed.



Photograph 8: Tree 17 *Schinus molle* (Peppercorn Tree) to be removed.



Photograph 9: Tree 18 *Schinus molle* (Peppercorn Tree) to be removed.

Appendix 3: Tree Assessment Criteria

Tree number: Identifying number given to individual (or group) trees.

Botanical Name: Latin name for tree showing genus and species.

Common Name: The common name given to the tree.

Tree Dimensions: The physical dimensions of the tree.

- **Height:** Estimated or measured height of tree in meters.
- **Spread:** Estimated or measured radial canopy spread of tree in meters.
- **Diameter at Breast Height (DBH):** The estimated or measured diameter of trunk given in mm measured at 1.4m from ground.
- **Diameter Above Base (DAB):** The estimated or measured diameter of trunk given in mm measured above the root flare. Used to calculate the structural root zone of the tree.

Age Class: An estimation of how old the tree is in relation to its life expectancy.

- **Young** – Age less than 20% of life expectancy of tree in situ
- **Mature** – Age 20% - 80% of life expectancy of tree in situ
- **Old** – Age greater than 80% of life expectancy of tree in situ
- **Dead** – Tree is dead

Vigour: Ability of a tree to sustain its life processes. This is independent of the condition of a tree but may impact upon it. Vigour can appear to alter rapidly with change of seasons (seasonality) e.g., dormant, deciduous or semi-deciduous trees. Vigour can be categorised as Dormant, Low, Normal and High.

- **Dormant Vigour** – Determined by the existing turgidity in the lower order branches in the outer extremity of the crown, with good bud set and formation, and where the last extension growth is distinct from those most recently preceding it, evident by bud scale scars. Normal vigour during dormancy is achieved when such growth is evident on a majority of branches throughout the crown.
- **Low Vigour** – Reduced ability of a tree to sustain its life processes. This may be evident by the atypical growth of leaves, reduced crown cover and reduced crown density, branches, roots and trunk, and a deterioration of their functions with reduced resistance to predation. This is independent of the condition of a tree but may impact upon it, and especially the ability of a tree to sustain itself against predation.
- **Normal Vigour** – Ability of a tree to maintain and sustain its life processes. This may be evident by the typical growth of leaves, crown cover and crown density, branches, roots and trunk and resistance to predation. This is independent of the condition of a tree but may impact upon it, and especially the ability of a tree to sustain itself against predation.
- **High Vigour** – Accelerated growth of a tree due to incidental or deliberate artificial changes to its growing environment that are seemingly beneficial, but may result in premature aging or failure if the favourable conditions cease, or promote prolonged senescence if the favourable conditions remain, e.g. water from a leaking pipe, water and nutrients from a leaking or disrupted sewer pipe, nutrients from animal waste, a tree growing next to a chicken coop, or a stock feed lot, or a regularly used stockyard, a tree subject to stringent watering and fertilisation program, or some trees may achieve an extended lifespan from continuous pollarding practices over the life of the tree.

Condition: A tree's crown form and growth habit, as modified by its environment (aspect, suppression by other trees, soils) the stability and viability of the root plate, trunk and structural branches (first (1st) and possibly (2nd) order branches), including structural defects such as wounds, cavities or hollows, crooked trunk or weak trunk/branch junctions and the effects of predation by pests and diseases. These may not be directly connected with vigour and it is possible for a tree to be of normal vigour but in poor condition. Condition can be categorised as Dead, Poor, Fair and Good.

- **Dead Condition** – Tree is no longer capable of performing any of the following processes or is exhibiting any of the following symptoms; Photosynthesis via its foliage crown (as indicated by the presence of moist, green or other coloured leaves), Osmosis (the ability of the roots system to take up water), Turgidity (the ability of the plant to sustain moisture pressure in its cells), Epicormic shoots or epicormic strands in Eucalypts (the production of new shoots as a response to stress, generated from latent or adventitious buds or from a lignotuber), Permanent leaf loss, Permanent leaf wilting (the loss of turgidity which is marked by desiccation of stems leaves and roots), Abscission of the epidermis (bark desiccates and peels off to the beginning of the sap wood).
- **Poor Condition** – Tree is of good habit or misshapen, a form that may be severely restricted for space and light, exhibits symptoms of advanced and irreversible decline such as fungal, or bacterial infestation, major die-back in the branch and foliage crown, structural deterioration from insect damage e.g. termite infestation, or storm damage or lightning strike, ring barking from borer activity in the trunk, root damage or instability of the tree, or damage from physical wounding impacts or abrasion, or from altered local environmental conditions and has been unable to adapt to such changes and may decline further to death regardless of remedial works or other modifications to the local environment that would normally be sufficient to provide for its basic survival if in good to fair condition. Deterioration physically, often characterised by a gradual and continuous reduction in vigour but may be independent of a change in vigour, but characterised by a proportionate increase in susceptibility to, and predation by pests and diseases against which the tree cannot be sustained. Such conditions may also be evident in trees of advanced senescence due to normal phenological processes, without modifications to the growing environment or physical damage having been inflicted upon the tree. This may be independent from, or contributed to by vigour.
- **Fair Condition** – Tree is of good habit or misshapen, a form not severely restricted for space and light, has some physical indication of decline due to the early effects of predation by pests and diseases, fungal, bacterial, or insect infestation, or has suffered physical injury to itself that may be contributing to instability or structural weaknesses, or is faltering due to the modification of the environment essential for its basic survival. Such a tree may recover with remedial works where appropriate, or without intervention may stabilise or improve over time, or in response to the implementation of beneficial changes to its local environment. This may be independent from, or contributed to by vigour.
- **Good Condition** – Tree is of good habit, with crown form not severely restricted for space and light, physically free from the adverse effects of predation by pests and diseases, obvious instability or structural weaknesses, fungal, bacterial or insect infestation and is expected to continue to live in much the same condition as at the time of inspection provided conditions around it for its basic survival do not alter greatly. This may be independent from, or contributed to by vigour.

Useful Life Expectancy (ULE) ULE is the length of time that the arborist assesses an individual tree can be retained with an acceptable level of risk based on the information available at the time of inspection. It is a snapshot in time of the potential an individual tree has for survival in the eyes of the assessor. ULE is not static – it is closely related to tree health and the surrounding conditions. Alterations in these variables may result in changes to the ULE assessment. Consequently, the reliability all ULE assessments have will decrease as time passes from the initial assessment and the potential for changes in variables increases.

- **Remove** – Trees that should be removed within the next 5 years
- **Short** – Trees that appear to be retainable at the time of the assessment for 5-15 years with an acceptable level of risk.
- **Medium** – Trees that appear to be retainable at the time of the assessment for 15-40 years with an acceptable level of risk.
- **Long** – Trees that appear to be retainable at the time of the assessment for 40+ years with an acceptable level of risk.

Amenity and Visual Value – For the purposes of assessing the visual and landscape value of each tree the IACA Significance of a Tree, Assessment Rating System (STARS) © (IACA 2010) © has been adopted. - The landscape significance of a tree is an essential criterion to establish the importance that a particular tree may have on a site. The system uses a scale of High, Medium and Low significance in the landscape.

High significance in landscape

- The tree is in good condition and good vigour
- The tree has a form typical for the species
- The tree is a remnant or is a planted locally indigenous specimen and/or is rare or uncommon in the local area or of botanical interest or of substantial age
- The tree is listed as a heritage item, threatened species or part of an endangered ecological community or listed on council's significant tree register
- The tree is visually prominent and visible from a considerable distance when viewed from most directions within the landscape due to its size and scale and makes a positive contribution to the local amenity
- The tree supports social and cultural sentiments or spiritual associations, reflected by the broader population or community group or has commemorative values
- The tree's growth is unrestricted by above and below ground influences, supporting its ability to reach dimensions typical for the taxa in situ – tree is appropriate to the site conditions

Medium significance in landscape

- The tree is in fair-good condition and good or low vigour
- The tree has form typical or atypical of the species
- The tree is a planted locally indigenous or a common species with its taxa commonly planted in the local area
- The tree is visible from surrounding properties, although not visually prominent as partially obstructed by other vegetation or buildings when viewed from the street
- The tree provides a fair contribution to the visual character and amenity of the local area
- The tree's growth is moderately restricted by above or below ground influences, reducing its ability to reach dimensions typical for the taxa in situ

Low significance in landscape

- The tree is in fair-poor condition and good or low vigour
- The tree has form atypical of the species
- The tree is not visible or is partly visible from the surrounding properties as obstructed by other vegetation or buildings
- The tree provides a minor contribution or has a negative impact on the visual character and amenity of the local area
- The tree is a young specimen which may or may not have reached dimensions to be protected by local Tree Preservation Orders or similar protection mechanisms and can easily be replaced with a suitable specimen
- The tree's growth is severely restricted by above or below ground influences, unlikely to reach dimensions typical for the taxa in situ – tree is inappropriate to the site conditions
- The tree is listed as exempt under the provisions of the local Council Tree Preservation Order or similar protection mechanisms
- The tree has a wound or defect that has the potential to become structurally unsound
- **Environmental Pest / Noxious Weed Species**
- The tree is an environmental pest species due to its invasiveness or poisonous/allergenic properties.
- The tree is a declared noxious weed by legislation
- **Hazardous / Irreversible Decline**
- The tree is structurally unsound and/or unstable and is considered potentially dangerous
- The tree is dead, or is in irreversible decline, or has the potential to fail or collapse in full or in part in the immediate to short term

The tree is to have a minimum of three (3) criteria in a category to be classified in that group.

In the development of this document IACA acknowledges the contribution and original concept of the Footprint Green Tree Significance & Retention Value Matrix, developed by Footprint Green Pty Ltd in June 2010.

The Australian Standard 4970-2009 Protection of Trees on Development Sites defines the requirements for assessing trees with respect to development. It provides the guidance on how to decide which trees are appropriate for retention and on the means of protecting them during construction works. It describes the areas and offsets, referred to as the Tree Protection Zone (TPZ) and Structural Root Zone (SRZ) required to be free from development works to maintain tree vitality and stability. This report has been prepared in accordance with the conditions set out within the standard.

- **Tree Protection Zone** – The tree protection zone is defined as a specified area above and below ground set aside for the protection of the tree's roots and crown. It is expressed as a radial measurement taken from the centre of the trunk at ground level.
- **Structural Root Zone** – The structural root zone is defined as a specified area around the base of a tree required to maintain its stability within the ground. It is expressed as a radial measurement taken from the center of the trunk at ground level. Excavation and development works are not recommended within the structural root zone unless additional investigation as to root size and location is undertaken

APPENDIX 4.1 WILEY PARK AIA (PLATEAU TREES)

Date: 30 April 2021

Re: Additional tree removals at Wiley Park Station as part of the Southwest Metro Package.

At the request of Downer Group an onsite inspection was undertaken at Wiley Park Station. It has been asked to confirm existing tree removals as recommended within the Arboricultural Impact Assessment (AIA) prepared by Urban Arbor, dated 15 January 2020, Ref 20/01/15/SWMPB and record additional trees to be removed as part of the proposed works package. On the 30 April a site walkthrough was undertaken by myself and a representative from Downer Group.

As stated within the existing AIA report trees 684, 687, 688 and 706 shall require removal to accommodate the proposed works. Trees 689, 690, 691, 693, 694, 707 and 708, previously identified for retention, are now to be removed. Trees 689, 690 and 691 are located within the footprint of works for the station services building adjacent platform 1 and cannot be retained. Trees 693 and 694 are located within the footprint of a permanent staircase to the signal hut and drainage line and cannot be retained. Trees 707 and 708 are located within the footprint of works for the station services building adjacent platform 2 and cannot be retained. Reference should be made to the AIA report for their respective tree data.

An additional four trees were identified for removal as part of the works. These consist of one *Pittosporum undulatum* (Sweet Pittosporum) tree 1 located adjacent platform 2 and one *Eucalyptus pilularis* (Blackbutt) tree 2, one *Eucalyptus robusta* (Swamp Mahogany) tree 3, one *Eucalyptus scoparia* (Wallangarra White Gum) tree 4 located adjacent the southern side of Urunga Parade. These additional trees are

located within the footprint of the proposed works and cannot be retained under the current design. The Sweet Pittosporum is considered to have low landscape significance. Its removal is not expected to have a significant impact upon the local amenity. The Blackbutt, Swamp Mahogany and Wallangarra White Gum are considered to have medium landscape significance. Their removal shall expose the northern end of Urunga parade to the new Metro Services Building, rail corridor and associated infrastructure. The locations of the additional trees to be removed can be found as Image 1. Tree data collected during the site inspection can be found as Appendix 1. Each additional tree for removal has been photographed and can be found as Appendix 2.

The Wallangarra White Gum (tree 4) is listed as Endangered under the Biodiversity Conservation Act 2016 and Vulnerable under the Environmental Protection Biodiversity Conservation Act 1999. However, the subject specimen is located outside of its naturally occurring range and appears to have been planted as part of the streetscape.



Image 1: Aerial image of Wiley Park Station Station showing the location of additional trees to be removed.

All appropriate approvals and consents are to be obtained prior to tree and vegetation removal works commencing. All tree removal works are to be undertaken by suitably qualified tree workers and in accordance with Safe Work Australia's Guide to Managing Risks of Tree Trimming and Removal Works.

Please feel free to contact me should you require any further assistance regarding this matter.

Regards.

Owen Tebbutt



Consulting Arborist
Plateau Tree Service

Appendix 1: Tree Assessment Schedule

Tree number	Tree name	Tree dimensions				Vigour	Condition	Age class	ULE	Amenity and Visual Value	Native or Exotic	TPZ (m)	SRZ (m)	Comments	Remove or Retain
	Botanical name Common name	Height (m)	Spread (m)	D.B.H. (mm)	D.A.B. (mm)										
1	<i>Pittosporum undulatum</i> (Sweet Pittosporum)	1-5	2x2	90	150	N	G	M	S	L	N	2	1.5	Growing at base of adjacent tree 706. Tree to be removed to accommodate the proposed station services building adjacent platform 2.	Remove
2	<i>Eucalyptus pilularis</i> (Blackbutt)	15-20	7x7	600	700	N	F	M	M	M	N	7.2	2.85	Council owned street tree located within road reserve. Tree has poor form due to regular pruning to clear overhead power lines. Epicormics and dead wood within canopy. Tree to be removed to accommodate driveway access to proposed Metro Services Building.	Remove
3	<i>Eucalyptus robusta</i> (Swamp mahogany)	15-20	6x6	550	550	N	F	M	M	M	N	6.6	2.57	Council owned street tree located within road reserve. Tree has poor form due to regular pruning to clear overhead power lines. Epicormics and dead wood within canopy. Exposed surface roots around base of trunk. Tree to be removed to accommodate ULX and permanent fencing.	Remove
4	<i>Eucalyptus scoparia</i> (Wallangarra White Gum)	15-20	7x7	400	500	N	F	M	M	M	N	4.8	2.47	Council owned street tree located within road reserve. Tree has poor form due to regular pruning to clear overhead power lines. Epicormics and dead wood within canopy. Tree to be removed to accommodate ULX and permanent fencing.	Remove

Appendix 1: Site Photographs

Photograph 1: Tree 1 *Pittosporum undulatum* (Sweet Pittosporum) identified for removal to accommodate Station Services Building adjacent platform 2.



Photograph 2: Tree 2 *Eucalyptus pilularis* (Blackbutt) identified for removal to accommodate Metro services Building driveway and access.

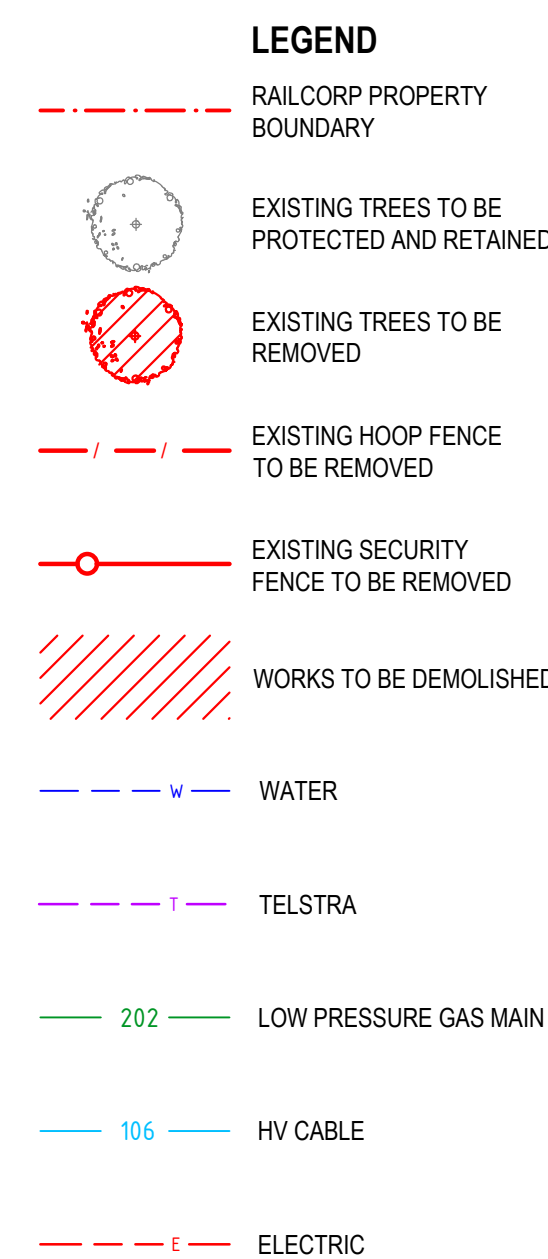


Photograph 3: Tree 3 *Eucalyptus robusta* (Swamp Mahogany) identified for removal to accommodate ULX and permanent fencing.



Photograph 4: Tree 4 *Eucalyptus scoparia* (Wallangarra White Gum) identified for removal to accommodate ULX and permanent fencing.

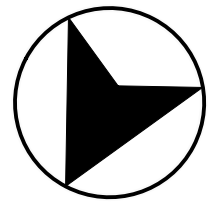




TREE 687, 688, 689, 690 &
 691 TO BE REMOVED
 DUE TO DIRECT CLASH
 WITH PERMANENT
 PLATFORM SERVICE
 BUILDING

NOT FOR CONSTRUCTION

[illegible]



TO SYDNEY

TO BANKSTOWN

LEGEND

- RAILCORP PROPERTY BOUNDARY
- EXISTING TREES TO BE PROTECTED AND RETAINED
- EXISTING TREES TO BE REMOVED
- EXISTING HOOP FENCE TO BE REMOVED
- EXISTING SECURITY FENCE TO BE REMOVED
- WORKS TO BE DEMOLISHED
- WATER
- TELSTRA
- LOW PRESSURE GAS MAIN
- HV CABLE
- ELECTRIC

NOTES:

- THE DESIGN IS BASED ON SYDNEY METRO CHAINAGE. PLEASE REFER TO CIVIL DRAWINGS FOR SYDNEY METRO CHAINAGE ALIGNMENT (PACKAGE NO. 103).
- ALL HOOP STYLE FENCING TO BE REMOVED.
- ALL EXISTING TREES TO BE RETAIN UNLESS STATED ON DRAWINGS
- STRIP EXISTING TOPSOIL TO 200mm DEPTH WHERE VEGETATION IS BEING REMOVED.
- WORKS TO STATION PLATFORMS, BUILDINGS AND CONCOURSE ARE INCLUDED IN THE ARCHITECTURAL PACKAGE - REFER TO ARCHITECTURAL DESIGN PACKAGE 231.
- REFER TO ARBORIST'S ARBORICULTURAL IMPACT ASSESSMENT REPORT FOR TREE PROTECTION WORKS.

THE BOULEVARDE

THE BOULEVARDE

PLATFORM 2

PLATFORM 1

EXISTING SIGNAL BUILDING

REMOVE EXISTING HOOP STYLE FENCE

REMOVE EXISTING VEGETATION AND TOPSOIL. REFER TO SOIL REPORT FOR TREATMENT OF TOPSOIL AT WILEY PARK.

REPLACE EXISTING CONCRETE CHANNEL WITH NEW ALIGNMENT REFER TO ENGINEER PACKAGE

REMOVE EXISTING SECURITY FENCE

693

694

REMOVE EXISTING TREES

REMOVE EXISTING VEGETATION AND TOPSOIL. REFER TO SOIL REPORT FOR TREATMENT OF TOPSOIL AT WILEY PARK.

Tree 2

Tree 3

Tree 4

TREES 693 & 694, TO BE REMOVED DUE TO DIRECT CLASH WITH PERMANENT STAIRWAY TO SIGNAL HUT AND DRAINAGE LINE

TREES 693 & 694, TO BE REMOVED DUE TO DIRECT CLASH WITH ULX & PERMANENT FENCE

TREE 3, TO BE REMOVED DUE TO DIRECT CLASH WITH PERMANENT DRIVEWAY

DRAWING COLOUR CODED - PRINT ALL COPIES IN COLOUR

FOR CONSTRUCTION

SCALES



00	ME	31/03/2021	APPROVED FOR CONSTRUCTION	LP
REV.	BY	DATE	DESCRIPTION	APPD.
A1	Original		Co-ordinate System: MGA Zone 56	
			Height Datum: A.H.D.	
This sheet may be prepared using colour and may be incomplete if copied				

NOTE: Do not scale from this drawing.

ALT. DRG No: SMCSWSWM-MTM-WWP-LA-DWG-231704 P01



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SERVICE PROVIDERS

METRON T2M

DRAWN	D. LEE	31/03/2021
DESIGNED	M. ENOCH	31/03/2021
DRG CHECK	M. ENOCH	31/03/2021
DESIGN CHECK	G. DAVIES	31/03/2021
APPROVED	L. PALMER	31/03/2021

SYDNEY METRO
WILEY PARK (15.846km to 16.211km)
LANDSCAPE DESIGN
DEMOLITION PLAN
STANLEA PARADE

STATUS: FOR CONSTRUCTION	FOR CONSTRUCTION APPROVAL	SHEET 5 of 25	©
DRG No: SMCSWSWM-MTM-WWP-LA-DWG-231704	REV.	00	

Appendix 3: Tree Assessment Criteria

Tree number: Identifying number given to individual (or group) trees.

Botanical Name: Latin name for tree showing genus and species.

Common Name: The common name given to the tree.

Tree Dimensions: The physical dimensions of the tree.

- **Height:** Estimated or measured height of tree in meters.
- **Spread:** Estimated or measured radial canopy spread of tree in meters.
- **Diameter at Breast Height (DBH):** The estimated or measured diameter of trunk given in mm measured at 1.4m from ground.
- **Diameter Above Base (DAB):** The estimated or measured diameter of trunk given in mm measured above the root flare. Used to calculate the structural root zone of the tree.

Age Class: An estimation of how old the tree is in relation to its life expectancy.

- **Young** – Age less than 20% of life expectancy of tree in situ
- **Mature** – Age 20% - 80% of life expectancy of tree in situ
- **Old** – Age greater than 80% of life expectancy of tree in situ
- **Dead** – Tree is dead

Vigour: Ability of a tree to sustain its life processes. This is independent of the condition of a tree but may impact upon it. Vigour can appear to alter rapidly with change of seasons (seasonality) e.g., dormant, deciduous or semi-deciduous trees. Vigour can be categorised as Dormant, Low, Normal and High.

- **Dormant Vigour** – Determined by the existing turgidity in the lower order branches in the outer extremity of the crown, with good bud set and formation, and where the last extension growth is distinct from those most recently preceding it, evident by bud scale scars. Normal vigour during dormancy is achieved when such growth is evident on a majority of branches throughout the crown.
- **Low Vigour** – Reduced ability of a tree to sustain its life processes. This may be evident by the atypical growth of leaves, reduced crown cover and reduced crown density, branches, roots and trunk, and a deterioration of their functions with reduced resistance to predation. This is independent of the condition of a tree but may impact upon it, and especially the ability of a tree to sustain itself against predation.
- **Normal Vigour** – Ability of a tree to maintain and sustain its life processes. This may be evident by the typical growth of leaves, crown cover and crown density, branches, roots and trunk and resistance to predation. This is independent of the condition of a tree but may impact upon it, and especially the ability of a tree to sustain itself against predation.
- **High Vigour** – Accelerated growth of a tree due to incidental or deliberate artificial changes to its growing environment that are seemingly beneficial, but may result in premature aging or failure if the favourable conditions cease, or promote prolonged senescence if the favourable conditions remain, e.g. water from a leaking pipe, water and nutrients from a leaking or disrupted sewer pipe, nutrients from animal waste, a tree growing next to a chicken coop, or a stock feed lot, or a regularly used stockyard, a tree subject to stringent watering and fertilisation program, or some trees may achieve an extended lifespan from continuous pollarding practices over the life of the tree.

Condition: A tree's crown form and growth habit, as modified by its environment (aspect, suppression by other trees, soils) the stability and viability of the root plate, trunk and structural branches (first (1st) and possibly (2nd) order branches), including structural defects such as wounds, cavities or hollows, crooked trunk or weak trunk/branch junctions and the effects of predation by pests and diseases. These may not be directly connected with vigour and it is possible for a tree to be of normal vigour but in poor condition. Condition can be categorised as Dead, Poor, Fair and Good.

- **Dead Condition** – Tree is no longer capable of performing any of the following processes or is exhibiting any of the following symptoms; Photosynthesis via its foliage crown (as indicated by the presence of moist, green or other coloured leaves), Osmosis (the ability of the roots system to take up water), Turgidity (the ability of the plant to sustain moisture pressure in its cells), Epicormic shoots or epicormic strands in Eucalypts (the production of new shoots as a response to stress, generated from latent or adventitious buds or from a lignotuber), Permanent leaf loss, Permanent leaf wilting (the loss of turgidity which is marked by desiccation of stems leaves and roots), Abscission of the epidermis (bark desiccates and peels off to the beginning of the sap wood).
- **Poor Condition** – Tree is of good habit or misshapen, a form that may be severely restricted for space and light, exhibits symptoms of advanced and irreversible decline such as fungal, or bacterial infestation, major die-back in the branch and foliage crown, structural deterioration from insect damage e.g. termite infestation, or storm damage or lightning strike, ring barking from borer activity in the trunk, root damage or instability of the tree, or damage from physical wounding impacts or abrasion, or from altered local environmental conditions and has been unable to adapt to such changes and may decline further to death regardless of remedial works or other modifications to the local environment that would normally be sufficient to provide for its basic survival if in good to fair condition. Deterioration physically, often characterised by a gradual and continuous reduction in vigour but may be independent of a change in vigour, but characterised by a proportionate increase in susceptibility to, and predation by pests and diseases against which the tree cannot be sustained. Such conditions may also be evident in trees of advanced senescence due to normal phenological processes, without modifications to the growing environment or physical damage having been inflicted upon the tree. This may be independent from, or contributed to by vigour.
- **Fair Condition** – Tree is of good habit or misshapen, a form not severely restricted for space and light, has some physical indication of decline due to the early effects of predation by pests and diseases, fungal, bacterial, or insect infestation, or has suffered physical injury to itself that may be contributing to instability or structural weaknesses, or is faltering due to the modification of the environment essential for its basic survival. Such a tree may recover with remedial works where appropriate, or without intervention may stabilise or improve over time, or in response to the implementation of beneficial changes to its local environment. This may be independent from, or contributed to by vigour.
- **Good Condition** – Tree is of good habit, with crown form not severely restricted for space and light, physically free from the adverse effects of predation by pests and diseases, obvious instability or structural weaknesses, fungal, bacterial or insect infestation and is expected to continue to live in much the same condition as at the time of inspection provided conditions around it for its basic survival do not alter greatly. This may be independent from, or contributed to by vigour.

Useful Life Expectancy (ULE) ULE is the length of time that the arborist assesses an individual tree can be retained with an acceptable level of risk based on the information available at the time of inspection. It is a snapshot in time of the potential an individual tree has for survival in the eyes of the assessor. ULE is not static – it is closely related to tree health and the surrounding conditions. Alterations in these variables may result in changes to the ULE assessment. Consequently, the reliability all ULE assessments have will decrease as time passes from the initial assessment and the potential for changes in variables increases.

- **Remove** – Trees that should be removed within the next 5 years
- **Short** – Trees that appear to be retainable at the time of the assessment for 5-15 years with an acceptable level of risk.
- **Medium** – Trees that appear to be retainable at the time of the assessment for 15-40 years with an acceptable level of risk.
- **Long** – Trees that appear to be retainable at the time of the assessment for 40+ years with an acceptable level of risk.

Amenity and Visual Value – For the purposes of assessing the visual and landscape value of each tree the IACA Significance of a Tree, Assessment Rating System (STARS) © (IACA 2010) © has been adopted. - The landscape significance of a tree is an essential criterion to establish the importance that a particular tree may have on a site. The system uses a scale of High, Medium and Low significance in the landscape.

High significance in landscape

- The tree is in good condition and good vigour
- The tree has a form typical for the species
- The tree is a remnant or is a planted locally indigenous specimen and/or is rare or uncommon in the local area or of botanical interest or of substantial age
- The tree is listed as a heritage item, threatened species or part of an endangered ecological community or listed on council's significant tree register
- The tree is visually prominent and visible from a considerable distance when viewed from most directions within the landscape due to its size and scale and makes a positive contribution to the local amenity
- The tree supports social and cultural sentiments or spiritual associations, reflected by the broader population or community group or has commemorative values
- The tree's growth is unrestricted by above and below ground influences, supporting its ability to reach dimensions typical for the taxa in situ – tree is appropriate to the site conditions

Medium significance in landscape

- The tree is in fair-good condition and good or low vigour
- The tree has form typical or atypical of the species
- The tree is a planted locally indigenous or a common species with its taxa commonly planted in the local area
- The tree is visible from surrounding properties, although not visually prominent as partially obstructed by other vegetation or buildings when viewed from the street
- The tree provides a fair contribution to the visual character and amenity of the local area
- The tree's growth is moderately restricted by above or below ground influences, reducing its ability to reach dimensions typical for the taxa in situ

Low significance in landscape

- The tree is in fair-poor condition and good or low vigour
- The tree has form atypical of the species
- The tree is not visible or is partly visible from the surrounding properties as obstructed by other vegetation or buildings
- The tree provides a minor contribution or has a negative impact on the visual character and amenity of the local area
- The tree is a young specimen which may or may not have reached dimensions to be protected by local Tree Preservation Orders or similar protection mechanisms and can easily be replaced with a suitable specimen
- The tree's growth is severely restricted by above or below ground influences, unlikely to reach dimensions typical for the taxa in situ – tree is inappropriate to the site conditions
- The tree is listed as exempt under the provisions of the local Council Tree Preservation Order or similar protection mechanisms
- The tree has a wound or defect that has the potential to become structurally unsound
- **Environmental Pest / Noxious Weed Species**
- The tree is an environmental pest species due to its invasiveness or poisonous/allergenic properties.
- The tree is a declared noxious weed by legislation
- **Hazardous / Irreversible Decline**
- The tree is structurally unsound and/or unstable and is considered potentially dangerous
- The tree is dead, or is in irreversible decline, or has the potential to fail or collapse in full or in part in the immediate to short term

The tree is to have a minimum of three (3) criteria in a category to be classified in that group.

In the development of this document IACA acknowledges the contribution and original concept of the Footprint Green Tree Significance & Retention Value Matrix, developed by Footprint Green Pty Ltd in June 2010.

The Australian Standard 4970-2009 Protection of Trees on Development Sites defines the requirements for assessing trees with respect to development. It provides the guidance on how to decide which trees are appropriate for retention and on the means of protecting them during construction works. It describes the areas and offsets, referred to as the Tree Protection Zone (TPZ) and Structural Root Zone (SRZ) required to be free from development works to maintain tree vitality and stability. This report has been prepared in accordance with the conditions set out within the standard.

- **Tree Protection Zone** – The tree protection zone is defined as a specified area above and below ground set aside for the protection of the tree's roots and crown. It is expressed as a radial measurement taken from the centre of the trunk at ground level.
- **Structural Root Zone** – The structural root zone is defined as a specified area around the base of a tree required to maintain its stability within the ground. It is expressed as a radial measurement taken from the center of the trunk at ground level. Excavation and development works are not recommended within the structural root zone unless additional investigation as to root size and location is undertaken

APPENDIX 4.2 WILEY PARK AIA (PLATEAU TREES)

Date: 28 September 2021

Re: Additional tree removal at Wiley Park Station as part of the Southwest Metro Package.

At the request of Downer Group an onsite inspection was undertaken at Wiley Park Station. It has been asked to identify and record additional tree removals beyond those recommended within the Arboricultural Impact Assessment (AIA) prepared by Urban Arbor, dated 15 January 2020, ref 20/01/15/SWMPB. On the 17 September a site walkthrough was undertaken by myself. Additional tree removals were identified under guidance of a Downer Group representative.

The subject tree consists of one *Quercus robur* (Common Oak) located adjacent the rear of Platform 2. It is identified as tree 711 within the AIA report.

At the time of the inspection the trees were found to be in good health and condition, consistent with their species type, age class and growing environment.

It was advised that the tree is located within the direct alignment of a proposed platform footprint & fence to be installed along the rear of Platform 2. As such, the tree cannot be retained under the current design. Its removal is not thought to pose a significant impact upon local amenity when taking into consideration the wider station upgrade works. Replacement planting with advanced tree stock is to be undertaken to offset the tree removals.

Photographs 1 and 2 of Appendix 1 shows the tree and its position with respects to Platform 2 and the proposed alignment of the fence. Appendix 2 Tree Assessment Schedule details the data relating to the tree.

All appropriate approvals and consents are to be obtained prior to tree and vegetation removal works commencing. All tree removal works are to be undertaken by suitably qualified tree workers and in accordance with Safe Work Australia's Guide to Managing Risks of Tree Trimming and Removal Works.

Please feel free to contact me should you require any further assistance regarding this matter.

Regards.

Owen Tebbutt



Consulting Arborist
Plateau Tree Service

Appendix 1: Site Photographs



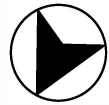
Photograph 1: Tree 711 *Quercus robur* (Common Oak).



Photograph 2: The position of tree 711 with regards to the alignment of Platform 2 and proposed fence.

Appendix 2: Tree Assessment Schedule

Tree number	Tree name	Tree dimensions				Vigour	Condition	Age class	ULE	Amenity and Visual Value	Native or Exotic	TPZ (m)	SRZ (m)	Comments	Remove or Retain
	Botanical name Common name	Height (m)	Spread (m)	D.B.H. (mm)	D.A.B. (mm)										
711	Quercus robur (Common Oak)	15-10	4x4	220 240 240	500	N	G	M	L	M	E	4.9	2.5	Trunk of tree located within the footprint of the permanent Platform 2 and the platform security fence.	Remove



TO SYDNEY

TO BANKSTOWN

LEGEND

- RAILCORP PROPERTY BOUNDARY
- EXISTING TREES TO BE PROTECTED AND RETAINED
- EXISTING TREES TO BE REMOVED
- EXISTING HOOP FENCE TO BE REMOVED
- EXISTING SECURITY FENCE TO BE REMOVED
- WORKS TO BE DEMOLISHED
- WATER
- TELSTRA
- 202 LOW PRESSURE GAS MAIN
- 106 HV CABLE
- ELECTRIC

NOTES:

- THE DESIGN IS BASED ON SYDNEY METRO CHAINAGE. PLEASE REFER TO CIVIL DRAWINGS FOR SYDNEY METRO CHAINAGE ALIGNMENT (PACKAGE NO. 103).
- ALL HOOP STYLE FENCING TO BE REMOVED.
- ALL EXISTING TREES TO BE RETAIN UNLESS STATED ON DRAWINGS
- STRIP EXISTING TOPSOIL TO 200mm DEPTH WHERE VEGETATION IS BEING REMOVED.
- WORKS TO STATION PLATFORMS, BUILDINGS AND CONCOURSE ARE INCLUDED IN THE ARCHITECTURAL PACKAGE - REFER TO ARCHITECTURAL DESIGN PACKAGE 231.
- REFER TO ARBORIST'S ARBORICULTURAL IMPACT ASSESSMENT REPORT FOR TREE PROTECTION WORKS.

THE BOULEVARDE

THE BOULEVARDE

Tree 1 to be removed due to direct clash with permanent platform 2 footprint and security fencing along edge of platform.

EXISTING SIGNAL BUILDING

REMOVE EXISTING HOOP STYLE FENCE

REMOVE EXISTING TREES. REFER TO ARBORIST'S REPORT

REMOVE EXISTING TREES

REMOVE EXISTING VEGETATION AND TOPSOIL. REFER TO SOIL REPORT FOR TREATMENT OF TOPSOIL AT WILEY PARK.

GRADE

REPLACE EXISTING CONCRETE CHANNEL WITH NEW ALIGNMENT REFER TO ENGINEER PACKAGE

REMOVE EXISTING SECURITY FENCE

REMOVE EXISTING TREES

REMOVE EXISTING VEGETATION AND TOPSOIL. REFER TO SOIL REPORT FOR TREATMENT OF TOPSOIL AT WILEY PARK.

CORNELIA STREET

DRAWING COLOUR CODED - PRINT ALL COPIES IN COLOUR

FOR CONSTRUCTION

REV.	BY	DATE	DESCRIPTION	APPD.
00	ME	31/03/2021	APPROVED FOR CONSTRUCTION	LP
A1	Original		Co-ordinate System: MGA Zone 56	
			Height Datum: A.H.D.	
			This sheet may be prepared using colour and may be incomplete if copied	



SCALES

NOTE: Do not scale from this drawing.

ALT. DRG No. SMCSWSWM-MTM-WWP-LA-DWG-231704 P01

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METRON T2M

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DESIGNED	M. ENOCH	31/03/2021
DRG CHECK	M. ENOCH	31/03/2021
DESIGN CHECK	G. DAVIES	31/03/2021
APPROVED	L. PALMER	31/03/2021

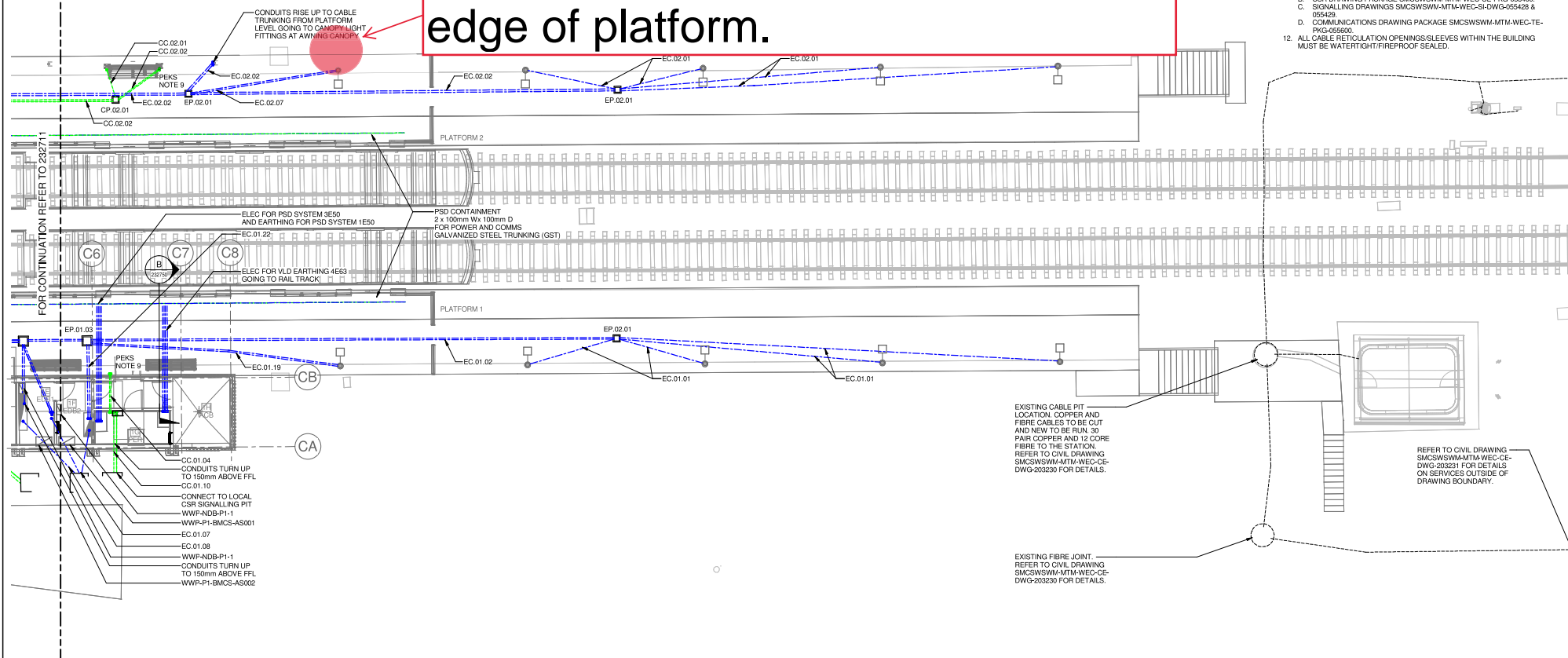
SYDNEY METRO
WILEY PARK (15.846km to 16.211km)
LANDSCAPE DESIGN
DEMOLITION PLAN
STANLEA PARADE

STATUS: FOR CONSTRUCTION APPROVAL	SHEET 5 of 25	©
DRG No. SMCSWSWM-MTM-WWP-LA-DWG-231704	REV.	00



BANKSTOWN

Tree 1 to be removed due to direct clash with permanent platform 2 footprint and security fencing along edge of platform.

[illegible]

DRAWING COLOUR CODED - PRINT ALL COPIES IN COLOUR

FOR CONSTRUCTION

[illegible]

NOTE: Do not scale from this drawing.

ALT. DRG No. SMCSWSWM-MTIA-WWP-BS-DWG-232712 P01

	CLIENT
--	--------



SERVICE PROVIDERS

METRON T2M

DRAWN R. DERQUIETO
DESIGNED A. CHINKA / C. ASIS
DRG CHECK C. ROSENBERG
DESIGN CHECK R. PATHAK
APPROVED L. PALMER 31032

SYDNEY METRO
WILEY PARK (15.846km to 16.211km SYDNEY METRO KILOMETRAGE)
CABLE CONTAINMENT
STATION PLATFORM LAYOUT PLAN 3 - INGROUND

STATUS: FOR CONSTRUCTION		SHEET 3 OF 3	©
0021	DRG No. SMCSSWSWM-MTM-WWP-BS-DWG-232712	REV.	00

APPENDIX 4.3 WILEY PARK AIA (AURA TREE SERVICES)

Report

Arboricultural Impact Assessment

SYDNEY METRO PROJECT
WILEY PARK TRAIN STATION, NSW

Prepared For – DOWNER c/o AURA TREE SERVICES

25 June 2022

ArborScan Report Reference: R1027
Version: 1.0



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25 June 2022

Downer C/O Aura Tree Services
Raghad Oudah
Cadet Engineer - Sydney Metro Project
Infrastructure Projects
Wiley Park Train Station, NSW

Arboricultural Impact Assessment and Report for Sydney Metro Project Wiley Park Train Station, NSW

Dear Raghad,

We are pleased to provide you with the following report for a Sydney Metro Project covering the proposed development works at property Wiley Park Train Station.

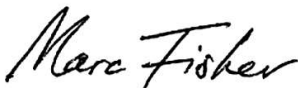
Complete use of this report is authorised under the conditions limiting its use as stated in the Arboricultural Reporting Assumptions, Limiting Conditions & Copyright Clause. This assessment and report is supplied strictly in accordance with the inclusions, conditions, terms and exclusions as detailed within our most recent quotation.

The recommendations of this report do not constitute consent to carry out works. Approval is required in the form of Development Consent to prune or remove trees, as well as the consent of the tree owner where trees are on neighbouring properties.

ArborScan Pty Ltd declares that it has no affiliation with any private contractors, associations or nurseries involved in the tree removal, pruning & tree supply business. This ensures an impartial approach to the recommendations given within this report.

Should you have any queries relating to this report or its recommendations, please do not hesitate to contact us on 0417 305 514.

Regards,

A handwritten signature in black ink that reads "Marc Fisher".

Marc Fisher
Consulting Arborist
ArborScan Pty Ltd

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1 Introduction

1.1 Report Purpose

- 1.1.1 ArborScan Pty Ltd was engaged by Downer C/O Aura Tree Services (The Client) to complete an Arboricultural Impact Assessment (AIA) on nineteen (19) trees at Wiley Park Train Station, NSW (The Site).
- 1.1.2 The AIA report has been requested as part of a wider upgrade of the Wiley Park Train Station site that involves various levels of construction and refurbishment of site infrastructure. The report is intended to focus specifically on the installation of new security fencing and associated tree removal & pruning works.
- 1.1.3 Information on the site trees and assessment of the development constraints imposed by the trees is needed with recommendations to minimise tree conflicts and injury where possible.

1.2 Scope

- 1.2.1 Carry out a visual examination of the trees within the areas that have been identified by/with the client for inspection.
- 1.2.2 Inspect the trees and their growing environment and provide an objective appraisal of the subject trees in relation to their species, estimated age, useful life expectancy, health, structural condition, and viability within the landscape.
- 1.2.3 Measure tree stems in order to identify the Tree Protection Zones (TPZ) & Structural Root Zones (SRZ).
- 1.2.4 Provide independent recommendations on the retention value of the trees using a recognised tree significance rating system.
- 1.2.5 Number the trees on aerial mapping to aid with the identification of their location on the site. Tree numbering, where it is known, is to remain consistent with any existing reports and plans.
- 1.2.6 Identify hollows/cavities and other nesting features that may benefit native Fauna.
- 1.2.7 Include a schedule, documenting tree attributes, calculated Tree Protection Zone (TPZ), Structural Root Zone (SRZ), calculated development incursions (if any) and recommendations in relation to retention values in accordance with AS4970-2009 Protection of Trees on Development Sites.
- 1.2.8 Create a site plan identifying trees that are proposed to be retained or removed, identify the tree protection area for each tree, clearly identify the development encroachment to the TPZ and further markup an approximate location for tree protection fence installation where applicable. The plan will be site-specific and will relate to the proposed development works. The provided plan is intended to be used as a reporting guide only, and it is not intended to be used for construction/development.
- 1.2.9 Identify limitations and further reporting requirements.
- 1.2.10 Provide supporting evidence in the form of a PDF report to aid with the applicable approval process.

2 Methodology

- 2.1.1 Marc Fisher (The Author) of ArborScan Pty Ltd carried out a site inspection of the subject trees on 21 June 2022.
- 2.1.2 Trees that are the subject of this report were identified during discussions with the client at the time of the requested site consultation and tree assessment.
- 2.1.3 The subject trees were inspected from the ground using the initial component of the recognised ground-based Visual Tree Assessment (VTA) technique (without the use of binoculars) developed by Mattheck and Breloer (1994), without the use of aerial or internal investigation, foliage, wood or soil sample analysis nor an underground investigation of the root plate(s).
- 2.1.4 Tree height was estimated, as was canopy spread.
- 2.1.5 Where access to the tree stem was not restricted, diameter measurements were taken with forestry callipers. Where tree stems were not accessible, an estimated size for the stem was recorded. A notation has been made within the data table for any trees where the tree stem size was not measured and was estimated only.
- 2.1.6 Tree protection zones (TPZ) and structural root zones (SRZ) were calculated in accordance with the Australian Standard AS 4970–2009: Protection of Trees on Development Sites.
- 2.1.7 Any tree protection zone (TPZ) encroachment and root loss has been calculated in line with section 3 of AS 4970:2009.
- 2.1.8 Tree retention/significance values were determined using the Institute of Australian Consulting Arboriculturists, Australia (IACA) Significance of a Tree, Assessment Rating System (STARS).
- 2.1.9 Tree locations and data have been collected by the arborist using a Trimble Handheld Data Collector with a GNSS Accuracy of +/- 1 m. The Trimble Catalyst™ on-demand GNSS positioning service was used to aid in the improvement of tree location accuracy.
- 2.1.10 The subject trees have been tagged (with the exception of trees 18 & 19) and mapped on high-resolution aerial imagery, with their number and location readily identifiable on the plan.
- 2.1.11 Any photographs that were taken at the time of the site inspection by the Author and have not been altered for brightness or contrast, nor have they been cropped.
- 2.1.12 A visual inspection from ground level for hollows/cavities and features that may benefit native Fauna has been performed by the Author on the day of the assessment. A licenced and trained ecological consultant has not been commissioned.
- 2.1.13 A risk assessment has not been performed for the purpose of this report.
- 2.1.14 Data collected on site was analysed by the Author, collated into report format, and relevant recommendations were formulated.

3 Observations

3.1 The Site

- 3.1.1 The Wiley Park station is part of the Southwest Metro line between the existing Lakemba & Punchbowl stations. Located at 91-93 King Georges Road Wiley Park 2195, the precincts surrounding the Site include a small retail strip immediately adjacent to the station, three schools on the southern side of the rail corridor, and mostly three-storey residential flat buildings make up the balance of the area. King Georges Road, immediately outside the station, is a wide, heavily trafficked arterial road. The Site falls within the City of Canterbury-Bankstown Council Local Government Area (LGA) and under the Canterbury Local Environmental Plan 2012. The location of the trees referred to in this Tree Report are highlighted in a coloured outline, as shown in Figure 1 below. The remaining vegetation consists of medium-large trees which contain a mixture of native and non-native varieties. The trees subject to this report are considered to offer a medium to high landscape contribution, with the trees forming along much of the property and platforms perimeter.



Figure 1. Aerial image of the subject assessment area highlighted in coloured outline. (ArborScan, 25 June 2022)

3.2 Heritage

- 3.2.1 The Site is a listed heritage item or within a heritage conservation area. Wiley Park Station was opened on 19 June 1938 as part of the extension to the Belmore line but was completed much later than all other stations. The overhead booking office (1938) and brick waiting room on Platform 2 (1938) are representative of the suburban growth in the inter-war period and the need for an interchange at King Georges Road. Wiley Park station group (overhead booking office, platform buildings and footbridge) is on the Railcorp S170 Register and the Local Heritage Register. Despite modifications, the overhead bookings office and brick waiting room are an example of Inter-War Railway Domestic style in use by NSW Railways during the inter-war period. The Lakemba pumping station, which sits between Wiley Park Public School and Wiley Park Girls High School, is an example of an inter-war electrically driven pumping station. It is still in operation but not visible from the street and is the only other locally listed heritage item in the area. The 1974 concrete overbridge is excluded from the Railcorp S170 Register, no specific mention of the adjoining vegetation was found, and the predominant species assessed, which form an avenue along the station's platform (English Oak) are neither native nor endemic. These are, however, considered consistent with common landscape plantings of this time period.

3.3 Significant Tree Register

- 3.3.1 No trees pertaining to this survey at the Site were identified as significant on any identifiable state or local tree registers.

3.4 Threatened Species & Ecological Communities

- 3.4.1 Threatened Ecological Community is a term used in Australia for ecosystems that are in danger of being lost due to some threatening processes. These areas are a naturally occurring group of native plants, animals and other organisms that are interacting in a unique habitat. Its structure, composition and distribution are determined by environmental factors such as soil type, position in the landscape, altitude, climate and water availability. The purpose of listing threatened ecosystems is primarily to reduce the rate of an ecosystem and species extinction. This includes preventing further degradation and loss of structure, function and composition of threatened ecosystems (Northern Beaches Council, 2022).
- 3.4.2 A desktop review was performed using available vegetation layers over high-resolution aerial imagery; in this process, no Threatened Tree Species & Ecological Tree Communities were identified at the site.
- 3.4.3 Critically endangered Sydney Turpentine-Ironbark Forest in the Sydney Basin Bioregion was identified on aerial mapping at nearby parkland 'Wiley Park' located between King Georges Road & Clio Street.

3.5 Vegetation Biodiversity Values Map

- 3.5.1 The Biodiversity Values Map (BV Map) identifies land with high biodiversity value that is particularly sensitive to impacts from development and clearing. The BV Map is one of the triggers for determining whether the Biodiversity Offset Scheme (BOS) applies to a clearing or development proposal.
- 3.5.2 A desktop review was performed using available vegetation layers over high-resolution aerial imagery; in this process, no mapped Biodiversity Values land was identified at the site.
- 3.5.3 Threatened species or communities with potential for serious and irreversible impacts was identified on aerial mapping at nearby parkland 'Wiley Park' located between King Georges Road & Clio Street.

3.6 Fauna / Wildlife

- 3.6.1 Hollow-bearing parts capable of supporting medium-large Fauna were not observed within the trees surveyed on the day of the ground-based VTA inspection. A stick nest was, however, sighted within the canopy of tree 1 during the assessment. Interaction between Fauna and the trees is, however, considered possible considering their fruiting/flowering and their dense, bushy habit.

3.7 Site Soils

- 3.7.1 Site soils may deviate from their natural state due to past development or farming activities. Based on a desktop analysis alone, the soil-landscape is classified as the Blacktown Residual soil group. This soil type occurs extensively on the Cumberland Lowlands between the Georges and Parramatta Rivers in the south-west. Examples include Strathfield, Auburn and Belmore. Isolated examples are found north of Parramatta River on the Hornsby Plateau at Chatswood, Crows Nest, Duffys Forest, Dundas, Naremburn, Neutral Bay, St. Ives and St. Leonards. The vegetation consists of almost completely cleared tall open-forest (wet sclerophyll forest) and open-woodland (dry sclerophyll forest). Remaining traces of the original wet sclerophyll forest containing Sydney blue gum *Eucalyptus saligna* and Blackbutt *E. pilularis* are located at Ashfield Park. The original woodland and open-forest in drier areas to the west were dominated by forest red gum *E. tereticornis*, narrow-leaved ironbark *E. crebra* and grey box *E. moluccana*. This has been almost completely cleared (Department of Planning, Industry and Environment, 2020).
- 3.7.2 The site vegetation which is directly impacted by the associated works is not considered consistent with the common vegetation of the Blacktown Residual soil group and is therefore likely to have been planted.



Figure 2. Soil type overlay mapping. (ArborGIS SOILS SYDNEY, Accessed 25 June 2022)



Figure 3. Heritage overlay mapping. (ArborGIS NSW HERITAGE & ZONING, Accessed 25 June 2022)



Figure 4. Urban exotic/native vegetation. (ArborGIS NSW VEG MAP SYDNEY METRO, Accessed 25 June 2022)

3.8 Proposed Development

- 3.8.1 A review of the proposed design has been undertaken in the context of tree retention and removal across the site. The proposal includes the construction of a new security fence and the removal of the existing fence. The impacts of landscaping or development beyond that aforementioned have not been assessed as part of this report. By way of aerial mapping review, tree clearing has previously occurred within the subject site area between trees 10-11, no physical building structure or soft/hard landscape exists in the area which has been cleared.
- 3.8.2 Client plans provided include – ‘Trees to be removed from Platform 1’

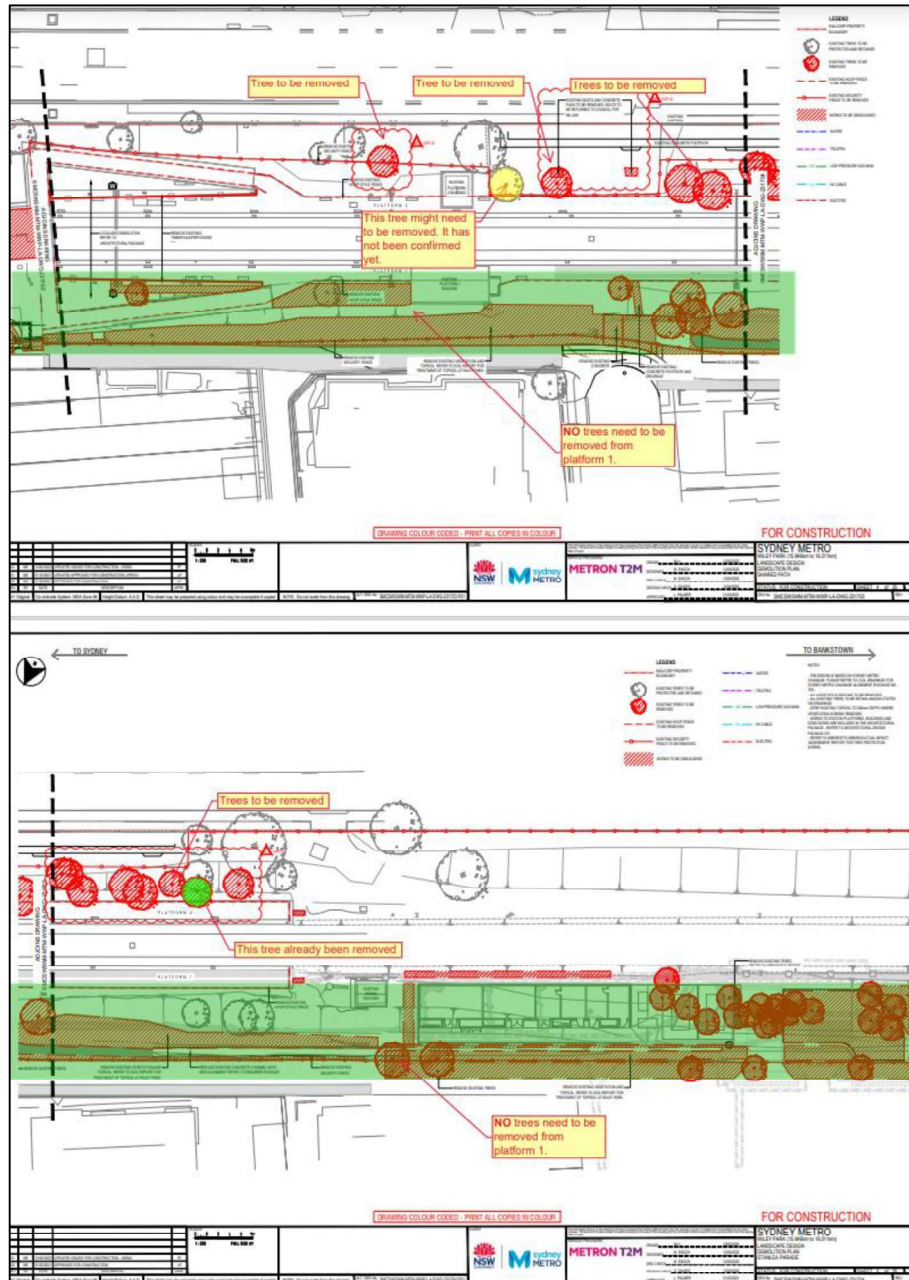


Figure 5. Site tree removal plans Sydney Metro Project Wiley Park Station. (Downer, 25 June 2022)

3.9 Summary of Tree Observations

- 3.9.1 A total of 19 trees have been assessed as part of this report.
- 3.9.2 Trees 18 & 19 are assumed to be located on Council land by way of location positioning.
- 3.9.3 Complete tree attributes and observations can be found in **Appendix 1 - Tree Data Table**. Tree locations are shown in **Appendix 2 – Site Assessment Mapping**.

4 Discussion

4.1 Tree Protection Zone

- 4.1.1 The Tree Protection Zone (TPZ) is a radial distance measured from the centre of the trunk. It is a combination of the root area and crown area requiring protection from construction disturbance so that the tree remains viable.
- 4.1.2 Incursions into the TPZ may occur due to excavation, modification of existing ground levels, trenching or inverting the soil profile. Such works may damage part or all of the root system or affect soil structure and growing conditions required for long-term growth.
- 4.1.3 A TPZ should not be less than 2 m nor greater than 15 m (except where crown protection is required).
- 4.1.4 The TPZ of palms, other monocots, cycads, and tree ferns should not be less than 1 m outside the crown projection.

4.2 Structural Root Zone (SRZ)

- 4.2.1 The Structural Root Zone (SRZ) defines the area around the base of a tree that is required for the tree's stability in the ground. The woody root growth and soil cohesion in this area is necessary to hold the tree upright. The SRZ is nominally circular with the trunk at its centre and is expressed by its radius in metres. This zone considers a tree's structural stability only, not the root zone required for a tree's vigour and long-term viability, which will usually be a much larger area.
- 4.2.2 Incursions into the SRZ are not recommended as they are likely to result in loss or damage to woody roots, which may significantly affect stability.

4.3 TPZ & SRZ Setbacks

- 4.3.1 Trees and their root systems may occupy a substantial part of any development site and, because of their potential size, can have a major influence on planning the use of the Site. Early identification and protection of important trees on development sites is essential from the outset and will minimize the problems of retaining inappropriate trees.
- 4.3.2 The extent of encroachment within the tree protection zone (greater than 20%) will result in damage to structural roots. The structural roots and structural root zone (SRZ) is the area of the root system required for stability and anchorage of the tree.
- 4.3.3 The below TPZ & SRZ **radius measurements are to be taken from the centre of the stem at ground level**.

4.4 TPZ Encroachment

- 4.4.1 It may be possible to encroach into or make variations to the standard TPZ. Encroachment includes excavation, compacted fill and machine trenching. Any area lost to encroachment should be compensated for elsewhere and contiguous to the TPZ.
- 4.4.2 Tree-sensitive construction measures such as pier and beam, suspended slabs, cantilevered building sections, screw piles and contiguous piling can minimize the impact of encroachment.
- 4.4.3 The levels of encroachment are below defined:
- **Major encroachment.** As per the Australian Standard AS 4970–2009: Protection of Trees on Development Sites, a major encroachment into the TPZ of any tree is considered to occur when it is beyond 10% of the total TPZ area. Trees with major encroachment may require removal or, in certain instances, be retained with specific protection requirements throughout the construction stage. Exploratory excavation using non-destructive methods such as pneumatic, hydraulic, or hand digging may also be required to evaluate the extent of potential damage to the root system and determine whether the tree(s) will remain viable.
 - **Minor encroachment.** Under the aforementioned standard, a minor encroachment is determined as being less than 10% of the total TPZ area. Trees with minor encroachment may be retained with specific, generic or no protection requirements throughout the construction stage.
 - **No encroachment.** Trees with no encroachment may be retained with generic or no protection requirements throughout the construction stage.
- 4.4.4 Thirteen (13) trees will have major encroachments from the proposed development works and will require tree removal, protection or tree-sensitive construction methods. Includes trees 1-10, 12, 13 & 16.
- 4.4.5 Six (6) Trees will have minor encroachments from the proposed development works and will require tree removal, protection or tree-sensitive construction methods. Includes trees 11, 14, 15, 17, 18 & 19.
- 4.4.6 There are zero (0) trees identified that do not have proposed development works within their TPZ areas, and will not be impacted, provided that tree protection measures are installed prior to works commencing and all works are excluded from their TPZ areas.

Table 1. Trees Subject To Major Encroachment.

	ENCROACHMENT DESCRIPTION	
	Encroachment Severity	Encroachment
Trees 1-10	Major	Security fence proposed in direct tree alignment.
Tree 12	Major	The security fence is not proposed in the direct tree alignment. The following works are however proposed within the TPZ - Site access, Removal of trees, Stump grinding, Demolition of existing fencing, and Installation of security fencing.
Tree 13	Major	Security fence proposed in direct tree alignment.
Tree 16	Major	Security fence proposed in direct tree alignment.

4.5 Summary Of Tree Retention Values

- 4.5.1 It is not always possible or reasonably practicable to retain all trees within a proposed development. It can be better to select the higher retention value trees and protect these well, rather than trying to retain all trees and decreasing the quality of tree protection (Matheny & Clark, 1998). A Tree Retention Rating system is designed to assist in the planning processes for proposed works, above and below ground where trees are to be retained on or are adjacent to a development site.
- 4.5.2 Retention values have been determined using the Retention Value - Priority Matrix of the IACA Significance of a Tree, Assessment Rating System (STARS) © (IACA, 2010).
- 4.5.3 This method uses a scale of High, Medium and Low significance in the landscape. Once the landscape significance of an individual tree has been defined, the retention value can be determined. Other criteria such as its physical dimensions, age class, location and its Amenity, Heritage and Environmental significance are also considered.
- 4.5.4 In accordance with the STARS Tree Significance - Assessment Criteria and Tree Retention Value - Priority Matrix, the retention value categories include:
- **High Retention (Priority for Retention)** - These trees are considered important for retention and should be retained and protected. Design modification or relocation of buildings should be considered to accommodate the setbacks as prescribed by the Australian Standards AS4970 Protection of trees on development sites. Tree-sensitive construction measures must be implemented, e.g. pier and beam etc., if works are to proceed within the Tree Protection Zone (TPZ).
 - **Medium Retention (Consider for Retention)** – These trees may be retained and protected. These are considered less critical; however, their retention should remain a priority, with removal considered only if adversely affecting the proposed building/works and all other alternatives have been considered and exhausted.
 - **Low Retention (Consider for Removal)** – These trees are not considered important for retention nor require special works or design modification to be implemented for their retention.
 - **Removal (Priority for Removal)** – These trees are considered hazardous, or in irreversible decline, or weeds and should be removed irrespective of development.
- 4.5.5 A breakdown summary of the Tree Retention Values of the assessment inventory is below listed in the table.

Table 2. Summary Of Tree Retention Values.

	Tree Retention Values	
	Qty	Tree Number(s)
High	1	12
Medium	11	1, 3, 4, 5, 8, 11, 13, 15, 17, 18, 19
Low	6	6, 7, 9, 10, 14, 16
Removal	1	2

4.6 Impacts of Proposed Development

- 4.6.1 A review of the proposed design has been undertaken in the context of tree retention and removal across the Site. The proposal includes the construction of a new security fence and the removal of the existing one. The impacts of landscaping or development beyond that aforementioned have not been assessed as part of this report.
- 4.6.2 Trees affected by direct conflict with the proposed construction footprint would require removal under the current design. To retain any of these trees, a redesign or relocation of the development would be required. Refer to Appendix 1 - Tree Data Table & Appendix 2 – Site Assessment Mapping for full details of trees.
- 4.6.3 The other main development impact which affects trees, but not necessarily to the point of requiring immediate removal, is through significant root damage due to major TPZ encroachment. These can largely be placed into three (3) categories – soil compaction, level changes or direct root severance.
- 4.6.4 Negative tree impacts can manifest as either a reduction in health and/or vigour due to root loss (absorption and/or transport roots), resulting in a reduction in water and nutrient absorption capability or on tree stability if larger roots are impacted. Ultimately, the outcome for the trees depends on a number of variable factors, including species, age, current health, TPZ encroachment percentage, soil type, topography, previous site use and the proposed design and construction methodology.
- 4.6.5 The presumption of allowable encroachment and minimal long-term health or structural impacts to trees relies upon a combination of the following being used - root-sensitive construction methods being adhered to within the TPZ, minimal excavation within the TPZ to limit root severance (i.e. construction placed outside the TPZ where possible), fill rather than excavation utilised to affect level changes where possible (i.e. to minimise root severance and allow the trees root system time to adjust), no construction occurring within the SRZ, the compensatory area being available around the unimpacted aspects of the trees and the enhancement of the existing TPZ area (i.e. mulched, soil conditioning and irrigation when required).
- 4.6.6 The development will affect twelve (12) site trees through encroachment via construction activity into their respective TPZs, and seven (7) trees are to be retained with specific (as well as generic) protection measures.

4.7 Site Images (Tree Removal)

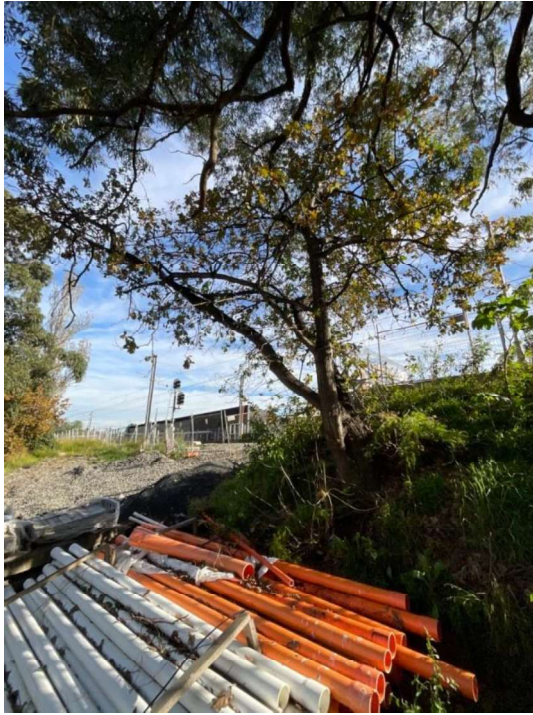


Figure 6. Tree 1. (ArborScan, 2022)

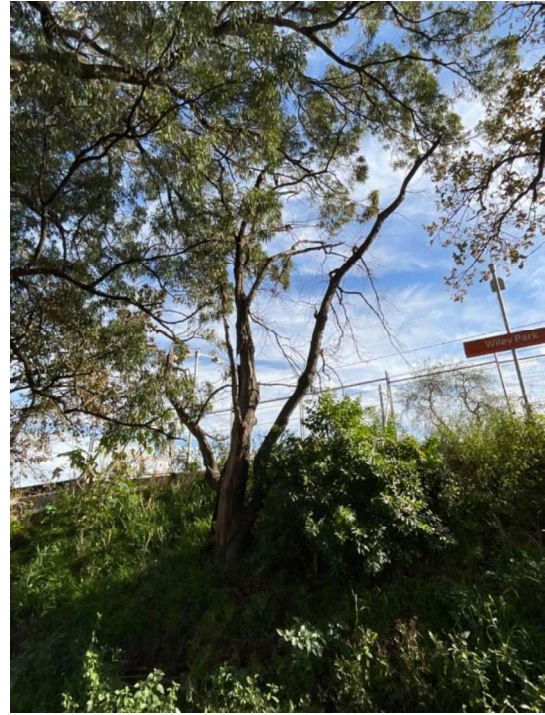


Figure 7. Tree 2 (Dead). (ArborScan, 2022)



Figure 8. Tree 3. (ArborScan, 2022)

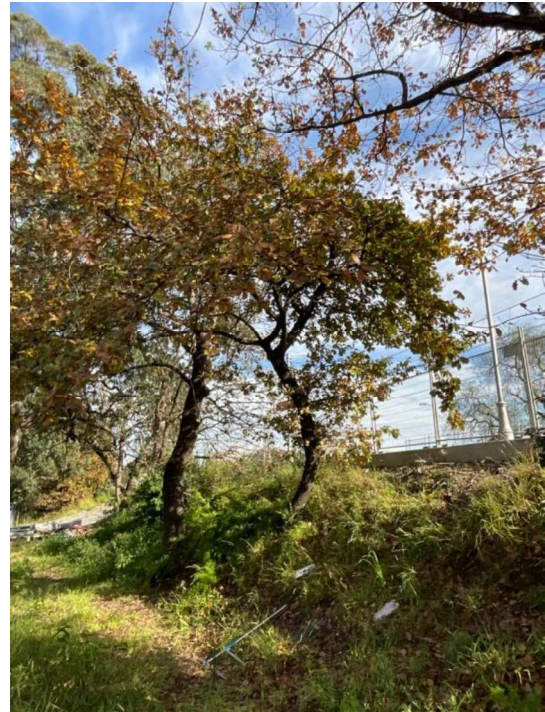


Figure 9. Tree 4. (ArborScan, 2022)

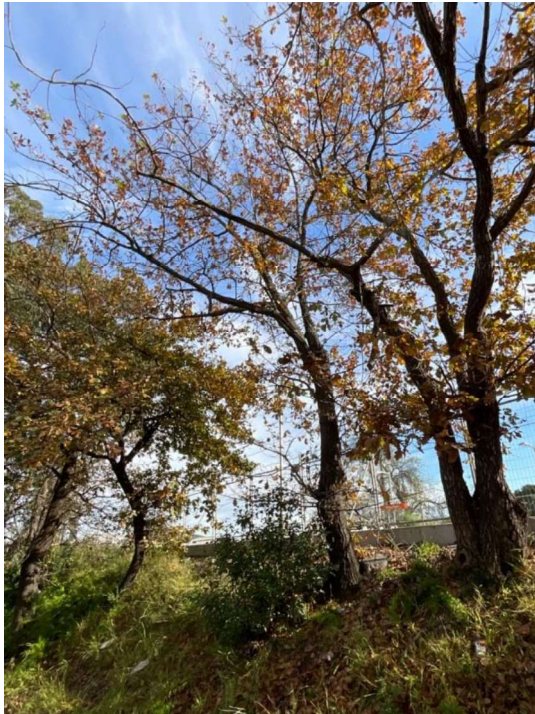


Figure 10. Tree 5. (ArborScan, 2022)

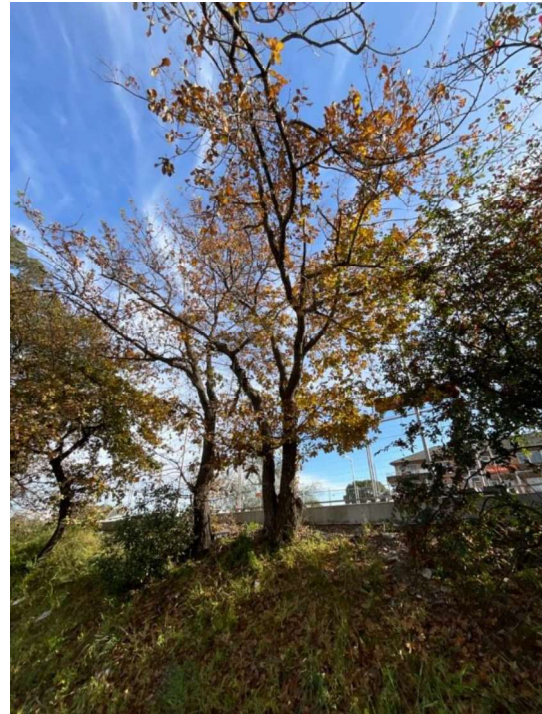


Figure 11. Tree 6. (ArborScan, 2022)



Figure 12. Tree 7. (ArborScan, 2022)



Figure 13. Tree(s) 8-10. (ArborScan, 2022)

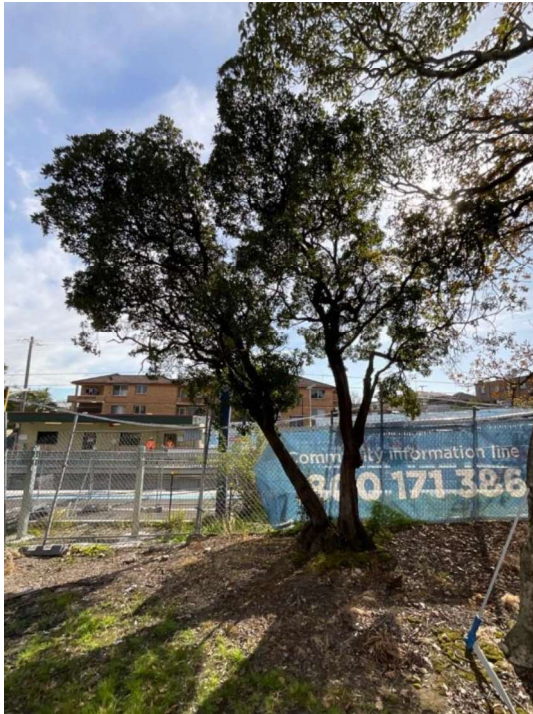


Figure 14. Tree 13. (ArborScan, 2022)



Figure 15. Tree 16. (ArborScan, 2022)

5 Recommendations & Tree Protection

5.1 Tree Removal

- 5.1.1 Twelve (12) trees have been recommended for removal based on the supplied design proposal. Includes trees 1-10, 13 & 16.
- 5.1.2 Trees recommended for removal were typically located within the alignment of the proposed security fence installation.
- 5.1.3 All approved tree removal works shall be carried out by a qualified Arborist, with a minimum Level 3 AQF in arboriculture and in accordance with WorkCover's Code of Practice – Amenity Tree Industry.
- 5.1.4 The undertaking of tree removal must avoid injury to retained trees.
- 5.1.5 Stumps located within the TPZs of trees to be retained shall be grubbed-out where required using a mechanical stump grinder (or by hand where less than 150mm in diameter) without damage to the root system of other trees. Stumps within the Tree Protection Zone of other trees to be retained shall not be pulled out using excavation equipment or similar without the prior consent of a project arborist.
- 5.1.6 Where trees to be removed are within the SRZ of any trees to be retained, consideration should be given to cutting the stump close to ground level and retaining the root crown intact. Grinding or excavating of stumps in the SRZ is not permitted without the prior consent of the project arborist.
- 5.1.7 Poisoning of any stumps retained post removal is not permitted in TPZs of trees to be retained without the prior consent of the project arborist.

5.2 Tree Retention

- 5.2.1 Seven (7) trees were recommended for retention and require specific and/or generic protection measures during construction to ensure that they remain viable following the completion of works. Includes trees 11, 12, 14, 15, 17, 18 & 19.

5.3 Site Work Activities

- 5.3.1 Seven (7) trees have proposed works within or near their respective TPZs; this includes site access, fencing demolition and construction, tree removal and stump grinding. These trees require a combination of specific and generic controls to ensure their viability post-project completion. Includes trees 11, 12, 14, 15, 17, 18 & 19.
- 5.3.2 Works should be undertaken using techniques that are sensitive to tree roots to avoid unnecessary damage. Such techniques include:
 - Excavation of fence holes using a high-pressure water jet and vacuum truck, Air-Spade with a vacuum truck or dug by hand. Any roots discovered are to be treated with care and minor roots (<40mm diameter) pruned with a sharp, sterile handsaw or secateurs. All significant roots (>40mm diameter) are to be recorded, photographed and reported to the project arborist.
- 5.3.3 Machine excavation is prohibited within the TPZs of retained trees unless undertaken at the direct consent of, or under supervision from the project arborist.
- 5.3.4 Machine use in the TPZs of retained trees for tree removal operations is not permitted unless the applicable tree protection has been installed.
- 5.3.5 Stumps located within the TPZs of trees to be retained shall be grubbed-out where required using a mechanical stump grinder.

5.4 Tree Pruning

- 5.4.1 Selective tree canopy pruning has been proposed by the client for security fence installation. Includes tree 11.
- 5.4.2 A 'Pruning Specification Diagram/Instruction' prepared by a qualified Arborist (minimum AQF Level 5) which shall be submitted to and approved by the project arborist prior to the commencement of any pruning works, the diagram/instruction must include –
- Number of branches and orientation, branch diameter, and percentage of the canopy to be pruned/removed.
 - Photos with individual branches which are recommended for pruning/removal to be clearly marked and labelled. (Please note reports which include photos with a single vertical line as the area recommended for pruning will not be accepted).
- 5.4.3 The removal of branches greater than 100mm diameter and/or greater than 10% canopy removal will not be approved.
- 5.4.4 Pruning work must be specified in accordance with Australian Standard 4373–2007, Pruning of Amenity Trees.



Figure 16. Tree 11. (ArborScan, 2022)

5.5 Protective Fencing Specification

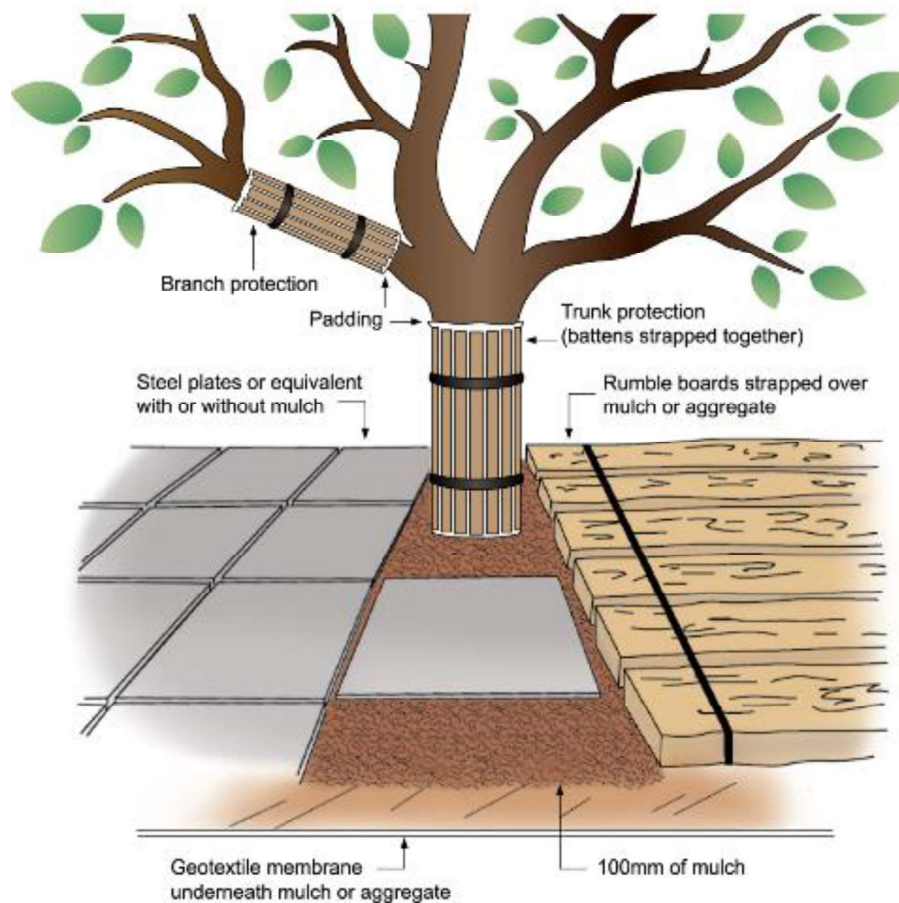
5.5.1 Due to site access limitations, tree protection fencing is not considered relevant for retained trees.

5.6 Trunk and Ground Protection

5.6.1 Given that proposed works are within the TPZs of retained trees, standard protective fencing may not always be a viable method of protection. In these areas, trunk protection and ground protection should be installed prior to the commencement of works and remain in place until after construction works have been completed. Includes trees 11, 12, 14, 15, 17, 18 & 19.

5.6.2 Where construction access into the TPZ of retained trees cannot be avoided, the root zone of each tree must be protected using either steel plates or rumble board strapped over mulch/aggregate until such a time as the permanent above-ground surfacing is installed.

5.6.3 Trunk and ground protection should be undertaken in line with Figure 17 and the Australian Standard AS 4790–2009: Protection of Trees on Development Sites.



Notes:

1. For trunk and branch protection use boards and padding that will prevent damage to the bark. Boards are to be strapped to trees, not nailed or screwed.
2. Rumble boards should be of a suitable thickness to prevent soil compaction and root damage.

Figure 17. Depicts trunk and ground protection techniques. (AS 4790–2009).

5.7 Project Arborist

- 5.7.1 An official "Project Arborist" must be commissioned to oversee the tree protection, any works within the TPZ and complete regular monitoring compliance certification.
- 5.7.2 The project arborist must have a minimum of five (5) years of industry experience in the field of arboriculture, horticulture with relevant demonstrated experience in tree management on construction sites and Diploma level qualifications in arboriculture – AQF Level 5.
- 5.7.3 Inspections are to be conducted by the project arborist at several key points during the construction in order to ensure that protection measures are being adhered to during construction stages and a decline in tree health or additional remediation measures can be identified.

5.8 Project Milestones

- 5.8.1 The following visits and milestones were recommended as to when on-site tree inspection by the project arborist is required:

Table 3. Project Milestones.

Item	Purpose of Visit	Timing of Visit(s)	Prerequisites
1	Pre-start induction	Following sign-off from Item 1. Contractor to provide a minimum of five days advance notice for this visit.	Prior to the commencement of works. All parties involved in the project to attend.
2	Supervision of works in TPZ, including all regrading and excavations	Whenever there is work planned to be performed within the TPZs. Contractor to provide a minimum of five days advance notice for such visits.	
3	Final sign off	Following completion of works.	Practical completion of works prior to tree protection removal.

5.9 Compliance Reporting

- 5.9.1 Following each inspection, the project arborist shall prepare a report detailing the condition of the trees. These reports should certify whether or not the works have been completed in compliance with the consent relating to tree protection.
- 5.9.2 These reports should contain photographic evidence where required to demonstrate that the work has been carried out as specified.
- 5.9.3 Matters to be monitored and included in these reports should include tree condition, tree protection measures and impact of site works that may arise from changes to the approved plans.
- 5.9.4 The reports and Compliance Statements shall be submitted to the Project Manager (as well as the Clients' nominated representative) following each inspection.
- 5.9.5 The reports and any Non-Compliance Statements shall be submitted to the Project Manager (as well as the Clients' nominated representative) if tree protection conditions have been breached. Reports should contain clear remedial action specifications to minimise any adverse impact on any subject tree.

5.10 Offset Tree Planting

- 5.10.1 Offset planting should reflect the number of trees removed and the initial loss of amenity and biomass. New trees should be of long-term potential and sourced from a reputable supplier.
- 5.10.2 Replacement tree species must suit their location on the site in terms of their potential physical size and their tolerance(s) to the surrounding environmental conditions. To avoid unethical or unprofessional tree selection and/or their placement within the landscape, replacement tree species must be selected in consultation with a consulting arborist, who can also assist in implementing successful tree establishment techniques.
- 5.10.3 Replacement tree species should have the genetic potential to reach a mature size potential of those trees removed to facilitate the development. As a guide, the potential height will be a minimum of 5m (or more) and produce a spreading canopy so as they may provide amenity value to the property and contribute to the tree canopy of the surrounding area in the future.
- 5.10.4 Offset planting requirements and species selection are to be specified by the authority.

5.11 Tree Damage

- 5.11.1 In the event of any tree becoming damaged for any reason during the construction period, a consulting arborist (Australian Qualification Framework Level 5) shall be engaged to inspect and provide advice on any remedial action to minimise any adverse impact. Such remedial action shall be implemented as soon as practicable and certified by the arborist.

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7 Appendix 1 - Tree Data Table

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8 Appendix 2 – Site Assessment Mapping














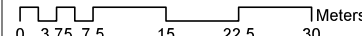



Source: Esri, DeLorme, GeoEye, (Geo), and the GIS User Community - Department of Finance, Natural Resources 2016

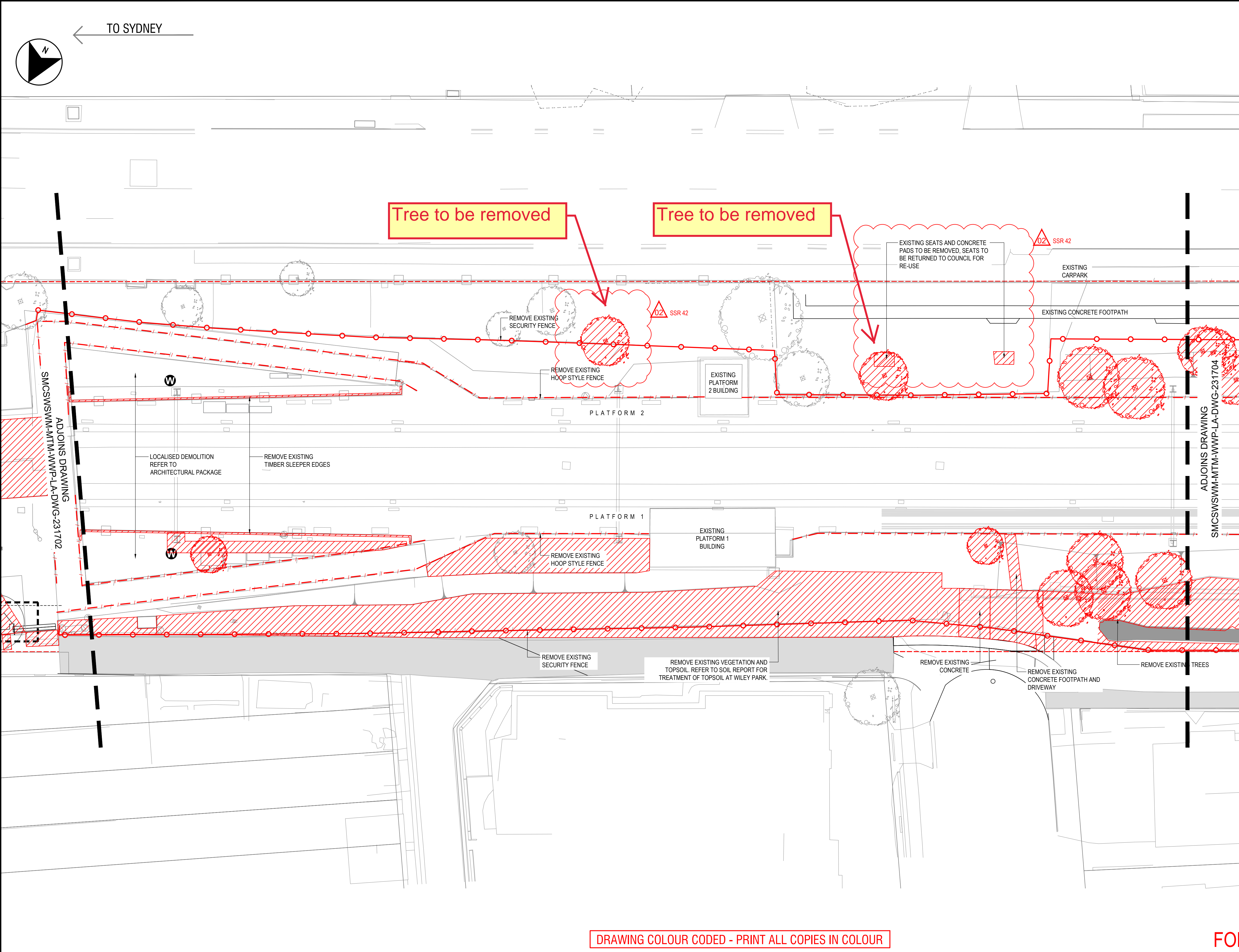
 TPZ	 HIGH	 RETAIN  REMOVE	IACA Significance of a Tree, Assessment Rating System (STARS) Priority for Retention (High) – These trees are considered important for retention and should be retained and protected. Design modification or re-location of buildings should be considered to accommodate the setbacks as prescribed by the Australian Standards AS4970 Protection of trees on development sites. Tree sensitive construction measures must be implemented e.g. pier and beam etc if works are to proceed within the Tree Protection Zone (TPZ). Consider for Retention (Medium) – These trees may be retained and protected. These are considered less critical; however, their retention should remain priority with removal considered only if adversely affecting the proposed building/works and all other alternatives have been considered and exhausted. Consider for Removal (Low) – These trees are not considered important for retention, nor require special works or design modification to be implemented for their retention. Priority for Removal – These trees are considered hazardous, or in irreversible decline, or weeds and should be removed irrespective of development.	PROJECT.	WILEY PARK TRAIN STATION, NSW				
	 MEDIUM			CLIENT.	DOWNER C/O AURA TREE SERVICES				
 SRZ	 LOW			PLAN TYPE.	TREE RETENTION CLASS				
	 REMOVE			PLAN DETAILS.	V 1.0	24.6.2022	A3	Scale: 1:400	
 PROJECT AREA	 NSW CADASTRE				 0 3.75 7.5 15 22.5 30 Meters				
									
			© (Copyright) ArborScan Pty Ltd 2022						



Sources: Esri, Maxar, Earthstar Geographics, and the GIS User Community, © Department of Planning, Services & Innovation 2018

	RETAIN		NSW CADASTRE	IACA Significance of a Tree, Assessment Rating System (STARS) Priority for Retention (High) - These trees are considered important for retention and should be retained and protected. Design modification or re-location of buildings should be considered to accommodate the setbacks as prescribed by the Australian Standards AS4970 Protection of trees on development sites. Tree sensitive construction measures must be implemented e.g. pier and beam etc if works are to proceed within the Tree Protection Zone (TPZ). Consider for Retention (Medium) - These trees may be retained and protected. These are considered less critical; however, their retention should remain priority with removal considered only if adversely affecting the proposed building/works and all other alternatives have been considered and exhausted. Consider for Removal (Low) - These trees are not considered important for retention, nor require special works or design modification to be implemented for their retention. Priority for Removal - These trees are considered hazardous, or in irreversible decline, or weeds and should be removed irrespective of development.	PROJECT.	WILEY PARK TRAIN STATION, NSW								
			REMOVE			PROJECT AREA	CLIENT.	DOWNER C/O AURA TREE SERVICES						
   		 HIGH  MEDIUM  LOW  REMOVE						PLAN TYPE.	TREE RETENTION / REMOVAL PLAN					
	PLAN DETAILS.				V 1.0			24.6.2022	A3	Scale: 1:400				
	TREE REMOVAL SUMMARY - 12 Trees The following trees have been recommended for removal - 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 13, 16							  Meters						
								 © (Copyright) ArborScan Pty Ltd 2022						

Cad File: X:\2 Projects\2018\18-67 Southwest Metro Design Services\02 CAD\73 WWP Wiley Park\Plot\SMCSWSWM-MTM-WWP-LA-DWG-231703.dwg
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TO SYDNEY

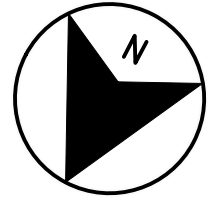
TO BANKSTOWN

- LEGEND**
- RAILCORP PROPERTY BOUNDARY
 - EXISTING TREES TO BE PROTECTED AND RETAINED
 - EXISTING TREES TO BE REMOVED
 - EXISTING HOOP FENCE TO BE REMOVED
 - EXISTING SECURITY FENCE TO BE REMOVED
 - WORKS TO BE DEMOLISHED
 - WATER
 - TELSTRA
 - 202 LOW PRESSURE GAS MAIN
 - 106 HV CABLE
 - ELECTRIC

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TO SYDNEY

TO BANKSTOWN

LEGEND

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- EXISTING TREES TO BE PROTECTED AND RETAINED
- ⊗

EXISTING TREES TO BE REMOVED
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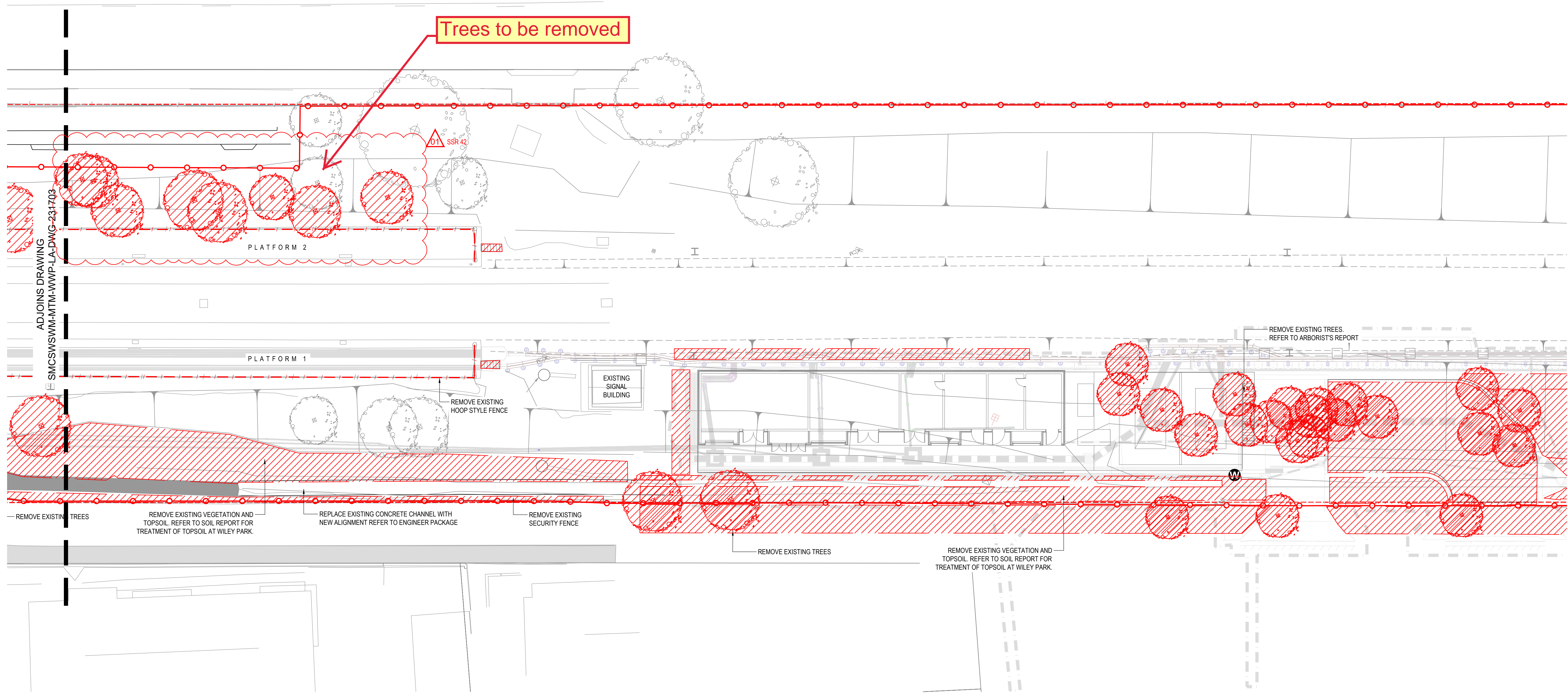
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WORKS TO BE DEMOLISHED
- WATER
- TELSTRA
- 202 LOW PRESSURE GAS MAIN
- 106 HV CABLE
- ELECTRIC

NOTES:

- THE DESIGN IS BASED ON SYDNEY METRO CHAINAGE. PLEASE REFER TO CIVIL DRAWINGS FOR SYDNEY METRO CHAINAGE ALIGNMENT (PACKAGE NO. 103).
- ALL HOOP STYLE FENCING TO BE REMOVED.
- ALL EXISTING TREES TO BE RETAIN UNLESS STATED ON DRAWINGS
- STRIP EXISTING TOPSOIL TO 200mm DEPTH WHERE VEGETATION IS BEING REMOVED.
- WORKS TO STATION PLATFORMS, BUILDINGS AND CONCOURSE ARE INCLUDED IN THE ARCHITECTURAL PACKAGE - REFER TO ARCHITECTURAL DESIGN PACKAGE 231.
- REFER TO ARBORIST'S ARBORICULTURAL IMPACT ASSESSMENT REPORT FOR TREE PROTECTION WORKS.

Trees to be removed



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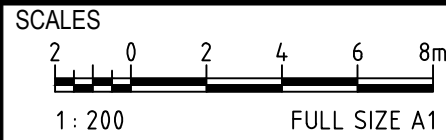
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ALT. DRG No SMCSWSWM-MTM-WWP-LA-DWG-231704 P01

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DESIGN CHECK	G. DAVIES	12/05/2022
APPROVED	L. PALMER	31/03/2021

SYDNEY METRO
WILEY PARK (15.846km to 16.211km)
LANDSCAPE DESIGN
DEMOLITION PLAN
STANLEA PARADE

STATUS: FOR CONSTRUCTION	SHEET 5 of 25	©
DRG No SMCSWSWM-MTM-WWP-LA-DWG-231704	REV.	01

9 Appendix 3 – Arboricultural Reporting Assumptions and Limiting Conditions

1. Any legal description provided to the consultant will be assumed to be correct. Any titles and ownership of any property will be assumed to be good. No responsibility will be assumed for matters legal in character.
2. It will be assumed that any property/project access and reporting is not in violation of any trespass laws, applicable codes, ordinances, statutes or other government regulations.
3. Care has been taken to obtain all information from reliable sources. All data has been verified in so far as possible; however, the consultant can neither guarantee nor be responsible for the accuracy of the information provided by others.
4. The consultant shall not be required to give testimony or to attend court by reason of this report unless subsequent contractual arrangements are made, including payment of an additional fee for such services.
5. Loss or alteration of any part of the report issued invalidates the entire report.
6. Possession of the report or a copy thereof does not imply a right of publication or use for any purpose by anyone but the person to whom it is addressed without the prior written consent of the consultant.
7. Neither all nor any part of the contents of the report, nor any copy thereof, shall be used for any purpose by anyone but the person to whom it is addressed without the written consent of the consultant. Nor shall it be conveyed by anyone, including the client, to the public through advertising, public relations, news, sales or other media without the written consent of the consultant.
8. This report and any values expressed herein represent the opinion of the consultant, and the consultant's fee is in no way contingent upon the reporting of a specified value, a stipulated result, the occurrence of a subsequent event, nor upon any finding to be reported.
9. Sketches, diagrams, graphs and photographs in the report, being intended as visual aids, will not necessarily be to scale unless expressed otherwise.
10. Information contained in this report covers only those items that were examined and reflect the condition of those items at the time of their inspection.
11. Inspection is limited to visual examination of accessible components without dissection, testing, excavation or probing.
12. It is important to understand that not all defects are detectable, and not all failures are predictable.
13. There will be no warranty or guarantee, expressed or implied that failures, problems or deficiencies of the tree/s subject to the report (or parts thereof) may not arise at any time in the future.
14. The findings and recommendations in this report reflect an impartial assessment of the tree(s) and its/their condition on the available evidence and project outcomes.

10 Appendix 4 – Description of Survey Assessment Terms

The trees assessed by visual examination which form the survey reflect an impartial assessment by the assessor and is based on the assessor's arboriculture experience and on the condition of the tree on the day of its survey. The following definitions have been provided to guide a better understanding of the assessment categories included within the issued report. Depending on the report type, all categories may not be applicable.

- **Tree Number** – Number assigned to the tree, often referenced on an aerial site map, depending on the project scope, a physical tag with the tree's corresponding number may also be installed.
- **Tree Location Coordinates** - Easting and northing coordinates, Geocentric Datum of Australia 1994 (GDA94) will be collected for each tree surveyed and will be displayed within the report's inventory. Coordinates, unless otherwise specified, are +/- 4 m in accuracy.
- **Tree Height & Canopy Spread** - Estimated size range in metres on its broadest axis. Where required, tree height and crown spread will be estimated to the nearest metre. Heights and spreads will only be measured where required by the scope.
- **Diameter At Root Crown (DBH)** - Estimated trunk diameter size range in 'mm' at its broadest axis at 1.4m from ground level for a single-trunked tree. DBH will be accurately measured as per the Australian Standard AS 4970–2009: Protection of Trees on Development Sites when defined in the project's scope.
- **Diameter At Root Crown (DRC)** - Estimated trunk diameter size range in 'mm' at its broadest axis at immediately above the buttress. The DRC will be accurately measured as per the Australian Standard AS 4970–2009: Protection of Trees on Development Sites when defined in the project's scope.
- **Tree Species** – The accepted common name and botanical name (genus & species) will be identified and documented in the report, where reproductive material and features of the tree are available to the assessor. Where species cannot be accurately identified, the assessor will identify the genus; where the genus cannot be identified, a family or general identification reference will be otherwise assigned.

Table 4. Definition - Age / Maturity Class.

Term	Age / Maturity Class
	Definition
Young	Establishing tree which has been planted or self-seeded within the last five years, in situ.
Juvenile	Tree aged less than 90% of its life expectancy, in situ.
Semi Mature	Tree aged less than 80% of its life expectancy, in situ.
Mature	Tree aged 20-80% of its life expectancy, in situ.
Over-mature	Tree aged greater than >80% of its life expectancy, in situ, or senescent with or without reduced vigour, and declining gradually or rapidly but irreversibly to death.

Table 5. Definition – Tree Health

Term	Tree Health
	Definition
Excellent	Perfect specimen with excellent form and vigour, along with a well-balanced crown. The trunk is sound and solid. No apparent pest problems. Normal to exceeding shoot length on new growth. Normal leaf size and colour. Exceptional life expectancy for the species.
Good	The tree should exhibit a full canopy of foliage. May lack natural symmetry. Good growth rate and minor deficiency in leaf development. Few pest issues or damage, and controllable if present. Normal branch and stem development with healthy growth. Typical life expectancy for the species.
Average	The tree is in reasonable condition but growing well. Crown decline and dieback up to 25% of the canopy. Average overall symmetry. The leaf size is smaller, and the colour is somewhat chlorotic. There may be some deadwood present in the crown. Minor decay in the trunk and major branches. Minor pathogen damage. Shoot extensions indicate some stunting and stressed growing conditions. Some signs of pest problems contribute to a lesser condition. Moderate life expectancy for the species.
Poor	Lacking a full crown, with more than 50% decline and dieback that especially affects larger branches. Not growing to its full capacity. Stunting obvious, with little evidence of growth on smaller stems. Large amounts of deadwood may be evident throughout the crown. Moderate decay in the trunk and major branches. Moderate pathogen damage. Leaf size and colour reveals overall stress in the plant. Insect or disease infestation may be severe. Low life expectancy for the species.
Very Poor	More than 70% of the canopy is in severe decline or dead. Canopy density is extremely low, with chlorotic and necrotic tissue dominating the canopy. Significant / Severe decay in the trunk and major branches. Significant / Severe pathogen damage. Root plate damage with a majority of roots damaged, diseased, or missing. Very low life expectancy for the species.
Dead	No live plant material observed.

Table 6. Definition – Tree Origin.

Term	Tree Origin
	Definition
Exotic	A plant introduced from another country or region to a place where it was not indigenous. Such plants may become naturalised and often originate as garden escapes.
Native	A plant found to occur as an endemic or indigenous species where it is growing or a plant known to have originated as an endemic or indigenous species from a particular place, e.g. continent, country, region, mountain or island.
Endemic	A native plant usually with a restricted occurrence limited to a particular country, geographic region or area and often further confined to a specific habitat.
Invasive / Noxious weed	A plant species of any taxa declared a weed by legislation. Treatment for the control or eradication of such weeds is usually prescribed by the legislation.

Table 7. Definition - Tree Form

Term	Tree Form
	Definition
Excellent	Ideal tree for that species, including shape and canopy symmetry, health, and density. Outstanding function on the site or location.
Good	Tree of typical crown shape and habit with proportions representative of the taxa considering constraints such as origin, e.g. indigenous or exotic, but does not appear to have been adversely influenced in its development by environmental factors in situ such as soil water availability, prevailing wind, or cultural practices such as lopping and competition for space and light.
Average	Acceptable tree for that species. Tree shape and symmetry are adequate, with some substantial asymmetry in shape and canopy form. May have considerable concerns for its use and function on the site or location.
Poor	Poor tree for that species. Highly irregular canopy shape and undesirable form make it unattractive and dysfunctional on the site or location.
Very Poor	Disagreeable tree for that species, with highly diminished function and aesthetic appeal on the site or location.
Dead	No live plant material observed.

Table 8. Definition – Vigour.

Term	Vigour
	Definition
Good	Accelerated growth of a tree due to incidental or deliberate artificial changes to its growing environment that are seemingly beneficial but may result in premature aging or failure if the favourable conditions cease or promote prolonged senescence if the favourable conditions remain, e.g. water from a leaking pipe; water and nutrients from a leaking or disrupted sewer pipe; nutrients from animal waste, a tree growing next to a chicken coop, or a stock feedlot, or a regularly used stockyard; a tree subject to a stringent watering and fertilising program, or some trees may achieve an extended lifespan from continuous pollarding practices over the life of the tree.
Normal	Ability of a tree to maintain and sustain its life processes. This may be evident by the typical growth of leaves, crown cover and crown density, branches, roots and trunk and resistance to predation. This is independent of the condition of a tree but may impact upon it, and especially the ability of a tree to sustain itself against predation.
Low	Reduced ability of a tree to sustain its life processes. This may be evident by the atypical growth of leaves, reduced crown cover and reduced crown density, branches, roots, and trunk, and a deterioration of their functions with reduced resistance to predation. This is independent of the condition of a tree but may impact upon it, and especially the ability of a tree to sustain itself against predation.

Table 9. Definition – Structure.

Term	Structure
	Definition
Good	Root plate appears normal, with no damage. No trunk defects. Good branch habit and attachment; minor dieback with no visible structural defects. There may be some signs of previous pruning. Minimal deadwood. Codominant stem formation may be present. No fungal pathogens are present.
Average	Root plate reveals previous minor damage or disturbance (Tree Protection Zone (TPZ) Encroachment <10%). Evidence of minor trunk damage or cavities where decay could colonise. Less than 25% of bark sections are missing. Included stems are present with no evidence of cracks or splits. Some branch unions may exhibit minor structural faults. Branching habits and attachments indicate poor pruning or damage, which requires moderate corrections. Minimal previous branch failures have occurred. Fungal pathogens may be present. Removal of surrounding trees and or the removal or the addition of buildings or structures has occurred, partly exposing the tree or its parts to increased wind loads.
Poor	Root plate disturbance and defects indicate major damage (Tree Protection Zone (TPZ) Encroachment >10%). Girdling roots around the trunk flare. Wounding evident with cavities and/or decay present. Trunk reveals more than 50% of bark section missing. Included stems are present and are considered likely to fail in 0-5 years. Branch structure has poor attachments, with several structurally important branches dead or broken. Branch unions may be poor or faulty at the point of attachment. Canopy reveals signs of damage or previous topping or lion-tailing, with major corrective action required. Fungal pathogens are present. Removal of surrounding trees and or the removal or the addition of buildings or structures has occurred, fully exposing the tree or its parts to increased wind loads.
Very Poor	Failure imminent. Severe damage within the root plate and root collar exhibit major defects that could lead to tree death or failure. Partial root plate failure. A majority of the bark or trunk is affected, either decayed or missing. Branching is extremely poor or severely topped, with severe dieback in the canopy. Active splits or partial failure. The tree has a very poorly structured crown. Little or no opportunity for mitigation of any tree parts. Fungal pathogens are severely impacting tree structure. The tree is significantly exposed to increased wind loads as a result of the removal of surrounding trees and or the removal or the addition of buildings or structures.

Table 10. Definition - Estimated Useful Life Expectancy

Term	Estimated Useful Life Expectancy
	Definition
Dead	No live plant material observed
Short Term	A period of time <5
Short Term	A period of time 5-15 years
Medium Term	A period of time 15 – 40 years.
Long Term	A period of time greater than >40 years.

11 Appendix 5 - General Arboricultural Terms

Abrasion wound - Mechanical wound causing laceration of tissue by an abrasive impact episode, e.g. grazed by a motor vehicle or the continuous action of the rubbing of crossed branches or stems where no graft has formed.

Aerial inspection - Assessment of the crown of a tree by climbing within the crown or by the use of an elevating work platform, often to examine a particular defect, e.g. cavity or hollow.

Arboriculture - The science and culture of the growth, planning, management, care and maintenance of trees primarily for amenity and utility purposes.

Asymmetrical - Imbalance within a crown, where there is an uneven distribution of branches and the foliage crown or root plate around the vertical axis of the trunk. This may be due to crown form codominant or crown form suppressed as a result of natural restrictions, e.g. from buildings, or from competition for space and light with other trees, or from exposure to wind, or artificially caused by pruning for clearance of roads, buildings or power lines. An example of an expression of this may be, crown asymmetrical, bias to west.

Basal flare - Swelling at the root crown is usually uniform around the base of the trunk involving tissue from the trunk and root crown. Here first-order roots may not be evident at the root crown.

Basal trunk wound - A wound on the trunk extending to the root crown where the base of the wound is open at the ground and usually truncated. Dependent upon the width of its base, such a wound may not become occluded.

Bracing - Systems of cables and ropes, traditionally using metal wires but generally replaced by polypropylene, used to support and prolong the life of trees in part or full; systems are susceptible to failure due to evident weaknesses in branch unions. Examples of such proprietary systems are Cobra and Yale nylon webbing.

Bracket fungus - The rigid sporophore of some fungus species, especially those associated with live trees or the decay of wood. Structures comprised of hyphae for the dispersal of spores, often bracket-shaped, usually protruding from the roots, trunk or branches of a host tree when the fungus matures. The fruiting body may be ephemeral or persistent and may last for only one season or persist for many years, with the fruiting body growing incrementally larger and continuing to produce new spores. Such fruiting bodies may be solitary or gregarious.

Dormant Tree - Vigour presently indeterminable, assessment to take place at the time of leaf return.

Cavity - A void often localised initiated by a wound and subsequent decay within the trunk, branches or roots, or beneath the bark, and maybe enclosed or have one or more openings.

Deadwooding - Removing of dead branches by pruning. Such pruning may assist in the prevention of the spread of decay from dieback or for reasons of safety near an identifiable target.

Dead Tree - A tree that does not contain any live tissue, i.e., green leaves or live limbs.

Included bark - 1. The bark on the inner side of the branch union or is within a concave crotch that is unable to be lost from the tree and accumulates or is trapped by acutely divergent branches

Decay - Process of degradation of wood by micro-organisms and fungus.

Deciduous - A woody plant, e.g. tree, shrub or vine, that sheds all of its leaves in one season and enters a dormant period, usually during winter.

Defect - In relation to tree hazards, any feature of a tree which detracts from the uniform distribution of mechanical stress, or which makes the tree mechanically unsuited to its environment.

Dieback - The death of some areas of the crown. Symptoms are leaf drop, bare twigs, dead branches and tree death, respectively. This can be caused by root damage, root disease, bacterial or fungal canker, severe bark damage, intensive grazing by insects, abrupt changes in growth conditions, drought, water-logging or over-maturity. Dieback often implies reduced resistance, stress or decline which may be temporary. Dieback can be categorised as Low volume dieback, Medium volume dieback and High volume dieback.

Emergency removal - Tree removal as a matter of urgency due to its imminent potential to cause damage to people or property as a result of structural defects or modifications to its growing environment rendering it vulnerable to failure in full or part, e.g. a tree in adverse weather conditions suddenly developing a progressive lean and collapsing across a busy road.

End weight - Excessive formation of foliage concentrated at the distal end of a branch.

Epicormic shoots - Juvenile shoots produced at branches or trunk from epicormic strands in some Eucalypts (Burrows 2002, pp. 111–131) or sprouts produced from dormant or latent buds concealed beneath the bark in some trees. Production can be triggered by fire, pruning, wounding, or root damage but may also be as a result of stress or decline. Epicormic shoots can be categorised as low volume epicormic shoots, medium volume epicormic shoots and high volume epicormic shoots.

Epicormic stem - Branch derived from an epicormic shoot.

Flush cut - An incorrect cut that damages or removes the branch collar or branch bark ridge and, as a result, damages stem tissue.

Formative pruning - The pruning of young trees is usually to assist with the development of crown form and shape and to develop strong structure (Australian Standard 2007, p. 7). Such pruning may reduce developmental weaknesses, e.g. crossed branches, branches with branch bark inclusions, or to remove codominant first-order branches to extend the length of a trunk or to guide the crown form of a tree to a single first-order structural branch, or to encourage branching to make a crown shape excurrent or deliquescent, respectively.

Habitat Features - The habitat features described in this report are parts of the environment (living or non-living) that may provide native animals with food and shelter and sites for nesting, migration and social interaction.

forming a compression fork. 2. Growth of bark at the interface of two or more branches on the inner side of a branch union or in the crotch where each branch forms a branch collar, and the collars roll past one another without forming a graft where no one collar is able to subsume the other. The risk of failure is worsened where branching is acutely divergent or acutely convergent and ascending or erect.

Lightning strike wound - A wound from a lightning strike. Such a wound may kill a tree outright or cause it to catch fire or may destroy the tree in full or part, or no injury may be evident, and a tree gradually declines through resulting stress. Bark may be exploded from the tree by pressure radiating from the core of the lightning path resulting in further compounded damage through water heating and steam explosions in the tissues and the electrical disruption of living cells.

Mixed-age population - A population of trees that contains representatives of each age class, i.e., young, mature and over-mature, so that trees in the population will not all mature or become senescent at the same time. This is usually achieved by staggering planting and/or removal of trees in a systematic manner. This also spreads the cost of planting, maintenance and removal over time.

Mulch - Any organic or inorganic material placed over the soil or growing media near cultivated plants primarily to suppress weeds, modify soil temperature and retain soil moisture levels. This artificial process generally imitates the function of leaf litter in a forest environment.

Nesting hollow - A hollow or cavity within any part of a tree utilised as habitat or shelter for any part of the life cycle of Fauna, e.g., birds, reptiles or mammals.

Non-invasive root mapping - Any root mapping process that does not disturb or displace soil or growing media to locate roots, e.g. ground-penetrating radar.

Occlusion Growth - Processes where wound wood develops to enclose the wound face by the merging of wound margins concealing the wound and restoring the growing surface of the structure with each growth increment gradually realigning fibres in the wood longitudinally along the stem to maximise uniform stress loading.

Occupancy rating - The frequency of use of a likely target and the possibility that people will be present when tree failure or collapse occurs.

Pathogen - Any organism is causing disease, e.g. fungus, bacterium, mycoplasma, virus, virioid, nematode or protozoan.

Pruning - Removal of any branch or root, dead or alive, by severance across the stem, back to the intersection of another live stem to a swollen area at the intersection called a branch collar where such a structure exists, with a final cut at the outer edge of the collar leaving no stub, or to undamaged woody tissue for roots. Also, the severing of any part of a tree so as to cause a reduction of the air space occupied by the branches and foliage in the crown or roots in the root plate. Examples of pruning are dead wooding, crown lifting, formative pruning, reduction pruning, selective pruning, crown thinning, and remedial and restorative pruning (Australian Standards 2007, p. 6). Pruning should conform to

recognised standards, e.g. Australian Standard® AS 4373 'Pruning of Amenity Trees'. The following are not recognised as pruning: lop, lopping, top, topping, top lopping.

Pruning wound - A wound created by the act of pruning.

Radial trenching - A series of excavated trenches near to the trunk, usually between first-order roots, allowing space for the introduction of improved growing media. This process is designed to stimulate new root growth through reduced compaction, improved aeration and removal of contaminated soil.

Mitigations / Recommendations / Actions - A list of arboricultural and/or plant health care works that are aimed at maintaining or improving the tree's health, structural condition or form. Actions may also directly or indirectly reduce the risk potential of the tree, such as via the removal of a particular branch or the moving of infrastructure from under its canopy.

Resistance Drilling - A self-powered drilling device that operates a thin spade drill bit at a constant forward speed to record soundness of wood by measuring resistance to drilling that is plotted on graph paper or with an electronic unit that gives clear support in taking, documenting and evaluating measurements. Examples of such proprietary devices are the **IML-RESI PowerDrill® & Resistograph®**

Structural Root Zone (SRZ) - An zone which defines the structural root zone which is an area required for tree stability. The SRZ is located within the TPZ.

Tree Protection Zone (TPZ) - An exclusion area that allows for protection of canopy and roots. The radius of the TPZ is normally calculated for each tree by multiplying the DBH × 12. The minimum distance will be 2m and maximum 15m as stipulated in the Australian Standard 4970-2009 – Protection of trees on development sites.

Tree significance - Includes environmental, social or historical reasons why the tree is significant to the site. The tree may also be rare under cultivation or have a rare or localised natural distribution.

Ultrasonic tomography - Electronic devices that measure the transmissibility of ultrasound waves through a given section of a tree by detecting pulses through multiple sensors placed around a stem to indicate areas with the same density. An example of such a proprietary device is the Picus® Tomograph.

Visual tree assessment (VTA) - A visual inspection of a tree from the ground-based on the principle that, when a tree exhibits apparently superfluous material in its shape, this represents repair structures to rectify defects or to reinforce weak areas in accordance with the axiom of uniform stress. Such assessments should only be undertaken by suitably competent practitioners.

Weed species - Any plant species exotic or native that is known to spread by the production of viable progeny often in large numbers, outcompeting and disrupting existing vegetation, e.g. in gardens, parks or bushland. The species concerned may be introduced from outside its area of natural distribution to an area where there are few or no natural predators, or it may have an ability to spread due to changes in land use creating a favourable habitat.

Information Source - Draper, Danny B. Dictionary for Managing Trees in Urban Environments. CSIRO PUBLISHING. Kindle Edition.

12 Appendix 6 - STARS© Tree Retention Value Matrix

12.1 IACA Significance of a Tree, Assessment Rating System (STARS) (IACA 2010)©

- 12.1.1 In the development of this assessment rating system, the Institute of Australian Consulting Arboriculturists (IACA) acknowledges the contribution and original concept of the Footprint Green Tree Significance & Retention Value Matrix, developed by Footprint Green Pty Ltd in June 2001. The landscape significance of a tree is an essential criterion to establish the importance that a particular tree may have on a site. However, rating the significance of a tree becomes subjective and difficult to ascertain in a consistent and repetitive fashion due to assessor bias. It is, therefore, necessary to have a rating system utilising structured qualitative criteria to assist in determining the retention value for a tree. To assist this process, all definitions for terms used in the Tree Significance - Assessment Criteria and Tree Retention Value - Priority Matrix are taken from the IACA Dictionary for Managing Trees in Urban Environments 2009.
- 12.1.2 This rating system will assist in the planning processes for proposed works, above and below ground, where trees are to be retained on or adjacent to a development site. The system uses a scale of High, Medium and Low significance in the landscape. Once the landscape significance of an individual tree has been defined, the retention value can be determined.

Table 11. Tree Significance - Assessment Criteria

1. High Significance in landscape	2. Medium Significance in landscape	3. Low Significance in landscape
<p>The tree is in good condition and good vigour,</p> <p>The tree has a form typical for the species,</p> <p>The tree is a remnant or is a planted locally indigenous specimen and/or is rare or uncommon in the local area or of botanical interest or of substantial age,</p> <p>The tree is listed as a Heritage Item, Threatened Species or part of an Endangered ecological community or listed on Councils significant Tree Register,</p> <p>The tree is visually prominent and visible from a considerable distance when viewed from most directions within the landscape due to its size and scale and makes a positive contribution to the local amenity,</p> <p>The tree supports social and cultural sentiments or spiritual associations, reflected by the broader population or community group or has commemorative values,</p> <p>The tree's growth is unrestricted by above and below ground influences, supporting its ability to reach dimensions typical for the taxa in situ - the tree is appropriate to the site conditions.</p>	<p>The tree is in fair-good condition and good or low vigour,</p> <p>The tree has form typical or atypical of the species,</p> <p>The tree is a planted locally indigenous or a common species with its taxa commonly planted in the local area,</p> <p>The tree is visible from surrounding properties, although not visually prominent as partially obstructed by other vegetation or buildings when viewed from the street,</p> <p>The tree provides a fair contribution to the visual character and amenity of the local area,</p> <p>The tree's growth is moderately restricted by above or below ground influences, reducing its ability to reach dimensions typical for the taxa in situ.</p>	<p>The tree is in fair-poor condition and good or low vigour,</p> <p>The tree has form atypical of the species,</p> <p>The tree is not visible or is partly visible from surrounding properties as obstructed by other vegetation or buildings,</p> <p>The tree provides a minor contribution or has a negative impact on the visual character and amenity of the local area,</p> <p>The tree is a young specimen that may or may not have reached dimension to be protected by local Tree Preservation orders or similar protection mechanisms and can easily be replaced with a suitable specimen,</p> <p>The tree's growth is severely restricted by above or below ground influences, unlikely to reach dimensions typical for the taxa in situ - the tree is inappropriate to the site conditions,</p> <p>The tree is listed as exempt under the provisions of the local Council Tree Preservation Order or similar protection mechanisms,</p> <p>The tree has a wound or defect that has the potential to become structurally unsound.</p>
		<p>Environmental Pest / Noxious Weed Species</p> <p>The tree is an Environmental Pest Species due to its invasiveness or poisonous/ allergenic properties,</p> <p>The tree is a declared noxious weed by legislation.</p>
		<p>Hazardous/Irreversible Decline</p> <p>The tree is structurally unsound and/or unstable and is considered potentially dangerous,</p> <p>The tree is dead, or is in irreversible decline, or has the potential to fail or collapse in full or part in the immediate to short term.</p>

The tree is to have a minimum of three (3) criteria in a category to be classified in that group. Note: The assessment criteria are for individual trees only; however, they can be applied to a monocultural stand in its entirety

12.2 Tree Retention Value - Priority Matrix

Table 12. Tree Retention Value - Priority Matrix STARS (IACA 2010)©

		Landscape Significance Rating				
		High	Medium	Low		
		Significance in Landscape	Significance in Landscape	Significance in Landscape	Environmental Pest / Noxious Species	Hazardous / Irreversible Decline
Estimated Life Expectancy (Years)	Long >40 Years					
	Medium 15-40 Years					
	Short <1-15 Years					
	Dead					

Table 13. Legend for Matrix Assessment STARS (IACA 2010)©

	Priority for Retention (High) - These trees are considered important for retention and should be retained and protected. Design modification or relocation of buildings should be considered to accommodate the setbacks as prescribed by the Australian Standards AS4970 <i>Protection of trees on development sites</i> . Tree sensitive construction measures must be implemented, e.g. pier and beam etc, if works are to proceed within the Tree Protection Zone (TPZ).
	Consider for Retention (Medium) – These trees may be retained and protected. These are considered less critical; however, their retention should remain a priority with removal considered only if adversely affecting the proposed building/works and all other alternatives have been considered and exhausted.
	Consider for Removal (Low) – These trees are not considered important for retention, nor require special works or design modification to be implemented for their retention.
	Priority for Removal – These trees are considered hazardous or in irreversible decline or weeds and should be removed irrespective of development.

IACA, 2010, IACA Significance of a Tree, Assessment Rating System (STARS), Institute of Australian Consulting Arboriculturists, Australia, www.iaca.org.au



APPENDIX 4.4 CCBC APPROVAL FOR TREE REMOVAL AT WILEY PARK

APPROVAL FOR TREE REMOVAL AND TREE PRUNING

Date: 14 May 2021

Location: Urunga Parade, Wiley Park Station

Contractor: Downer

Approval for the removal of the three (3) council street trees identified in the Aboricultural Impact Assessment to facilitate the works required for the Sydney Metro project at the above location is approved subject to the following conditions:

Any trees removed will require replacement at councils standard rate of 3:1. The tree/s shall have a container size not less than 75 litres, shall comply with NATSPEC Specifying Trees: a guide to assessment of tree quality (2003) or Australian Standard AS 2303 – 2015 Tree stock for landscape use, and be planted and maintained in accordance with Councils street tree planting specifications Standard Drawing No. S-201.

The tree pruning and removal works are subject to the following conditions:

- All pruning and removal works must be carried out by a qualified arborist (minimum qualifications AQF Level 3 or equivalent);
- All pruning works shall comply with Australian Standard AS4373-2007 Pruning of amenity trees
- The tree pruning work must comply with the Amenity Tree Industry – Code of Practice, 1998 (Workcover, NSW) and the Guide to Managing Risks of Tree Trimming and Removal Work (Safe Work Australia 2016).
- The tree pruning contractor must hold a Public Liability Insurance Certificate of Currency with a minimum indemnity of \$20 million, together with a NSW Workers Compensation Insurance Certificate of Currency;
- All tree material shall be removed from site;
- The site must be maintained in a safe condition at all times;
- Appropriate hazard signage to be in place at all times during the tree pruning works.

Wayne Broomfield
Team Leader Open Space Services

APPENDIX 5 HURLSTONE PARK AIA (URBAN ARBOR)



Arboricultural Impact Assessment Report

Site location:

South West Metro
Hurlstone Park Station
Hurlstone Park NSW

Prepared for:

Metron T2M

Prepared by: Jack Williams and
Bryce Claassens

Urban Arbor Pty Ltd

Date: 26 February 2021

Ref: 210226-SWMHP-AIA

Rev: C

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Site Address: Hurlstone Park Station, Hurlstone Park, NSW.

Prepared for: Metron T2M.

Prepared by: Jack Williams & Bryce Claassens, Urban Arbor Pty Ltd, sales@urbanarbor.com.au, (02) 8004 2802.

Date of prepared: 26 February 2021. Rev: C.

SMCSWSWM-MTM-WHP-LA-REP-131000-C

1. INTRODUCTION

- 1.1 Urban Arbor have been instructed by Metron T2M to provide an Arboricultural Impact Assessment Report for trees located within the site and adjoining sites in relation to a proposed development.
- 1.2 Below is a list of all documents and information provided to Urban Arbor to assist in preparing this report.
 - A) Hurlstone Park Landscape Drawings, Metron T2M, Rev E, Including Sheet No: 6, 8, 9 and 10, 16 October 2020.
 - B) Civil Engineering Package No. 133, Metron T2M, Rev D, 158 Pages in total, 29 May 2020.
 - C) Hurlstone Park Station Service Building, Metron T2M, Rev C, 16 November 2020
- 1.3 The trees were inspected on 5 December 2019 and 17 December 2020. Access was available to the subject site and the adjoining public areas only. All tree data contained in this report was collected during these site inspections.

2. SCOPE OF THE REPORT

- 2.1 This report has been undertaken to meet the following objectives.
 - 2.1.1 Conduct a visual assessment of all significant trees located within 10 metres of development works from ground level. For the purpose of this report, a significant tree is a tree with a height equal to or greater than 5 metres.
 - 2.1.2 Determine the trees estimated contribution years and remaining, useful life expectancy and award the trees a retention value.
 - 2.1.3 Provide an assessment of the potential impact the proposed development is likely to cause to the condition of the subject trees in accordance with AS4970 Protection of trees on development sites (2009).
 - 2.1.4 Specify tree protection measures for trees to be retained in accordance with AS4970-2009.

3. LIMITATIONS

- 3.1 The observations and recommendations are based on the site inspections identified in the introduction (section 1) and the access available at the time of inspection. Findings of this report are based on the observations and site conditions at the time inspection.
- 3.2 All of the observations were carried out from ground level and none of the surrounding surfaces were lifted or removed during the inspection. No tests were carried out to the subject trees or surrounding area during the inspection.
- 3.3 Root decay can sometimes be present with no visual indication above ground. It is also impossible to know the extent of any root damage caused by mechanical damage such as underground root cutting during the installation of services without undertaking detailed root investigation. Any form of tree failure due to these activities is beyond the scope of this assessment.
- 3.4 The report reflects the subject tree(s) as found on the day of inspection. Any changes to the growing environment of the subject tree, or tree management works beyond those recommended in this report may alter the findings of the report. There is no warranty, expressed or implied, that problems or deficiencies relating to the subject tree, or subject site may not arise in the future.
- 3.5 Tree identification is based on accessible visual characteristics at the time of inspection. As key identifying features are not always available the accuracy of identification is not guaranteed. Where tree species is unknown, it is indicated with an *spp.*
- 3.6 All diagrams, plans and photographs included in this report are visual aids only, and are not to scale unless otherwise indicated.
- 3.7 Urban Arbor neither guarantees, nor is it responsible for, the accuracy of information provided by others that is contained within this report.
- 3.8 While an assessment of the subject trees estimated useful life expectancy is included in this report, no specific tree risk assessment has been undertaken for any of trees at the site.
- 3.9 The ultimate safety of any tree cannot be categorically guaranteed. Even trees apparently free of defects can collapse or partially collapse in extreme weather conditions. Trees are dynamic, biological entities subject to changes in their environment, the presence of pathogens and the effects of ageing. These factors reinforce the need for regular inspections. It is generally accepted that hazards can only be identified from distinct defects or from other failure-prone characteristics of a tree or its locality.
- 3.10 Alteration of this report invalidates the entire report.

4. METHODOLOGY

- 4.1 The following information was collected during the assessment of the subject tree(s).
- 4.1.1 Tree common name
 - 4.1.2 Tree botanical name
 - 4.1.3 Tree age class
 - 4.1.4 DBH (Trunk/Stem diameter at breast height/1.4m above ground level) - millimetres.
 - 4.1.5 Estimated height - metres
 - 4.1.6 Estimated crown spread (diameter of crown) - metres
 - 4.1.7 Health
 - 4.1.8 Structural condition
 - 4.1.9 Amenity value
 - 4.1.10 Estimated remaining contribution years (SULE)¹
 - 4.1.11 Retention value (Tree AZ)²
 - 4.1.12 Notes/comments
- 4.2 An assessment of the trees condition was made using the visual tree assessment (VTA) model (Mattheck & Breloer, 1994).³
- 4.3 Tree diameter was measured using a DBH tape or in some cases estimated. Tree height and tree canopy spread was measured with a clinometer or in some cases estimated. All other measurements were estimations unless otherwise stated. The other tools used during the assessment were a nylon mallet, compass, camera and a steel probe.
- 4.4 All information was imported into our computerised geographical information system (GIS) PT-mapper pro. This software was used to measure/calculate all encroachment estimates included in this report.
- 4.5 All DBH measurements, tree protection zones, and structural root zones were calculated in accordance with methods set out in AS4970 Protection of trees on development sites (2009) ⁴ and in some cases estimated. See appendices for information.
- 4.6 Details of how the observations in this report have been assessed are listed in the appendices.

¹ Barrell Tree Consultancy, *SULE: Its use and status into the New Millennium*, TreeAZ/03/2001, <http://www.treeaz.com/>.

² Barrell Tree Consultancy, *Tree AZ version 10.04-ANZ*, <http://www.treeaz.com/>.

³ Mattheck, C. & Breloer, H., *The body language of trees - A handbook for failure analysis*, The Stationary Office, London, England (2015).

⁴ Council Of Standards Australia, *AS4970 Protection of trees on development sites* (2009).

5. SITE LOCATION AND BRIEF DESCRIPTION

- 5.1 The site is located in the suburb of Hurlstone Park, New South Wales, which is located in the Canterbury Bankstown Local Government Area (LGA). All trees within the Canterbury Bankstown LGA are subject to protection under the Canterbury Local Environmental Plan (LEP) 2012⁵ and Development Control Plan (DCP) 2012.⁶ The site is identified as a heritage item (I124) in the LEP heritage maps.⁷

6. GENERAL INFORMATION IN RELATION TO PROTECTING TREES ON DEVELOPMENT SITES

- 6.1 **Tree protection zone (TPZ):** The TPZ is the principle means of protecting trees on development sites and is an area required to maintain the viability of trees during development. It is commonly observed that tree roots will extend significantly further than the indicative TPZ, however the TPZ is an area identified in AS4970-2009 to be the area where root loss or disturbance will generally impact the viability of the tree. The TPZ is identified as a restricted area to prevent damage to trees either above or below ground during a development. Where trees are intended to be retained proposed developments must provide an adequate TPZ around trees. The TPZ is set aside for the tree's root zone, trunk and crown and it is essential for the stability and longevity of the tree. The TPZ also incorporates the SRZ (see below for more information about the SRZ). The TPZ is calculated by multiplying the DBH by twelve, with the exception of palms, other monocots, cycads and tree ferns, the TPZ of which have been calculated at one metre outside the crown projection. Additional information about the TPZ is included in Appendix 3.
- 6.2 **Structural Root Zone (SRZ):** This is the area around the base of a tree required for the trees stability in the ground. An area larger than the SRZ always needs to be maintained to preserve a viable tree. The SRZ is calculated using the following formula; $(DAB \times 50)^{0.42} \times 0.64$. There are several factors that can vary the SRZ which include height, crown area, soil type and soil moisture. It can also be influenced by other factors such as natural or built structures. Generally, work within the SRZ should be avoided. Soil level changes should also generally be avoided inside the SRZ of trees to be retained. Palms, other monocots, cycads and tree ferns do not have an SRZ. See the appendices for more information about the SRZ.

⁵ Canterbury Local Environmental Plan 2012, <https://www.legislation.nsw.gov.au/#/view/EPI/2012/673>, accessed 21 December 2020.

⁶ Canterbury Development Control Plan 2012, <https://www.cbcity.nsw.gov.au/development/planning-control-policies/canterbury-development-control-plan-2012>, accessed 21 December 2020.

⁷ Canterbury Local Environmental Plan Heritage Map - Sheet HER_009, https://www.legislation.nsw.gov.au/maps/97a9d84a-cdcf-cf29-ae35-e3dc43c6dc7f/1550_COM_HER_009_010_20121105.pdf, 21 December 2020.

6.3 Minor encroachment into TPZ: Sometimes encroachment into the TPZ is unavoidable. Encroachment includes but is not limited to activities such as excavation, compacted fill and machine trenching. Minor encroachment of up to 10% of the overall TPZ area is normally considered acceptable, providing there is space adjacent to the TPZ for the tree to compensate and the tree is displaying adequate vigour/health to tolerate changes to its growing environment.

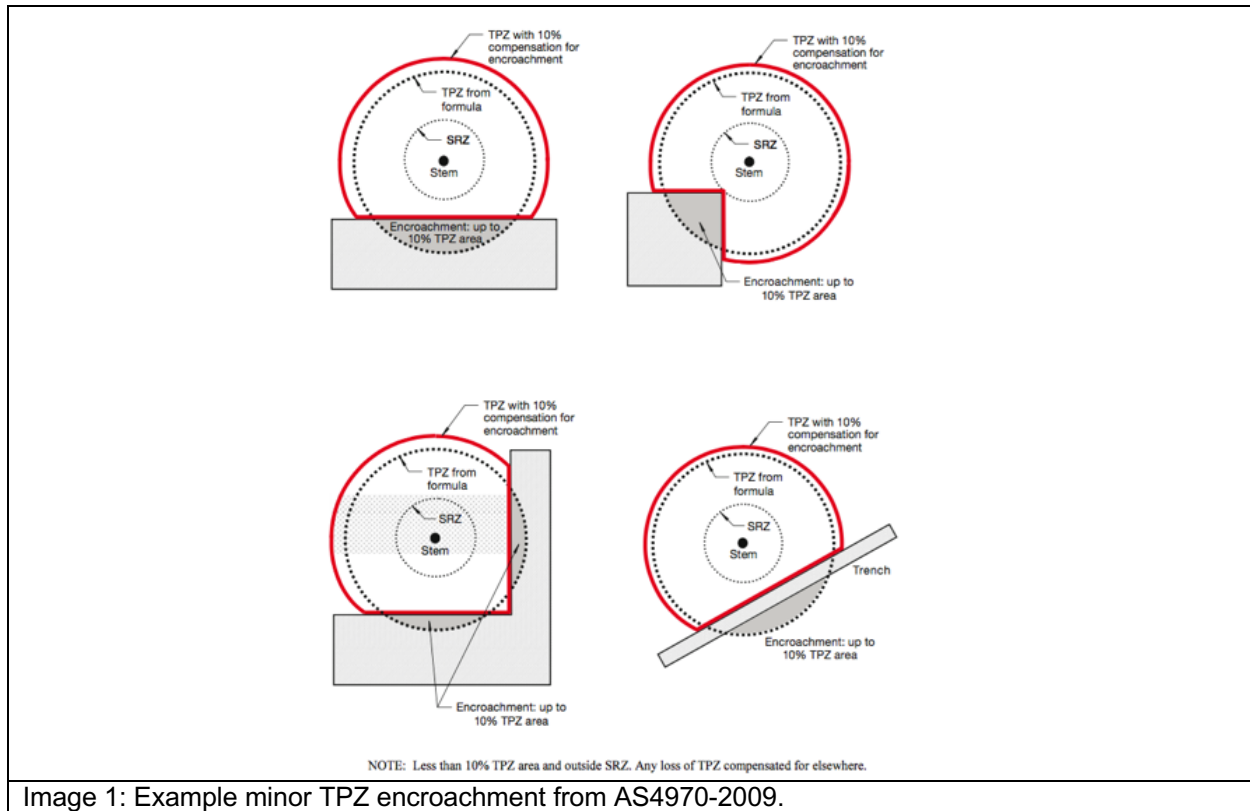


Image 1: Example minor TPZ encroachment from AS4970-2009.

6.4 Major encroachment into TPZ: Where encroachment of more than 10% of the overall TPZ area is proposed the project Arborist must investigate and demonstrate that the tree will remain in a viable condition. In some cases, tree sensitive construction methods such as pier and beam footings, suspended slabs, or cantilevered sections, can be utilised to allow additional encroachment into the TPZ by bridging over roots and minimising root disturbance. Major encroachment is only possible if it can be undertaken without severing significant size roots, or if it can be demonstrated that significant roots will not be impacted. Root investigations may be required to identify roots that will be impacted during major TPZ encroachment (see Appendix 3 for more information in relation to root investigations).

7. OBSERVATIONS

- 7.1 **Tree information:** Details of each individual tree assessed, including the observations taken during the site inspection can be found in the tree inspection schedule in Appendix 2, where the indicative tree protection zone (TPZ) for the subject trees has been calculated. The TPZ and SRZ should be measured in radius from the centre of the trunk. The subject trees have been awarded a retention value based on the observations during the site inspection. The system used to award the retention value is Tree AZ. Tree AZ is used to identify higher value trees worthy of being a constraint to development and lower value trees that should generally not be a constraint to the development. The Tree AZ categories sheet (Barrell Tree Consultancy) has been included in the appendices to assist with understanding the retention values. The retention value that has been allocated to the subject trees in this report is not definitive and should only be used as a guideline. This information has been summarised below.
- 7.2 **Site Plan:** Site plans has been included in Appendix 1, where the indicative TPZ and SRZ of the trees have been overlaid onto the received plan provided by the client. The following plan is included in Appendix 1;
- Appendix 1A: Proposed Site Plan East
 - Appendix 1B: Proposed Site Plan West

8. ASSESSMENT OF CONSTRUCTION IMPACTS

8.1 Table 1: In the table below, the impact of the proposed development has been assessed for all trees included in the report. The assessed TPZ encroachments include proposed structures and hard landscaping only. All soft landscaping should be completed in accordance with section 11.10.

Tree ID	Species	Retention value	TPZ radius (m)	TPZ area (m ²)	SRZ radius (m)	TPZ encroachment	Discussion/ Conclusion	Recommendation
166	<i>Morus nigra</i>	Z3	2.0	12.6	1.5	Footprint	The trunk is within the footprint of a proposed service building area.	Remove
167	<i>Morus nigra</i>	Z3	2.0	12.6	1.7	Footprint	The trunk is within the footprint of a proposed service building area.	Remove
168	<i>Ligustrum lucidum</i>	Z3	2.4	18.1	1.8	Major	A proposed fence will encroach significantly into the TPZ and SRZ of the tree. A combined service route (CSR) will also encroach into the TPZ and SRZ. To reduce the impact to the tree, the proposed fence and CSR must be installed in accordance with section 9.2 of this report.	Retain and protect*
169	<i>Ficus elastica</i>	Z1	2.0	12.6	1.6	Major	A proposed fence will encroach significantly into the TPZ and SRZ of the tree. A combined service route (CSR) will also encroach into the TPZ and SRZ. To reduce the impact to the tree, the proposed fence and CSR must be installed in accordance with section 9.2 of this report.	Retain and protect*
170	<i>Ilex spp</i>	Z1	2.0	12.6	1.5	Major	A proposed fence will encroach significantly into the TPZ and SRZ of the tree. A combined service route (CSR) will also encroach into the TPZ and SRZ. To reduce the impact to the tree, the proposed fence and CSR must be installed in accordance with section 9.2 of this report.	Retain and protect*
G3	<i>Ailanthus altissima</i>	Z3	2.0	12.6	1.5	Footprint	The trunk is within the footprint of a proposed service building area.	Remove
171	<i>Cinnamomum camphora</i>	A1	13.2	547.4	3.7	Footprint	The trunk is within the footprint of a proposed service building area.	Remove
G4	<i>Acmena smithii var. minor</i>	A1	2.2	15.2	1.6	Major	A proposed fence will encroach significantly into the TPZ and SRZ of the tree. To reduce the impact to the tree, the proposed fence must be installed in accordance with section 9.2.2 of this report.	Retain and protect*

Tree ID	Species	Retention value	TPZ radius (m)	TPZ area (m ²)	SRZ radius (m)	TPZ encroachment	Discussion/ Conclusion	Recommendation
172	<i>Ligustrum lucidum</i>	Z3	2.0	12.6	1.5	Footprint	The trunk is within the footprint of a proposed service building area.	Remove
173	<i>Ligustrum lucidum</i>	Z3	2.0	12.6	1.5	Footprint	The trunk is within the footprint of a proposed service building area.	Remove
174	<i>Celtis sinensis</i>	Z3	2.0	12.6	1.5	Footprint	The trunk is within the footprint of a proposed service building area.	Remove
175	<i>Ligustrum lucidum</i>	Z3	2.4	18.1	1.8	Footprint	The trunk is within the footprint of a proposed service building area.	Remove
176	<i>Ligustrum lucidum</i>	Z3	2.0	12.6	1.5	Footprint	The trunk is within the footprint of a proposed service building area.	Remove
177	<i>Ailanthus altissima</i>	Z3	2.0	12.6	N/A	Footprint	The trunk is within the footprint of a proposed service building area.	Remove
178	<i>Ailanthus altissima</i>	Z3	2.0	12.6	N/A	Footprint	The trunk is within the footprint of a proposed service building area.	Remove
179	<i>Cinnamomum camphora</i>	Z3	2.4	18.1	N/A	Footprint	The trunk is within the footprint of a proposed service building area.	Remove
180	<i>Eucalyptus saligna</i>	A1	6.6	136.8	N/A	Footprint	The trunk is within the footprint of a proposed service building area.	Remove
181	<i>Ligustrum lucidum</i>	Z3	2.0	12.6	1.5	Footprint	The trunk is within the footprint of a proposed service building area.	Remove
182	<i>Ligustrum lucidum</i>	Z3	2.0	12.6	1.6	Footprint	The trunk is within the footprint of a proposed service building area.	Remove
183	<i>Gleditsia triacanthos</i>	Z3	2.0	12.6	1.5	Footprint	The trunk is within the footprint of a proposed service building area.	Remove
184	<i>Robinia pseudoacacia</i>	Z3	2.6	21.2	1.8	Footprint	The trunk is within the footprint of a proposed service building area.	Remove

 Site Address: Hurlstone Park Station, Hurlstone Park, NSW.

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Tree ID	Species	Retention value	TPZ radius (m)	TPZ area (m ²)	SRZ radius (m)	TPZ encroachment	Discussion/ Conclusion	Recommendation
185	<i>Robinia pseudoacacia</i>	Z3	2.0	12.6	1.5	Footprint	The trunk is within the footprint of a proposed service building area.	Remove
186	<i>Robinia pseudoacacia</i>	Z3	2.5	19.6	2.0	Footprint	The trunk is within the footprint of a proposed service building area.	Remove
187	<i>Eucalyptus botryoides</i>	A1	7.7	186.3	2.8	Major	The proposed service building driveway will encroach into the TPZ by 20% (37.5m ²) but not into the SRZ. This is considered to be a major TPZ encroachment and the proposed works could potentially impact the condition of the tree. To reduce the impact to the tree, the proposed hard surfacing must be installed in accordance with section 9.2 of this report. A proposed fence and combined service route (CSR) will also encroach significantly into the TPZ and SRZ of the tree. To reduce the impact to the tree, the proposed fence and CSR must be installed in accordance with section 9.2 of this report.	Retain and protect*
188	<i>Callistemon salignus</i>	A1	4.8	72.4	2.3	Major	A proposed fence and combined service route (CSR) will encroach significantly into the TPZ and SRZ of the tree. To reduce the impact to the tree, the proposed fence and CSR must be installed in accordance with section 9.2 of this report. The proposed service building driveway will encroach into the TPZ by 9% (6.8m ²) but not into the SRZ. This is considered to be a major TPZ encroachment, in combination with the impacts from the fence and CSR. The proposed driveway could potentially impact the condition of the tree. To reduce the impact to the tree, the proposed hard surfacing must be installed in accordance with section 9.2 of this report.	Retain and protect*
189	<i>Ligustrum lucidum</i>	Z3	2.0	12.6	1.6	Footprint	The trunk is within the footprint of a proposed service building area.	Remove
190	<i>Robinia pseudoacacia</i>	Z3	2.0	12.6	1.6	Footprint	The trunk is within the footprint of a proposed service building area.	Remove
191	<i>Gleditsia triacanthos</i>	Z3	2.0	12.6	1.5	Footprint	The trunk is within the footprint of a proposed service building area.	Remove

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Tree ID	Species	Retention value	TPZ radius (m)	TPZ area (m ²)	SRZ radius (m)	TPZ encroachment	Discussion/ Conclusion	Recommendation
192	<i>Robinia pseudoacacia</i>	Z3	2.0	12.6	1.6	Footprint	The trunk is within the footprint of a proposed service building area.	Remove
193	<i>Robinia pseudoacacia</i>	Z3	2.1	13.9	1.7	Footprint	The trunk is within the footprint of a proposed service building area.	Remove
194	<i>Cinnamomum camphora</i>	A1	15.0	706.9	3.7	Footprint	The trunk is within the footprint of a proposed service building area.	Remove
195	<i>Robinia pseudoacacia</i>	Z3	2.0	12.6	1.5	Footprint	The trunk is within the footprint of a proposed service building area.	Remove
196	<i>Pittosporum undulatum</i>	A1	2.0	12.6	1.6	Footprint	The trunk is within the footprint of a proposed service building area.	Remove
197	<i>Cinnamomum camphora</i>	Z3	2.9	26.4	2.7	Footprint	The trunk is within the footprint of a proposed service building area.	Remove
198	<i>Jacaranda mimosifolia</i>	A1	5.9	109.4	2.5	Footprint	The trunk is within the footprint of a proposed service building driveway.	Remove
199	<i>Lophostemon confertus</i>	A1	6.1	116.9	2.6	Footprint	The trunk is within the footprint of a proposed service building driveway.	Remove
200	<i>Ligustrum lucidum</i>	Z3	2.1	13.9	1.8	Footprint	The trunk is within the footprint of a proposed service building area.	Remove
201	<i>Robinia pseudoacacia</i>	Z3	4.7	69.4	2.5	Footprint	The trunk is within the footprint of a proposed service building area.	Remove
202	<i>Robinia pseudoacacia</i>	Z3	2.2	15.2	1.7	Footprint	The trunk is within the footprint of a proposed service building area.	Remove
203	<i>Robinia pseudoacacia</i>	Z3	2.2	15.2	1.7	Footprint	The trunk is within the footprint of a proposed service building area.	Remove
204	<i>Robinia pseudoacacia</i>	Z3	3.0	28.3	1.9	Footprint	The trunk is within the footprint of a proposed service building area.	Remove

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Tree ID	Species	Retention value	TPZ radius (m)	TPZ area (m ²)	SRZ radius (m)	TPZ encroachment	Discussion/ Conclusion	Recommendation
205	<i>Robinia pseudoacacia</i>	Z3	3.4	36.3	2.1	Footprint	The trunk is within the footprint of a proposed service building area.	Remove
591	<i>Corymbia ficifolia</i>	A1	2.8	24.6	1.9	None	No encroachment into the TPZ.	Retain and protect
592	<i>Camellia japonica</i>	Z1	2.0	12.6	1.5	None	No encroachment into the TPZ.	Retain and protect
593	<i>Callistemon viminalis</i>	A1	3.0	28.3	2.0	None	No encroachment into the TPZ.	Retain and protect
594	<i>Callistemon viminalis</i>	A1	4.2	55.4	2.2	None	No encroachment into the TPZ.	Retain and protect

Notes

TPZ Encroachment Percentage: TPZ encroachment percentages are based on new structures and hard surfaces only. New soft landscaping, such as turf or amenity planting areas have not been included in the calculation for TPZ encroachment.

Retain and protect*: The proposed construction must be completed in accordance with section 9.2 to reduce the impact to the tree.

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9. CONCLUSIONS

9.1 **Table 2:** Summary of the impact to trees during the development;

Impact	Reason	Category A	Category Z	Total
		A	Z	
Trees to be removed	Building construction, new surfacing and/or proximity, or trees in poor condition.	171, 180, 194, 196, 198, 199 (Six trees)	166, 167, G3, 172, 173, 174, 175, 176, 177, 178, 179, 181, 182, 183, 184, 185, 186, 189, 190, 191, 192, 193, 195, 197, 200, 201, 202, 203, 204, 205 (Twenty-nine trees and one group of trees)	35 trees + 1 group of trees
Retained trees subject to TPZ encroachment greater than 10%	Removal of existing surfacing/structures and/or installation of new surfacing/structures.	187, 188, G4 (Two trees and one group of trees)	168, 169, 170 (Three trees)	5 trees + 1 group of trees
Retained trees subject to TPZ encroachment of 10% or less	Removal of existing surfacing/structures and/or installation of new surfacing/structures.	591, 593, 594 (Three trees)	592 (One tree)	4 trees

9.2 Construction Design/Specification Requirements: The proposed construction will encroach into the TPZ of trees 168, 169, 170, 187, 188 and G4 by more than 10%. To ensure the trees are not adversely impacted by the construction, it must be demonstrated the following design and construction specifications can be implemented within the TPZ of the trees. If the construction cannot be completed in accordance with these specifications, the trees may not be viable for retention.

9.2.1 Tree Sensitive Hard Surfacing Construction – tree 187 and 188: To retain the trees in a viable condition, the hard surfacing must be constructed in a tree sensitive method. The hard surfacing should be constructed above existing grades in the TPZ of the trees. The diagram below (Image A) gives an example of a no-excavation method for constructing hard surfacing close to trees. The location of retaining pegs should be flexible, avoiding damage to structural roots.

If excavations are essential, they must not exceed 100mm below the existing grades. The excavations should be supervised by a project Arborist with a minimum AQF level 5 qualification. All excavations for the hard surfacing should be carried out manually to avoid impacting retained tree roots. All tree roots greater than 40mm in diameter should be retained, unless the project arborist has assessed and advised that the pruning/severing of the root will not impact the condition or stability of the tree. Manual excavation may include the use of pneumatic and hydraulic tools, high-pressure air or a combination of high-pressure water and a vacuum device.

Where tree roots greater than 40mm are encountered that must be retained, the hard surfacing should be elevated over the individual tree root to allow for its retention. Examples of methods that can be used to bridge individual tree roots have been included below (Image B and C). Using pier and beam bridges as per image C is the recommended/preferred method, as it will allow for future growth of the tree roots, reducing future damage to the surfacing from the roots.

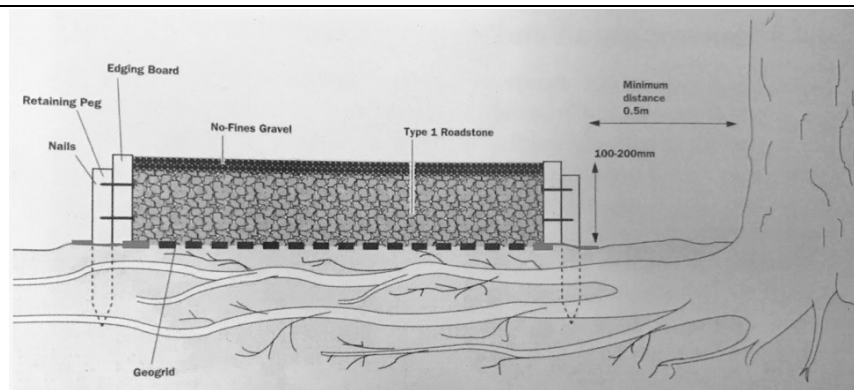


Image A: An image from 'Tree Roots in the Built Environment'⁸, showing how to construct hard surfacing above a trees root system without excavation. Type 1 Roadstones are an example of blue metal or crushed sandstone.

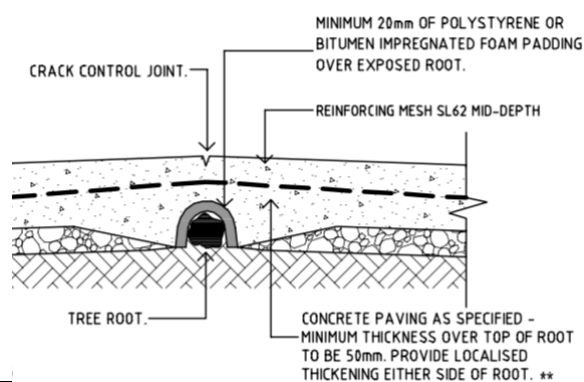


Image B: Example method for bridging concrete surfacing over tree roots provided in the Canterbury Bankstown Council standard drawings.⁹

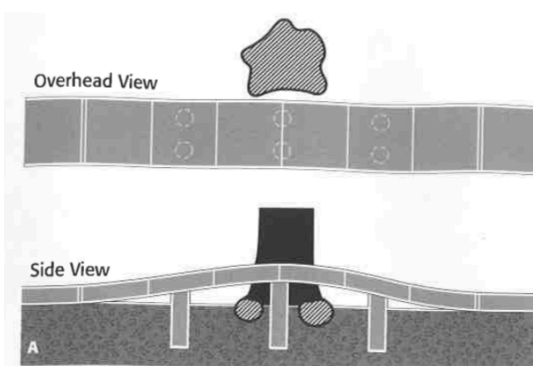


Image C: Example method from Reducing infrastructure damage by tree roots: A compendium of strategies.¹⁰

⁸ Roberts, J., Jackson, N., & Smith, M., *Tree Roots in the Built Environment*, The Stationary Office, London, England (2006). Page 305 & 306.

⁹ Canterbury Bankstown Council standard drawing S-209 Existing street tree treatments, <https://www.cbcity.nsw.gov.au/development/planning-control-policies/council-standard-drawings>, accessed 3 October 2019.

¹⁰ Costello, L. R., & Jones, K. S., *Reducing infrastructure damage by tree roots: A compendium of strategies*, Western Chapter of the International Society of Arboriculture, 31883 Success Valley Drive, Porterville, CA (2003), page 27.

- 9.2.2 Fencing– tree 168, 169, 170, 187, 188 and G4:** The proposed fencing will be installed using the tree sensitive method of post and rail type construction. To ensure the trees are not significantly impacted by the works, all post holes within the TPZ must be excavated manually. The post location must be flexible to avoid the severance of significant roots 40mm and greater in diameter. No posts are to be located within the SRZ or root investigations will be required to determine the post location. See Appendix 3 for more information in regards to root investigations. All rails/horizontal materials are to be located on or above existing soil grades. This will allow for the majority of the root system to be retained between the posts, minimising root loss.
- 9.2.3 CSR – tree 168, 169, 170, 187, 188 and G4:** The proposed CSR will be installed using the tree sensitive method of post and rail type construction. To ensure the trees are not significantly impacted by the works, all post holes within the TPZ must be excavated manually. The post location must be flexible to avoid the severance of significant roots 40mm and greater in diameter. No posts are to be located within the SRZ or root investigations will be required to determine the post location. See Appendix 3 for more information in regards to root investigations. All rails/horizontal materials are to be located on or above existing soil grades. This will allow for the majority of the root system to be retained between the posts, minimising root loss.

10. RECOMMENDATIONS

- 10.1 This report assesses the impact of a proposed development at the subject site to forty-four (44) trees and two groups of trees located within the site and adjoining sites, in accordance with AS4970 Protection of trees on development sites (2009).
- 10.2 Two site plans have been included in Appendix 1, where the indicative TPZ and SRZ of the trees have been overlaid onto the received plans provided by the client. The following plans are included in Appendix 1;
 - Appendix 1A - Proposed Site Plan East
 - Appendix 1B - Proposed Site Plan West
- 10.3 Thirty-five (35) trees and one (1) group have been recommended for removal to accommodate the development works, including tree 166, 167, G3, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204 and 205. Tree 171, 180, 194, 196, 198 and 199 are higher value category value trees. All other trees to be removed are lower value category Z retention value trees.
- 10.4 Five (5) trees and one (1) group will be subject to a TPZ encroachment greater than 10% from the proposed construction, including tree to 168, 169, 170, 187, 188 and G4. To reduce the impact to the trees, the proposed construction within the TPZ of the trees must be completed in accordance with section 9.2 of this report.
- 10.5 The remaining four (4) trees will be subject to minor and acceptable TPZ encroachments of 10% or less and can be retained in a viable condition, including tree 591, 592, 593 and 594.
- 10.6 All trees to be retained must be protected for the duration of development, (including demolition and landscaping, in accordance with AS4970-2009). See section 11 for more information.
- 10.7 See section 11.10 for general landscape guidance when working within the TPZ of trees to be retained.
- 10.8 Where possible underground services must be located outside the TPZ of trees to be retained. All underground services located inside the TPZ of any tree to be retained must be installed via tree sensitive techniques. This should include either directional drilling methods or manual excavations to minimise the impact to trees identified for retention.
- 10.9 This report does not provide approval for tree removal or pruning works. All recommendations in this report are subject to approval by the relevant authorities and/or tree owners. This report should be submitted as supporting evidence with any tree removal/pruning or development application.

11. TREE PROTECTION REQUIREMENTS

- 11.1 Use of this report:** All contractors must be made aware of the tree protection requirements prior to commencing works at the site. This report and a copy of the site plan (Appendix 1) drawings must also be made available to any contractor prior to works commencing and during any on site operations.
- 11.2 Project Arborist:** Prior to any works commencing at the site a project Arborist should be appointed. The project Arborist should be qualified to a minimum AQF level 5 and/or equivalent qualifications and experience, and should assist with any development issues relating to trees that may arise. If at any time it is not feasible to carryout works in accordance with this, an alternative must be agreed in writing with the project Arborist.
- 11.3 Tree work:** All tree work must be carried out by a qualified and experienced Arborist with a minimum of AQF level 3 in arboriculture, in accordance with NSW Work Cover Code of Practice for the Amenity Tree Industry (1998) and AS4373 Pruning of amenity trees (2007).
- 11.4 Initial site meeting/on-going regular inspections:** The project Arborist is to hold a pre-construction site meeting with principle contractor to discuss methods and importance of tree protection measures and resolve any issues in relation to tree protection that may arise. In accordance with AS4970-2009, the project Arborist should carryout regular site inspections to ensure works are carried out in accordance with this document throughout the development process. Site inspections are recommended on a one-month frequency.
- 11.5 Site Specific Tree Protection Recommendations:** The table below provides recommendations for each tree, including site specific tree protection requirements. All trees to be retained must be protected in accordance with general requirements of AS4970-2009 for the duration of the development, details of which are discussed in further details in this section of the report.

Tree ID	Tree Species	TPZ Radius (m)	SRZ Radius (m)	Recommendations
166	<i>Morus nigra</i>	2.0	1.5	Remove.
167	<i>Morus nigra</i>	2.0	1.7	Remove.
168	<i>Ligustrum lucidum</i>	2.4	1.8	Retain and protect. Tree protection fencing is to create a combined exclusion zone for tree 168, 169, 170 and G4. The fencing is to run along the TPZ perimeter within the site and is to be set back from the proposed construction by 1m. TPZ signage is required on the fencing. Mulch is required within the fenced area.
169	<i>Ficus elastica</i>	2.0	1.6	Retain and protect. See tree protection recommendations for tree 168.
170	<i>Ilex spp</i>	2.0	1.5	Retain and protect. See tree protection recommendations for tree 168.
G3	<i>Ailanthus altissima</i>	2.0	1.5	Remove.

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171	<i>Cinnamomum camphora</i>	13.2	3.7	Remove.
G4	<i>Acmena smithii</i> var. <i>minor</i>	2.2	1.6	Retain and protect. See tree protection recommendations for tree 168.
172	<i>Ligustrum lucidum</i>	2.0	1.5	Remove.
173	<i>Ligustrum lucidum</i>	2.0	1.5	Remove.
174	<i>Celtis sinensis</i>	2.0	1.5	Remove.
175	<i>Ligustrum lucidum</i>	2.4	1.8	Remove.
176	<i>Ligustrum lucidum</i>	2.0	1.5	Remove.
177	<i>Ailanthus altissima</i>	2.0	N/A	Remove.
178	<i>Ailanthus altissima</i>	2.0	N/A	Remove.
179	<i>Cinnamomum camphora</i>	2.4	N/A	Remove.
180	<i>Eucalyptus saligna</i>	6.6	N/A	Remove.
181	<i>Ligustrum lucidum</i>	2.0	1.5	Remove.
182	<i>Ligustrum lucidum</i>	2.0	1.6	Remove.
183	<i>Gleditsia triacanthos</i>	2.0	1.5	Remove.
184	<i>Robinia pseudoacacia</i>	2.6	1.8	Remove.
185	<i>Robinia pseudoacacia</i>	2.0	1.5	Remove.
186	<i>Robinia pseudoacacia</i>	2.5	2.0	Remove.
187	<i>Eucalyptus botryoides</i>	7.7	2.8	Retain and protect. Tree protection fencing is to create a combined exclusion zone for tree 187 and 188. The fencing is to encompass as much of the TPZ area as practical and is to be set back from the proposed construction by 1m. TPZ signage is required on the fencing. Mulch is required within the fenced area.
188	<i>Callistemon salignus</i>	4.8	2.3	Retain and protect. See tree protection recommendations for tree 187.
189	<i>Ligustrum lucidum</i>	2.0	1.6	Remove.
190	<i>Robinia pseudoacacia</i>	2.0	1.6	Remove.
191	<i>Gleditsia triacanthos</i>	2.0	1.5	Remove.
192	<i>Robinia pseudoacacia</i>	2.0	1.6	Remove.
193	<i>Robinia pseudoacacia</i>	2.1	1.7	Remove.
194	<i>Cinnamomum camphora</i>	15.0	3.7	Remove.
195	<i>Robinia pseudoacacia</i>	2.0	1.5	Remove.
196	<i>Pittosporum undulatum</i>	2.0	1.6	Remove.
197	<i>Cinnamomum camphora</i>	2.9	2.7	Remove.
198	<i>Jacaranda mimosifolia</i>	5.9	2.5	Remove.
199	<i>Lophostemon confertus</i>	6.1	2.6	Remove.

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200	<i>Ligustrum lucidum</i>	2.1	1.8	Remove.
201	<i>Robinia pseudoacacia</i>	4.7	2.5	Remove.
202	<i>Robinia pseudoacacia</i>	2.2	1.7	Remove.
203	<i>Robinia pseudoacacia</i>	2.2	1.7	Remove.
204	<i>Robinia pseudoacacia</i>	3.0	1.9	Remove.
205	<i>Robinia pseudoacacia</i>	3.4	2.1	Remove.
591	<i>Corymbia ficifolia</i>	2.8	1.9	Retain and protect. Tree protection fencing is to create a combined exclusion zone for tree 591 and 592. The fencing is to encompass as much of the TPZ area as practical. TPZ signage is required on the fencing. Mulch is required within the fenced area.
592	<i>Camellia japonica</i>	2.0	1.5	Retain and protect. See tree protection recommendations for tree 591.
593	<i>Callistemon viminalis</i>	3.0	2.0	Retain and protect. Tree protection fencing is to create a combined exclusion zone for tree 593 and 594. The fencing is to encompass as much of the TPZ area as practical. TPZ signage is required on the fencing. Mulch is required within the fenced area.
594	<i>Callistemon viminalis</i>	4.2	2.2	Retain and protect. See tree protection recommendations for tree 593.

11.6 Tree protection Specifications: It is the responsibility of the principle contractor to install tree protection prior to works commencing at the site (prior to demolition works) and to ensure that the tree protection remains in adequate condition for the duration of the development. The tree protection must not be moved without prior agreement of the project Arborist. The project Arborist must inspect that the tree protection has been installed in accordance with this document and AS4970-2009 prior to works commencing.

11.6.1 Protective fencing: Site specific tree protection requirements are in section 11.5. Where it is not feasible to install fencing at the specified location due to factors such as restricting access to areas of the site or for constructing new structures, an alternative location and protection specification must be agreed with the project Arborist. Where the installation of fencing is unfeasible due to restrictions on space, trunk and branch protection will be required (see below). The protective fencing must be constructed of 1.8 metre 'cyclone chainmesh fence'. The fencing must only be removed for the landscaping phase and must be authorised by the project Arborist. Any modifications to the fencing locations must be approved by the project Arborist.

11.6.2 TPZ signage: Tree protection signage is to be attached to the protective fencing, displayed in a prominent position and the sign repeated at 10 metres intervals or closer where the fence changes direction. Each sign shall contain in a clearly legible form, the following information:

- Tree protection zone/No access.

Site Address: Hurlstone Park Station, Hurlstone Park, NSW.

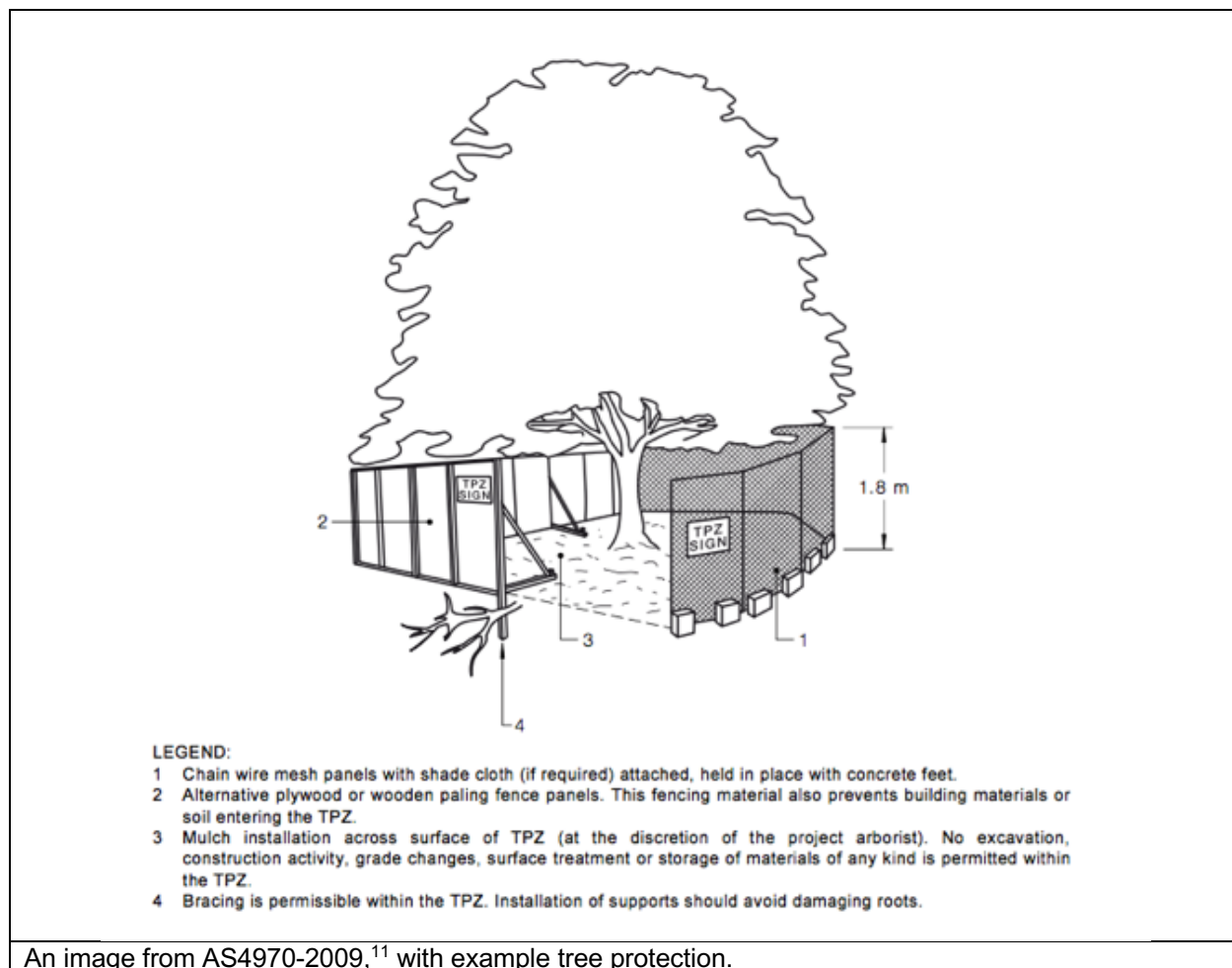
Prepared for: Metron T2M.

Prepared by: Jack Williams & Bryce Claassens, Urban Arbor Pty Ltd, sales@urbanarbor.com.au, (02) 8004 2802.

Date of prepared: 26 February 2021. Rev: C.

- This fence has been installed to prevent damage to the tree/s and their growing environment both above and below ground. Do not move fencing or enter TPZ without the agreement of the project Arborist.
- The name, address, and telephone number of the developer/builder and project Arborist

- 11.6.3 Trunk and Branch Protection: The trunk must be protected by wrapped hessian or similar material to limit damage. Timber planks (50mm x 100mm or similar) should then be placed around tree trunk. The timber planks should be spaced at 100mm intervals, and must be fixed against the trunk with tie wire, or strapping and connections finished or covered to protect pedestrians from injury. The hessian and timber planks must not be fixed to the tree in any instance. The trunk and branch protection shall be installed prior to any work commencing on site and shall be maintained in good condition for the entire development period.
- 11.6.4 Mulch: Any areas of the TPZ located inside the subject site (only trees to be retained directly adjacent to site works must be mulched to a depth of 75mm with good quality composted wood chip/leaf mulch.
- 11.6.5 Ground Protection: Ground protection is required to protect the underlying soil structure and root system in areas where it is not practical to restrict access to whole TPZ, while allowing space for construction. Ground protection must consist of good quality composted wood chip/leaf mulch to a depth of between 150-300mm, laid on top of geo textile fabric. If vehicles are to be using the area, additional protection will be required such as rumble boards or track mats to spread the weight of the vehicle and avoid load points. Ground protection is to be specified by the project Arborist as required.
- 11.6.6 Temporary irrigation: Temporary irrigation should be set up in the TPZ of all trees to be retained, and should distribute water evenly throughout the area of the TPZ. The irrigation should be used for at minimum one hour daily throughout all stages of the development.



An image from AS4970-2009,¹¹ with example tree protection.

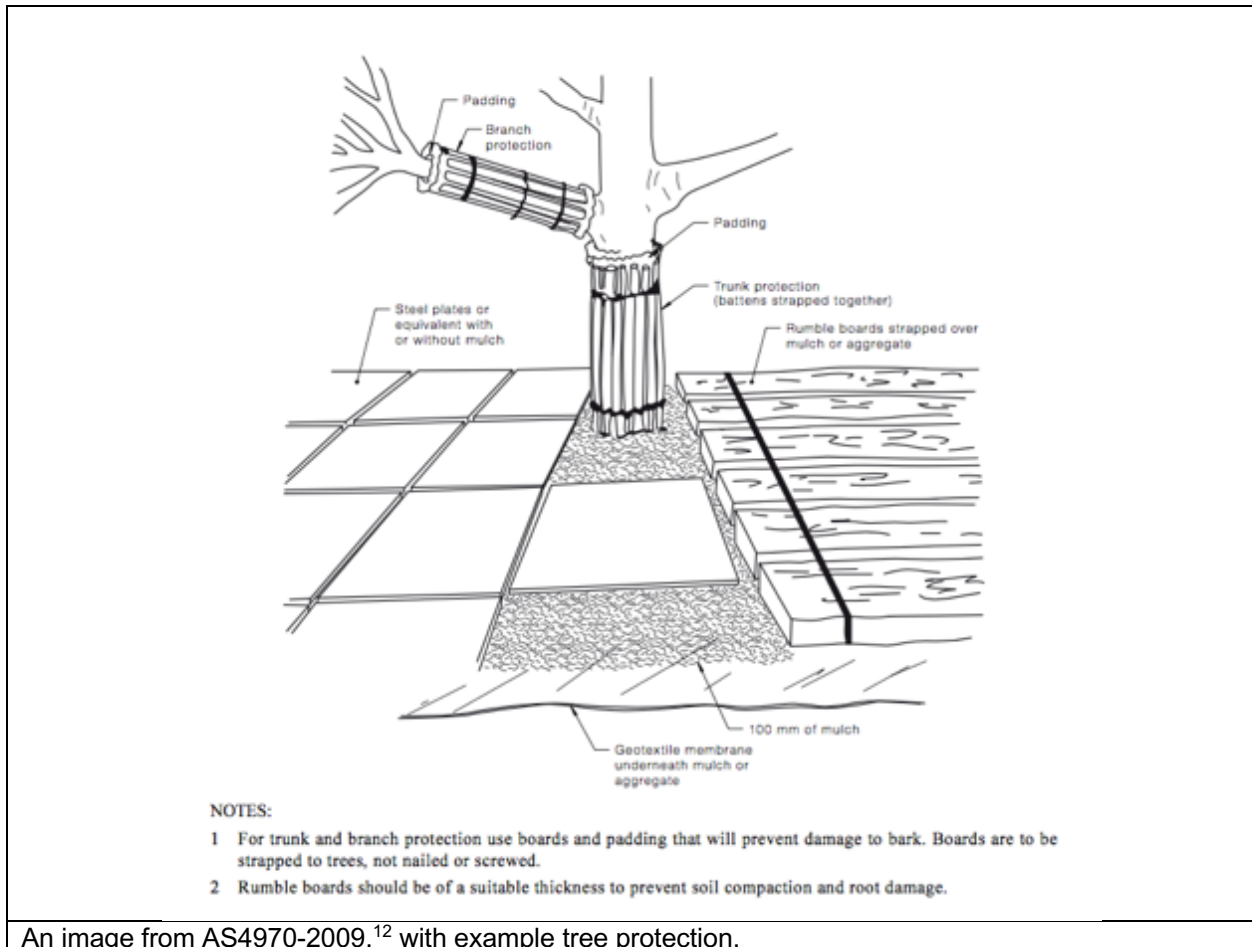
¹¹ Council Of Standards Australia, *AS4970 Protection of trees on development sites* (2009), page 16.

Site Address: Hurlstone Park Station, Hurlstone Park, NSW.

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Date of prepared: 26 February 2021. Rev: C.



An image from AS4970-2009,¹² with example tree protection.

11.7 Restricted activities inside TPZ: The following activities must be avoided inside the TPZ of all trees to be retained unless approved by the project Arborist. If at any time these activities cannot be avoided an alternative must be agreed in writing with the project Arborist to minimise the impact to the tree.

- A) Machine excavation.
- B) Ripping or cultivation of soil.
- C) Storage of spoil, soil or any such materials
- D) Preparation of chemicals, including preparation of cement products.
- E) Refuelling.
- F) Dumping of waste.
- G) Wash down and cleaning of equipment.
- H) Placement of fill.
- I) Lighting of fires.
- J) Soil level changes.
- K) Any physical damage to the crown, trunk, or root system.
- L) Parking of vehicles.

¹² Council Of Standards Australia, *AS4970 Protection of trees on development sites* (2009), page 17.

- 11.8 Demolition:** The demolition of all existing structures inside or directly adjacent to the TPZ of trees to be retained must be undertaken in consultation with the project Arborist. Any machinery is to work from inside the footprint of the existing structures or outside the TPZ, reaching in to minimise soil disturbance and compaction. If it is not feasible to locate demolition machinery outside the TPZ of trees to be retained, ground protection will be required. The demolition should be undertaken inwards into the footprint of the existing structures, sometimes referred to as the 'top down, pull back' method.
- 11.9 Excavations:** The project Arborist must supervise and certify that all excavations and root pruning are in accordance with AS4373-2007 and AS4970-2009. For continuous strip footings, first manual excavation is required along the edge of the structures closest to the subject trees. Manual excavation should be a depth of 1 metre (or to unfavourable root growth conditions such as bed rock or heavy clay, if agreed by project Arborist). Next roots must be pruned back in accordance with AS4373-2007. After all root pruning is completed, machine excavation is permitted within the footprint of the structure. For tree sensitive footings, such as pier and beam, all excavations inside the TPZ must be manual. Manual excavation may include the use of pneumatic and hydraulic tools, high-pressure air or a combination of high-pressure water and a vacuum device. No pruning of roots greater 30mm in diameter is to be carried out without approval of the project arborist. All pruning of roots greater than 30mm in diameter must be carried out by a qualified Arborist/Horticulturalist with a minimum AQF level 3. Root pruning is to be a clean cut with a sharp tool in accordance with AS4373 Pruning of amenity trees (2007).¹³ The tree root is to be pruned back to a branch root if possible. Make a clean cut and leave as small a wound as possible.
- 11.10 Landscaping:** All landscaping works within the TPZ of trees to be retained are to be undertaken in consultation with a consulting Arborist to minimize the impact to trees. General guidance is provided below to minimise the impact of new landscaping to trees to be retained.
- Level changes should be minimised. The existing ground levels within the landscape areas should not be lowered by more than 100mm or increased by more than 100mm (300mm increase is acceptable if using a coarse free draining material) without assessment by a consulting Arborist.
 - New retaining walls should be avoided. Where new retaining walls are proposed inside the TPZ of trees to be retained, they should be constructed from tree sensitive material, such as timber sleepers, that require minimal footings/excavations. If brick retaining walls are proposed inside the TPZ, considerer pier and beam type footings to bridge significant roots that are critical to the trees condition. Retaining walls must be located outside the SRZ and sleepers/beams located above existing soil grades.

¹³ Council Of Standards Australia, AS 4373 *Pruning of amenity trees* (2007) page 18

- New footpaths and hard surfaces should be minimised, as they can limit the availability of water, nutrients and air to the trees root system. Where they are proposed, they should be constructed on or above existing soil grades to minimise root disturbance and consider using a permeable surface. Footpaths should be located outside the SRZ where possible.
- Where fill/sub base is used inside the TPZ, fill material should be a coarse granular material that does not restrict the flow of water and air to the root system below. This type of material will also reduce the impact of soil compaction during construction.
- The location of new plantings inside the TPZ of trees to be retained should be flexible to avoid unnecessary damage to tree roots greater than 30mm in diameter.

11.11 Sediment and Contamination: All contamination run off from the development such as but not limited to concrete, sediment and toxic wastes must be prevented from entering the TPZ at all times.

11.12 Tree Wounding/Injury: Any wounding or injury that occurs to a tree during the construction process will require the project Arborist to be contacted for an assessment of the injury and provide mitigation/remediation advice. It is generally accepted that trees may take many years to decline and eventually die from root damage. All repair work is to be carried out by the project Arborist, at the contractor's expense.

11.13 Completion of Development Works: After all construction works are complete the project Arborist should assess that the subject trees have been retained in the same condition and vigour. If changes to condition are identified the project Arborist should provide recommendations for remediation.

12. CONSTRUCTION HOLD POINTS FOR TREE PROTECTION

12.1 Hold Points: Below is a sequence of hold points requiring project Arborist certification throughout the development process. It provides a list of hold points that must be checked and certified. All certification must be provided in written format upon completion of the development. The final certification must include details of any instructions for remediation undertaken during the development. The principle contractor should be responsible for implementing all tree protection requirements.

Hold Point	Stage	Date Completed and Signature of Project Arborist Responsible
Project Arborist to hold pre construction site meeting with principal contractor to discuss methods and importance of tree protection measures and resolve any issues in relation to feasibility of tree protection requirements that may arise. Project Arborist to mark all trees approved for removal under DA consent.	Prior to development work commencing	
Project Arborist to assess and certify that tree protection has been installed in accordance with AS4970-2009 prior to works commencing at site.	Prior to development work commencing.	
In accordance with AS4970-2009 the project arborist should carryout regular site inspections to ensure works are carried out in accordance with the recommendations. Site inspections are recommended on a monthly frequency.	On-going throughout the development	
The removal of existing structures inside the TPZ of any tree to be retained, such as the existing buildings and hard surfaces must be supervised by the project Arborist.	Demolition	
Project Arborist to supervise all manual excavations and root pruning inside the TPZ of any tree to be retained. Project Arborist to approve all pruning of roots greater than 30mm inside TPZ. All root pruning of roots greater than 30mm in diameter must be carried out by a qualified Arborist/Horticulturalist with a minimum AQF level 3.	Construction	
Project Arborist to certify that all underground services including storm water inside TPZ of any tree to be retained have been installed in accordance with AS4970-2009.	Construction	
All landscaping works within the TPZ of trees to be retained are to be undertaken in consultation with the project Arborist to minimise the impact to trees.	Construction/ Landscape	
After all demolition, construction and landscaping works are complete the project Arborist should assess that the subject trees have been retained in the same condition and vigour. If changes to condition are identified the project Arborist should provide recommendations for remediation.	Upon completion of development	

Site Address: Hurlstone Park Station, Hurlstone Park, NSW.

Prepared for: Metron T2M.

Prepared by: Jack Williams & Bryce Claassens, Urban Arbor Pty Ltd, sales@urbanarbor.com.au, (02) 8004 2802.

Date of prepared: 26 February 2021. Rev: C.

13. BIBLIOGRAPHY/REFERENCES

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14. LIST OF APPENDICES

The following are included in the appendices:

Appendix 1A: Proposed Site Plan East

Appendix 1B: Proposed Site Plan West

Appendix 2 - Tree Inspection Schedule

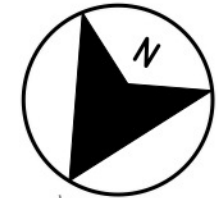
Appendix 3 - Further information of methodology



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ISA Member No. 228863
Quantified Tree Risk Assessment (QTRA)
ISA Tree Risk Assessment Qualification (TRAQ)



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Member Arboriculture Australia
QTRA
TRAQ



TO SYDNEY

TO BANKSTOWN

LEGEND

EXISTING

RAILCORP PROPERTY BOUNDARY

EXISTING TREES TO BE RETAINED

EXISTING PLANTING TO BE RETAINED

PROPOSED

FENCE/WALLS

EXISTING PEDESTRIAN FENCE TO BE REPAIRED AND PAINTED

2.4m HIGH SECURITY FENCE REFER TO FENCING PACKAGE

SEGREGATION FENCE REFER TO FENCING PACKAGE

CHAIN MESH FENCE

THROW SCREEN REFER TO URBAN DESIGN PACKAGE 131800

PLANTING

PROPOSED TREES

MASS PLANTING

PAVING

TGSIS REFER TO ARCHITECTURAL PACKAGE (TGS-1)

FURNITURE

ST-1 SEAT AS PER MATERIAL SCHEDULE

BH-1 - BIKE HOOPS

BOL-1 - BOLLARD

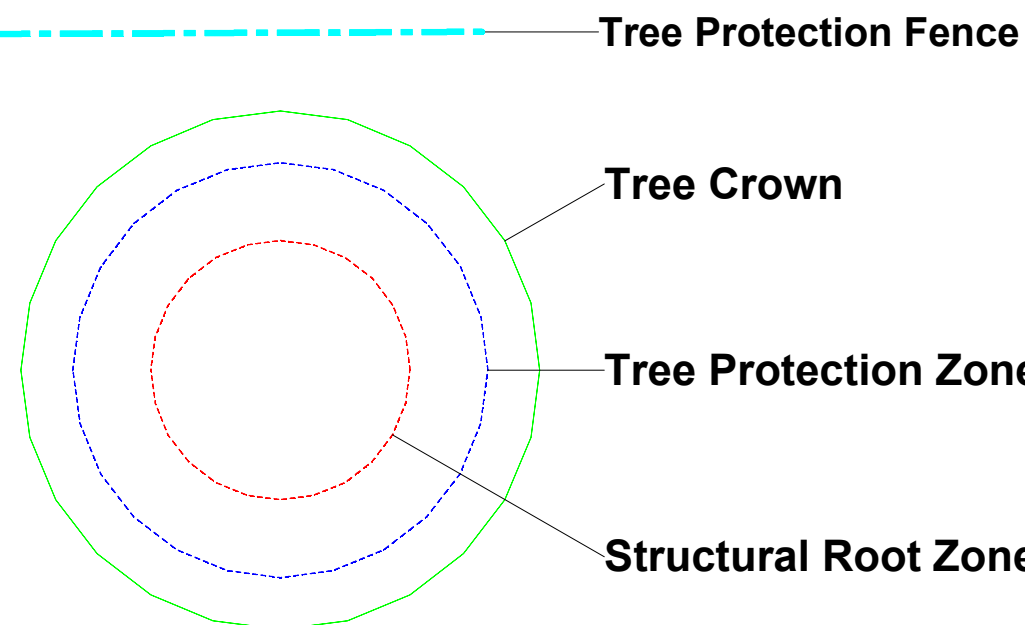
BIN-1 RELOCATED BIN

DF-1 DRINKING FOUNTAIN

NOTE:

- REFER TO CIVIL DESIGN PACKAGE 133 FOR ALL FOOTPATH LEVELS.
- REFER TO FENCING PACKAGE 133 FOR ALL FENCING SET OUT AND LOCATIONS.
- REFER TO UTILITIES PACKAGE 133 FOR ALL SERVICES LAYOUTS.
- REFER TO DRAINAGE PACKAGE 133 FOR ALL DRAINAGE DETAILS
- REFER TO ARCHITECTURAL 131 PACKAGE FOR ALL STATION CONCOURSE, BUILDING AND PLATFORM WORKS.
- REFER TO LIGHTING PACKAGE 133 FOR ALL ELECTRICAL AND LIGHTING LAYOUTS.
- REFER TO ARBORISTS ARBORICULTURAL IMPACT ASSESSMENT REPORT SMCSWSWM-MTM-WHP-LA-REP-131000 FOR TREE PROTECTION WORKS.
- ENSURE HERITAGE MITIGATION WORKS IS CARRIED OUT IN ACCORDANCE TO REFERENCES OUTLINED IN DRAWING SMCSWSWM-MTM-WHP-LA-DWG-131701 UNDER GENERAL NOTES, ITEM 3 REFERRING TO HERITAGE AND ARCHAEOLOGICAL ASSESSMENTS

Map Legend



KEY PLAN



Urban Arbor Pty Ltd

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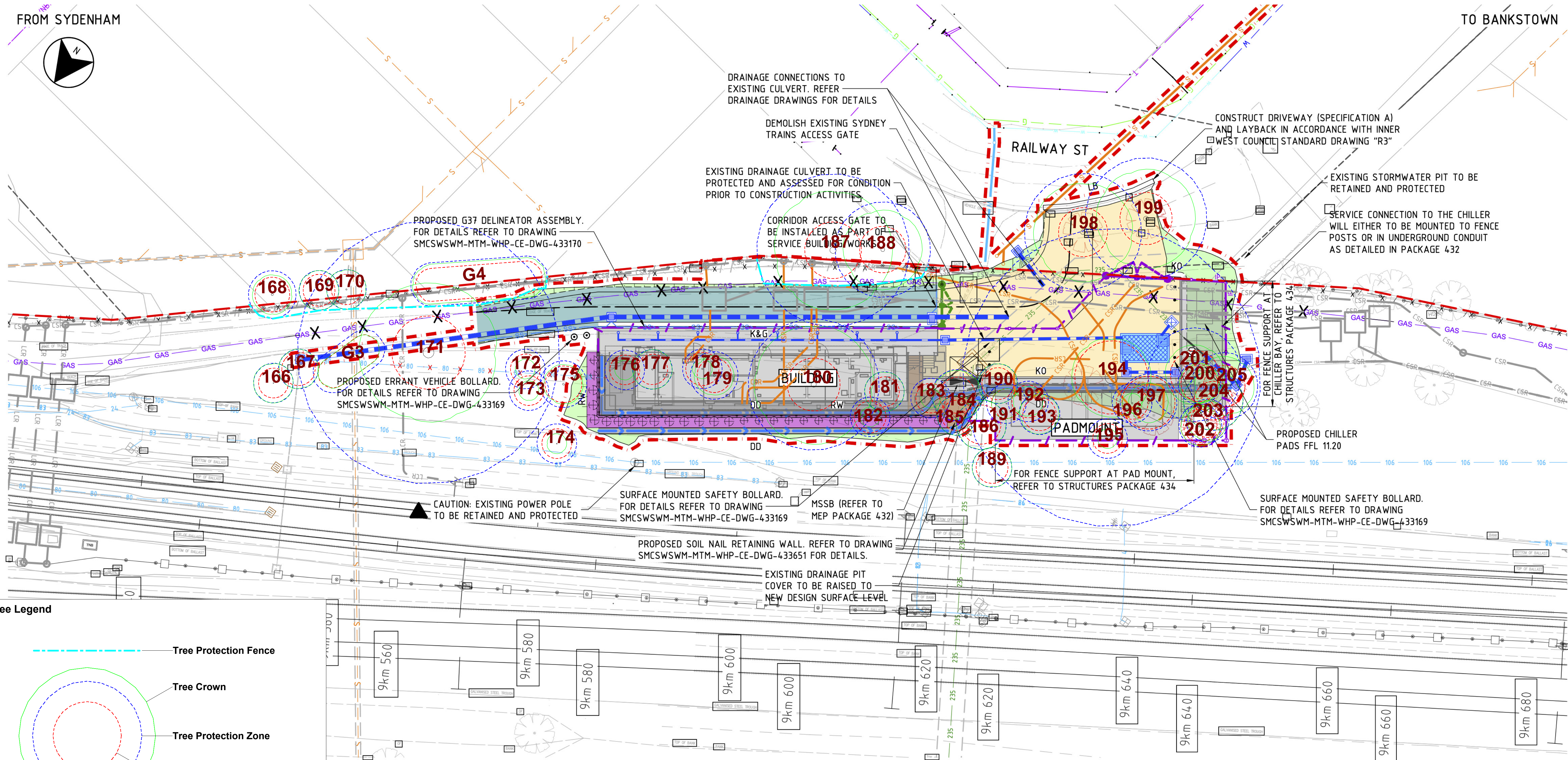
Site Location: Hurlstone Park Station
Hurlstone Park NSW

SCALE :
1 : 200 @ A1 DATE :
21/12/2020

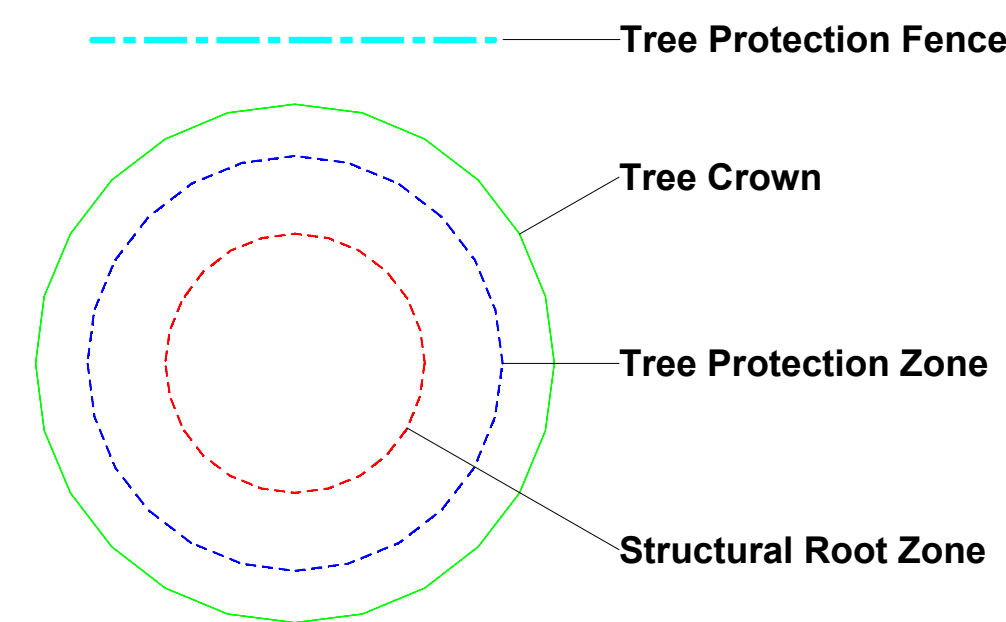
URBAN ARBOR
The Trusted Name in Tree Management

Appendix 1A - Proposed Site Plan East

Prepared by: Bryce Claassens, Urban Arbor Pty Ltd



Tree Legend



Urban Arbor Pty Ltd

PO Box 450 Turramurra NSW 2074
sales@urbanarbor.com.au

Site Location: Hurlstone Park Station
Hurlstone Park NSW

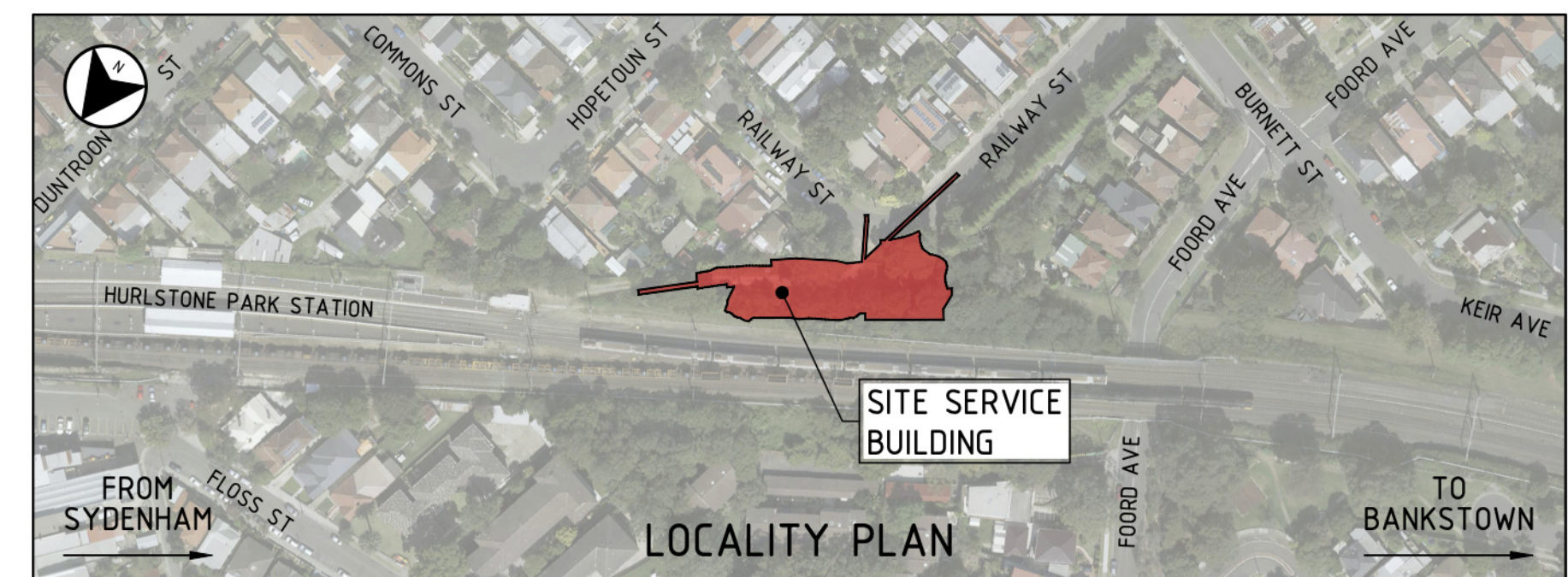
SCALE : 1 : 200 @ A1 DATE : 21/12/2020



Appendix 1B - Proposed Site Plan West

Prepared by: Bryce Claassens, Urban Arbor Pty Ltd

PLAN
SCALE 1:200



DRAWING COLOUR CODED - PRINT ALL COPIES IN COLOUR NOT FOR CONSTRUCTION

Appendix 2 - Tree Inspection Schedule

Tree ID	Common Name	Botanical Name	Age Class	Height (m)	Canopy Spread Radius (m)	Stem 1	Stem 2	Stem 3	Stem 4	Stem 5	DBH (mm)	DAB (mm)	Health	Structure	Amenity Value	SULE	Retention Value	TPZ Radius (m)	SRZ Radius (m)	Notes
166	Common or Black Mulberry	<i>Morus nigra</i>	Young	4	2	90					90	100	Good	Fair	Low	5. Small/Young	Z3	2.0	1.5	Located within corridor. Exempt species.
167	Common or Black Mulberry	<i>Morus nigra</i>	Semi-mature	7	2	160					160	200	Good	Good	Low	5. Small/Young	Z3	2.0	1.7	Located within corridor. Exempt species.
168	Broad Leaved Privet	<i>Ligustrum lucidum</i>	Mature	7	2	200					200	220	Good	Fair	Low	2. Medium	Z3	2.4	1.8	Canopy extends into corridor. Exempt species.
169	Rubber Tree	<i>Ficus elastica</i>	Semi-mature	6	2	150					150	180	Good	Fair	Low	5. Small/Young	Z1	2.0	1.6	Canopy extends into corridor.
170	Holly	<i>Ilex spp</i>	Mature	5	2	150					150	160	Good	Good	Low	5. Small/Young	Z1	2.0	1.5	Canopy extends slightly into corridor.
G3	Tree of Heaven	<i>Ailanthus altissima</i>	Mature	8	1.5	100					100	120	Fair	Fair	Low	3. Short	Z3	2.0	1.5	Located within corridor. Group of trees in decline. Exempt species. Approximately 6 trees.
171	Camphor Laurel	<i>Cinnamomum camphora</i>	Mature	17	7	1100					1100	1300	Good	Good	Medium	1. Long	A1	13.2	3.7	Located within corridor.
G4	Dwarf Lilly Pilly	<i>Acmena smithii var. minor</i>	Semi-mature	8	2	180					180	190	Good	Good	Medium	1. Long	A1	2.2	1.6	Canopy extends into corridor. Group of acmena smithii var minor. Approximately 7 trees.
172	Broad Leaved Privet	<i>Ligustrum lucidum</i>	Semi-mature	5	1	100					100	120	Good	Fair	Very Low	5. Small/Young	Z3	2.0	1.5	Located within corridor. Exempt species.
173	Broad Leaved Privet	<i>Ligustrum lucidum</i>	Young	4	1	90					90	100	Good	Fair	Very Low	5. Small/Young	Z3	2.0	1.5	Located within corridor. Exempt species.
174	Chinese Hackberry	<i>Celtis sinensis</i>	Semi-mature	4	1	100					100	120	Good	Good	Very Low	5. Small/Young	Z3	2.0	1.5	Located within corridor. Exempt species.
175	Broad Leaved Privet	<i>Ligustrum lucidum</i>	Semi-mature	5	2	100	110	130			197	250	Good	Fair	Very Low	5. Small/Young	Z3	2.4	1.8	Located within corridor. Exempt species.
176	Broad Leaved Privet	<i>Ligustrum lucidum</i>	Young	5	1	100					100	110	Good	Good	Very Low	5. Small/Young	Z3	2.0	1.5	Located within corridor. Exempt species.
177	Tree of Heaven	<i>Ailanthus altissima</i>	Semi-mature	5	2	90	120				150	160	Fair	Fair	Very Low	3. Short	Z3	2.0	1.5	Located within corridor. Exempt species with low foliage density for species and apical dieback.
178	Tree of Heaven	<i>Ailanthus altissima</i>	Semi-mature	6	1	100	110				149	200	Fair	Fair	Very Low	3. Short	Z3	2.0	1.7	Located within corridor. Exempt species in decline.
179	Camphor Laurel	<i>Cinnamomum camphora</i>	Semi-mature	8	2	200					200	210	Good	Fair	Low	2. Medium	Z3	2.4	1.7	Located within corridor. Exempt species.
180	Sydney Blue Gum	<i>Eucalyptus saligna</i>	Mature	22	6	550					550	600	Good	Fair	High	1. Long	A1	6.6	2.7	Located within corridor. Asymmetric crown shape due to power line clearance.
181	Broad Leaved Privet	<i>Ligustrum lucidum</i>	Semi-mature	6	2	110					110	120	Good	Fair	Very Low	5. Small/Young	Z3	2.0	1.5	Located within corridor. Exempt species.
182	Broad Leaved Privet	<i>Ligustrum lucidum</i>	Semi-mature	5	1	110	100				149	180	Good	Fair	Very Low	5. Small/Young	Z3	2.0	1.6	Located within corridor. Exempt species.
183	Honey Locust	<i>Gleditsia triacanthos</i>	Young	5	1	100					100	110	Good	Fair	Very Low	5. Small/Young	Z3	2.0	1.5	Located within corridor. Exempt species.
184	Robinia	<i>Robinia pseudoacacia</i>	Mature	9	2.5	190	100				215	240	Good	Fair	Very Low	2. Medium	Z3	2.6	1.8	Located within corridor. Exempt species.
185	Robinia	<i>Robinia pseudoacacia</i>	Semi-mature	8	2	140					140	160	Good	Fair	Very Low	5. Small/Young	Z3	2.0	1.5	Located within corridor. Exempt species.
186	Robinia	<i>Robinia pseudoacacia</i>	Mature	7	2.5	210					210	290	Good	Fair	Very Low	2. Medium	Z3	2.5	2.0	Located within corridor. Weed/vine species at base of trunk. Exempt species
187	Bangalay	<i>Eucalyptus botryoides</i>	Mature	20	6	640					640	700	Good	Good	High	2. Medium	A1	7.7	2.8	Canopy extends into corridor. DBH estimated.
188	Willow Bottlebrush	<i>Callistemon salignus</i>	Mature	10	4	400					400	440	Good	Good	High	1. Long	A1	4.8	2.3	Canopy extends into corridor. DBH estimated.
189	Broad Leaved Privet	<i>Ligustrum lucidum</i>	Semi-mature	5	2	150					150	180	Good	Fair	Very Low	5. Small/Young	Z3	2.0	1.6	Located within corridor. Exempt species.

Appendix 2 - Tree Inspection Schedule

Tree ID	Common Name	Botanical Name	Age Class	Height (m)	Canopy Spread Radius (m)	Stem 1	Stem 2	Stem 3	Stem 4	Stem 5	DBH (mm)	DAB (mm)	Health	Structure	Amenity Value	SULE	Retention Value	TPZ Radius (m)	SRZ Radius (m)	Notes
190	Robinia	<i>Robinia pseudoacacia</i>	Semi-mature	6	2	150					150	180	Good	Good	Very Low	2. Medium	Z3	2.0	1.6	Located within corridor. Exempt species.
191	Honey Locust	<i>Gleditsia triacanthos</i>	Young	8	1.5	50	100				112	150	Good	Fair	Very Low	5. Small/Young	Z3	2.0	1.5	Located within corridor. Exempt species.
192	Robinia	<i>Robinia pseudoacacia</i>	Semi-mature	9	1.5	170					170	190	Good	Fair	Very Low	2. Medium	Z3	2.0	1.6	Located within corridor. Exempt species.
193	Robinia	<i>Robinia pseudoacacia</i>	Semi-mature	8	2	140	100				172	200	Good	Fair	Very Low	2. Medium	Z3	2.1	1.7	Located within corridor. Exempt species.
194	Camphor Laurel	<i>Cinnamomum camphora</i>	Mature	17	4	1300					1300	1300	Good	Fair	Medium	2. Medium	A1	15.0	3.7	Located within corridor. DBH measured at base.
195	Robinia	<i>Robinia pseudoacacia</i>	Semi-mature	6	1	100					100	120	Good	Fair	Very Low	5. Small/Young	Z3	2.0	1.5	Located within corridor. Exempt species.
196	Sweet Pittosporum	<i>Pittosporum undulatum</i>	Semi-mature	6	1	150					150	180	Good	Good	Medium	1. Long	A1	2.0	1.6	Located within corridor.
197	Camphor Laurel	<i>Cinnamomum camphora</i>	Semi-mature	8	2	100	100	100	120	110	238	600	Good	Fair	Low	5. Small/Young	Z3	2.9	2.7	Located within corridor. Exempt species. Multi stem tree.
198	Blue Jacaranda	<i>Jacaranda mimosifolia</i>	Mature	14	5	390	300				492	500	Good	Good	Medium	1. Long	A1	5.9	2.5	Canopy extends into corridor.
199	Queensland Brushbox	<i>Lophostemon confertus</i>	Mature	18	5	510					510	580	Good	Good	High	1. Long	A1	6.1	2.6	Upper canopy extends into corridor.
200	Broad Leaved Privet	<i>Ligustrum lucidum</i>	Semi-mature	8	2	100	110	100			179	250	Good	Fair	Very Low	5. Small/Young	Z3	2.1	1.8	Located within corridor. Exempt species.
201	Robinia	<i>Robinia pseudoacacia</i>	Mature	9	3	240	310				392	490	Good	Fair	Very Low	2. Medium	Z3	4.7	2.5	Located within corridor. Exempt species.
202	Robinia	<i>Robinia pseudoacacia</i>	Semi-mature	8	2	180					180	200	Good	Fair	Very Low	2. Medium	Z3	2.2	1.7	Located within corridor. Exempt species.
203	Robinia	<i>Robinia pseudoacacia</i>	Semi-mature	8	2	180					180	200	Good	Fair	Very Low	2. Medium	Z3	2.2	1.7	Located within corridor. Exempt species.
204	Robinia	<i>Robinia pseudoacacia</i>	Mature	10	3	250					250	280	Good	Good	Very Low	2. Medium	Z3	3.0	1.9	Located within corridor. Exempt species.
205	Robinia	<i>Robinia pseudoacacia</i>	Mature	9	3	100	170	200			281	340	Good	Fair	Very Low	2. Medium	Z3	3.4	2.1	Located within corridor. Exempt species.
591	Red Flowering Gum	<i>Corymbia ficifolia</i>	Mature	5	3	230					230	280	Good	Good	Medium	1. Long	A1	2.8	1.9	None
592	Japanese Camellia	<i>Camellia japonica</i>	Young	2	0.5	40	40				57	80	Good	Good	Low	5. Small/Young	Z1	2.0	1.5	None.
593	Weeping Bottlebrush	<i>Callistemon viminalis</i>	Mature	5	2.5	250					250	290	Good	Good	Medium	2. Medium	A1	3.0	2.0	Located on steep embankment.
594	Weeping Bottlebrush	<i>Callistemon viminalis</i>	Veteran	5	3	350					350	390	Good	Good	Medium	2. Medium	A1	4.2	2.2	Located on steep embankment.

Explanatory Notes

Tree Species - Common name followed by botanical name. Where species is unknown it is indicated with an 'spp'.

Age Class - Over mature (OM), Mature (M), Early mature (EM), Semi mature (SM), Young (Y).

Diameter at Breast Height (DBH) - Measured with a DBH tape or estimated at approximately 1.4m above ground level.

Diameter Above root Buttresses (DAB): Measured with a DBH tape or estimated above root buttresses (DAB) for calculating the SRZ.

Height - Height from ground level to top of crown. All heights are estimated unless otherwise indicated.

Spread - Radius of crown at widest section. All tree spreads are estimated unless otherwise indicated.

Tree Protection Zone (TPZ) - DBH x 12. Measured in radius from the centre of the trunk. Rounded to nearest 0.1m. For monocots, the TPZ is set at 1 metre outside the crown projection.

Structural Root Zone (SRZ) - (DAB x 50)^{0.42} x 0.64. Measured in radius from the centre of the trunk. Rounded up to nearest 0.1m.

Health - Good/Fair/Poor/Dead

Structure - Good/Fair/Poor

Safe Useful Life Expectancy (SULE) - 1. Long (40+years), 2. Medium (15 - 40 years), 3. Short (5 - 15 years), 4. Remove (under 5 years), 5. Small/young.

Amenity Value - Very High/High/Medium/Low/Very Low.

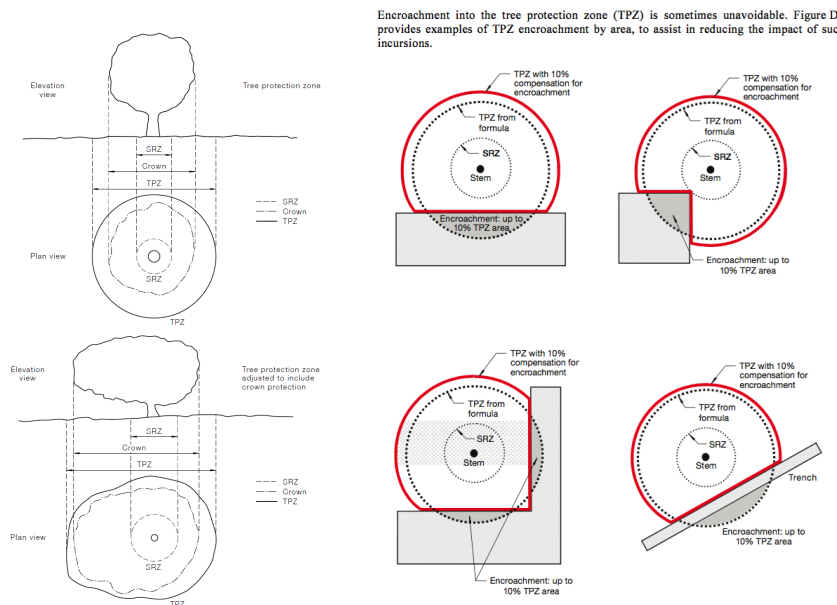
Retention Value: Tree AZ, see appendix 3 for categories.

Appendix 3 - Further Information of Methodology

1. **Tree Protection Zone:** The tree protection zone (TPZ) is the principle means of protecting trees on development sites. The TPZ is a combination of the root area and crown area requiring protection. It is an area isolated from construction disturbance, so that the tree remains viable. The radius of the TPZ is calculated for each tree by multiplying its DBH x 12. The derived value is measured in radius from the centre of the stem/trunk at ground level. A TPZ should not be less than 2.0 metres nor greater than 15 metres (except where crown protection is required). It is commonly observed that tree roots will extend significant further than the indicative TPZ, however the TPZ is an area identified AS4970-2009 to be extent where root loss or disturbance will generally not impact the viability of the tree. The TPZ is identified as a restricted area to prevent damage to trees either above or below ground during a development. Where trees are intended to be retained proposed developments must provide an adequate TPZ around trees. The TPZ is set aside for the tree's root zone, trunk and crown and it is essential for the stability and longevity of the tree. The tree protection also incorporates the SRZ (see below for more information about the SRZ). I have calculated the TPZ of palms, other monocots, cycads and tree ferns at one metre outside the crown projection. See appendices for additional information about the TPZ including information about calculating the TPZ and examples of TPZ encroachment.

Minor encroachment into TPZ: Sometimes encroachment into the TPZ is unavoidable. Encroachment includes but is not limited to activities such as excavation, compacted fill and machine trenching. Minor encroachment of up to 10% of the overall TPZ area is normally considered acceptable, providing there is space adjacent to the TPZ for the tree to compensate and the tree is displaying adequate vigour/health to tolerate changes to its growing environment.

Major encroachment into TPZ: Where encroachment of more than 10% of the overall TPZ area is proposed the project Arborist must investigate and demonstrate that the tree will remain in a viable condition. In some cases, tree sensitive construction methods such as pier and beam footings, suspended slabs, or cantilevered sections, can be utilised to allow additional encroachment into the TPZ by bridging over roots and minimising root disturbance. Major encroachment is only possible if it can be undertaken without severing significant size roots, or if it can be demonstrated that significant roots will not be impacted.



2. **Structural Root Zone:** This is the area around the base of a tree required for the trees stability in the ground. An area larger than the SRZ always need to be maintained to preserve a viable tree as it will only have a minor effect on the trees vigour and health. There are several factors that determine the SRZ which include height, crown area, soil type and soil moisture. It can also be influenced by other factors such as natural or built structures. Generally work within the SRZ should be avoided.

An indicative SRZ radius can be determined from the diameter of the trunk measured immediately above the root buttresses. Root investigation could provide more information about the extent of the SRZ. The following formula should be used to calculate the SRZ.

SRZ radius = $(D \times 50)^{0.42} \times 0.64$ (D = Diameter above root buttress).

3. **Tree Age Class:** It can be difficult to determine the age of a tree without carrying out invasive tests that may damage the tree, so we have categorised there likely age class which is defined below;
 - Young/Newly planted: Young or recently planted tree.
 - Semi Mature: Up to 20% of the usual life expectancy for the species.
 - Early mature/Mature: Between 20%-80% of the usual life expectancy for the species.
 - Over mature: Over 80% of the usual life expectancy for the species.
 - Dead: Tree is dead or almost dead.

4. **Health/Physiological Condition:** Below are examples conditions used when assigning a category for tree health.

Category	Example condition	Summary
Good	<ul style="list-style-type: none"> • Crown has good foliage density for species. • Tree shows no or minimal signs of pathogens that are unlikely to have an effect on the health of the tree. • Tree is displaying good vigour and reactive growth development. 	<ul style="list-style-type: none"> • The tree is in above average health and condition and no remedial works are required.
Fair	<ul style="list-style-type: none"> • The tree may be starting to dieback or have over 25% deadwood. • Tree may have slightly reduced crown density or thinning. • There may be some discolouration of foliage. • Average reactive growth development. • There may be early signs of pathogens which may further deteriorate the health of the tree. • There may be epicormic growth indicating increased levels of stress within the tree. 	<ul style="list-style-type: none"> • The tree is in below average health and condition and may require remedial works to improve the trees health.
Poor	<ul style="list-style-type: none"> • The tree may be in decline, have extensive dieback or have over 30% deadwood. • The canopy may be sparse or the leaves may be unusually small for species. • Pathogens or pests are having a significant detrimental effect on the tree health. 	<ul style="list-style-type: none"> • The tree is displaying low levels of health and removal or remedial works may be required.
Dead	<ul style="list-style-type: none"> • The tree is dead or almost dead. 	<ul style="list-style-type: none"> • The tree should generally be removed.

5. **Structural Condition:** Below are examples conditions used when assigning a category for structural condition.

Category	Example condition	Summary
Good	<ul style="list-style-type: none"> • Branch unions appear to be strong with no sign of defects. • There are no significant cavities. • The tree is unlikely to fail in usual conditions. • The tree has a balanced crown shape and form. 	<ul style="list-style-type: none"> • The tree is considered structurally good with well developed form.
Fair	<ul style="list-style-type: none"> • The tree may have minor structural defects within the structure of the crown that could potentially develop into more significant defects. • The tree may have a cavity that is currently unlikely to fail but may deteriorate in the future. • The tree is an unbalanced shape or leans significantly. • The tree may have minor damage to its roots. • The root plate may have moved in the past but the tree has now compensated for this. • Branches may be rubbing or crossing. 	<ul style="list-style-type: none"> • The identified defects are unlikely cause major failure. • Some branch failure may occur in usual conditions. • Remedial works can be undertaken to alleviate potential defects.
Poor	<ul style="list-style-type: none"> • The tree has significant structural defects. • Branch unions may be poor or weak. • The tree may have a cavity or cavities with excessive levels of decay that could cause catastrophic failure. • The tree may have root damage or is displaying signs of recent movement. • The tree crown may have poor weight distribution which could cause failure. 	<ul style="list-style-type: none"> • The identified defects are likely to cause either partial or whole failure of the tree.

6. **Amenity Value:** To determine the amenity value of a tree we assess a number of different factors, which include but are not limited to the information below.

- The visibility of the tree to adjacent sites.
- The relationship between the tree and the site.
- Whether the tree is protected by any statutory conditions.
- The habitat value of the tree.
- Whether the tree is considered a noxious weed species.

The amenity value is rated using one of the following values.

- Very High
- High
- Moderate
- Low
- Very Low

7. **Safe Useful Life Expectancy (SULE), (Barrel, 2001):** A tree's safe useful life expectancy is determined by assessing a number of different factors including the health and vitality, estimated age in relation to expected life expectancy for the species, structural defects, and remedial works that could allow retention in the existing situation.

Category	Description
1. Long - Over 40 years	(a) Structurally sound trees located in positions that can accommodate future growth. (b) Trees that could be made suitable for retention in the long term by remedial tree care. (c) Trees of special significance for historical, commemorative or rarity reasons that would warrant extraordinary efforts to secure their long term retention.
2. Medium - 15 to 40 years	(a) Trees that may only live between 15 and 40 more years. (b) Trees that could live for more than 40 years but may be removed for safety or nuisance reasons. (c) Trees that could live for more than 40 years but may be removed to prevent interference with more suitable individuals or to provide space for new planting. (d) Trees that could be made suitable for retention in the medium term by remedial tree care.
3. Short - 5 to 15 years	(a) Trees that may only live between 5 and 15 more years. (b) Trees that could live for more than 15 years but may be removed for safety or nuisance reasons. (c) Trees that could live for more than 15 years but may be removed to prevent interference with more suitable individuals or to provide space for new planting. (d) Trees that require substantial remedial tree care and are only suitable for retention in the short term.
4. Remove - Under 5 years	(a) Dead, dying, suppressed or declining trees because of disease or inhospitable conditions. (b) Dangerous trees because of instability or recent loss of adjacent trees. (c) Dangerous trees because of structural defects including cavities, decay, included bark, wounds or poor form. (d) Damaged trees that are clearly not safe to retain. (e) Trees that could live for more than 5 years but may be removed to prevent interference with more suitable individuals or to provide space for new planting. (f) Trees that are damaging or may cause damage to existing structures within 5 years. (g) Trees that will become dangerous after removal of other trees for the reasons given in (a) to (f). (h) Trees in categories (a) to (g) that have a high wildlife habitat value and, with appropriate treatment, could be retained subject to regular review.
5. Small/Young	(a) Small trees less than 5m in height. (b) Young trees less than 15 years old but over 5m in height. (c) Formal hedges and trees intended for regular pruning to artificially control growth.

8. **Root investigations:** The root investigations should identify roots greater than 30mm in diameter that are located along the edge of the structure's footprint or in the location of footings. Root investigations must be carried out using non-invasive methods (manual excavations). Any excavations for the root investigations must be carried out manually to avoid damaging the roots during excavations. Manual excavation may include the use of a high-pressure air/air knife, or a combination of high-pressure water and a vacuum device. When hand excavating carefully work around roots retaining as many as possible. Take care to not fray, wound, or cause damage to any roots during excavations as this may cause decay or infection from pathogens. It is essential that exposed roots are kept moist and the excavation back filled as soon as possible. The root investigations should be carried out by a qualified Arborist minimum AQF3. Once roots are exposed, a visual assessment can be carried out by a consulting Arborist to evaluate the potential impact of the proposed root loss on the health and stability of the tree. A root map/report should be prepared identifying the findings of investigations, including photographs as supporting evidence in the report.

9. **Retention Value:** The system I have used to award the retention value is Tree AZ. Tree AZ is used to identify higher value trees worthy of being a constraint to development and lower value trees that should generally not be a constraint to the development. The table below provides a brief description of each category.

TreeAZ Categories (Version 10.04-ANZ)

CAUTION: TreeAZ assessments must be carried out by a competent person qualified and experienced in arboriculture. The following category descriptions are designed to be a brief field reference and are not intended to be self-explanatory. They must be read in conjunction with the most current explanations published at www.TreeAZ.com.

Category Z: Unimportant trees not worthy of being a material constraint

Local policy exemptions: Trees that are unsuitable for legal protection for local policy reasons including size, proximity and species

Z1	Young or insignificant small trees, i.e. below the local size threshold for legal protection, etc
Z2	Too close to a building, i.e. exempt from legal protection because of proximity, etc
Z3	Species that cannot be protected for other reasons, i.e. scheduled noxious weeds, out of character in a setting of acknowledged importance, etc

High risk of death or failure: Trees that are likely to be removed within 10 years because of acute health issues or severe structural failure

Z4	Dead, dying, diseased or declining
Z5	Severe damage and/or structural defects where a high risk of failure <u>cannot</u> be satisfactorily reduced by reasonable remedial care, i.e. cavities, decay, included bark, wounds, excessive imbalance, overgrown and vulnerable to adverse weather conditions, etc
Z6	Instability, i.e. poor anchorage, increased exposure, etc

Excessive nuisance: Trees that are likely to be removed within 10 years because of unacceptable impact on people

Z7	Excessive, severe and intolerable inconvenience to the extent that a locally recognized court or tribunal would be likely to authorize removal, i.e. dominance, debris, interference, etc
Z8	Excessive, severe and intolerable damage to property to the extent that a locally recognized court or tribunal would be likely to authorize removal, i.e. severe structural damage to surfacing and buildings, etc

Good management: Trees that are likely to be removed within 10 years through responsible management of the tree population

Z9	Severe damage and/or structural defects where a high risk of failure can be <u>temporarily</u> reduced by reasonable remedial care, i.e. cavities, decay, included bark, wounds, excessive imbalance, vulnerable to adverse weather conditions, etc
Z10	Poor condition or location with a low potential for recovery or improvement, i.e. dominated by adjacent trees or buildings, poor architectural framework, etc
Z11	Removal would benefit better adjacent trees, i.e. relieve physical interference, suppression, etc
Z12	Unacceptably expensive to retain, i.e. severe defects requiring excessive levels of maintenance, etc

NOTE: Z trees with a high risk of death/failure (Z4, Z5 & Z6) or causing severe inconvenience (Z7 & Z8) at the time of assessment and need an urgent risk assessment can be designated as ZZ. ZZ trees are likely to be unsuitable for retention and at the bottom of the categorization hierarchy. In contrast, although Z trees are not worthy of influencing new designs, urgent removal is not essential and they could be retained in the short term, if appropriate.

Category A: Important trees suitable for retention for more than 10 years and worthy of being a material constraint

A1	No significant defects and could be retained with minimal remedial care
A2	Minor defects that could be addressed by remedial care and/or work to adjacent trees
A3	Special significance for historical, cultural, commemorative or rarity reasons that would warrant extraordinary efforts to retain for more than 10 years
A4	Trees that may be worthy of legal protection for ecological reasons (Advisory requiring specialist assessment)

NOTE: Category A1 trees that are already large and exceptional, or have the potential to become so with minimal maintenance, can be designated as AA at the discretion of the assessor. Although all A and AA trees are sufficiently important to be material constraints, AA trees are at the top of the categorization hierarchy and should be given the most weight in any selection process.

TreeAZ is designed by Barrell Tree Consultancy (www.barrelltreecare.co.uk) and is reproduced with their permission

Glossary of Terms

Abiotic - Pertaining to non-living agents; e.g. environmental factors

Adventitious shoots - Shoots that develop other than from apical, axillary or dormant buds; see also 'epicormic'

Anchorage - The system whereby a tree is fixed within the soil, involving cohesion between roots and soil and the development of a branched system of roots which withstands wind and gravitational forces transmitted from the aerial parts of the tree

Bark - A term usually applied to all the tissues of a woody plant lying outside the vascular cambium, thus including the phloem, cortex and periderm; occasionally applied only to the periderm or the phellem

Branch:

- **Primary**. A first order branch arising from a stem
- **Lateral**. A second order branch, subordinate to a primary branch or stem and bearing sub-lateral branches
- **Sub-lateral**. A third order branch, subordinate to a lateral or primary branch, or stem and usually bearing only twigs

Branch collar - A visible swelling formed at the base of a branch whose diameter growth has been disproportionately slow compared to that of the parent stem; a term sometimes applied also to the pattern of growth of the cells of the parent stem around the branch base

Brown-rot - A type of wood decay in which cellulose is degraded, while lignin is only modified

Buckling - An irreversible deformation of a structure subjected to a bending force

Buttress zone - The region at the base of a tree where the major lateral roots join the stem, with buttress-like formations on the upper side of the junctions

Cambium - Layer of dividing cells producing xylem (woody) tissue internally and phloem (bark) tissue externally

Canker - A persistent lesion formed by the death of bark and cambium due to colonisation by fungi or bacteria

Compartmentalisation - The confinement of disease, decay or other dysfunction within an anatomically discrete region of plant tissue, due to passive and/or active defences operating at the boundaries of the affected region

Compressive loading - Mechanical loading which exerts a positive pressure; the opposite to tensile loading

Condition - An indication of the physiological condition of the tree. Where the term 'condition' is used in a report, it should not be taken as an indication of the stability of the tree

Crown/Canopy - The main foliage bearing section of the tree

Crown lifting - The removal of limbs and small branches to a specified height above ground level

Crown thinning - The removal of a proportion of secondary branch growth throughout the crown to produce an even density of foliage around a well-balanced branch structure

Crown reduction/shaping - A specified reduction in crown size whilst preserving, as far as possible, the natural tree shape

DAB (Diameter Above Buttress) - Trunk diameter measured above the root buttress

Defect - In relation to tree hazards, any feature of a tree which detracts from the uniform distribution of mechanical stress, or which makes the tree mechanically unsuited to its environment

Dieback - The death of parts of a woody plant, starting at shoot-tips or root-tips

Disease - A malfunction in or destruction of tissues within a living organism, usually excluding mechanical damage; in trees, usually caused by pathogenic micro-organisms

Dominance - In trees, the tendency for a leading shoot to grow faster or more vigorously than the lateral shoots; also the tendency of a tree to maintain a taller crown than its neighbours

Dormant bud - An axial bud which does not develop into a shoot until after the formation of two or more annual wood increments; many such buds persist through the life of a tree and develop only if stimulated to do so

Dysfunction - In woody tissues, the loss of physiological function, especially water conduction, in sapwood

DBH (Diameter at Breast Height) - Stem diameter measured at a height of 1.4 metres or the nearest measurable point. Where measurement at a height of 1.4 metres is not possible, another height may be specified

Deadwood - Branch or stem wood bearing no live tissues. Retention of deadwood provides valuable habitat for a wide range of species and seldom represents a threat to the health of the tree. Removal of deadwood can result in the ingress of decay to otherwise sound tissues and climbing operations to access deadwood can cause significant damage to a tree. Removal of deadwood is generally recommended only where it represents an unacceptable level of hazard

Epicormic shoot - A shoot having developed from a dormant or adventitious bud and not having developed from a first year shoot

Flush-cut - A pruning cut which removes part of the branch bark ridge and or branch-collar

Girdling root - A root which circles and constricts the stem or roots possibly causing death of phloem and/or cambial tissue

Habit - The overall growth characteristics, shape of the tree and branch structure

Hazard beam - An upwardly curved part of a tree in which strong internal stresses may occur without being reduced by adaptive growth; prone to longitudinal splitting

Heartwood/false-heartwood - The dead central wood that has become dysfunctional as part of the aging processes and being distinct from the sapwood

Heave - A term mainly applicable to a shrinkable clay soil which expands due to re-wetting after the felling of a tree which was previously extracting moisture from the deeper layers; also the lifting of pavements and other structures by root diameter expansion; also the lifting of one side of a wind-rocked root-plate

Included bark (ingrown bark) - Bark of adjacent parts of a tree (usually forks, acutely joined branches or basal flutes) which is in face-to-face contact

Lever arm - A mechanical term denoting the length of the lever represented by a structure that is free to move at one end, such as a tree or an individual branch

Lignin - The hard, cement-like constituent of wood cells; deposition of lignin within the matrix of cellulose microfibrils in the cell wall is termed Lignification

Lions tailing - A term applied to a branch of a tree that has few if any side-branches except at its end, and is thus liable to snap due to end-loading

Loading - A mechanical term describing the force acting on a structure from a particular source; e.g. the weight of the structure itself or wind pressure

Mycelium - The body of a fungus, consisting of branched filaments (hyphae)

Occlusion - The process whereby a wound is progressively closed by the formation of new wood and bark around it

Pathogen - A micro-organism which causes disease in another organism

Photosynthesis - The process whereby plants use light energy to split hydrogen from water molecules, and combine it with carbon dioxide to form the molecular building blocks for synthesizing carbohydrates and other biochemical products

Probability - A statistical measure of the likelihood that a particular event might occur

Pruning - The removal or cutting back of twigs or branches, sometimes applied to twigs or small branches only, but often used to describe most activities involving the cutting of trees or shrubs

Radial - In the plane or direction of the radius of a circular object such as a tree stem

Reactive Growth/Reaction Wood - Production of woody tissue in response to altered mechanical loading; often in response to internal defect or decay and associated strength loss (cf. adaptive growth)

Ring-barking - The removal of a ring of bark and phloem around the circumference of a stem or branch, normally resulting in an inability to transport photosynthetic assimilates below the area of damage. Almost inevitably results in the eventual death of the affected stem or branch above the damage

Root-collar - The transitional area between the stem/s and roots

Sapwood - Living xylem tissues

Soft-rot - A kind of wood decay in which a fungus degrades cellulose within the cell walls, without any general degradation of the wall as a whole

Stem/s - Principle above-ground structural component(s) of a tree that supports its branches

Stress - In plant physiology, a condition under which one or more physiological functions are not operating within their optimum range, for example due to lack of water, inadequate nutrition or extremes of temperature

SRZ (Structural Root Zone) - The area around the base of the tree required for the trees stability in the ground

Subsidence - In relation to soil or structures resting in or on soil, a sinking due to shrinkage when certain types of clay soil dry out, sometimes due to extraction of moisture by tree roots

Taper - In stems and branches, the degree of change in girth along a given length

Targets - In tree risk assessment (with slight misuse of normal meaning) persons or property or other things of value which might be harmed by mechanical failure of the tree or by objects falling from it

Topping - In arboriculture, the removal of the crown of a tree, or of a major proportion of it

Transpiration - The evaporation of moisture from the surface of a plant, especially via the stomata of leaves; it exerts a suction which draws water up from the roots and through the intervening xylem cells

TPZ (Tree Protection Zone) - A specified area above and below ground and at a given distance from the trunk set aside for the protection of a tree's roots and crown to provide for the viability and stability of a tree to be retained where it is potentially subject to damage by development

Understory - This layer consists of younger individuals of the dominant trees, together with smaller trees and shrubs which are adapted to grow under lower light conditions

Veteran tree - Tree that, by recognised criteria, shows features of biological, cultural or aesthetic value that are characteristic of, but not exclusive to, individuals surviving beyond the typical age range for the species concerned. These characteristics might typically include a large girth, signs of crown retrenchment and hollowing of the stem

Vigour - The expression of carbohydrate expenditure to growth (in trees)

White-rot - A range of kinds of wood decay in which lignin, usually together with cellulose and other wood constituents, is degraded

Wind exposure - The degree to which a tree or other object is exposed to wind, both in terms of duration and velocity

Wind pressure - The force exerted by a wind on a particular object

Windthrow - The blowing over of a tree at its roots

APPENDIX 6 HURLSTONE PARK AIA (PLATEAU TREES)

Date: 17 March 2021

Revision: 10 May 2021

Re: Additional tree removals at Hurlstone Park Station as part of the Southwest Metro Package.

At the request of Downer Group an onsite inspection was undertake at Hurlstone Park Station. It has been asked to identify and record additional tree removals beyond those recommended within the Arboricultural Impact Assessment (AIA) was prepared by Urban Arbor, dated 11 December 2019, Ref19/12/11/SWMMS. On the 5 March a site walkthrough was undertaken by myself and representatives from Downer Group. Additional tree removals were identified with respects to the proposed Southwest Metro Package works. The data for these additional trees can be found as Appendix 1 of this report.

Based upon the information, rational and justification provided within the AIA Report I can confirm that trees G3, 166, 167, 171, 172, 173, 174, 175, 177, 178, 179, 180, 181 and 182 shall require removal to accommodate the proposed works. Reference should be made to the AIA report for respective tree data.

Additional tree removals were identified where there is a direct design clash and 100% encroachment into the TPZ and SRZ at the following locations:

- adjacent the southern side of the rail corridor along Floss Street
- adjacent the southern side of the rail corridor along Railway Street

Additional tree removal adjacent Railway Street

Additional tree and vegetation removal adjacent Floss Street involves two Wattles, trees 1 and 2, located adjacent the bridge and woody vegetation along the rail embankment. Image 1 shows their location.

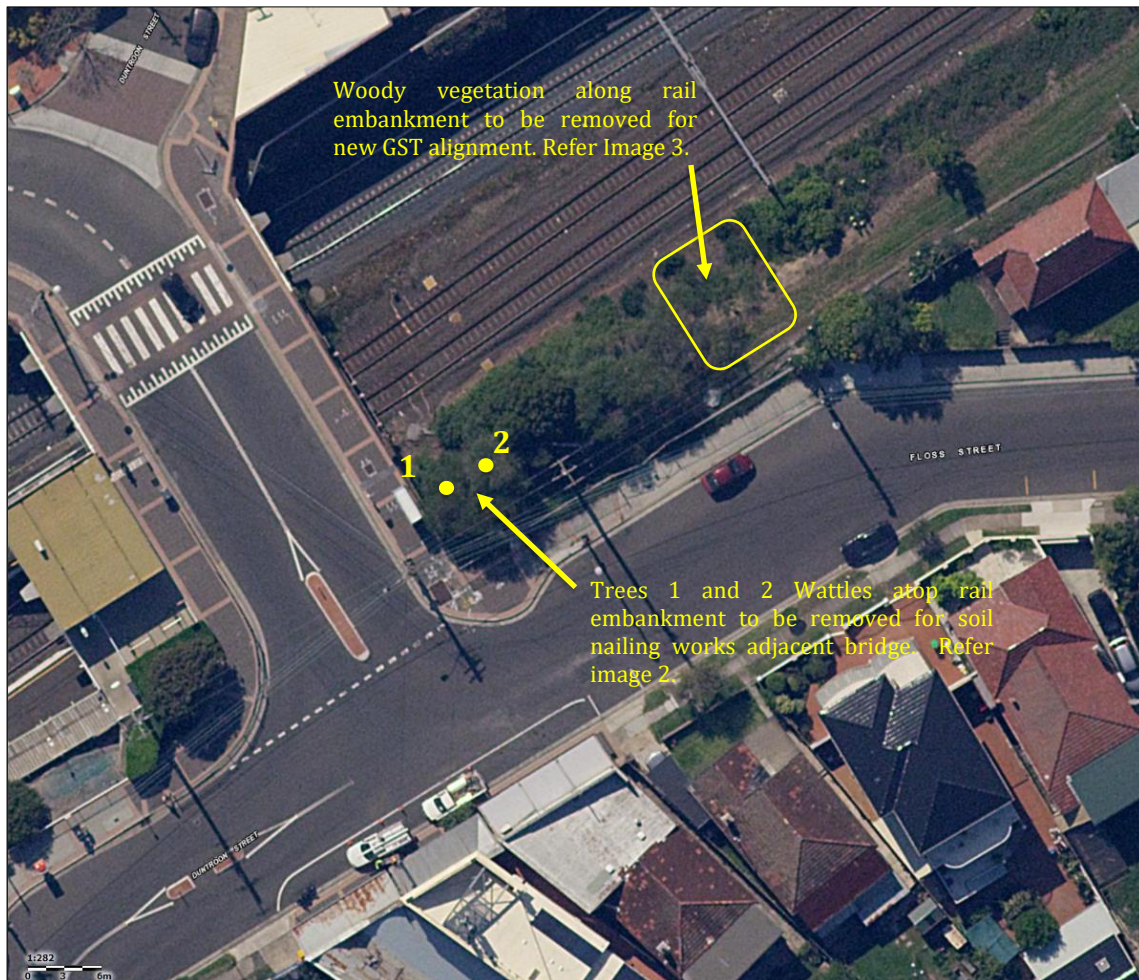


Image 1: Aerial image of Hurlstone Park Station adjacent Floss Street showing additional tree and vegetation removal. (Source Six Maps accessed 10/03/2021).

The two Wattles were identified for removal to accommodate soil nailing works. Image 2 shows the subject trees. The trees were found to have a short useful life expectancy given their species type and medium landscape significance. The trees provide some screening from the rail corridor and its associated infrastructure.



Image 2: Trees 1 and 2, Wattles require removal to accommodate soil pinning works adjacent the bridge.

Woody vegetation located along the rail embankment was identified for removal to align the new GST. No access was gained to the rail corridor to assess the vegetation, but it has been confirmed in consultation with the project Ecologist to consist of; one *Pittosporum undulatum* (Sweet Pittosporum) tree 13, seven *Acacia saligna* (Golden Wreath Wattle) trees 47 to 53, one *Grevillea* sp (Grevillea), tree 54 and two *Yucca* sp (Yucca) trees 55 and 56. The vegetation is considered to have a short useful life expectancy and low landscape significance given its location within the rail corridor. Image 3 shows the approximate area to be cleared.

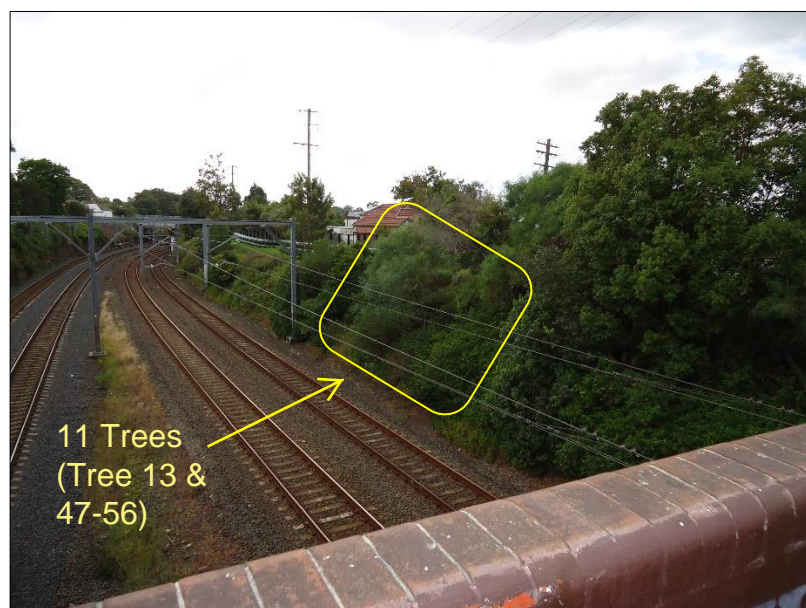


Image 3: Approximate area of woody vegetation along the rail embankment to be cleared to align the new GST.

Additional tree removal adjacent Railway Street

Additional tree removals were identified within the rail corridor associated with the construction of the Metro Services Building. A concrete pad is to be relocated from adjacent trees 166 and 167 to overlay the position of tree 194 *Cinnamomum camphora* (Camphor Laurel) requiring its removal. The tree has been identified for removal on demolition documentation viewed during the on-site inspection. Image 4 shows the tree.



Image 4: Tree 194 as identified within the AIA report shall require removal to accommodate the relocation of the concrete pad. Note the rail embankment to the rear of the tree has been cleared of woody vegetation.

Tree 198 *Jacaranda mimosifolia* (Jacaranda) and and 199 *Lophostemon confertus* (Brush Box) is a council owned street tree located within the road reserve area adjacent the rail corridor access gate. These trees are positioned within the footprint of the access road into the proposed Metro Services Building requiring their removal. Image 5 shows the trees. These trees have been identified for removal on demolition documentation viewed during the on-site inspection.

At the time of the inspection, it was found that a portion of the rail embankment had been cleared by others. Trees 181, 182, 183, 184, 185, 186, 189, 190, 191, 192, 193, 195, 196 and 197, as identified within the AIA report and have been removed by others as part of regular rail corridor clearing works.



Image 5: Trees 198 and 199 as identified within the AIA report shall require removal for the Metro Services Building access road.

An understory of ten *Ligustrum lucidum* (Broad-leaved Privet) trees 3 to 12, two *Phoenix canariensis* (Canary Island Date Palm) trees 14 and 15, eight *Cinnamomum camphora* (Camphor Laurel) trees 16 to 23, nine *Albanthus altissima* (Tree of Heaven) trees 24 to 32, three *Robinia pseudoacacia* (Black Locust) trees 33 to 35, one *Gleditsia triacanthos* (Honey Locust) tree 36, two *Morus alba* (Mulberry) trees 37 and 38 and eight *Senna pendula* (Easter Cassia) trees 39 to 46 exists along the embankment beneath the canopies of trees 166 to 180. Although meeting the requirement of a tree under the *Sydney Metro City & Southwest Sydneyham to Bankstown Instrument of Approval* these species are commonly considered to be weeds. Broad-leaved Privet, Camphor Laurel, Tree of Heaven, Easter Cassia, Black Locust and Honey Locust are identified species under the *Biosecurity Act 2015*. A general biosecurity duty exists within NSW to prevent, eliminate or minimise any biosecurity risk. The understory generally ranges in height between 3 and 10m and has been previously managed through selective pruning, lopping and removal works. Its significance has been assessed under the Pre-clearance Assessment prepared by Cumberland Ecology dated 14 March 2021.

The additional trees to be removed are not representative of an endangered or threatened species or ecological community.

All appropriate approvals and consents are to be obtained prior to tree and vegetation removal works commencing. All tree removal works are to be undertaken by suitably qualified tree workers and in accordance with Safe Work Australia's Guide to Managing Risks of Tree Trimming and Removal Works.

Please feel free to contact me should you require any further assistance regarding this matter.

Regards.

Owen Tebbutt



Consulting Arborist
Plateau Tree Service

Appendix 1: Tree Assessment Schedule

Tree number	Tree name	Tree dimensions				Vigour	Condition	Age class	ULE	Amenity and Visual Value	Native or Exotic	TPZ (m)	SRZ (m)	Comments	Remove or Retain
	Botanical name Common name	Height (m)	Spread (m)	D.B.H. (mm)	D.A.B. (mm)										
1	<i>Acacia saligna</i> (Golden Wreath Wattle)	1-5	4x4	-	-	N	G	M	S	M	N	-	-	No access to rail corridor, DBH not obtained. Short lived tree species. Clash with soil nailing and GST.	Remove
2	<i>Acacia saligna</i> (Golden Wreath Wattle)	1-5	4x4	-	-	N	G	M	S	M	N	-	-	No access to rail corridor, DBH not obtained. Short lived tree species. Clash with soil nailing and GST.	Remove
3	<i>Ligustrum lucidum</i> (Broad-leafed Privet)	5-10	1x1	100	200	N	G	M	S	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – general biosecurity duty exists. Clash with MSB.	Remove
4	<i>Ligustrum lucidum</i> (Broad-leafed Privet)	5-10	1x1	100	200	N	G	M	S	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – general biosecurity duty exists. Clash with MSB.	Remove
5	<i>Ligustrum lucidum</i> (Broad-leafed Privet)	1-5	1x1	50	80	N	G	M	S	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – general biosecurity duty exists. Clash with MSB.	Remove
6	<i>Ligustrum lucidum</i> (Broad-leafed Privet)	1-5	1x1	50	80	N	G	M	S	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – general biosecurity duty exists. Clash with MSB.	Remove
7	<i>Ligustrum lucidum</i> (Broad-leafed Privet)	1-5	1x1	50	80	N	G	M	S	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – general biosecurity duty exists. Clash with MSB.	Remove
8	<i>Ligustrum lucidum</i> (Broad-leafed Privet)	5-10	1x1	50	80	N	G	M	S	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – general biosecurity duty exists. Clash with MSB.	Remove
9	<i>Ligustrum lucidum</i> (Broad-leafed Privet)	5-10	1x1	50	80	N	G	M	S	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – general biosecurity duty exists. Clash with MSB.	Remove
10	<i>Ligustrum lucidum</i> (Broad-leafed Privet)	5-10	1x1	50	80	N	G	M	S	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – general biosecurity duty exists. Clash with MSB.	Remove
11	<i>Ligustrum lucidum</i> (Broad-leafed Privet)	5-10	1x1	50	80	N	G	M	S	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – general biosecurity duty exists. Clash with MSB.	Remove
12	<i>Ligustrum lucidum</i> (Broad-leafed Privet)	5-10	1x1	50	80	N	G	M	S	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – general biosecurity duty exists. Clash with MSB.	Remove
13	<i>Pittosporum undulatum</i> (Sweet pittosporum)	5-10	2x2	100	200	N	G	M	S	L	N	2	1.5	Clash with soil nailing and GST.	Remove

Tree number	Tree name	Tree dimensions				Vigour	Condition	Age class	ULE	Amenity and Visual Value	Native or Exotic	TPZ (m)	SRZ (m)	Comments	Remove or Retain
	Botanical name Common name	Height (m)	Spread (m)	D.B.H. (mm)	D.A.B. (mm)										
14	<i>Phoenix canariensis</i> (Canary Island Date Palm)	1-2	2x2	100	200	N	G	M	M	L	E	3	1.5	Understorey specimen. Clash with MSB. Not a tree due to height.	Remove
15	<i>Phoenix canariensis</i> (Canary Island Date Palm)	1-2	2x2	100	200	N	G	M	M	L	E	3	1.5	Understorey specimen. Clash with MSB. Not a tree due to height.	Remove
16	<i>Cinnamomum camphora</i> (Camphor laurel)	5-10	3x3	100	200	N	G	M	M	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – general biosecurity duty exists. Clash with MSB.	Remove
17	<i>Cinnamomum camphora</i> (Camphor laurel)	5-10	3x3	100	200	N	G	M	M	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – general biosecurity duty exists. Clash with MSB.	Remove
18	<i>Cinnamomum camphora</i> (Camphor laurel)	5-10	3x3	100	200	N	G	M	M	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – general biosecurity duty exists. Clash with MSB.	Remove
19	<i>Cinnamomum camphora</i> (Camphor laurel)	5-10	3x3	100	200	N	G	M	M	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – general biosecurity duty exists. Clash with MSB.	Remove
20	<i>Cinnamomum camphora</i> (Camphor laurel)	10-15	3x3	150	250	N	G	M	M	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – general biosecurity duty exists. Clash with MSB.	Remove
21	<i>Cinnamomum camphora</i> (Camphor laurel)	10-15	3x3	1000	1200	N	G	M	M	L	E	12	3.6	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – general biosecurity duty exists. Clash with MSB.	Remove
22	<i>Cinnamomum camphora</i> (Camphor laurel)	5-10	3x3	50	80	N	G	M	M	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – general biosecurity duty exists. Clash with MSB.	Remove
23	<i>Cinnamomum camphora</i> (Camphor laurel)	5-10	3x3	50	80	N	G	M	M	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – general biosecurity duty exists. Clash with MSB.	Remove
24	<i>Alianthus altissima</i> (Tree of Heaven)	5-10	3x3	100	200	N	G	M	S	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – general biosecurity duty exists. Clash with MSB.	Remove
25	<i>Alianthus altissima</i> (Tree of Heaven)	5-10	3x3	100	200	N	G	M	S	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – general biosecurity duty exists. Clash with MSB.	Remove
26	<i>Alianthus altissima</i> (Tree of Heaven)	5-10	3x3	100	200	N	G	M	S	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – general biosecurity duty exists. Clash with MSB.	Remove

Tree number	Tree name	Tree dimensions				Vigour	Condition	Age class	ULE	Amenity and Visual Value	Native or Exotic	TPZ (m)	SRZ (m)	Comments	Remove or Retain
	Botanical name Common name	Height (m)	Spread (m)	D.B.H. (mm)	D.A.B. (mm)										
27	<i>Alianthus altissima</i> (Tree of Heaven)	5-10	3x3	100	200	N	G	M	S	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – general biosecurity duty exists. Clash with MSB.	Remove
28	<i>Alianthus altissima</i> (Tree of Heaven)	5-10	3x3	100	200	N	G	M	S	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – general biosecurity duty exists. Clash with MSB.	Remove
29	<i>Alianthus altissima</i> (Tree of Heaven)	5-10	3x3	100	200	N	G	M	S	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – general biosecurity duty exists. Clash with MSB.	Remove
30	<i>Alianthus altissima</i> (Tree of Heaven)	5-10	3x3	100	200	N	G	M	S	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – general biosecurity duty exists. Clash with MSB.	Remove
31	<i>Alianthus altissima</i> (Tree of Heaven)	5-10	3x3	100	200	N	G	M	S	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – general biosecurity duty exists. Clash with MSB.	Remove
32	<i>Alianthus altissima</i> (Tree of Heaven)	5-10	3x3	100	200	N	G	M	S	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – general biosecurity duty exists. Clash with MSB.	Remove
33	<i>Robinia psuedoacacia</i> (Black Locust)	5-10	3x3	100	200	N	G	M	S	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – general biosecurity duty exists. Clash with MSB.	Remove
34	<i>Robinia psuedoacacia</i> (Black Locust)	5-10	3x3	100	200	N	G	M	S	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – general biosecurity duty exists. Clash with MSB.	Remove
35	<i>Robinia psuedoacacia</i> (Black Locust)	5-10	3x3	100	200	N	G	M	S	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – general biosecurity duty exists. Clash with MSB.	Remove
36	<i>Gleditsia triacanthos</i> (Honey Locust)	1-2	1x1	50	80	N	G	Y	S	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015. Not a tree due to height. Clash with MSB.	Remove
37	<i>Morus alba</i> (Mulberry)	5-10	3x3	200	300	N	G	M	S	L	E	2.4	2	Understorey specimen. Clash with MSB	Remove
38	<i>Morus alba</i> (Mulberry)	5-10	3x3	200	300	N	G	M	S	L	E	2.4	2	Understorey specimen. Clash with MSB	Remove
39	<i>Senna pendula</i> (Easter Cassia)	1-5	1x1	50	80	N	G	Y	S	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – general biosecurity duty exists. Clash with MSB	Remove

Tree number	Tree name	Tree dimensions				Vigour	Condition	Age class	ULE	Amenity and Visual Value	Native or Exotic	TPZ (m)	SRZ (m)	Comments	Remove or Retain
	Botanical name Common name	Height (m)	Spread (m)	D.B.H. (mm)	D.A.B. (mm)										
40	<i>Senna pendula</i> (Easter Cassia)	1-5	1x1	50	80	N	G	Y	S	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – general biosecurity duty exists. Clash with MSB	Remove
41	<i>Senna pendula</i> (Easter Cassia)	1-5	1x1	50	80	N	G	Y	S	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – general biosecurity duty exists. Clash with MSB	Remove
42	<i>Senna pendula</i> (Easter Cassia)	1-5	1x1	50	80	N	G	Y	S	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – general biosecurity duty exists. Clash with MSB	Remove
43	<i>Senna pendula</i> (Easter Cassia)	1-5	1x1	50	80	N	G	Y	S	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – general biosecurity duty exists. Clash with MSB	Remove
44	<i>Senna pendula</i> (Easter Cassia)	1-5	1x1	50	80	N	G	Y	S	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – general biosecurity duty exists. Clash with MSB	Remove
45	<i>Senna pendula</i> (Easter Cassia)	1-5	1x1	50	80	N	G	Y	S	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – general biosecurity duty exists. Clash with MSB	Remove
46	<i>Senna pendula</i> (Easter Cassia)	1-5	1x1	50	80	N	G	Y	S	L	E	2	1.5	Understorey specimen. Listed noxious weed under Biosecurity Act 2015 – general biosecurity duty exists. Clash with MSB	Remove
47	<i>Acacia saligna</i> (Golden Wreath Wattle)	5-10	3x3	150	250	N	G	M	S	L	N	2	1.5	Clash with soil nailing and GST.	Remove
48	<i>Acacia saligna</i> (Golden Wreath Wattle)	5-10	3x3	150	250	N	G	M	S	L	N	2	1.5	Clash with soil nailing and GST.	Remove
49	<i>Acacia saligna</i> (Golden Wreath Wattle)	5-10	3x3	150	250	N	G	M	S	L	N	2	1.5	Clash with soil nailing and GST.	Remove
50	<i>Acacia saligna</i> (Golden Wreath Wattle)	5-10	3x3	50	80	N	G	M	S	L	N	2	1.5	Clash with soil nailing and GST.	Remove
51	<i>Acacia saligna</i> (Golden Wreath Wattle)	5-10	3x3	50	80	N	G	M	S	L	N	2	1.5	Clash with soil nailing and GST.	Remove
52	<i>Acacia saligna</i> (Golden Wreath Wattle)	5-10	3x3	100	200	N	G	M	S	L	N	2	1.5	Clash with soil nailing and GST.	Remove

Tree number	Tree name	Tree dimensions				Vigour	Condition	Age class	ULE	Amenity and Visual Value	Native or Exotic	TPZ (m)	SRZ (m)	Comments	Remove or Retain
	Botanical name Common name	Height (m)	Spread (m)	D.B.H. (mm)	D.A.B. (mm)										
53	<i>Acacia saligna</i> (Golden Wreath Wattle)	5-10	3x3	100	200	N	G	M	S	L	N	2	1.5	Clash with soil nailing and GST.	Remove
54	<i>Grevillea</i> sp (Grevillea)	5-10	2x2	50	80	N	G	M	S	L	N	2	1.5	Clash with soil nailing and GST.	Remove
55	<i>Yucca</i> sp (Yucca)	1-5	1x1	-	-	N	G	M	S	L	E	2	1.5	Clash with soil nailing and GST.	Remove
56	<i>Yucca</i> sp (Yucca)	1-5	1x1	-	-	N	G	M	S	L	E	2	1.5	Clash with soil nailing and GST.	Remove

TREES 3-12 & 14-46, ALL TREES TO BE REMOVED DUE TO DIRECT CLASH WITH MSB AND
RETAINING WALL

3,4,5,6,7,8,9,10,11,12,14,15,16,17,18,19,20,21,22,23,24,25,26,27,28,29,30,
31,32,33,34,35,36,37,38,39,40,41,42,43,44,45 & 46



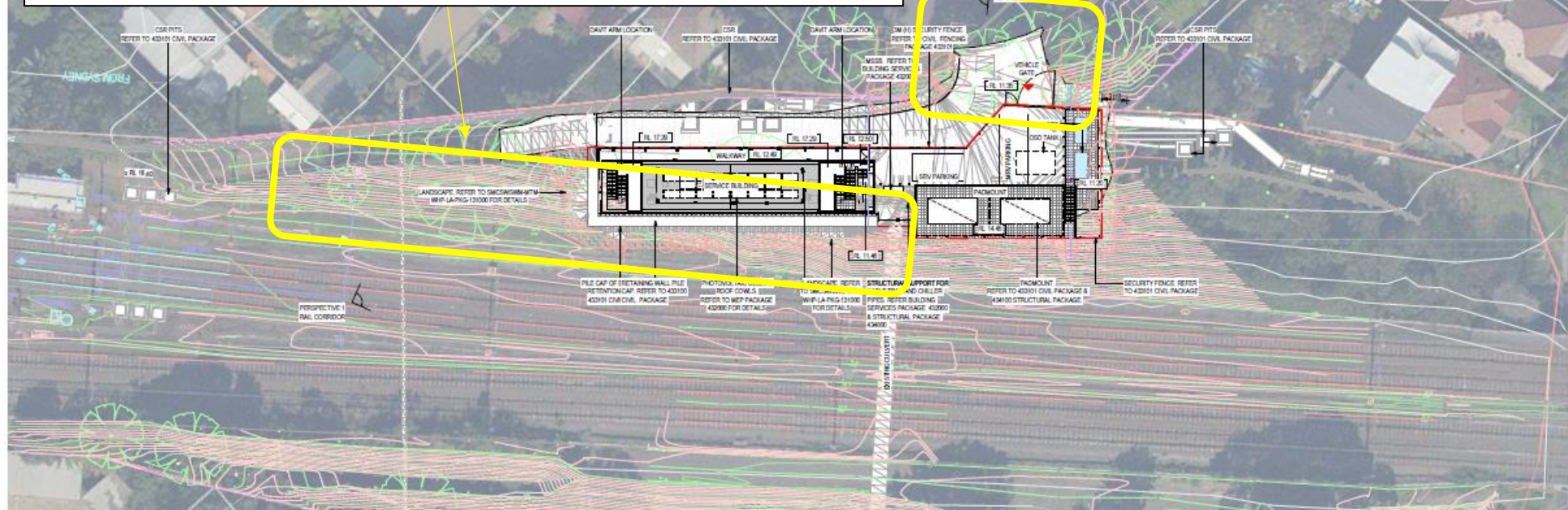


CENTRAL / CITY

BANKSTOWN

TREES 198 & 199, TO BE REMOVED DUE TO DIRECT CLASH WITH ACCESS ROAD INTO THE MSB

TREES 3-12 & 14-46, ALL TREES TO BE REMOVED DUE TO DIRECT CLASH WITH MSB AND RETAINING WALL



FOR CONSTRUCTION

REV	BY	DATE	DESCRIPTION	APPROVED
1	SM	2020-01-10	ISSUED FOR CONSTRUCTION	SM
2	SM	2020-01-10	ISSUED FOR CONSTRUCTION	SM
3	SM	2020-01-10	ISSUED FOR CONSTRUCTION	SM
4	SM	2020-01-10	ISSUED FOR CONSTRUCTION	SM
5	SM	2020-01-10	ISSUED FOR CONSTRUCTION	SM
6	SM	2020-01-10	ISSUED FOR CONSTRUCTION	SM
7	SM	2020-01-10	ISSUED FOR CONSTRUCTION	SM
8	SM	2020-01-10	ISSUED FOR CONSTRUCTION	SM
9	SM	2020-01-10	ISSUED FOR CONSTRUCTION	SM
10	SM	2020-01-10	ISSUED FOR CONSTRUCTION	SM



NOTE: Do not scale from this drawing

ALT. DRG. NO. SMCSWSMM/MTM-WHP-AT-DWG-431120



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SERVICE PROVIDERS

DESIGNED BY: J. GILBERT
DRAWN BY: J. GILBERT
CHECKED BY: J. GILBERT
DESIGN CHECKED BY: J. GILBERT
APPROVED BY: J. GILBERT

SYDNEY METRO

HURLESTONE PARK
ARCHITECTURAL
OVERALL ARRANGEMENT
SITE PLAN - SERVICE BUILDING

STATUS: FOR CONSTRUCTION

DRG. NO. SMCSWSMM/MTM-WHP-AT-DWG-431120

SHEET 1 OF 1

REV 00

Appendix 3: Tree Assessment Criteria

Tree number: Identifying number given to individual (or group) trees.

Botanical Name: Latin name for tree showing genus and species.

Common Name: The common name given to the tree.

Tree Dimensions: The physical dimensions of the tree.

- **Height:** Estimated or measured height of tree in meters.
- **Spread:** Estimated or measured radial canopy spread of tree in meters.
- **Diameter at Breast Height (DBH):** The estimated or measured diameter of trunk given in mm measured at 1.4m from ground.
- **Diameter Above Base (DAB):** The estimated or measured diameter of trunk given in mm measured above the root flare. Used to calculate the structural root zone of the tree.

Age Class: An estimation of how old the tree is in relation to its life expectancy.

- **Young** – Age less than 20% of life expectancy of tree in situ
- **Mature** – Age 20% - 80% of life expectancy of tree in situ
- **Old** – Age greater than 80% of life expectancy of tree in situ
- **Dead** – Tree is dead

Vigour: Ability of a tree to sustain its life processes. This is independent of the condition of a tree but may impact upon it. Vigour can appear to alter rapidly with change of seasons (seasonality) e.g., dormant, deciduous or semi-deciduous trees. Vigour can be categorised as Dormant, Low, Normal and High.

- **Dormant Vigour** – Determined by the existing turgidity in the lower order branches in the outer extremity of the crown, with good bud set and formation, and where the last extension growth is distinct from those most recently preceding it, evident by bud scale scars. Normal vigour during dormancy is achieved when such growth is evident on a majority of branches throughout the crown.
- **Low Vigour** – Reduced ability of a tree to sustain its life processes. This may be evident by the atypical growth of leaves, reduced crown cover and reduced crown density, branches, roots and trunk, and a deterioration of their functions with reduced resistance to predation. This is independent of the condition of a tree but may impact upon it, and especially the ability of a tree to sustain itself against predation.
- **Normal Vigour** – Ability of a tree to maintain and sustain its life processes. This may be evident by the typical growth of leaves, crown cover and crown density, branches, roots and trunk and resistance to predation. This is independent of the condition of a tree but may impact upon it, and especially the ability of a tree to sustain itself against predation.
- **High Vigour** – Accelerated growth of a tree due to incidental or deliberate artificial changes to its growing environment that are seemingly beneficial, but may result in premature aging or failure if the favourable conditions cease, or promote prolonged senescence if the favourable conditions remain, e.g. water from a leaking pipe, water and nutrients from a leaking or disrupted sewer pipe, nutrients from animal waste, a tree growing next to a chicken coop, or a stock feed lot, or a regularly used stockyard, a tree subject to stringent watering and fertilisation program, or some trees may achieve an extended lifespan from continuous pollarding practices over the life of the tree.

Condition: A tree's crown form and growth habit, as modified by its environment (aspect, suppression by other trees, soils) the stability and viability of the root plate, trunk and structural branches (first (1st) and possibly (2nd) order branches), including structural defects such as wounds, cavities or hollows, crooked trunk or weak trunk/branch junctions and the effects of predation by pests and diseases. These may not be directly connected with vigour and it is possible for a tree to be of normal vigour but in poor condition. Condition can be categorised as Dead, Poor, Fair and Good.

- **Dead Condition** – Tree is no longer capable of performing any of the following processes or is exhibiting any of the following symptoms; Photosynthesis via its foliage crown (as indicated by the presence of moist, green or other coloured leaves), Osmosis (the ability of the roots system to take up water), Turgidity (the ability of the plant to sustain moisture pressure in its cells), Epicormic shoots or epicormic strands in Eucalypts (the production of new shoots as a response to stress, generated from latent or adventitious buds or from a lignotuber), Permanent leaf loss, Permanent leaf wilting (the loss of turgidity which is marked by desiccation of stems leaves and roots), Abscission of the epidermis (bark desiccates and peels off to the beginning of the sap wood).
- **Poor Condition** – Tree is of good habit or misshapen, a form that may be severely restricted for space and light, exhibits symptoms of advanced and irreversible decline such as fungal, or bacterial infestation, major die-back in the branch and foliage crown, structural deterioration from insect damage e.g. termite infestation, or storm damage or lightning strike, ring barking from borer activity in the trunk, root damage or instability of the tree, or damage from physical wounding impacts or abrasion, or from altered local environmental conditions and has been unable to adapt to such changes and may decline further to death regardless of remedial works or other modifications to the local environment that would normally be sufficient to provide for its basic survival if in good to fair condition. Deterioration physically, often characterised by a gradual and continuous reduction in vigour but may be independent of a change in vigour, but characterised by a proportionate increase in susceptibility to, and predation by pests and diseases against which the tree cannot be sustained. Such conditions may also be evident in trees of advanced senescence due to normal phenological processes, without modifications to the growing environment or physical damage having been inflicted upon the tree. This may be independent from, or contributed to by vigour.
- **Fair Condition** – Tree is of good habit or misshapen, a form not severely restricted for space and light, has some physical indication of decline due to the early effects of predation by pests and diseases, fungal, bacterial, or insect infestation, or has suffered physical injury to itself that may be contributing to instability or structural weaknesses, or is faltering due to the modification of the environment essential for its basic survival. Such a tree may recover with remedial works where appropriate, or without intervention may stabilise or improve over time, or in response to the implementation of beneficial changes to its local environment. This may be independent from, or contributed to by vigour.
- **Good Condition** – Tree is of good habit, with crown form not severely restricted for space and light, physically free from the adverse effects of predation by pests and diseases, obvious instability or structural weaknesses, fungal, bacterial or insect infestation and is expected to continue to live in much the same condition as at the time of inspection provided conditions around it for its basic survival do not alter greatly. This may be independent from, or contributed to by vigour.

Safe Useful Life Expectancy (SULE) SULE is the length of time that the arborist assesses an individual tree can be retained with an acceptable level of risk based on the information available at the time of inspection. It is a snapshot in time of the potential an individual tree has for survival in the eyes of the assessor. SULE is not static – it is closely related to tree health and the surrounding conditions. Alterations in these variables may result in changes to the SULE assessment. Consequently, the reliability all SULE assessments have will decrease as time passes from the initial assessment and the potential for changes in variables increases.

- **Remove** – Trees that should be removed within the next 5 years
- **Short** – Trees that appear to be retainable at the time of the assessment for 5-15 years with an acceptable level of risk.
- **Medium** – Trees that appear to be retainable at the time of the assessment for 15-40 years with an acceptable level of risk.
- **Long** – Trees that appear to be retainable at the time of the assessment for 40+ years with an acceptable level of risk.

Amenity and Visual Value – For the purposes of assessing the visual and landscape value of each tree the IACA Significance of a Tree, Assessment Rating System (STARS) © (IACA 2010) © has been adopted. - The landscape significance of a tree is an essential criterion to establish the importance that a particular tree may have on a site. The system uses a scale of High, Medium and Low significance in the landscape.

High significance in landscape

- The tree is in good condition and good vigour
- The tree has a form typical for the species
- The tree is a remnant or is a planted locally indigenous specimen and/or is rare or uncommon in the local area or of botanical interest or of substantial age
- The tree is listed as a heritage item, threatened species or part of an endangered ecological community or listed on council's significant tree register
- The tree is visually prominent and visible from a considerable distance when viewed from most directions within the landscape due to its size and scale and makes a positive contribution to the local amenity
- The tree supports social and cultural sentiments or spiritual associations, reflected by the broader population or community group or has commemorative values
- The tree's growth is unrestricted by above and below ground influences, supporting its ability to reach dimensions typical for the taxa in situ – tree is appropriate to the site conditions

Medium significance in landscape

- The tree is in fair-good condition and good or low vigour
- The tree has form typical or atypical of the species
- The tree is a planted locally indigenous or a common species with its taxa commonly planted in the local area
- The tree is visible from surrounding properties, although not visually prominent as partially obstructed by other vegetation or buildings when viewed from the street
- The tree provides a fair contribution to the visual character and amenity of the local area
- The tree's growth is moderately restricted by above or below ground influences, reducing its ability to reach dimensions typical for the taxa in situ

Low significance in landscape

- The tree is in fair-poor condition and good or low vigour
- The tree has form atypical of the species
- The tree is not visible or is partly visible from the surrounding properties as obstructed by other vegetation or buildings
- The tree provides a minor contribution or has a negative impact on the visual character and amenity of the local area
- The tree is a young specimen which may or may not have reached dimensions to be protected by local Tree Preservation Orders or similar protection mechanisms and can easily be replaced with a suitable specimen
- The tree's growth is severely restricted by above or below ground influences, unlikely to reach dimensions typical for the taxa in situ – tree is inappropriate to the site conditions
- The tree is listed as exempt under the provisions of the local Council Tree Preservation Order or similar protection mechanisms
- The tree has a wound or defect that has the potential to become structurally unsound
- **Environmental Pest / Noxious Weed Species**
- The tree is an environmental pest species due to its invasiveness or poisonous/allergenic properties.
- The tree is a declared noxious weed by legislation
- **Hazardous / Irreversible Decline**
- The tree is structurally unsound and/or unstable and is considered potentially dangerous
- The tree is dead, or is in irreversible decline, or has the potential to fail or collapse in full or in part in the immediate to short term

The tree is to have a minimum of three (3) criteria in a category to be classified in that group.

In the development of this document IACA acknowledges the contribution and original concept of the Footprint Green Tree Significance & Retention Value Matrix, developed by Footprint Green Pty Ltd in June 2010.

The Australian Standard 4970-2009 Protection of Trees on Development Sites defines the requirements for assessing trees with respect to development. It provides the guidance on how to decide which trees are appropriate for retention and on the means of protecting them during construction works. It describes the areas and offsets, referred to as the Tree Protection Zone (TPZ) and Structural Root Zone (SRZ) required to be free from development works to maintain tree vitality and stability. This report has been prepared in accordance with the conditions set out within the standard.

- **Tree Protection Zone** – The tree protection zone is defined as a specified area above and below ground set aside for the protection of the tree's roots and crown. It is expressed as a radial measurement taken from the centre of the trunk at ground level.

Structural Root Zone – The structural root zone is defined as a specified area around the base of a tree required to maintain its stability within the ground. It is expressed as a radial measurement taken from the center of the trunk at ground level. Excavation and development works are not recommended within the structural root zone unless additional investigation as to root size and location is undertaken



Pruning Specification

7 COMMONS ST, HURLSTONE PARK 2193

Prepared By: Colin Curtis
AQF 5 Arboriculture Diploma
Arboriculture Australia Member #2332
Member of the International Society of Arboriculture #228182

Prepared For:
Downer Group

11/05/2021

1. INTRODUCTION

- 1.1 A request from Downer Group was made to Plateau Trees on the 11th May 2021, to produce a pruning specification as to allow for heavy vehicle access within the rail corridor of Hurlstone Park Station. The pruning of one (1) x tree is detailed within this specification.

2. THE SITE

- 2.1 The subject tree are located in the rear yard of 7 Commons St, Hurlstone Park 2193. The tree can be seen in figure 1 below, numbered and outlined in red.



Figure 1

1 7 Commons St, Hurlstone Park 2193.



Plateau Tree Service Pty Ltd
PO BOX 1522, DEE WHY NSW 2099 Australia
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ABN : 17 090 798 002

3. PRUNING SPECIFICATION

3.1 TREE 1 – MORTON BAY FIG (*FICUS MACROPHYLLA*) SEE FIGURE 2

Branch No #	Branch / Stem Height (Mts)	Branch / Stem Diameter (mm)	Branch Order	Pruning Class	Canopy Percentage
1	3	80	2 nd	7.2.4, Selective	3%
2	3	250	2 nd	7.2.4, Selective	13%
3	3.6	180	2 nd	7.2.4, Selective	7%



Figure 2: Cut locations of limbs to be pruned marked in red.

2 7 Commons St, Hurlstone Park 2193.



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This area of foliage is minor regrowth from weed species and is requested to be pruned back to the fence line.



3 7 Commons St, Hurlstone Park 2193.

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4. CONCLUSION & RECOMMENDATIONS

- 4.1 All works must be undertaken in accordance with the Australian Standard (AS)4373-2007, Pruning of Amenity Trees.
- 4.2 Any additional limbs that may be required to be pruned that have not been mentioned in this specification, will be undertaken at the discretion of the site arborist.
- 4.3 Pruning must be undertaken by a qualified Arborist (AQF¹ 3) following the guidelines provided in the Amenity Tree Industry – Work Cover Code of Practice 1998 and Safe work Australia’s “Guide to managing risks of tree trimming and removal work” (July 2016).

¹ Australian Qualification Framework

4 7 Commons St, Hurlstone Park 2193.



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Pruning Specification

5 RAILWAY ST, HURLSTONE PARK 2193

Prepared By: Colin Curtis
AQF 5 Arboriculture Diploma
Arboriculture Australia Member #2332
Member of the International Society of Arboriculture #228182

Prepared For:
Downer Group

11/05/2021

1. INTRODUCTION

- 1.1 A request from Downer Group was made to Plateau Trees on the 11th May 2021, to produce a pruning specification as to allow for heavy vehicle access within the rail corridor of Hurlstone Park Station. The pruning of two (2) x trees is detailed within this specification.

2. THE SITE

- 2.1 The subject trees are located in the rear yard of 5 Railway St, Hurlstone Park 2193. These trees can be seen in figure 1 below, numbered and outlined in red.



Figure 1

1 5 Railway S, Hurlstone Park 2193.



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3. PRUNING SPECIFICATION

3.1 TREE 1 – WILLOW BOTTLE BRUSH (*CALLISTEMON SALIGNUS*) SEE FIGURE 2

Branch No #	Branch / Stem Height (Mts)	Branch / Stem Diameter (mm)	Branch Order	Pruning Class	Canopy Percentage
1	2	150	1st	7.2.4, Selective	4%
2	2.1	120	1st	7.2.4, Selective	4%
3	2.3	100	1st	7.2.4, Selective	4%
4	2.5	80	1st	7.2.4, Selective	3%



Figure 2:Limbs to be pruned marked in red.

2 5 Railway S, Hurlstone Park 2193.



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3.2 TREE 2 – GUM TREE (*UNIDENTIFIED EUCALYPTUS SP.*) SEE FIGURE 3

Branch No #	Branch / Stem Height	Branch / Stem Diameter	Branch Order	Pruning Class	Canopy Percentage
1	4.4m	180mm	2 nd	7.2.4, Selective	8%
2	4.5m	180mm	2 nd	7.2.4, Selective	9%



Figure 3: Limbs to be pruned marked in red.

3 5 Railway S, Hurlstone Park 2193.



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4. CONCLUSION & RECOMMENDATIONS

- 4.1 All works must be undertaken in accordance with the Australian Standard (AS)4373-2007, Pruning of Amenity Trees.
- 4.2 Any additional limbs that may be required to be pruned that have not been mentioned in this specification, will be undertaken at the discretion of the site arborist.
- 4.3 Pruning must be undertaken by a qualified Arborist (AQF¹ 3) following the guidelines provided in the Amenity Tree Industry – Work Cover Code of Practice 1998 and Safe work Australia’s “Guide to managing risks of tree trimming and removal work” (July 2016).

¹ Australian Qualification Framework

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