



Project No: SHBC/NORTH/22 Report No: SHBC/NORTH/AIA/A

ARBORICULTURAL IMPACT ASSESSMENT

Sydney Harbour Bridge Cycleway Northern Access Milsons Point

Prepared for: TfNSW

5th June 2023
Revision A

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1.1 Background

- 1.1.1 This Arboricultural Impact Assessment Report was prepared for Transport for NSW (TfNSW) in relation to the Sydney Harbour Bridge Cycleway Northern Access Project (the Project). As background, around 2000 bike trips are taken across the Sydney Harbour Bridge (SHB) cycleway on weekdays, making it the most heavily used cycleway in Sydney.¹ It is the only cross-harbour bike route in eastern Sydney and is a critical part of the wider bike network, linking the two sides of the city across the harbour.
- 1.1.2 The northern end of the SHB cycleway is currently accessed from Burton Street via a 55-step stairway. The stairway rises 11 metres and then requires cyclists to push their bikes through the safety barriers at the top of the steps. The steps are a safety hazard and slow the movement of people as they access or exit the cycleway, creating bottlenecks at peak times. The stairs also prevent a wider group of people from using the cycleway.
- 1.1.3 A range of ramp options (both linear and loop) were developed for TfNSW for the northern SHB cycleway access. In response to community feedback, TfNSW proceeded with plans to upgrade access to the SHB cycleway with the linear ramp as the preferred option.² On the August 18th 2021, TfNSW commenced a competitive design process via an open Registration of Interest (ROI) to select three leading architectural design teams with heritage and Connecting with Country expertise to help design a linear ramp. The winning design team led by ASPECT Studios was announced on the 1st April 2022.³
- 1.1.4 The purpose of this Report is to determine the impact of the proposed works on the trees, and where appropriate, recommend the use of sensitive construction methods and tree protection measures to minimise adverse impacts. Reference should be made to the Preliminary Arboricultural Report (Report No. SHBC/NORTH/PAR/B) prepared for the project in May 2022.
- 1.1.5 In preparing this Report, the authors have considered the objectives of the following:
- *State Environmental Planning Policy Vegetation in Non-Rural Areas (2017)*
 - *North Sydney Local Environmental Plan (2013)*
 - *Section 16 to Part B of North Sydney Development Control Plan (2013)*
 - *Transport for NSW Sydney Harbour Bridge Ramp Option - Consultation Report (2021)*
 - *Sydney Harbour Bridge Cycleway Access Project – North Supplementary Detailed Heritage Framework (2021)*
 - *Australian Standard 4970 Protection of Trees on Development Sites (2009)*
 - *Australian Standard 4373 Pruning of Amenity Trees (2007)*
 - *Australian Standard 2303 Tree Stock for Landscape Use (2015)*
 - *Safe Work Australia Guide for Managing Risks of Tree Trimming and Removal Work (2016)*

Refer to Methodology (**Appendix 1**)

¹ TfNSW (2021)

² TfNSW (2021)

³ TfNSW (2021)

1.1.6 This impact assessment is based on an assessment of the following supplied documentation/plans only:

- Detailed Design Report— prepared by Aspect (Issue A, 23.02.23)
- Proposed Site Plan Zones A-D— prepared by Aspect (Rev B, 20.03.23)
- Tree Retention & Removal Plan Zones A-C & D— prepared by Aspect (Rev A, 08.05.23)
- Tree Retention & Removal Plan Zone B— prepared by Aspect (Rev A, 05.06.23)

Refer to Plans (**Appendix 2**)

1.2 The Project

1.2.1 The scope of the project includes:

- Construction of a ramp structure at the northern end of the SHB cycleway
- Integration works between the transition at the ramp landing point to the surrounding street network
- Relocation of utilities to facilitate the delivery of the cycleway works

2.0 RESULTS

2.1 The Site

2.1.1 The site includes the former Kirribilli Bowling Green (Northern Bowling Green), Bradfield Park Central, the southern section of Bradfield Park North and a section of Alfred Street.

2.1.2 Bradfield Park (including northern section) is listed in Schedule 5 of the *North Sydney Local Environmental Plan (2013)* (I0538).⁴ Bradfield Park Central is located outside the curtilage of the SHB, Milsons Point Station and the LEP listing for Bradfield Park.⁵ The former Kirribilli Bowling Club is not listed as a heritage item.

2.2 Historical Background

2.2.1 Bradfield Park occupies a portion of land originally part of a land grant to Robert Ryan in 1800. In the 1850s, the subdivision and lot sales led to the creation of Milson Point Wharf and Land Cove Road (Alfred Street) in 1861. Bradfield Park was originally formed in the aftermath of major earthworks undertaken during construction of SHB.⁶

2.2.2 North Sydney Council completed the northern rockery and Milsons Point Station entry section of Bradfield Park in 1934 however plans for further works were delayed by the Great Depression of the 1930s. Surviving plantings from the 1930s include the *Butia capitata* (Wine Palms) at the entrance to the station.⁷

⁵ North Sydney Council (2012)

⁶ Tonkin Zulaikha Greer Architects Pty Ltd (2021)

⁷ Tonkin Zulaikha Greer Architects Pty Ltd (2021)

- 2.2.3 A review of the 1943 aerial photograph of the site shows trees in the same locations as Trees 8, 14 and 20. Tree 4 is of a similar age to Trees 8 and 20 and was likely planted at the same time however this tree appears to have been relocated to the northernmost raised lawn at some point. Tree 14 was dead when assessed in October 2021. The current Tree 14 is a recently transplanted specimen of the same size and species.
- 2.2.4 Archival images of the site in the 1960s show a line of Poplars in front of the viaduct pilasters. These were replaced with Simons Poplars located either side of the bridge pilasters by Council in the 1990s.⁸
- 2.2.5 The Cabbage Palms were introduced in 1981 when Burton Street was closed to through traffic.⁹ The land was transferred to the North Sydney Council in 1988 to allow construction of the Sydney Harbour Tunnel.
- 2.2.6 None of the trees are listed in Schedule 5 of the *North Sydney Local Environmental Plan (2013)*.¹⁰

2.3 The Trees

- 2.3.1 A Visual Tree Assessment (VTA) was undertaken of in early October 2021 (and updated and extended in May 2022 and May 2023) in preparation of Preliminary Arboricultural Report.
- 2.3.2 The trees comprise a mix of Australian-native and exotic species including *Agonis flexuosa* (Willow Myrtle), *Butia capitata* (Jelly Palm), *Callistemon viminalis* (Weeping Bottlebrush), *Corymbia maculata* (Spotted Gum), *Ficus macrophylla* (Moreton Bay Fig), *Lagerstroemia indica* (Crepe Myrtle), *Livistona australis* (Cabbage Tree Palm), *Lophostemon confertus* (Brush Box), *Phoenix canariensis* (Canary Island Date Palm), *Platanus x acerifolius* (London Plane Tree), *Populus simonii* (Simons Poplar), *Pyrus cvs* (Ornamental Pear Cultivars) and *Ulmus parvifolia* (Chinese Elm).
- 2.3.3 A search of the BioNet Atlas of NSW Wildlife Database was undertaken in October 2021. No individual threatened tree species listed within this database for the area were identified during the current field investigations of the site.¹¹ The ecological significance and habitat value of the trees has not been assessed and is beyond the scope of this report.
- 2.3.4 As required by Clause 2.3.2 of *Australian Standard 4970 Protection of Trees on Development Sites (2009)*, each of the trees assessed has been allocated a Retention Value. TreeIQ allocates one of four Retention Value categories based on a combination of Landscape Significance and Useful Life Expectancy (ULE). The assessment of Landscape Significance and ULE involves a degree of subjectivity and there will be a range of tree quality and value within each of the Retention Value categories. The Retention Values do not consider any proposed development works and are not a schedule for tree retention or removal. The trees have been allocated one of the following Retention Values:
- Priority for Retention
 - Consider for Retention
 - Consider for Removal
 - Priority for Removal

Refer to Tree Assessment Schedule (**Appendix 3**)

⁸ Tonkin Zulaikha Greer Architects Pty Ltd (2021)

⁹ Tonkin Zulaikha Greer Architects Pty Ltd (2021)

¹⁰ North Sydney Council (2013)

¹¹ NSW Office of Environment and Heritage (2011)

3.1 Tree Removal

3.1.1 The supplied plans show that seven (7) trees are to be removed as part of the proposed works. This includes five (5) trees with a Retention Value of *Consider for Retention*, one (1) tree with a Retention Value of *Consider for Removal* and one (1) tree with a Retention Value of *Priority for Removal*. No trees with a Retention Value of *Priority for Retention* are proposed for removal. In addition to the above, Tree 35 should also be removed. This tree could be retained and protected as part of the proposed works. However, the tree is recommended for removal as it is in poor structural condition. The trees to be removed are discussed in more detail below.

3.1.2 Trees 2, 3, 28-30 & 35

Trees 2, 3, 28-30 and 35 were identified as *Populus simonii* (Simons Poplar) and are mature specimens located in the southern section of Bradfield Park North, adjacent to the SHB viaduct wall. In general the trees are in good health and fair to poor structural condition due to wounds with advanced stages of decay. The trees are of moderate Landscape Significance however their form has been significantly impacted by Reduction Pruning to provide clearance for the SHB viaduct wall. Trees 2, 3, 29, 30 and 35 have been allocated a Retention Value of *Consider for Retention* with Tree 28 being in sufficiently poor structural condition to be allocated a Retention Value of *Priority for Removal*.

3.1.3 The supplied plans show Trees 2, 3, 28 and 29 are to be removed to accommodate the footprint of the proposed elevated cycleway and Trees 30 is to be removed due to accommodate new areas of pavement. Tree 35 is recommended for removal due to its poor structural condition.

3.1.4 Tree 27

Tree 27 was identified as *Pyrus cvs* (Ornamental Pear cultivar) and is a young specimen located in the southern section of Bradfield Park North. Tree 27 is in good health and good structural condition with no significant defects identified at the time of inspection. The tree is starting to develop a phototropic lean due to suppression from the adjacent Tree 26. It is expected the form of the tree will continue to be impacted as it grows. The tree is of low Landscape Significance and has been allocated a Retention Value of *Consider for Removal*.

3.1.5 The supplied plans show Tree 27 is to be removed due to accommodate new areas of pavement.

3.1.6 Tree 31

Tree 31 was identified as *Phoenix canariensis* (Canary Island Date Palm) and is located in a roundabout at the junction of Alfred Street and Fitzroy Street. Tree 31 is in good health and good structural condition with no significant defects identified at the time of inspection. The tree is of moderate Landscape Significance and has been allocated a Retention Value of *Consider for Retention*. *Phoenix canariensis* (Canary Island Date Palm) is an exotic palm species which was introduced to Australia in the late 1800's. It is historically associated with commemorative plantations and civic landscapes established during the late nineteenth and early twentieth centuries (including the Inter-war Period). Tree 31 is not visible in aerial imagery from 1943 and is unlikely to be a culturally significant specimen.

3.1.7 The supplied plans show Tree 31 is to be removed as part of the road reconfiguration works. It may be possible to transplant this tree to a new location. However, new plantings of this species are now uncommon due to its propensity to self-seed and become weedy and its susceptibility to the fungal disease *Fusarium oxysporum* f. sp. *Canariensis*.

3.2 Tree Retention

3.2.1 The supplied plans show that thirty-three (33) trees are to be retained as part of the proposed works. This includes fifteen (15) trees with a Retention Value of *Priority for Retention*, thirteen (13) trees with a *Retention Value of Consider for Retention* and five (5) trees with a Retention Value of *Consider for Removal*. These trees are discussed in more detail below.

3.2.2 Trees 1, 23, 26 & 34

Trees 1, 23, 26 and 34 were identified as *Ulmus parvifolia* (Chinese Elm) and are mature specimens located in the southern section of Bradfield Park North. Trees 1 and 23 are in good health and good structural condition with no significant defects identified at the time of inspection. Major bark inclusions have developed at the junction of co-dominant stems on Trees 26 and 34. These defects are not considered a significant hazard at the current time however they may become more serious as the crowns of the trees increase in size, weight and sail area. The trees are of moderate Landscape Significance and have been allocated a Retention Value of *Consider for Retention*.

3.2.3 The supplied plans show Trees 1, 23, 26 and 34 are to be retained with new pavement areas proposed within their Tree Protection Zone (TPZ) areas. The extent of works represent *Major Encroachments* as defined by AS-4970. Clause 3.3.4 of AS-4970 outlines that design factors and tree sensitive construction methods should be considered when determining the potential impact of the encroachment.

3.2.4 The following tree sensitive methods should be used to minimise adverse impacts.

- New pavements within the TPZ areas should be installed above existing grade (including any subbase layers) and designed to eliminate the need for high levels of compaction. For above grade pavements, ground levels may need to be locally raised and regraded along the edges of the pavement using an 80/20 washed river sand/screen topsoil blend.
- New pavements should only be installed at existing grade when replacing areas of existing pavement and utilising existing subbase layers. Roots (>25mm ϕ) identified with existing subbase layers should be retained as required by the Project Arborist, and surfaces and subbase layers should be thinned/modified as required.
- Where excavation is required, exploratory root investigations should be undertaken along the edge of the proposed pavement (to the depth of the proposed pavement and subbase) to determine the level of root damage that will result from the excavation and therefore the potential impacts the works may have on the trees. Localised regrading or thinning of the subbase layers may be required in areas where roots (>25mm ϕ) are present and are to be retained as required by the Project Arborist.
- Where pavement surfaces cover more than 20% of the TPZ area, consideration should be given to the use of a permeable pavement surface and subbase layer.

3.2.5 The supplied plans also show that the elevated cycleway is proposed within the TPZ areas of Trees 1 and 23. However, as an elevated structure with the columns and footings located outside of TPZ areas, the works should not impact the trees.

3.2.6 Trees 4, 8, 14 & 20

Trees 4, 8, 14 and 20 were identified as *Butia capitata* (Jelly Palm) and are late-mature specimens located within the raised lawn areas fronting the station entrance. Trees 8, 14 and 20 are in good health and structural condition with no significant defects identified at the time of inspection. Tree 4 is in fair health as indicated by foliar damage (widespread yellow/orange necrotic spotting of older fronds) consistent with either a leaf blight and/or nutritional deficiency. Potassium is the most likely nutritional deficiency to be affecting the palm which may eventually result in palm death. The trees are of very high Landscape Significance and have been allocated a Retention Value of *Priority for Retention*.

3.2.7 The supplied plans show Trees 4, 8, 14 and 20 are to be retained with no works proposed within their TPZ areas.

3.2.8 Trees 5-7, 10-13 & 16-18

Trees 5-7, 10-13 and 16-18 were identified as *Livistona australis* (Cabbage Tree Palm) and are mature specimens located in pavements intersecting the raised lawn areas to the front of the station. The trees are in good health and structural condition with no significant defects identified at the time of inspection. Tree 18 has a cable tie affixed to the trunk which is becoming occluded as the trunk expands. The trees are of high Landscape Significance and have been allocated a Retention Value of *Priority for Retention*.

3.2.9 The supplied plans show Trees 5-7, 10-13 and 16-18 are to be retained. No works are proposed within the TPZ areas of Trees 5, 6, 10, 12 and 16-18. Works are proposed within the TPZ areas of Trees 7, 11 and 13. For Trees 11 and 13, the extent of work represents *Minor Encroachments* as defined by AS-4970. A *Minor Encroachment* is considered acceptable by AS-4970 when it is compensated for elsewhere and contiguous within the TPZ.

3.2.10 The extent of works within the TPZ of Tree 7 represents a *Major Encroachment* as defined by AS-4970. Clause 3.3.4 of AS-4970 outlines that tree species and tolerance to root disturbance should be considered when determining the potential impact of an encroachment. Palms are arborescent monocots which have an adventitious root system comprised of numerous fibrous roots that arise independently from the Root Initiation Zone (RIZ) at the base of the trunk. Research has shown that when transplanting palms, most species require a minimum rootball radius of 300mm for successful transplantation. With consideration to this research, palm species can be considered more tolerant of root disturbance within the TPZ than tree species that produce a woody root system. Therefore, with the implementation of best practice tree protection measures, the proposed pavement works should not impact the health and structural condition of the tree.

3.2.11 There appears to be very limited clearance between the crown of Tree 7 and the proposed elevated cycleway. In the event that design/construction conflicts occur between the ramp and the tree (beyond what can be managed with pruning or tying back foliage during the works) Tree 7 could be transplanted, stored and reinstated (with additional clearance) following ramp installation. Although palms are generally highly tolerant of transplanting, several factors must be considered as part of a transplanting proposal, including:

- Time Frame – Particularly for mature/large trees an extended period of pre-transplant preparation is generally required and involves staged root pruning, rootball preparation and irrigation.
- Reduction in ULE – Even with the implementation of best practice preparation, transplanting and re-establishment, transplanting procedures may place the trees under high levels of physiological stress which may impact their ULE.

- Financial Costs - The physical size and weight of large trees which are to be transplanted requires the use of heavy machinery which may require significant financial expenditure.
- Logistical Constraints – The practicality of transplanting large trees may be limited by a range of factors including access, infrastructure (both at the existing site and the new site), and the transportation route between the sites. The provision of adequate guying/additional support, irrigation and post transplanting care during the re-establishment phase must also be considered.
- Heritage Impacts – The removal of significant trees from their contextual setting and the resultant impact on heritage significance needs to be considered and assessed in accordance with heritage guidelines.

3.2.12 Preliminary pothole investigations should be undertaken to determine the location of services and soil depths if transplanting of is being considered. A Transplanting Feasibility Report should be prepared by an experienced Tree Transplanting Contractor.

3.2.13 Trees 9, 15 & 19

Trees 9, 15 and 19 were identified as *Lagerstroemia indica* (Crepe Myrtle) and are semi-mature mature specimens located in the raised lawn areas to the front of the station. The trees are in good health and good structural condition with no significant defects identified at the time of inspection. Trees 9, 15 and 19 are of low Landscape Significance and have been allocated a Retention Value of *Consider for Removal*.

3.2.14 The supplied plans show Trees 5, 15 and 19 are to be retained. Works are proposed within their TPZ areas with the extent of works representing *Minor Encroachments* as defined by AS-4970. A *Minor Encroachment* is considered acceptable by AS-4970 when it is compensated for elsewhere and contiguous within the TPZ.

3.2.15 Tree 21

Tree 21 was identified as *Ficus macrophylla* (Moreton Bay Fig) and is a mature specimen located in the south-western corner of the site. Tree 21 is in good health and good structural condition with no significant defects identified at the time of inspection. Fungal fruiting bodies consistent in appearance with the genus *Auricularia* are present at the wound face of a pruned dead branch. This fungus is predominantly a saprobe which is feeding on the dead tissue at the wound face and should not impact the health of the tree. The tree is of high Landscape Significance and has been allocated a Retention Value of *Priority for Retention*.

3.2.16 The supplied plans show Tree 21 is to be retained with no works proposed within its TPZ.

3.2.17 Trees 22, 25, 37 & 38

Tree 22 was identified as *Corymbia maculata* (Spotted Gum), Trees 25 and 38 were identified as *Lophostemon confertus* (Brush Box) and Tree 37 was identified as *Agonis flexuosa* (Willow Myrtle). They are mature specimens located in the southern section of Bradfield Park North. Trees 22, 25 and 38 are in good health and good structural condition with no significant defects identified at the time of inspection. Tree 37 is in fair health with a reduced crown density of 50-75% and in poor structural condition due to the presence of a major inclusion at the junction of co-dominant stems. Trees 22, 25, 37 and 38 are of moderate Landscape Significance and have been allocated a Retention Value of *Consider for Retention*.

3.2.18 The supplied plans show Trees 22, 25, 37 and 38 are to be retained with new pavement areas proposed within their TPZ areas. The extent of works represents *Major Encroachments* as defined by AS-4970. Tree sensitive methods as per Section 3.2.4 should be used to minimise adverse impacts.

3.2.19 Trees 24, 36, 39 & 40

Tree 24 was identified as *Lophostemon confertus* (Brush Box) and Trees 36, 39 and 40 were identified as *Ulmus parvifolia* (Chinese Elm). They are mature specimens located in the southern section of Bradfield Park North. The trees are in good health and good structural condition with no significant defects identified at the time of inspection. Trees 24, 36, 39 and 40 are of moderate Landscape Significance and have been allocated a Retention Value of *Consider for Retention*.

3.2.20 The supplied plans show Trees 24, 36, 39 and 40 are to be retained. Works are proposed within their TPZ areas with the extent of works representing *Minor Encroachments* as defined by AS-4970. A *Minor Encroachment* is considered acceptable by AS-4970 when it is compensated for elsewhere and contiguous within the TPZ.

3.2.21 Tree 32 & 33

Trees 32 and 33 were identified as *Platanus x acerifolius* (London Plane Tree) and are located within the western Alfred Street road reserve. Tree 32 is in good health and good structural condition with no significant defects identified at the time of inspection. Tree 32 is of low Landscape Significance and has been allocated a Retention Value of *Consider for Removal*. Tree 33 is in good health and poor structural condition due to significant canker-like wounds located on the lower trunk. This wounding is consistent with infection by *Phytophthora* sp. *Phytophthora* sp. is relatively common, fungus-like (oomycete) plant pathogen responsible for *Phytophthora* Dieback or *Phytophthora* Root Rot and can also cause trunk and stem lesions. Pathology testing and internal diagnostic testing should be undertaken to more accurately determine the significance of this defect. Tree 33 is of moderate Landscape Significance and has been allocated a Retention Value of *Consider for Retention*.

3.2.22 The supplied plans show Trees 32 and 33 are to be retained with new pavement areas proposed within their TPZ areas. The extent of works represents *Major Encroachments* as defined by AS-4970. Tree sensitive methods as per Section 3.2.4 should be used to minimise adverse impacts. The design should ensure there is adequate clearance from the cycleway to the trees, particularly Tree 33 which is located parallel to the proposed road crossing. In addition, consideration should be given to the installation of bollards to prevent accidental bike impact damage. Bollards/posts should be installed to avoid roots (>25mm ϕ).

3.2.23 Tree 41

Tree 41 was identified as *Callistemon viminalis* (Weeping Bottlebrush) located in the south-western corner of the site. The tree is in good health and fair structural condition due to the presence of minor bark inclusions. Tree 41 is of low Landscape Significance and has been allocated a Retention Value of *Consider for Removal*.

3.2.24 The supplied plans show Tree 41 is to be retained with no works proposed within its TPZ.

3.3 Other Works within TPZ Areas

3.3.1 Mulch, Turf & Vegetation Removal

The removal of small areas of mulch, turf and vegetation within TPZ areas should be undertaken using hand tools. Larger woody shrubs and small trees which cannot be removed without significant ground disturbance should either be cut to ground level and treated with herbicide (listed on TfNSW approved Pesticides List) to prevent regrowth (where required) or stump ground. Stump grinding should not be undertaken in the SRZ of existing trees to be retained.

3.3.2 Demolition Works

Demolition works within TPZ areas should be supervised by the Project Arborist and utilise tree sensitive methods. Structures should be demolished in small sections ensuring demolition machinery/equipment does not contact any part of the tree. Existing structures within the SRZ can contribute to tree stability by providing ballast to the rootplate or act as a stop to the overturning of the rootball and should be retained in-situ if possible.

3.3.3 Landscape Fixtures

Landscape fixtures within TPZ areas should be supported on isolated piers (with all other parts of the structures positioned above existing ground levels). Excavation for footings within the TPZ areas should be undertaken using tree sensitive methods (hand/hydrovac/airspade etc). Footing locations should be flexible and/or the footing design modified to enable the retention of roots (>25mm ϕ) as required by the Project Arborist.

3.3.4 Underground Services

Underground services should be located outside of the TPZ areas. Where this is not possible, services should be installed using tree sensitive excavation (hand/hydrovac/air spade) methods with the services located around/below roots (>25mm ϕ) as required by the Project Arborist. Excavation using compact machinery fitted with a flat bladed bucket is permissible where approved by the Project Arborist. Excavation using compact machinery should be undertaken in small increments, guided by a spotter who is to look for and prevent damage to roots (>25mm ϕ).

3.3.5 Alternatively, boring methods may be used for underground service installation where the obvert level (highest interior level of pipe) is greater than 1200mm below existing grade. Excavations for starting and receiving pits for boring equipment should be located outside of the TPZ areas or located to avoid roots (>25mm ϕ) as deemed necessary by the Project Arborist.

3.3.6 Soft Landscaping

The installation of plants/turf within the TPZ should be undertaken using hand tools and roots (>25mm ϕ) should be protected. No mechanical cultivation/ripping of soils should be undertaken within TPZ areas. Soil conditioners and turf underlay may be installed however should not increase existing soil levels within the TPZ by greater than 150mm and must not raise levels within 1m of the base of any tree.

3.4 Pruning

3.4.1 The supplied plans show that selective Reduction Pruning maybe required for Trees 1, 21, 23, 26 and 41 to provide clearance to the elevated cycleway and for access during construction. Only minor pruning which will not significantly impact the Useful Life Expectancy (ULE) or amenity of the trees should be undertaken.

Refer to Plates (**Appendix 4**)

3.4.2 Pruning works should be carried out by a Practising Arborist. The Practising Arborist should hold a minimum qualification equivalent (using the Australian Qualifications Framework) of Level 3 or above, in Arboriculture or its recognised equivalent. The Practising Arborist should have a minimum of 3 years' experience in practical Arboriculture. Pruning work should be undertaken in accordance with *Australian Standard 4373: Pruning of Amenity Trees (2007)*, *Safe Work Australia Guide for Managing Risks of Tree Trimming and Removal Work (2016)* and other applicable legislation and codes.

4.0 CONCLUSION

- 4.1.1 Forty-one (41) trees were assessed in preparation of this Report and comprise a mix of Australian-native and exotic species. Of these:
- Fifteen (15) were trees allocated a Retention Value of *Priority for Retention*
 - Nineteen (19) trees were allocated a Retention Value of *Consider for Retention*
 - Six (6) trees were allocated a Retention Value of *Consider for Removal*
 - One (1) tree was allocated a Retention Value of *Priority for Removal*
- 4.1.2 The scope of the project includes the construction of a ramp structure at the northern end of the SHB cycleway, integration works between the transition at the ramp landing point to the surrounding street network, and relocation of utilities to facilitate the delivery of the cycleway works.
- 4.1.3 The supplied plans show that seven (7) trees (Trees 2, 3, 27, 28, 29, 30 & 31) are to be removed as part of the proposed works. This includes five (5) trees with a Retention Value of *Consider for Retention*, one (1) tree with a Retention Value of *Consider for Removal* and one (1) tree with a Retention Value of *Priority for Removal*. No trees with a Retention Value of *Priority for Retention* are proposed for removal. Although Trees 2, 3, 29 and 30, meet the criteria to be allocated a Retention Value of *Consider for Retention*, they have a short ULE of 5-15 years.
- 4.1.4 In addition to the trees listed above, Tree 35 should also be removed. This tree could be retained and protected as part of the proposed works. However, the tree is recommended for removal as it is in poor structural condition.
- 4.1.5 The supplied plans show thirty-three (33) trees (Trees 1, 4-26, 32-34, 36-41) are to be retained as part of the proposed works. Tree sensitive methods (as per Section 3) should be utilised for Trees 1, 7, 22, 23, 25, 26, 32, 33, 34, 37 and 38 to minimise adverse impacts.
- 4.1.6 The supplied plans show that selective Reduction Pruning maybe required for Trees 1, 21, 23, 26 and 41 to provide clearance to the elevated cycleway and for access during construction. Only minor pruning which will not significantly impact the Useful Life Expectancy (ULE) or amenity of the trees should be undertaken. Pruning work should be undertaken in accordance with *Australian Standard 4373: Pruning of Amenity Trees (2007)*, *Safe Work Australia Guide for Managing Risks of Tree Trimming and Removal Work (2016)* and other applicable legislation and codes.
- 4.1.7 This Arboricultural Impact Assessment should be updated based on the 70% design stage to examine the potential impact of any proposed works on the trees and provide recommendations for tree sensitive methods and tree protection measures. The proposed RLs of new pavement areas should be shown on the plans. A Tree Protection Plan should be prepared based on the 95% design stage.

TreeiQ takes care to obtain information from reliable sources. However, TreeiQ can neither guarantee nor be responsible for the accuracy of information provided by others. Plans, diagrams, graphs and photographs in this Arboricultural Report are visual aids only and are not necessarily to scale. This Report provides recommendations relating to tree management only. Advice should be sought from appropriately qualified consultants regarding design/construction/ecological/heritage etc issues.

This Report has been prepared for exclusive use by the client. This Report shall not be used by others or for any other reason outside its intended target or without the prior written consent of TreeiQ. Unauthorised alteration or separate use of any section of the Report invalidates the Report.

Many factors may contribute to tree failure and cannot always be predicted. TreeiQ takes care to accurately assess tree health and structural condition. However, a tree's internal structural condition may not always correlate to visible external indicators. There is no warranty or guarantee, expressed or implied that problems or deficiencies regarding the trees or site may not arise in the future. Information contained in this Report covers only the trees assessed and reflects the condition of the trees at the time of inspection. Additional information regarding the methodology used in the preparation of this Report is attached as Appendix 1. A comprehensive tree risk assessment and management plan for the trees is beyond the scope of this Report.

Reference should be made to any relevant legislation including Tree Management Controls. All recommendations contained within this Report are subject to approval from the relevant Consent Authority.

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Appendix 1: Methodology

- 1.1 Site Inspection:** This report was determined as a result of a comprehensive site during October 2021, May 2022 and May 2023. The comments and recommendations in this report are based on findings from these site inspections.
- 1.2 Visual Tree Assessment (VTA):** The subject tree(s) was assessed using the Visual Tree Assessment criteria and notes as described in *The Body Language of Trees – A Handbook for Failure Analysis*.¹² The inspection was limited to a visual examination of the subject tree(s) from ground level only. No internal diagnostic testing was undertaken as part of this assessment. Trees outside the subject site were assessed from the property boundaries only.
- 1.3 Tree Dimensions:** The dimensions of the subject tree(s) are approximate only.
- 1.4 Tree Locations:** The location of the subject tree(s) was determined from the supplied plans. Trees not shown on the supplied plans have been plotted in their approximate location only.
- 1.5 Trees & Development:** Tree Protection Zones, Tree Protection Measures and Sensitive Construction Methods for the subject tree were based on methods outlined in *Australian Standard 4970-2009 Protection of Trees on Development Sites*.

The *Tree Protection Zone* (TPZ) is described in AS-4970 as 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 *Structural Root Zone* (SRZ) is described in AS-4970 as the area around the base of a tree required for the tree's stability in the ground. Severance of structural roots within the SRZ is not recommended as it may lead to the destabilisation and/or demise of the tree.

In some cases it may be possible to encroach into or make variations to the theoretical TPZ. A *Minor Encroachment* is less than 10% of the area of the TPZ and is outside the SRZ. The area lost to this encroachment should be compensated for elsewhere and contiguous with the TPZ. A *Major Encroachment* is greater than 10% of the TPZ or inside the SRZ. In this situation the Project Arborist must demonstrate that the tree would remain viable. This may require root investigation by non-destructive methods or the use of sensitive construction methods.

- 1.6 Tree Health:** The health of the subject tree(s) was determined by assessing:
- I. Foliage size and colour
 - II. Pest and disease infestation
 - III. Extension growth
 - IV. Crown density
 - V. Deadwood size and volume
 - VI. Presence of epicormic growth
- 1.7 Tree Structural Condition:** The structural condition of the subject tree(s) was assessed by:
- I. Assessment of branching structure
(i.e co-dominant/bark inclusions, crossing branches, branch taper, terminal loading, previous branch failures)
 - II. Visible evidence of structural defects or instability
(i.e root plate movement, wounds, decay, cavities, fungal brackets, adaptive growth)
 - III. Evidence of previous pruning or physical damage
(root severance/damage, lopping, flush-cutting, lions tailing, mechanical damage)
- 1.8 Useful Life Expectancy (ULE):** The ULE is an estimate of the longevity of the subject tree(s) in its growing environment. The ULE is modified where necessary to take in consideration tree(s) health, structural condition and site suitability. The tree(s) has been allocated one of the following ULE categories (Modified from Barrell, 2001):
- I. 40 years +
 - II. 15-40 years
 - III. 5-15 years
 - IV. Less than 5 years

¹²Mattheck & Breloer (2003)

1.9 Landscape Significance: Landscape Significance was determined by assessing the combination of the cultural, environmental and aesthetic values of the subject tree(s). Whilst these values are subjective, a rating of high, moderate, low or insignificant has been allocated to the tree(s). This provides a relative value of the tree's Landscape Significance which may aid in determining its Retention Value. If the tree(s) can be categorized into more than one value, the higher value has been allocated.

Landscape Significance	Description
Very High	The subject tree is listed as a Heritage Item under the <i>Local Environmental Plan</i> with a local or state level of significance.
	The subject tree is listed on Council's Significant Tree Register or meets the criteria for significance assessment of trees and/or landscapes by a suitably qualified professional. The criteria are based on general principles outlines in the Burra Charter and on criteria from the Register of the National Estate.
High	The subject tree creates a 'sense of place' or is considered 'landmark' tree.
	The subject tree is of cultural or historical importance or is widely known.
	The subject tree is a prominent specimen which forms part of the curtilage of a heritage item with a known or documented association with that item.
	The subject tree has been identified by a suitably qualified professional as a species scheduled as a Threatened or Vulnerable Species for the site defined under the provisions of the NSW <i>Biodiversity Conservation Act (2016)</i> or the Commonwealth <i>Environmental Protection and Biodiversity Conservation Act (1999)</i> .
	The subject tree is known to contain nesting hollows to a species scheduled as a Threatened or Vulnerable Species for the site as defined under the provisions of the NSW <i>Biodiversity Conservation Act (2016)</i> or the Commonwealth <i>Environmental Protection and Biodiversity Conservation Act (1999)</i> .
	The subject tree is an excellent representative of the species in terms of aesthetic value.
	The subject tree is of significant size, scale or makes a significant contribution to the canopy cover of the locality.
Moderate	The subject tree makes a positive contribution to the visual character, amenity or canopy cover of the area
	The subject tree provides a specific function such as screening or minimising the scale of a building.
	The subject tree is a good representative of the species in terms of aesthetic value.
Low	The subject tree is a known environmental weed species or is exempt under the provisions of the local Council's Tree Management Controls
	The subject tree is small in size and/or or makes little or no contribution to the amenity or canopy cover of the area
	The subject tree is a poor representative of the species in terms of aesthetic value.

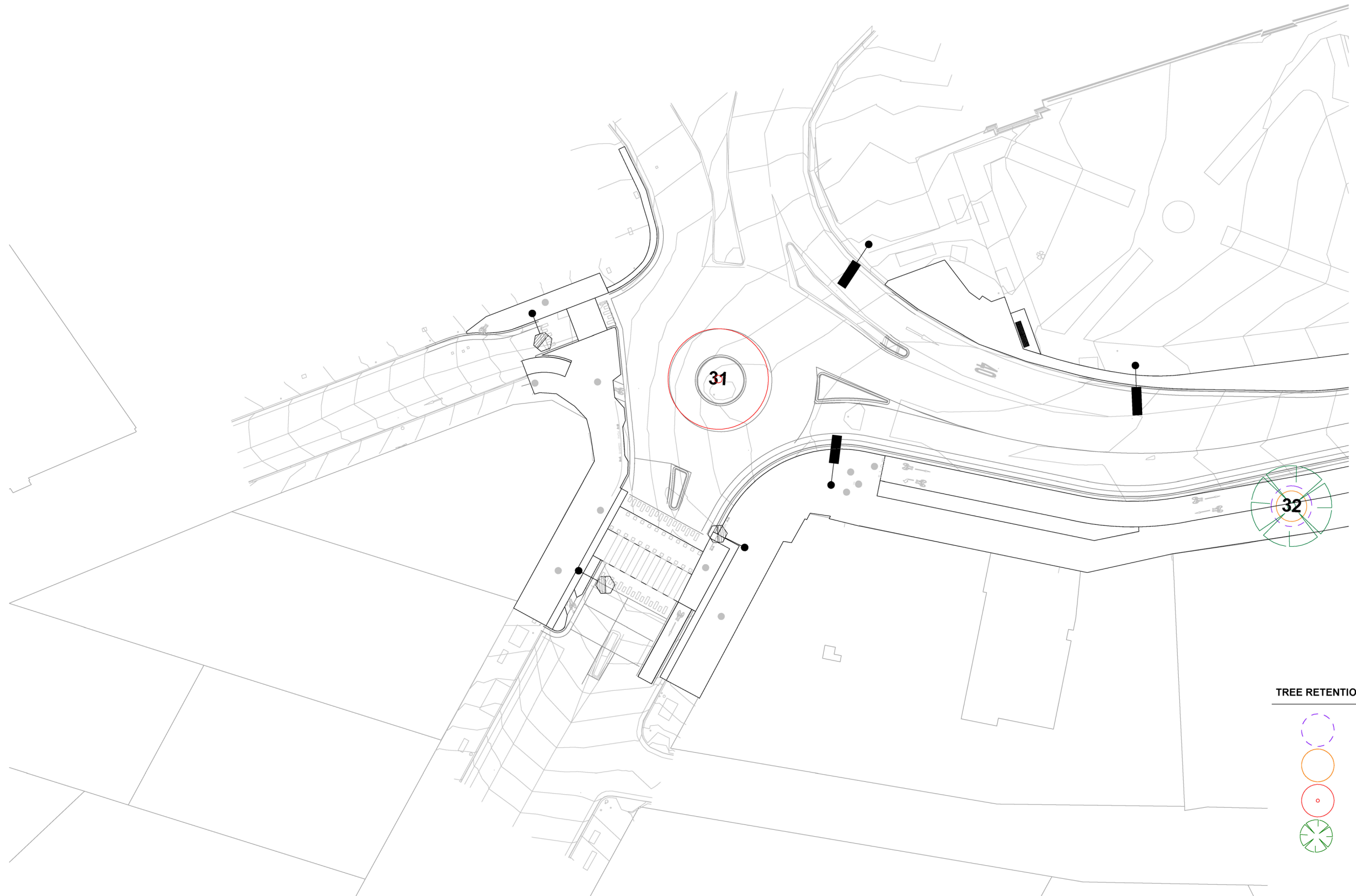
1.10 Retention Value: Retention Value was based on the subject tree's Useful Life Expectancy and Landscape Significance. The Retention Value was modified where necessary to take in consideration the subject tree's health, structural condition and site suitability. The subject tree(s) has been allocated one of the following Retention Values:

- I. Priority for Retention
- II. Consider for Retention
- III. Consider for Removal
- IV. Priority for Removal





ULE	Landscape Significance	Retention Value				
		Very High	High	Moderate	Low	Insignificant
40 years +	Priority for Retention	Priority for Retention			Consider for Removal	Priority for Removal
15-40 years		Priority for Retention	Consider for Retention			
5-15 years		Consider for Retention				
Less than 5 years	Consider for Removal	Priority for Removal				

The above table has been modified from the Footprint Green Tree Significance and Retention Value Matrix.

Appendix 2: Plans



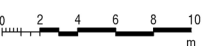


TREE RETENTION PLAN

-  TREE PROTECTION ZONE
-  STRUCTURAL ROOT ZONE
-  TREE TO BE REMOVED
-  TREE TO BE RETAINED

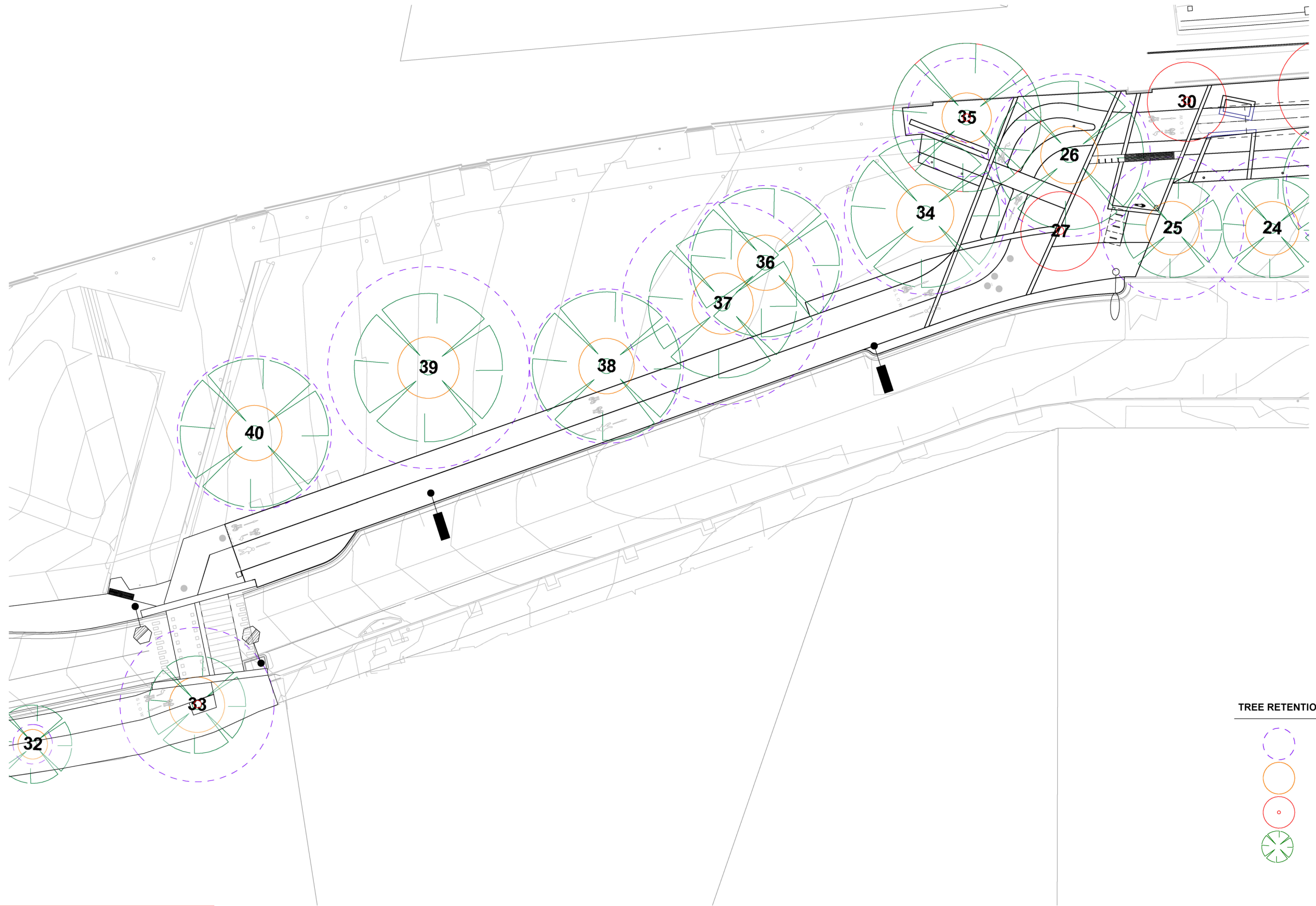
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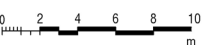

TREE RETENTION PLAN

-  TREE PROTECTION ZONE
-  STRUCTURAL ROOT ZONE
-  TREE TO BE REMOVED
-  TREE TO BE RETAINED

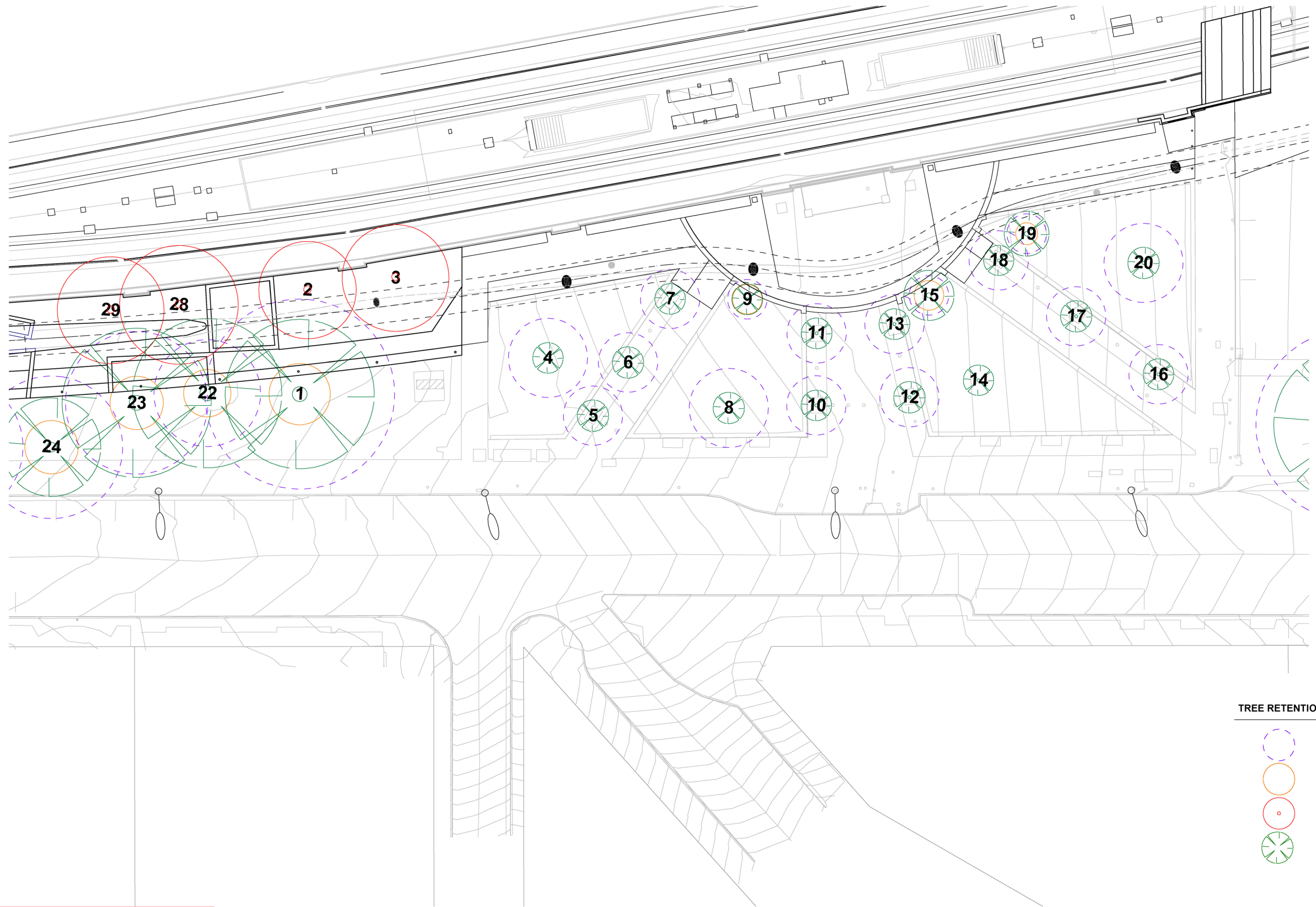
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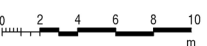
TREE RETENTION PLAN

-  TREE PROTECTION ZONE
-  STRUCTURAL ROOT ZONE
-  TREE TO BE REMOVED
-  TREE TO BE RETAINED

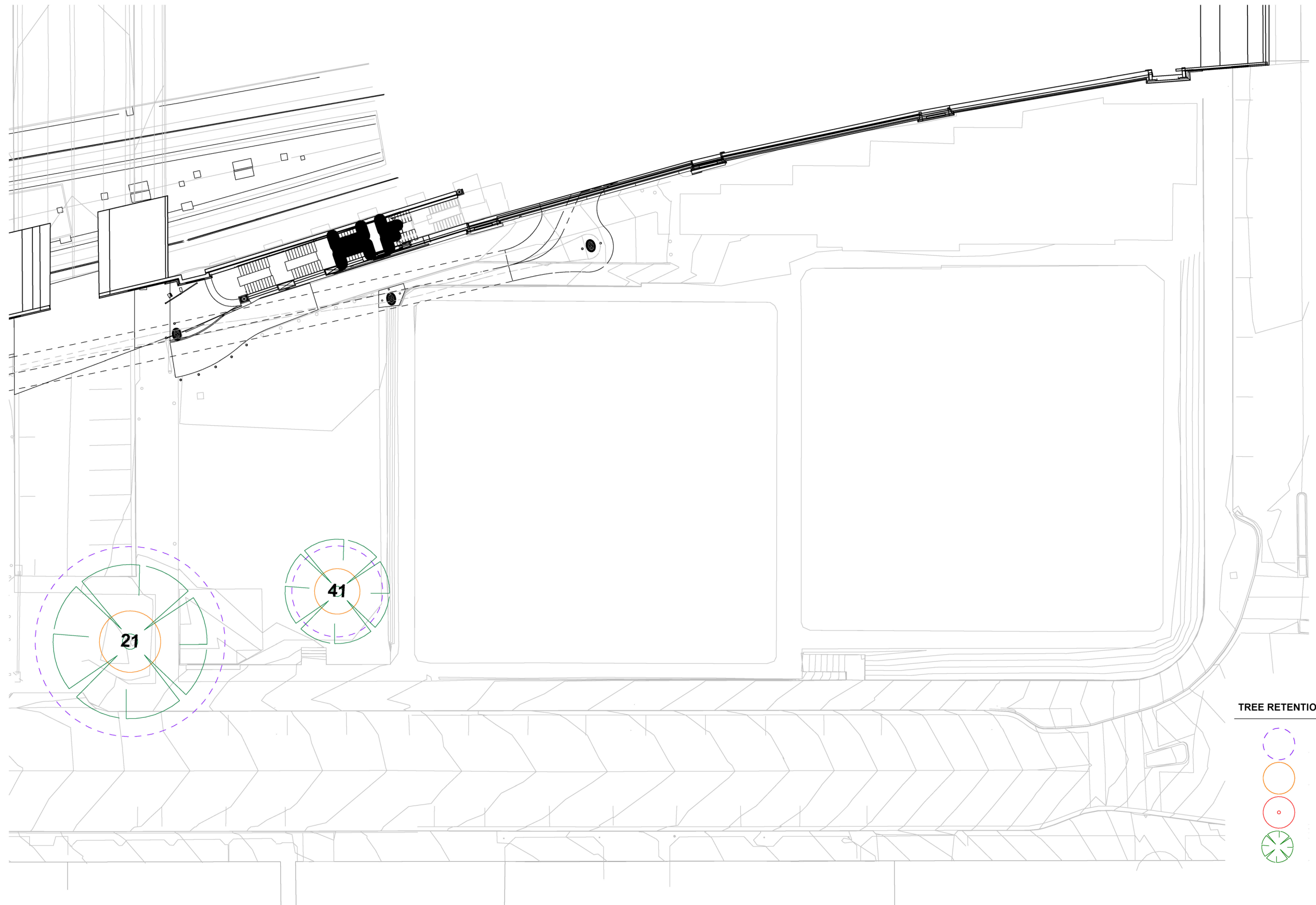
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TREE RETENTION PLAN

-  TREE PROTECTION ZONE
-  STRUCTURAL ROOT ZONE
-  TREE TO BE REMOVED
-  TREE TO BE RETAINED

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SHB CYCLEWAY NORTHERN ACCESS
ALFRED STREET SOUTH
BETWEEN LAVENDER ST AND FITZROY ST
URBAN DESIGN
TREE RETENTION AND REMOVAL PLAN - ZONE D



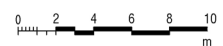
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 APPROVED _____ Sacha Coles 08/05/2023

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Appendix 3: Tree Assessment Schedule

Tree No.	Species	DBH comb. (mm)	Height (m)	Radial Crown Spread (m)	Health Rating	Structural Condition Rating	Comments	Age Class	ULE (years)	L/Sign	Retention Value	Radial TPZ (m)	Radial SRZ (m)	Implication
1	<i>Ulmus parvifolia</i> (Chinese Elm)	800	11	9	Good	Good	Small (<25mm \emptyset) & medium (25-75mm \emptyset) deadwood in low volumes. Small (<25mm \emptyset) & medium (25-75mm \emptyset) epicormic growth in low volumes. Branch inclusion(s), minor. Mechanical damage to exposed surface root(s). Cavity(s), minor.	Mature	15-40	Moderate	Consider for Retention	9.6	3.1	Retain. Major encroachment, elevated cycleway & pavement. Reduction pruning maybe required.
2	<i>Populus simonii</i> (Simons Poplar)	400	9	5	Good	Fair	Small (<25mm \emptyset) & medium (25-75mm \emptyset) deadwood in low volumes. Small (<25mm \emptyset) & medium (25-75mm \emptyset) epicormic growth in low volumes. Pruning wound(s), various stages of decay. Asymmetrical crown form due to Reduction Pruning for bridge pilasters. Crown lifted for pedestrian clearance. Hanger in crown.	Mature	5-15	Moderate	Consider for Retention	4.8	2.3	Remove. Elevated cycleway.
3	<i>Populus simonii</i> (Simons Poplar)	450	9	5	Good	Fair	Small (<25mm \emptyset) & medium (25-75mm \emptyset) deadwood in low volumes. Small (<25mm \emptyset) & medium (25-75mm \emptyset) epicormic growth in low volumes. Partially suppressed. Pruning wound(s), various stages of decay. Asymmetrical crown form due to Reduction Pruning for bridge pilasters. Crown lifted for pedestrian clearance.	Mature	5-15	Moderate	Consider for Retention	5.4	2.4	Remove. Elevated cycleway.
4	<i>Butia capitata</i> (Jelly Palm)	450	8	3	Fair	Good	Fig in crown. Leaf spot/dicolouration - blight/nutrient deficiency?	Late Mature	5-15	Very High	Priority for Retention	4.0	n/a	Retain. No works within TPZ.

Tree No.	Species	DBH comb. (mm)	Height (m)	Radial Crown Spread (m)	Health Rating	Structural Condition Rating	Comments	Age Class	ULE (years)	L/Sign	Retention Value	Radial TPZ (m)	Radial SRZ (m)	Implication
5	<i>Livistona australis</i> (Cabbage Tree Palm)	450	10	2	Good	Good	Lichen on trunk.	Mature	15-40	High	Priority for Retention	3.0	n/a	Retain. No works within TPZ.
6	<i>Livistona australis</i> (Cabbage Tree Palm)	450	10	2	Good	Good	Lichen on trunk. Wound at base.	Mature	15-40	High	Priority for Retention	3.0	n/a	Retain. No works within TPZ.
7	<i>Livistona australis</i> (Cabbage Tree Palm)	350	10	2	Good	Good	Lichen on trunk.	Mature	15-40	High	Priority for Retention	3.0	n/a	Retain. Major encroachment, elevated cycleway & pavement. Possible crown conflict.
8	<i>Butia capitata</i> (Jelly Palm)	400	7	3	Good	Good		Late Mature	15-40	Very High	Priority for Retention	4.0	n/a	Retain. No works within TPZ.
9	<i>Lagerstroemia indica</i> (Crepe Myrtle)	130	4	2	Good	Good	No access to base.	Semi-mature	15-40	Low	Consider for Removal	2.0	1.5	Retain. Minor encroachment, elevated cycleway & pavement.
10	<i>Livistona australis</i> (Cabbage Tree Palm)	300	10	2	Good	Good	Lichen on trunk. Minor abrasion damage on trunk.	Mature	15-40	High	Priority for Retention	3.0	n/a	Retain. No works within TPZ.
11	<i>Livistona australis</i> (Cabbage Tree Palm)	300	10	2	Good	Good	Lichen on trunk. Minor abrasion damage on trunk.	Mature	15-40	High	Priority for Retention	3.0	n/a	Retain. Minor encroachment, pavement.
12	<i>Livistona australis</i> (Cabbage Tree Palm)	400	10	2	Good	Good	Lichen on trunk.	Mature	15-40	High	Priority for Retention	3.0	n/a	Retain. No works within TPZ.

Tree No.	Species	DBH comb. (mm)	Height (m)	Radial Crown Spread (m)	Health Rating	Structural Condition Rating	Comments	Age Class	ULE (years)	L/Sign	Retention Value	Radial TPZ (m)	Radial SRZ (m)	Implication
13	<i>Livistona australis</i> (Cabbage Tree Palm)	400	10	2	Good	Good	Lichen on trunk. Wound at base.	Mature	15-40	High	Priority for Retention	3.0	n/a	Retain. Minor encroachment, pavement.
14	<i>Butia capitata</i> (Jelly Palm)	400	7	3	Good	Good	Previously dead specimen which has been replaced.	Late Mature	15-40	Very High	Priority for Retention	4.0	n/a	Retain. No works within TPZ.
15	<i>Lagerstroemia indica</i> (Crepe Myrtle)	130	4	2	Good	Good	No access to base.	Semi-mature	15-40	Low	Consider for Removal	2.0	1.5	Retain. Minor encroachment, pavement.
16	<i>Livistona australis</i> (Cabbage Tree Palm)	350	10	2	Good	Good	Lichen on trunk.	Mature	15-40	High	Priority for Retention	3.0	n/a	Retain. No works within TPZ.
17	<i>Livistona australis</i> (Cabbage Tree Palm)	350	10	2	Good	Good	Lichen on trunk.	Mature	15-40	High	Priority for Retention	3.0	n/a	Retain. No works within TPZ.
18	<i>Livistona australis</i> (Cabbage Tree Palm)	350	10	2	Good	Good	Lichen on trunk. Cable tie on trunk.	Mature	15-40	High	Priority for Retention	3.0	n/a	Retain. No works within TPZ.
19	<i>Lagerstroemia indica</i> (Crepe Myrtle)	130	4	2	Good	Good	No access to base.	Semi-mature	15-40	Low	Consider for Removal	2.0	1.5	Retain. Minor encroachment, pavement.
20	<i>Butia capitata</i> (Jelly Palm)	400	7	3	Good	Good	Fig in crown.	Late Mature	15-40	Very High	Priority for Retention	4.0	n/a	Retain. No works within TPZ.
21	<i>Ficus macrophylla</i> (Moreton Bay Fig)	800	10	15	Good	Good	Crown density 75-95%. Recently pruned with <i>Auricularia</i> fruiting body at wound. Wound(s), various stages of decay. Lopped for powerline clearance. Exposed surface roots.	Mature	15-40	High	Priority for Retention	9.6	3.1	Retain. No works within TPZ. Reduction pruning maybe required.

Tree No.	Species	DBH comb. (mm)	Height (m)	Radial Crown Spread (m)	Health Rating	Structural Condition Rating	Comments	Age Class	ULE (years)	L/Sign	Retention Value	Radial TPZ (m)	Radial SRZ (m)	Implication
22	<i>Corymbia maculata</i> (Spotted Gum)	450	13	8	Good	Good	Partially suppressed. Small (<25mm \emptyset) & medium (25-75mm \emptyset) deadwood in low volumes. Small (<25mm \emptyset) & medium (25-75mm \emptyset) epicormic growth in low volumes.	Mature	15-40	Moderate	Consider for Retention	5.4	2.4	Retain. Major encroachment, elevated cycleway & pavement.
23	<i>Ulmus parvifolia</i> (Chinese Elm)	600	15	12	Good	Good	Partially suppressed. Small (<25mm \emptyset) & medium (25-75mm \emptyset) deadwood in low volumes. Small (<25mm \emptyset) & medium (25-75mm \emptyset) epicormic growth in low volumes. Wound(s), various stages of decay. Adaptive growth on branch.	Mature	15-40	Moderate	Consider for Retention	7.2	2.7	Retain. Major encroachment, elevated cycleway & pavement. Reduction pruning maybe required.
24	<i>Lophostemon confertus</i> (Brush Box)	600	15	8	Good	Good	Small (<25mm \emptyset) & medium (25-75mm \emptyset) deadwood in low volumes. Spheroplast growth.	Mature	15-40	Moderate	Consider for Retention	7.2	2.7	Retain. Minor encroachment, pavement.
25	<i>Lophostemon confertus</i> (Brush Box)	600	15	8	Good	Good	Small (<25mm \emptyset) & medium (25-75mm \emptyset) deadwood in low volumes.	Mature	15-40	Moderate	Consider for Retention	7.2	2.7	Retain. Major encroachment, pavement.
26	<i>Ulmus parvifolia</i> (Chinese Elm)	400 300 450	10	12	Good	Fair	Small (<25mm \emptyset) & medium (25-75mm \emptyset) deadwood in low volumes. Small (<25mm \emptyset) & medium (25-75mm \emptyset) epicormic growth in low volumes. Co-dominant inclusion, major.	Mature	15-40	Moderate	Consider for Retention	8.2	2.9	Retain. Major encroachment, pavement.
27	<i>Pyrus cvs</i> (Ornamental Pear Cultivars)	50	4	1	Good	Good	Suckers from base. Developing slight phototropic lean due to suppression from Tree 26.	Young	5-15	Low	Consider for Removal	2	1.5	Remove. Pavement footprint.

Tree No.	Species	DBH comb. (mm)	Height (m)	Radial Crown Spread (m)	Health Rating	Structural Condition Rating	Comments	Age Class	ULE (years)	L/Sign	Retention Value	Radial TPZ (m)	Radial SRZ (m)	Implication
28	<i>Populus simonii</i> (Simons Poplar)	500	14	5	Good	Poor	Crown density 25-50% - not in full at time of assessment (Autumn). Small (<25mmø) & medium (25-75mmø) deadwood in low volumes. Small (<25mmø) & medium (25-75mmø) epicormic growth in low volumes. Partially suppressed. Pruning wound(s), various stages of decay. Major wound with early stages of decay 0-1.4m. Rib of adaptive tissue. Possible injection sites. Asymmetrical crown form due to Reduction Pruning for bridge pilasters. Crown lifted for pedestrian clearance.	Mature	<5	Moderate	Priority for Removal	6	2.5	Remove. Elevated cycleway.
29	<i>Populus simonii</i> (Simons Poplar)	400	13	3	Good	Poor	Crown density 25-50% - not in full at time of assessment (Autumn). Small (<25mmø) & medium (25-75mmø) deadwood in low volumes. Small (<25mmø) & medium (25-75mmø) epicormic growth in low volumes. Pruning wound(s), various stages of decay. Depressed seam of tissue 0-1.5m. Asymmetrical crown form due to Reduction Pruning for bridge pilasters. Crown lifted for pedestrian clearance.	Mature	5-15	Moderate	Consider for Retention	6	2.5	Remove. Elevated cycleway.
30	<i>Populus simonii</i> (Simons Poplar)	450	12	6	Good	Fair	Crown density 25-50% - not in full at time of assessment (Autumn). Small (<25mmø) & medium (25-75mmø) deadwood in low volumes. Small (<25mmø) & medium (25-75mmø) epicormic growth in low volumes. Pruning wound(s), various stages of decay. Asymmetrical crown form due to Reduction Pruning for bridge pilasters. Crown lifted for pedestrian clearance.	Mature	5-15	Moderate	Consider for Retention	5.4	2.4	Remove. Pavement footprint.
31	<i>Phoenix canariensis</i> (Canary Island Date Palm)	600	7	4	Good	Good	No access to base.	Mature	15-40	Moderate	Consider for Retention	5	n/a	Remove. Road reconfiguration.
32	<i>Planantus x acerifolius</i> (London Plane Tree)	100	6	2	Good	Good		Semi-mature	15-40	Low	Consider for Removal	2	1.5	Retain. Major encroachment, pavement.

Tree No.	Species	DBH comb. (mm)	Height (m)	Radial Crown Spread (m)	Health Rating	Structural Condition Rating	Comments	Age Class	ULE (years)	L/Sign	Retention Value	Radial TPZ (m)	Radial SRZ (m)	Implication
33	<i>Planantus x acerifolius</i> (London Plane Tree)	650	17	10	Good	Poor	Major basal wound possibly Phytophthora infection. Girdled root. Lopped branch. Displaced kerb.	Mature	5-15	Moderate	Consider for Retention	7.8	2.8	Retain. Major encroachment, pavement.
34	<i>Ulmus parvifolia</i> (Chinese Elm)	350	10	12	Good	Fair	Small (<25mm \emptyset) & medium (25-75mm \emptyset) deadwood in low volumes. Small (<25mm \emptyset) & medium (25-75mm \emptyset) epicormic growth in low volumes. Co-dominant inclusion, major.	Mature	15-40	Moderate	Consider for Retention	8.2	2.9	Retain. Major encroachment, (cycleway) pavement.
35	<i>Populus simonii</i> (Simons Poplar)	400	13	3	Good	Poor	Crown density 25-50% - not in full at time of assessment (Autumn). Small (<25mm \emptyset) & medium (25-75mm \emptyset) deadwood in low volumes. Small (<25mm \emptyset) & medium (25-75mm \emptyset) epicormic growth in low volumes. Pruning wound(s), various stages of decay. Depressed seam of tissue 0-1.5m. Asymmetrical crown form due to Reduction Pruning for bridge pilasters. Crown lifted for pedestrian clearance.	Mature	5-15	Moderate	Consider for Retention	6	2.5	Major encroachment, pavement. Remove due to poor structural condition.
36	<i>Ulmus parvifolia</i> (Chinese Elm)	650	9	10	Good	Good	Small (<25mm \emptyset) & medium (25-75mm \emptyset) deadwood in low volumes. Small (<25mm \emptyset) & medium (25-75mm \emptyset) epicormic growth in moderate volumes. Mechanical damage to exposed surface roots.	Mature	15-40	Moderate	Consider for Retention	7.8	2.8	Retain. Minor encroachment, (cycleway) pavement.
37	<i>Agonis flexuosa</i> (Willow Myrtle)	600 600	10	10	Fair	Poor	Crown density 50-75%. Heavily suppressed. Co-dominant inclusion, major.	Mature	5-15	Moderate	Consider for Retention	10.2	3.1	Retain. Major encroachment, (cycleway) pavement.
38	<i>Lophostemon confertus</i> (Brush Box)	650	12	10	Good	Good	Small (<25mm \emptyset) & medium (25-75mm \emptyset) deadwood in low volumes.	Mature	15-40	Moderate	Consider for Retention	7.8	2.8	Retain. Major encroachment, (cycleway) pavement.
39	<i>Ulmus parvifolia</i> (Chinese Elm)	850	9	10	Good	Good	Small (<25mm \emptyset) & medium (25-75mm \emptyset) deadwood in low volumes. Small (<25mm \emptyset) & medium (25-75mm \emptyset) epicormic growth in low volumes. Mechanical damage to exposed surface roots.	Mature	15-40	Moderate	Consider for Retention	10.2	3.1	Retain. Minor encroachment, (cycleway) pavement.

Tree No.	Species	DBH comb. (mm)	Height (m)	Radial Crown Spread (m)	Health Rating	Structural Condition Rating	Comments	Age Class	ULE (years)	L/Sign	Retention Value	Radial TPZ (m)	Radial SRZ (m)	Implication
40	<i>Ulmus parvifolia</i> (Chinese Elm)	650	9	10	Good	Good	Small (<25mm ϕ) & medium (25-75mm ϕ) deadwood in low volumes. Small (<25mm ϕ) & medium (25-75mm ϕ) epicormic growth in low volumes. Mechanical damage to exposed surface roots.	Mature	15-40	Moderate	Consider for Retention	7.8	2.8	Retain. Minor encroachment, (cycleway) pavement.
41	<i>Callistemon viminalis</i> (Weeping Bottlebrush)	200 200 250	6	5	Good	Fair	Small (<25mm ϕ) & medium (25-75mm ϕ) deadwood in low volumes. Removed first order stems. Branch inclusion(s), minor.	Mature	5-15	Low	Consider for Removal	4.6	2.3	Retain. No works within TPZ. Reduction pruning maybe required.

Appendix 4: Plates

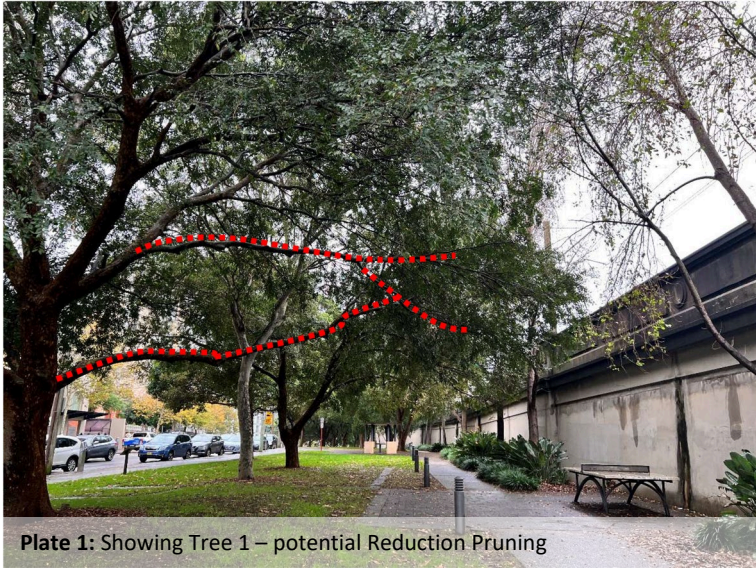


Plate 1: Showing Tree 1 – potential Reduction Pruning



Plate 2: Showing Trees 2 & 3



Plate 3: Showing Trees 4-7



Plate 4: Showing Tree 14



Plate 5: Showing Trees 16-20



Plate 6: Showing Tree 21 – potential Reduction Pruning



Plate 7: Showing Tree 21 – potential Reduction Pruning



Plate 8: Showing Tree 22

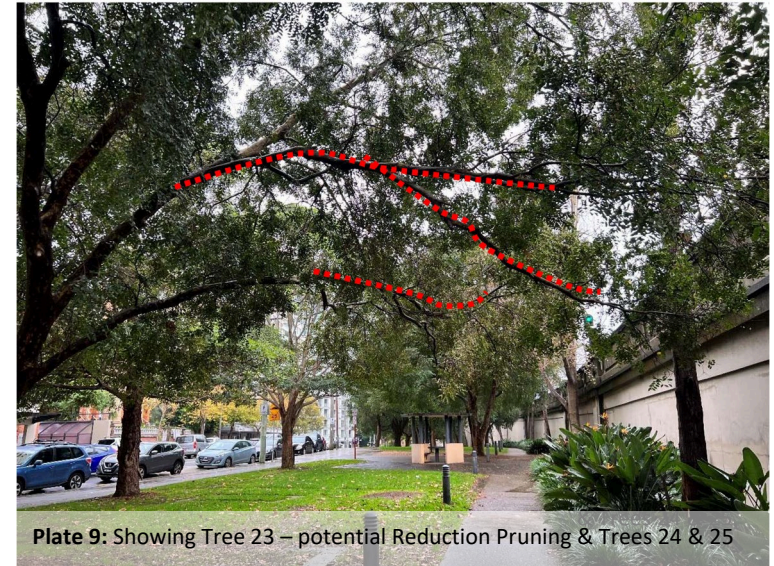


Plate 9: Showing Tree 23 – potential Reduction Pruning & Trees 24 & 25



Plate 10: Showing Trees 26 & 27



Plate 11: Showing Tree 28



Plate 12: Showing Tree 28 - rib



Plate 13: Showing Tree 29 – depressed seam



Plate 14: Showing Tree 31



Plate 15: Showing Tree 32-34



Plate 16: Showing Tree 33 – canker-like lesions



Plate 17: Showing Tree 34



Plate 18: Showing Trees 36-38



Plate 19: Showing Tree 41 – potential Reduction Pruning

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