

Appendix I

Arboricultural impact assessment



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ARBORICULTURAL IMPACT ASSESSMENT

Harbour Village North Cycleway

Prepared for: CITY OF SYDNEY

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Revision A

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1.0 INTRODUCTION

1.1 Background

1.1.1 This Arboricultural Impact Assessment Report (Revision A) was prepared for the City of Sydney in relation to the proposed Harbour Village North Cycleway. The purpose of this report is to undertake a Visual Tree Assessment (VTA) of the subject trees, determine the impact of the proposed works on the subject trees, and where appropriate, recommend the use of sensitive construction methods to minimise adverse impacts. The scope of this report is based on Section 4.4.2 of the Consultancy Brief for the Consultant Arboricultural Services Contract.

1.1.2 In preparing this report, the author is aware of and has taken into account the objectives of the City of Sydney's *Sydney Local Environmental Plan (2012)*, *Register of Significant Trees (2013)*, *Observatory Hill Tree Management Plan (2008)*, *Australian Standard 4970 Protection of Trees on Development Sites (2009)*, *Australian Standard 4373 Pruning of Amenity Trees (2007)* and *Australian Standard 2303 (2015) Tree Stock for Landscape Use*.

Refer to Methodology (**Appendix 1**)

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

Harbour Village North Cycleway Feasibility & Concept Design Report – Issue 7 (Final), prepared by GroupGSA, dated 08.12.15, including the following sections:

- 3.0 Design Overview
- 3.01 Masterplan
- 3.02 Site Precincts
- 3.03 P1: Harbour Bridge Link & Incident Response Area
- 3.04 P2: Incident Response Area & Fort Street Public School
- 3.05 P3: Bridge Crossing & S.H. Ervin Gallery Frontage
- 3.06 P4: S.H. Ervin Gallery Frontage To Kent Street
- 4.0 Design Parameter (4.01-4.08)

Refer to Plans (**Appendix 2**)

1.1.4 The proposed Harbour Village North Cycleway is in the concept design phase. No scale has been provided on the assessed plans and a number of trees detailed within this Report are not shown on the plans. The level of accuracy of locations of trees which are shown is not known. However, any limitations associated with the current drawing should not significantly alter the recommendations/conclusions of this report. Further detailed assessment of the potential impacts to trees should be undertaken as detailed plans are developed.

2.0 RESULTS

2.1 The Site

2.1.1 The site is bound by the Observatory Hill precinct to the west (which includes the Observatory Hill parkland, the Sydney Observatory, Fort Street Primary School and the National Trust/S.H. Ervin Gallery) and to the east, the Bradfield Highway leading the Sydney Harbour Bridge.

2.1.2 The Harbour Village North Cycleway Feasibility and Concept Design Report has broken the site into four (4) precincts to enable the exploration of design options for each area. Starting at the northern end of the site, the four precincts are as follows:

- **Precinct 1:** Harbour Bridge Link & Incident Response Area
- **Precinct 2:** Fort Street Public School & Incident Response Area
- **Precinct 3:** Cahill Expressway Overpass
- **Precinct 4:** S.H. Ervin Gallery to Kent Street

Refer to Plans (**Appendix 2**)

2.2 The Proposal

2.2.1 The supplied plans and documentation show that the proposed works include the construction of a bidirectional separated cycleway connecting the dedicated cycleway on the Sydney Harbour Bridge through to the Kent Street cycleway.

2.2.2 The concept design also includes the construction of a new bridge and elevated structure over the Cahill Expressway and a separated cycleway alongside the Bradfield Highway between the Cahill Expressway and the Kent Street cycleway.

Refer to Plans (**Appendix 2**)

2.3 The Trees

2.3.1 A Visual Tree Assessment¹ (VTA) has been undertaken on trees growing within the site to determine their health and structural condition. Forty four (44) trees were assessed and include a mix of locally indigenous, Australian native and exotic species. Thirteen (13) species are represented.

2.3.2 As required by Clause 2.3.2 of *Australian Standard 4970 (2009) Protection of Trees on Development Sites (AS-4970)*, each tree assessed has been allocated a Retention Value. The Retention Value is based on the tree's Useful Life Expectancy and Landscape Significance with consideration to its health, structural condition and site suitability. The Retention Values do not take into account 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

2.3.3 Further detail on the assessment of the trees is provided in the Tree Assessment Schedule (**Appendix 3**).

¹ Mattheck & Breloer (1994), *The Body Language of Trees – A Handbook for Failure Analysis*.

- 2.3.4 Trees 3-9 have been identified as *Butia capitata* (Jelly Palm) and are listed on the City of Sydney Register of Significant Trees (2013).² The Register notes that these palms were thought to be planted in the early 1930's as part of a broader civic landscaping program associated with the Harbour Bridge opening in 1932. Based on a review of the Observatory Hill Tree Management Plan (2008), it is understood the palms were transplanted from the north-east corner of Observatory Hill Park to their current location.³
- 2.3.5 Trees 24 and 28 have been identified as *Celtis sinensis* (Chinese Hackberry). *Celtis sinensis* (Chinese Hackberry) are prolific self-seeders and are considered an environmental weed. This species is listed as a Class 4 Locally Controlled Weed for the Sydney Local Control Authority area under the Noxious Weed Act (1993).⁴
- 2.3.6 Tree 31 (*Ficus macrophylla* - Moreton Bay Fig) is also listed on the City of Sydney Register of Significant Trees (2013).⁵ The Register notes that this tree was planted c.1880 and is the only remaining specimen of a former large group of figs. Tree 31 has historic significance due to its association with the broader collection of Moreton Bay Figs planted around Observatory Hill and Argyle Street during the same period.⁶
- 2.3.7 A search of the BioNet Atlas of NSW Wildlife Database was undertaken in June 2016. No individual threatened tree species that were listed within this database for the area were identified during the current field investigations of the site.⁷ The ecological significance and habitat value of the trees has not been assessed and is beyond the scope of this report.

3.0 ARBORICULTURAL IMPACT ASSESSMENT

3.1 Precinct 1: Harbour Bridge Link & Incident Response Area

- 3.1.1 **Tree 1** has been identified as *Ficus macrophylla* (Moreton Bay Fig) and is located adjacent to the existing Harbour Bridge Cycleway entrance. This tree has an estimated Useful Life Expectancy (ULE) of 40 years+, and has been allocated a moderate Landscape Significance and Retention Value of *Priority for Retention*.
- 3.1.2 The supplied plans show no works are proposed within the Tree Protection Zone (TPZ) of Tree 1.
- 3.1.3 **Trees 2, 10 and 11** have been identified as *Jacaranda mimosifolia* (Jacaranda) and are located near the fitness area and Bradfield Highway Retaining Wall and Parapet. These trees have an estimated ULE of 15-40 years, and have been allocated a moderate Landscape Significance and Retention Value of *Consider for Retention*.
- 3.1.4 The supplied plans show the new elevated cycleway (Type A) is proposed within the TPZ areas of Trees 2 and 11. These works represents a *Major Encroachment* as defined by *Australian Standard 4970 2009 Protection of Trees on Development Sites* (AS-4970). Clause 3.3.4 of the AS-4970 outlines that design factors and tree sensitive construction methods should be considered when determining the potential impact of the encroachment.
- 3.1.5 The supplied plans show that Tree 10 will need to be removed to accommodate the proposed cycleway.

² City of Sydney (2013) *Register of Significant Trees*.

³ City of Sydney (2008), *Observatory Hill Tree Management Plan*.

⁴ Department of Primary Industries (2015), *NSW Weedwise*.

⁵ City of Sydney (2013) *Register of Significant Trees*.

⁶ City of Sydney (2013) *Register of Significant Trees*.

⁷ NSW Office of Environment and Heritage (2011), *BioNet Atlas of NSW Wildlife Database*.

3.1.6 **Recommendations:** The following tree sensitive construction methods should be used to minimise the impact of works on Trees 2 and 11:

- Footings supporting cycleway base columns should be located outside of the trees' Structural Root Zones (SRZ).
- Where possible, footings supporting the cycleway base columns should be located outside of TPZ areas. Where this is not possible, the footing design should allow for a degree of flexibility to enable the retention of significant roots, where deemed necessary by the Project Arborist.
- Excavation/pruning of roots (>25mmØ) within the TPZ should be supervised/undertaken by the Project Arborist.

3.1.7 **Trees 3-9** have been identified as *Butia capitata* (Jelly Palm) and are located between the fitness area and Bradfield Highway Retaining Wall and Parapet. These trees have an estimated ULE of 15-40 years, and have been allocated a very high Landscape Significance and Retention Value of *Priority for Retention*.

3.1.8 The supplied plans show that Trees 3-9 are to be relocated as part of the proposed works. *Butia capitata* (Jelly Palm) is an arborescent monocot which has an adventitious root system and is generally tolerant of transplanting, even when of a large mature size. However, transplanting is a specialist area of arboriculture and numerous factors beyond the individual species suitability to be successfully lifted, relocated and re-established must be considered (such as timeframe, financial costs and logistical constraints).

3.1.9 **Recommendations:** Investigation into the viability of transplanting Trees 3-9 (including the preparation of a detailed Transplanting Feasibility Study) should be undertaken by an experienced Tree Transplanting Contractor. In addition, 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 **Precinct 2: Fort Street Public School & Incident Response Area**

3.2.1 **Trees 12-14** have been identified as *Banksia serrata* (Old Man Banksia) and are located directly opposite Fort Street Public School. Tree 14 is of fair structural condition due to the presence of a trunk wound with advanced stages of decay. Trees 12 and 13 have an estimated ULE of 15-40 years, and have been allocated a low Landscape Significance and Retention Value of *Consider for Removal*. Tree 14 has an estimated ULE of 5-15 years, and has been allocated a moderate Landscape Significance and Retention Value of *Consider for Retention*.

3.2.2 The supplied plans show that Trees 12-14 will need to be removed to accommodate the proposed cycleway.

3.3 **Precinct 3: Cahill Expressway Overpass**

3.3.1 **Tree 15** has been identified as *Eucalyptus cladocalyx* (Sugar Gum) and is located near the entry to the Cahill Expressway overpass bridge. This tree is of fair health as indicated by its reduced crown density, and presence of small diameter deadwood and epicormic growth within its crown. Tree 15 has an estimated ULE of 15-40 years, and has been allocated a high Landscape Significance and Retention Value of *Priority for Retention*.

3.3.2 The supplied plans show that Trees 15 will need to be removed to accommodate the proposed cycleway.

3.3.3 **Recommendations:** Tree 15 is a large specimen with high Landscape Significance. As no significant structural issues were identified at the time of assessment and the tree is a prominent feature within the local area, consideration should be given to amending the design to allow for its retention.

- 3.3.4** **Tree 16** has been identified as *Eucalyptus robusta* (Swamp Mahogany) and is located near the entry to the Cahill Expressway overpass bridge. This tree is of fair health as indicated by its reduced crown density, and presence of small diameter deadwood and epicormic growth within its crown. Tree 16 has an estimated ULE of 5-15 years, and has been allocated a moderate Landscape Significance and Retention Value of *Consider for Retention*.
- 3.3.5** The supplied plans show that this tree will need to be removed to accommodate the proposed works.
- 3.3.6** **Tree 17** has been identified as *Ficus rubiginosa* (Port Jackson Fig) and is located in a small landscape area between the Cahill Expressway and Bradfield Highway. This tree is of fair structural condition due to the presence of major bark inclusions and wounds with advanced stages of decay. *Ficus rubiginosa* are a very large tree species which develops a broad spreading crown. Given the proximity of Tree 17 to the Cahill Expressway and Bradfield Highway, significant and ongoing Reduction Pruning will be required in the future to maintain clearance from the carriageways. Based on the above, Tree 17 is an inappropriate species for its location. Tree 17 has an estimated ULE of 5-15 years, and has been allocated a moderate Landscape Significance and Retention Value of *Consider for Retention*.
- 3.3.7** The supplied plans show that Tree 17 will need to be removed to accommodate the proposed cycleway.
- 3.3.8** **Trees 18-21** have been identified as *Schinus molle* var. *areira* (Peppercorn Tree) and are located in a small landscape area between the Cahill Expressway and Bradfield Highway. Trees 18-21 are of fair health as indicated by their reduced crown density, and presence of medium and large diameter deadwood within their crowns. The trees are of poor structural condition with the potential for rootplate instability. A concrete footing immediately to the west of the trees has prevented the development of roots on the tension side of their rootplates. In this regard, the rootplate of Tree 19 has previously, partially failed however at the time of assessment the rootplate appeared to have restabilised. Trees 18-21 have a ULE of less than 5 years, and have been allocated a low Landscape Significance and Retention Value of *Priority for Removal*.
- 3.3.9** The supplied plans show that Trees 18-21 will need to be removed to accommodate the proposed cycleway.
- 3.3.10** **Trees 22, 30 and 31** have been identified as *Ficus macrophylla* (Moreton Bay Fig) and are located within the landscape area fronting the National Trust/S.H Ervin Gallery. Tree 31 is of fair structural condition due to the presence of wounds in various stages of decay. Trees 22 and 30 have an estimated ULE of 40+ years, and have been allocated a moderate Landscape Significance and Retention Value of *Priority for Retention*. Tree 31 has an estimated ULE of 15-40 years, and has been allocated a very high Landscape Significance and Retention Value of *Priority for Retention*.
- 3.3.11** The supplied plans show that Tree 22 will need to be removed to accommodate the proposed cycleway. The supplied plans show no works are proposed within the TPZ of Tree 30 and 31.
- 3.3.12** Recommendations: Tree 22 may be a viable candidate for transplanting as it is in the early mature stage of growth and in good health. Anecdotally, *Ficus macrophylla* are considered a robust species tolerant of transplanting. Investigation into the viability of transplanting (including the preparation of a detailed Transplanting Feasibility Study) should be undertaken by an experienced Tree Transplanting Contractor.
- 3.3.13** As the proposed stone retaining wall fronting the National Trust/S.H Ervin Gallery is in close proximity to the TPZ areas of Trees 30 and 31, it should be designed and constructed as to avoid the requirement for over-excavation, battering or benching. A slimline draincell type product should be used to the rear of the wall to reduce the requirement for additional excavation. Demolition of the existing wall should be undertaken using tree sensitive methods.

3.3.14 Trees 23, 25, 26 and 29 have been identified as *Olea europaea* var. *europaea* (European Olive) and are located within a landscape area between National Trust/S.H Ervin Gallery and the Cahill Expressway. These trees have an estimated ULE of 5-15 years, and have been allocated a low Landscape Significance and Retention Value of *Consider for Removal*.

3.3.15 The supplied plans show that Trees 23, 25, 26 and 29 will need to be removed to accommodate the proposed cycleway.

3.3.16 Trees 24 and 28 have been identified as *Celtis sinensis* (Chinese Nettle Tree) and are located within a landscape area between National Trust/S.H Ervin Gallery and the Cahill Expressway. Tree 24 has an estimated ULE of 15-15 years, and has been allocated a low Landscape Significance and Retention Value of *Consider for Removal*. Tree 28 has an estimated ULE of 5-15 years, and has been allocated a moderate Landscape Significance and Retention Value of *Consider for Retention*.

3.3.17 The supplied plans show that Trees 24 and 28 will need to be removed to accommodate the proposed cycleway.

3.3.18 Tree 27 has been identified as *Ficus macrophylla* (Moreton Bay Fig) and is located within the landscape area between National Trust/S.H Ervin Gallery and the Cahill Expressway. *Ficus macrophylla* are a very large tree species which develops a broad spreading crown. Given the proximity of Tree 27 to the Cahill Expressway, significant and ongoing Reduction Pruning will be required in the future to maintain clearance from the carriageway. Based on the above, Tree 27 is an inappropriate species for its location. Tree 27 has an estimated ULE of 5-15 years, and has been allocated a moderate Landscape Significance and Retention Value of *Consider for Retention*.

3.3.19 The supplied plans show that Tree 27 will need to be removed to accommodate the proposed cycleway.

3.4 Precinct 4: S.H Ervin Gallery to Kent Street

3.4.1 Trees 32-34 have been identified as *Ficus macrophylla* (Moreton Bay Fig) and are located within the landscape area fronting the National Trust/S.H Ervin Gallery. These trees have an estimated ULE of 40+ years, and have been allocated a moderate Landscape Significance and Retention Value of *Priority for Retention*.

3.4.2 The supplied plans show that no works are proposed within the TPZ areas of Tree 32 and 33. The supplied plans show the new cycleway is proposed within the TPZ areas of Tree 34. These works represents a *Major Encroachment* as defined by AS-4970. Clause 3.3.4 of the AS-4970 outlines soil characteristics and volume, topography and drainage should be considered when determining the impact of an encroachment. As the tree is located at the top of a rock shelf of approximately 1.7m in height, root growth on the eastern side of the rootplate will have been restricted, and the proposed works should not impact the tree.

3.4.3 Tree 35 and 36 have been identified as *Ficus rubiginosa* (Port Jackson Fig) and are located within a small landscape area between Bradfield Highway and the National Trust/S.H Ervin Gallery. The trees are of fair structural condition due to the presence of wounds with decay and bark inclusions. *Ficus rubiginosa* are a large tree species which develops a broad spreading crown. Given the proximity of Trees 35 and 36 to the Bradfield Highway, significant and ongoing Reduction Pruning will be required in the future to maintain clearance from the carriageway. Based on the above, Trees 35 and 36 are an inappropriate species for their location. Trees 35 and 36 have an estimated ULE of 5-15 years, and have been allocated a low Landscape Significance and Retention Value of *Consider for Removal*.

3.4.4 The supplied plans show that Trees 35 and 36 will need to be removed to accommodate the proposed cycleway.

- 3.4.5** **Tree 37** has been identified as *Leptospermum petersonii* (Lemon-Scented Tea Tree) and is located within a small landscape area between Bradfield Highway and the National Trust/S.H Ervin Gallery. This tree is of poor structural condition due to the presence of major bark inclusions, wounds with advanced stages of decay and lopped branches. Tree 37 has an ULE of less than 5 years, and has been allocated a low Landscape Significance and Retention Value of *Priority for Removal*.
- 3.4.6** The supplied plans show that Tree 37 will need to be removed to accommodate the proposed cycleway.
- 3.4.7** **Trees 38-43** have been identified as *Ficus microcarpa* var. *hillii* (Hills Weeping Fig) and are located within a small landscape area between a multi-storey residential apartment block and the Bradfield Highway. The trees are of fair structural condition with the potential for rootplate instability, particularly during storms/high winds, and as the trees develop in size and the sail area of their crowns increase. It is likely that the trees have developed a predominately linear root distribution, orientated north/south, within the garden bed and footpath area. The presence of the building footing immediately to the east of the trees and the highly compacted nature of the sub-base/sub-grade beneath the carriageway to the east will have restricted root growth in these directions.
- 3.4.8** Surface root growth was observed within the footpath with areas of the asphalt surface being extensively cracked and sections of the kerb bordering the garden bed being lifted/displaced. Trees 38-43 have an estimated ULE of 5-15 years and have been allocated a high Landscape Significance and Retention Value of *Consider for Retention*.
- 3.4.9** The supplied plans show the new cycleway/footpath is proposed within the TPZ areas of Trees 38-43. These works represents a *Major Encroachment* as defined by AS-4970. Clause 3.3.4 of the AS-4970 outlines that design factors and tree sensitive construction methods should be considered when determining the potential impact of the encroachment.
- 3.4.10** Recommendations: The following tree sensitive demolition/construction methods should be used to minimise the impact of works on Trees 38-43:
- The existing footpath should be demolished using tree sensitive methods.
 - The new footpath/cycleway should be designed to enable the retention of roots (25mmØ), or as directed by the Project Arborist.
 - Where roots (25mmØ) are to be retained, the footpath/cycleway should be installed above existing grade (including sub base materials) and kerbs should be modified to bridge significant roots.
- 3.4.11** **Tree 44** has been identified as *Ficus benjamina* (Weeping Fig) and is located within the landscape area of a multi-storey residential apartment block and the Bradfield Highway. This tree is of fair structural condition due to the presence of a major co-dominant bark inclusion. A 100mm (approx.) surface root has grown between an expansion joint in the adjacent concrete wall, and runs along the edge of the footpath at the base of the wall. This tree has an estimated ULE of 5-15 years and has been allocated a high Landscape Significance and Retention Value of *Consider for Retention*.
- 3.4.12** The supplied plans show the new cycleway/footpath is proposed within the TPZ area of Tree 44. These works represents a *Major Encroachment* as defined by AS-4970. Clause 3.3.4 of the AS-4970 outlines that design factors and tree sensitive construction methods should be considered when determining the potential impact of the encroachment.
- 3.4.13** Recommendations: The following tree sensitive demolition/construction methods should be used to minimise the impact of works on Tree 44:

- The existing footpath should be demolished using tree sensitive methods.
- The new footpath/cycleway should be designed to enable the retention of roots (25mmØ), or as directed by the Project Arborist.
- Where roots (25mmØ) are to be retained, the footpath/cycleway should be installed above existing grade (including sub base materials) and kerbs should be modified to bridge significant roots.

3.5 Underground Services

- 3.5.1 The installation of underground services should be located outside of TPZ areas. Where this is not possible, they should be installed using either hydrovac or hand excavation methods with the services located around/below roots (>25mmØ or as determined by the Project Arborist). Alternatively, boring methods may be used for underground service installation where the installation depth is greater than 800mm below existing grade. Excavations for starting and receiving pits for boring equipment should be located outside of TPZ areas or located to avoid roots (>25mmØ or as determined by the Project Arborist).

3.6 Pruning Works

- 3.6.1 Trees 2 and 11 (*Jacaranda mimosifolia*) may need to be Reduction Pruned to provide clearance to the new elevated cycleway (Type A). These pruning works are minor and would be limited to branches less than 30mm in diameter. Provision should be made within the design so that additional pruning for construction access and scaffolding/hoarding is not required. Where additional clearance is required, branches may be temporarily pushed or tied. Where branches cannot be pushed or tied back without damage, scaffolding should be modified and constructed around branches (with appropriate branch protection installed as required). The clearance required to prevent conflict between the trees' crowns and crane movements should also be considered. It should also be noted that given the close proximity of the trees' crowns to the proposed cycleway, ongoing, periodic pruning will be required to maintain clearances.
- 3.6.3 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)*, *Workcover Code of Practice for the Amenity Tree Industry (1998)* and other applicable legislation and codes.

3.7 Replacement Planting

- 3.7.1 Replacement tree planting should be installed as part of the works. Replacement trees should be supplied as advanced-size stock to help offset the loss of amenity resultant from the tree removals.
- 3.7.2 Replacement planting should be supplied in accordance with *Australian Standard 2303 (2015) Tree Stock for Landscape Use*.

4.0 CONCLUSION

- 4.1 Forty four (44) trees were assessed in the preparation of this Report. Trees 3-9 and 31 are listed on Council's Register of Significant Trees (2013).
- 4.2 The supplied plans and documentation show that the proposed works include a bidirectional separated cycleway connecting the dedicated cycleway on the Sydney Harbour Bridge through to the Kent Street cycleway.

- 4.3 The supplied plans show that Trees 10, 12-29 and 35-37 will need to be removed to accommodate the proposed cycleway. With the exception of Trees 15 and 22, the removal of these trees should have a minimal visual impact due to their small relative size and low/moderate Landscape Significance. The removal of these trees will create opportunities for new, more appropriate tree plantings (species and locations), which should provide better long term outcomes in regards to tree maintenance requirements and amenity. Replacement planting using healthy, advanced-size specimens could replace the loss of amenity within a short to medium timeframe.
- 4.4 Tree 15 is a large specimen with high Landscape Significance. Consideration should be given to amending the design to allow for the retention of this tree. Tree 22 may be a viable candidate for transplanting as it is in the early mature stage of growth, in good health, and is considered a robust species tolerant of transplanting.
- 4.5 The supplied plans show Trees 3-9 are to be relocated as part of the proposed works. Investigation into the viability of transplanting Trees 3-9 (and Tree 22 as discussed above) should be undertaken by an experienced Tree Transplanting Contractor. In addition, 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.
- 4.6 The proposal for the new Harbour Village Cycleway is currently in the concept design phase and detailed drawings are not available. From the supplied plans, it may be possible to retain Trees 1, 2, 11, 30-34 and 38-44. However, an updated Arboricultural Impact Assessment (based on scaled plans which correctly locate the existing trees) will be required to accurately determine the potential impacts on the trees. A Tree Protection Plan should be should also be prepared based on the completed design.
- 4.7 Replacement planting is recommended where trees are proposed for removal. New tree plantings should be supplied in accordance with *Australian Standard 2303 (2015) Tree Stock for Landscape Use*.

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 viewed 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 these 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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Standards Australia (2009), *Protection of Trees on Development Sites AS-4970*.

Standards Australia (2007), *Pruning of Amenity Trees AS-4373*.

Standards Australia (2015), *Tree Stock for Landscape Use AS-2303*.

Appendix 1: Methodology

- 1.1 Site Inspection:** This report was determined as a result of a comprehensive site during June 2016. The comments and recommendations in this report are based on findings from this site inspection.
- 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*.⁸ The inspection was limited to a visual examination of the subject tree(s) from ground level only. No internal diagnostic or tissue 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. Tree 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

⁸ Mattheck & 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 is considered to meet 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.
	The subject tree is a remnant tree.
High	The subject tree creates a 'sense of place' or is considered 'landmark' tree.
	The subject tree is of local, cultural or historical importance or is widely known.
	The subject tree has been identified by a suitably qualified professional as a species scheduled as a Threatened or Vulnerable Species or forms part of an Endangered Ecological Community associated with the subject site, as defined under the provisions of the <i>Threatened Species Conservation Act 1995 (NSW)</i> or the <i>Environmental Protection and Biodiversity Conservation Act 1999</i> .
	The subject tree is known to provide habitat to a threatened species.
	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.
	The subject tree forms part of the curtilage of a heritage item with a known or documented association with that item.
Moderate	The subject tree makes a positive contribution to the visual character or amenity of the area.
	The subject tree provides a specific function such as screening or minimising the scale of a building.
	The subject tree has a known habitat value.
	The subject tree is a good representative of the species in terms of aesthetic value.
Low	The subject tree is an environmental pest species or is exempt under the provisions of the local Council's Tree Management Controls
	The subject tree makes little or no contribution to the amenity of the locality.
	The subject tree is a poor representative of the species in terms of aesthetic value.
Insignificant	The subject tree is declared a Noxious Weed under the Noxious Weeds Act

- 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			
	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.

3.02

SITE PRECINCTS

The study area has been broken into four (4) precincts to allow the exploration of various design options for each area.

Starting at the northern end of the study area, the four precincts are as follows:

- > Precinct 1 - Harbour Bridge Link & Incident Response Area
- > Precinct 2 - Fort Street Public School & Incident Response Area
- > Precinct 3 - Cahill Expressway Overpass
- > Precinct 4 - S.H. Ervin Gallery to Kent Street

Key factors vary for each precinct and have been listed under the precinct title for each area on the following pages.

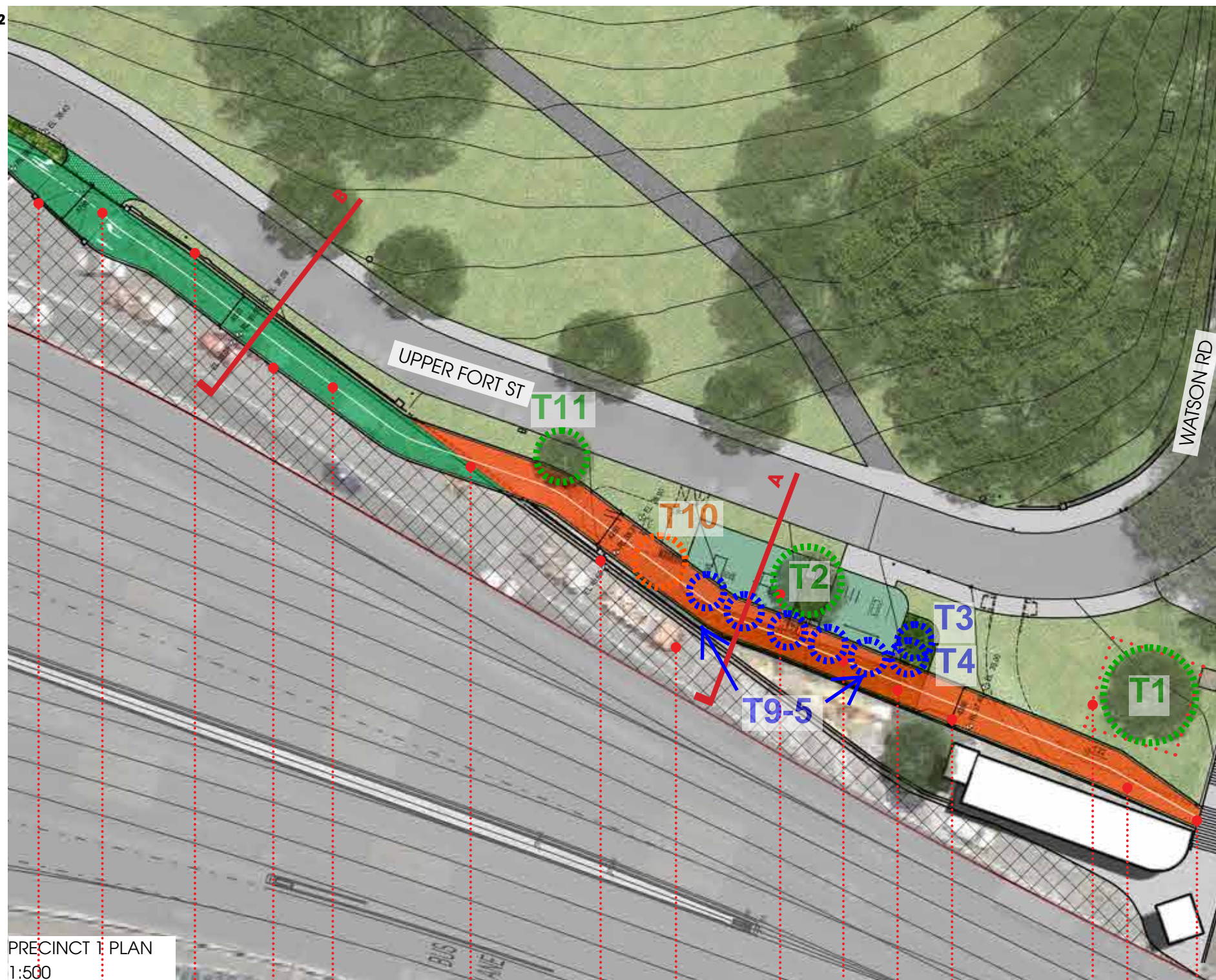


PRECINCT 4
S.H. ERVIN GALLERY TO KENT
STREET

PRECINCT 3
CAHILL EXPRESSWAY
OVERPASS

PRECINCT 2
FORT STREET PUBLIC SCHOOL
& INCIDENT RESPONSE AREA

PRECINCT 1
HARBOUR BRIDGE LINK &
INCIDENT RESPONSE AREA



3.03

P1: HARBOUR BRIDGE LINK & INCIDENT RESPONSE AREA

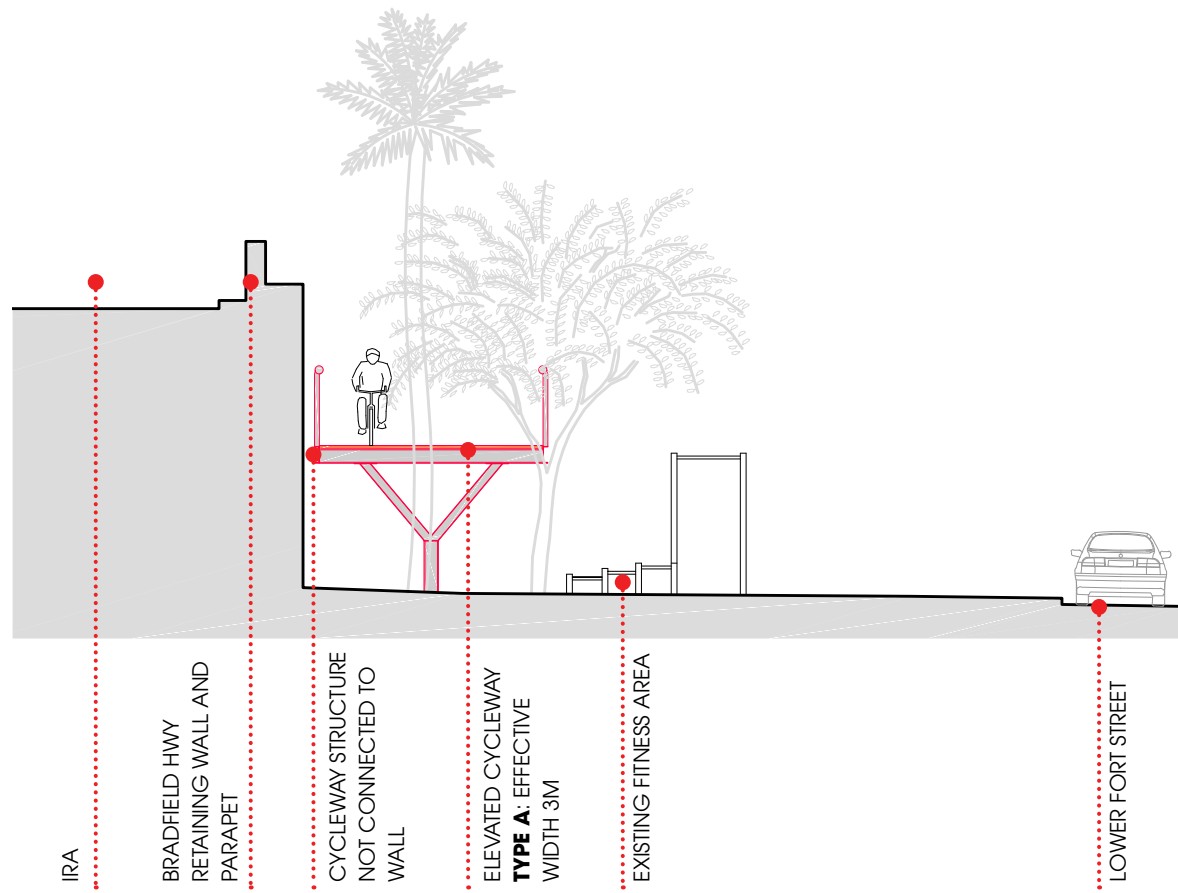
The first precinct of the study area connects to the existing Harbour Bridge Cycleway. The connection point is restricted in width due to the existing bridge portal entry. There is no proposal to alter this entry due to the heritage significance of the Harbour Bridge.

The cycleway is proposed as an elevated structure in the area between the Harbour Bridge entry portal and the IRA. The benefits of the elevated cycleway in this area include:

- > The cycleway will not impede access to the maintenance and emergency access to the railway line.
- > Cyclists are separated from motorists, pedestrians and park users using the fitness equipment and future amenities block.
- > Separation from traffic on Upper Fort Street for cyclists travelling northwards through the precinct.
- > Ability to meet the level of the Bradfield Highway (IRA) at the earliest opportunity.
- > Relocation of cycleway access to/from Upper Fort Street results in slight increase of travel distance for cyclists wishing to travel towards/from Barangaroo direction via Watson Road

The cycleway is proposed to be located on the Bradfield Hwy deck level in the space provided through the adjusted location of the IRA. The benefits of the cycleway located in this area include:

- > Retention of car parking along Lower Fort Street.
- > No disturbance to the park edge and road edge along Observatory Hill.
- > Separation from traffic on Upper Fort Street for cyclists travelling northwards through the precinct.

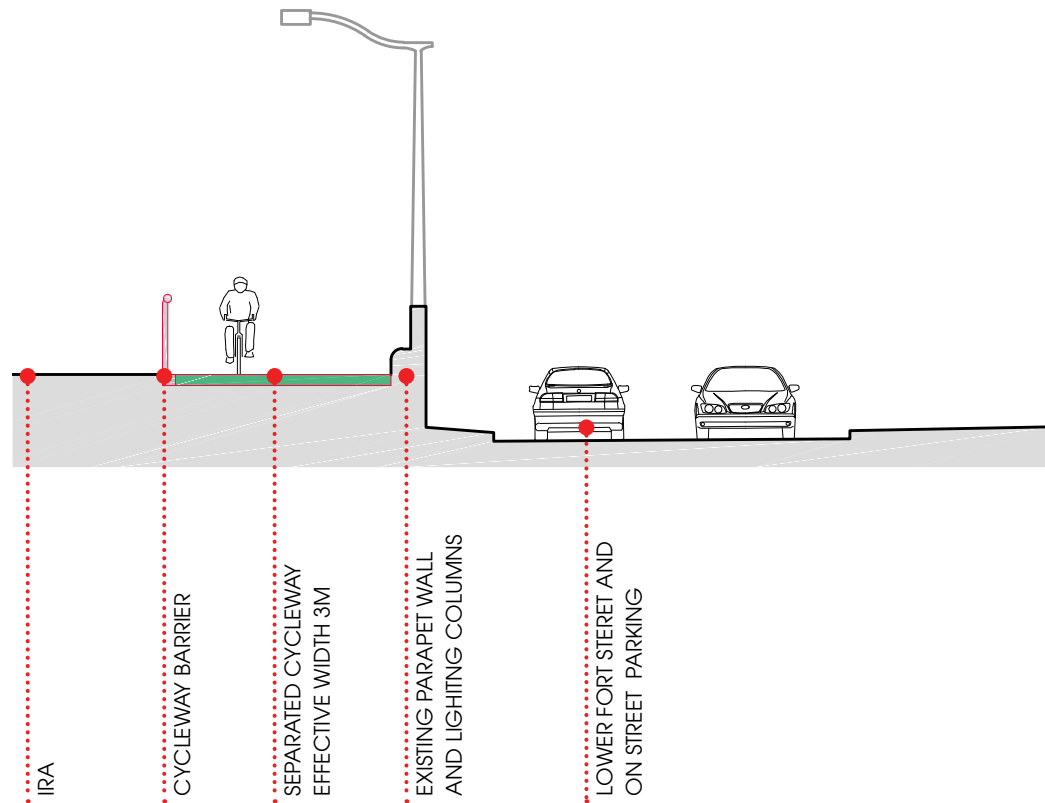


SECTION A
ELEVATED CYCLEWAY



BRADFELD HWY RETAINING
WALL AND PARAPET

EXISTING FITNESS AREA



SECTION B
ON-GRADE SEPARATED CYCLEWAY



EXISTING PARAPET WALL
AND LIGHTING COLUMNS

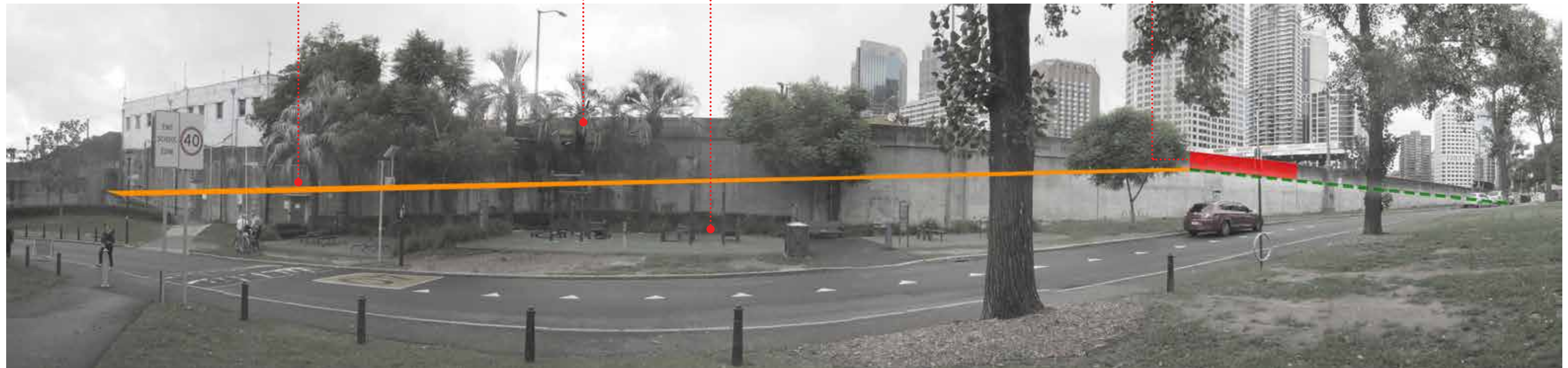
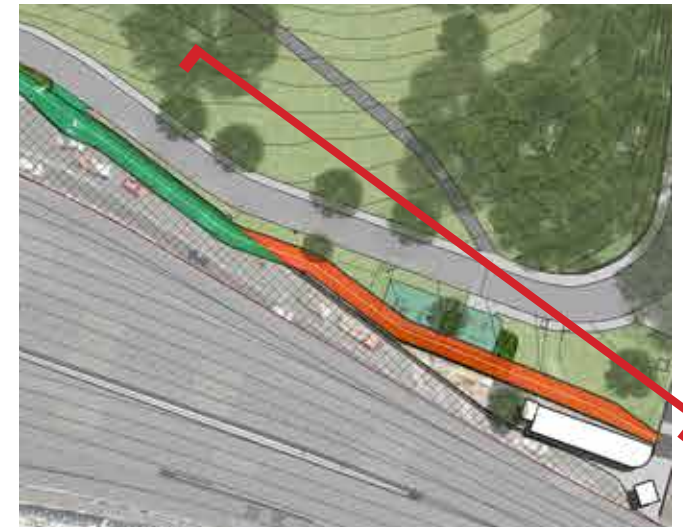
LOWER FORT STREET AND
ON STREET PARKING

HEIGHT OF ELEVATED
CYCLEWAY TO CLEAR
EXISTING SERVICE/
MAINTENANCE ACCESS
TO RAILWAY LINE

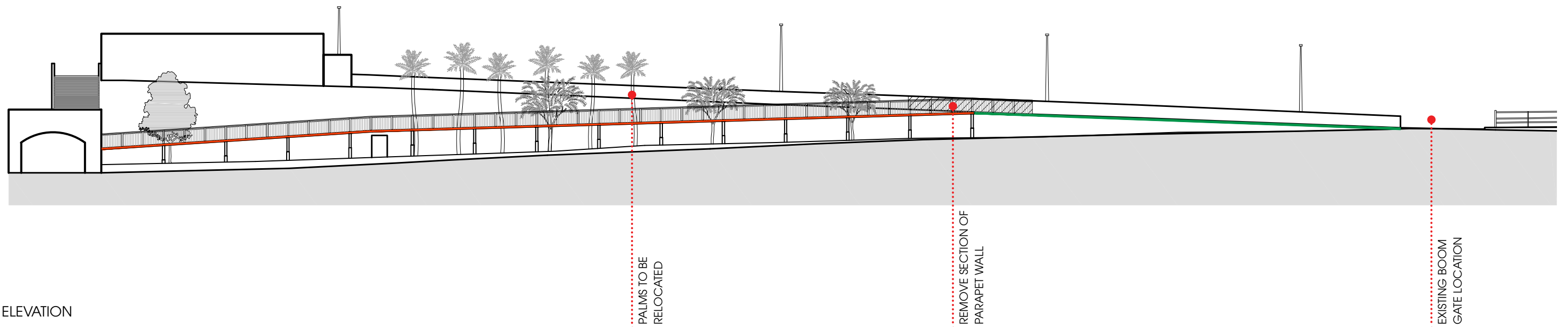
PALMS TO BE RELOCATED

EXISTING FITNESS AREA

REMOVE SECTION OF
PARAPET WALL



LOCATION OF PROPOSED ELEVATED CYCLEWAY



ELEVATION

3.04

P2: INCIDENT RESPONSE AREA & FORT STREET PUBLIC SCHOOL

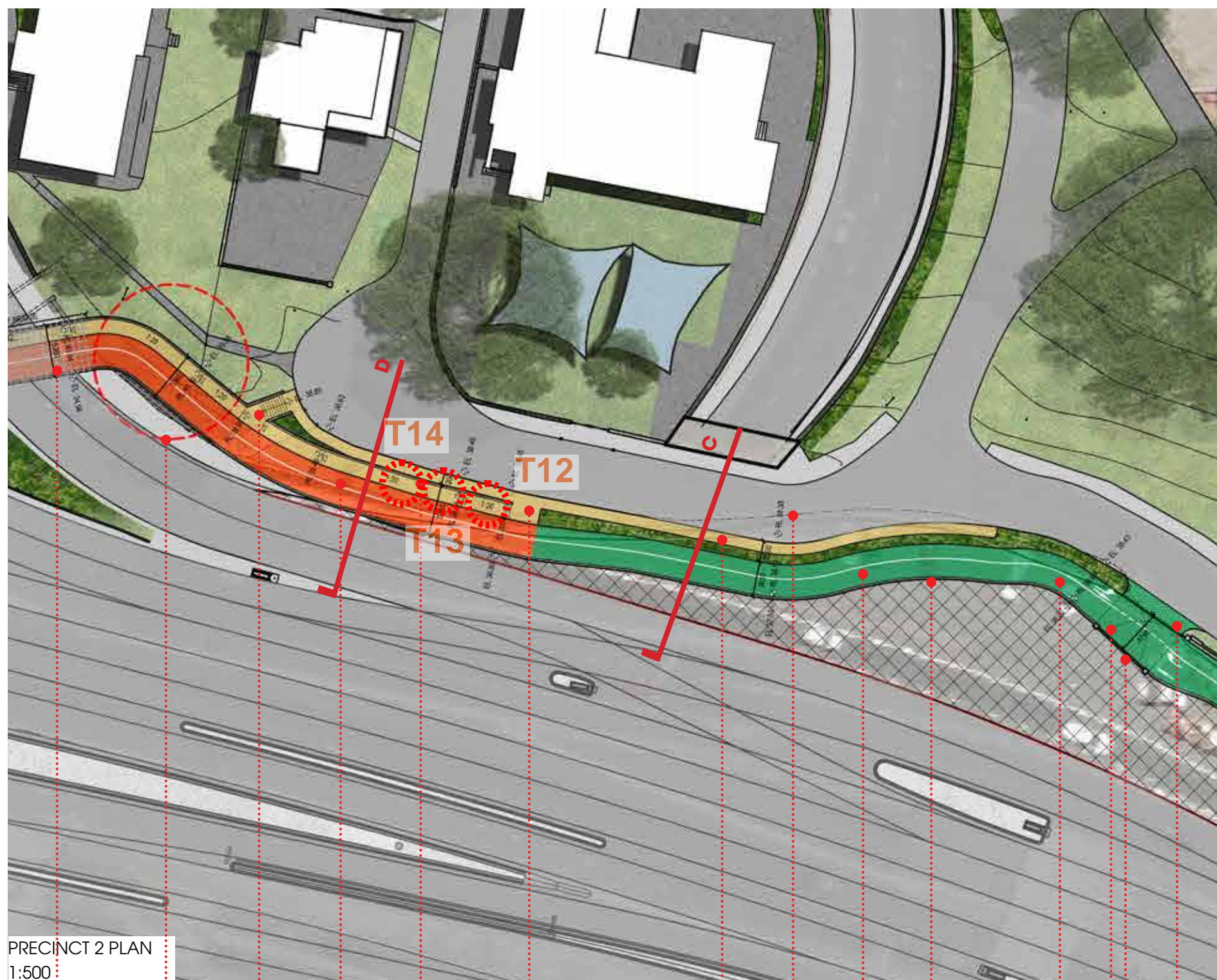
The second precinct of the study area is located to the front of Fort Street Public School and provides the connection between the proposed on-grade cycleway on the Bradfield Highway deck to the Cahill Expressway overpass.

The cycleway is proposed in the space provided through the adjusted location of the IRA. South of the boom gate location, the cycleway will stay at the same level as Upper Fort Street. Upper Fort Street is proposed to be widened to achieve a consistent six metre width. The benefits of the cycleway located in this area include:

- > Separation from traffic on Upper Fort Street for cyclists travelling through the precinct.
- > Cyclists are separated from motorists, pedestrians and school users using the school drop-off zone.
- > The introduction of a planting strip to the eastern side of Upper Fort Street.
- > Reduced congestion for mixed traffic using Upper Fort Street with the widened road at existing pinch point.
- > The provision of a footpath to utilise when dropping off students at Fort Street Public School.

The proposed cycleway transitions to an elevated structure once adjacent Fort Street Public School. Pedestrians connect to the path in this area leading up the elevated structure, following a gentle 1:20 gradient up towards the Cahill Expressway overpass. The benefits of this section of the cycleway include:

- > Improved approach angle, gradient and sightlines from/to overpass.
- > Separation between cyclists and pedestrians using the cycleway.
- > Provision of stair access from/to Upper Fort Street for pedestrians.



PRECINCT 2 PLAN
1:500

CONNECTION TO OVERPASS
BRIDGE

GUM TREE REMOVED TO
ACCOMMODATE HEADSTOCK

STAIR CONNECTION TO SEPARATED
PATH

ELEVATED BRIDGE APPROACH RAMP
- TYPE B : EFFECTIVE WIDTH = 4.5M

SEPARATED PATH

PEDESTRIAN ACCESS POINT WHERE
RAMP APPROACH TO BRIDGE
MEETS EXISTING GROUND LEVEL

FOOTPATH FOR PEDESTRIAN ACCESS
AND FOR SCHOOL DROP OFF

ROAD WIDENED TO 6 METRES TO
MATCH ADJACENT ROAD WIDTHS

CYCLEWAY AT UPPER FORT STREET
LEVEL . EFFECTIVE WIDTH = 3M

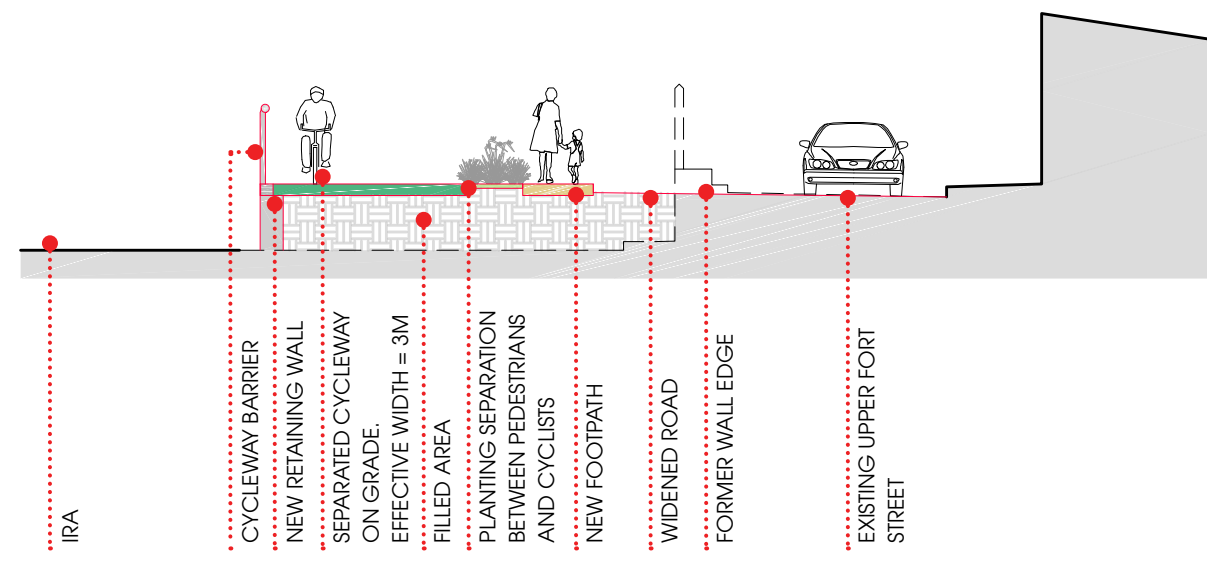
RETAINING WALL WITH 1.4 M
BARRIER FENCE

WIDENED CYCLEWAY TO
ACCOMMODATE TURNING INTO
UPPER FORT STREET

GATE TO CYCLEWAY TO RESTRICT
ACCESS DURING VEHICLE CROSSING

RMS CONTROLLED ACCESS GATE
TO IRA

PAVED THRESHOLD TO VEHICLE /
CYCLE ENTRY

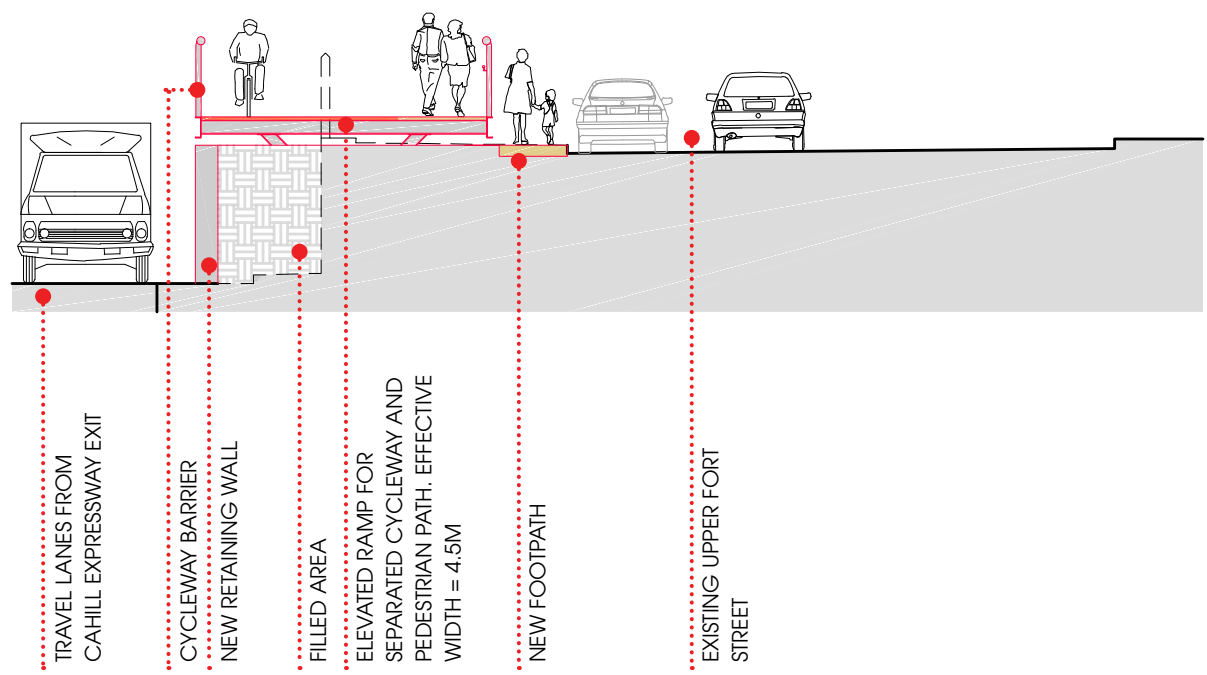


SECTION C
ON-GRADE SEPARATED CYCLEWAY + FOOTPATH

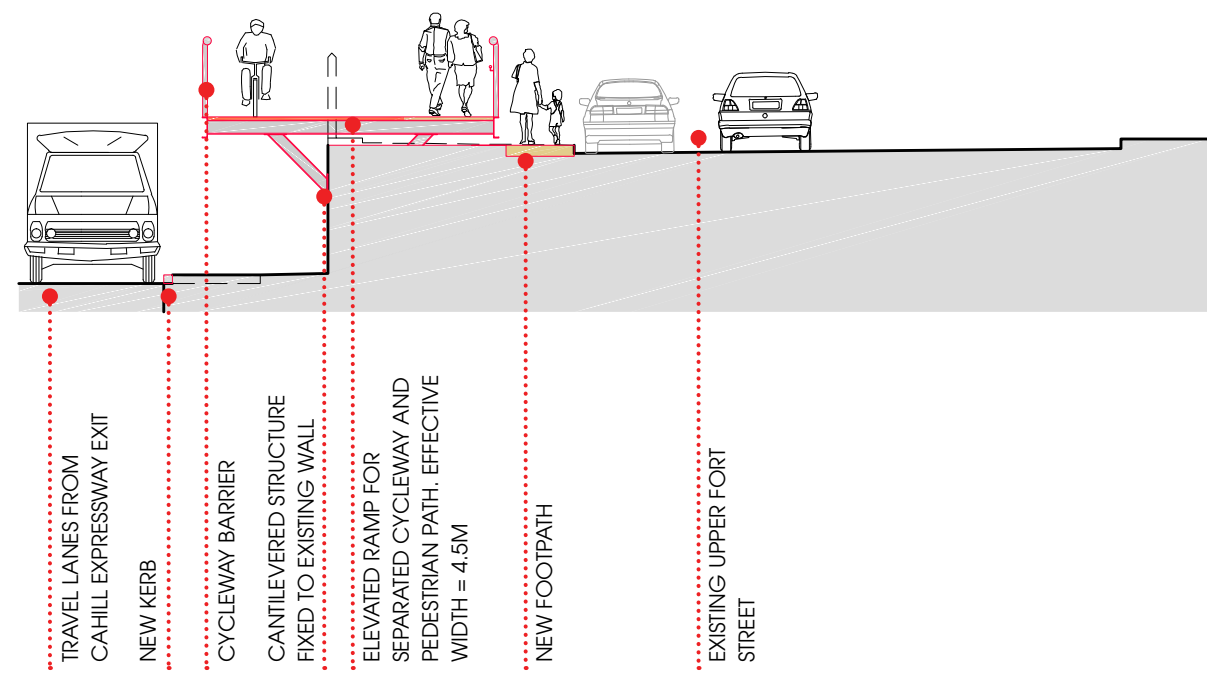


UPPER FORT STREET
PINCH POINT

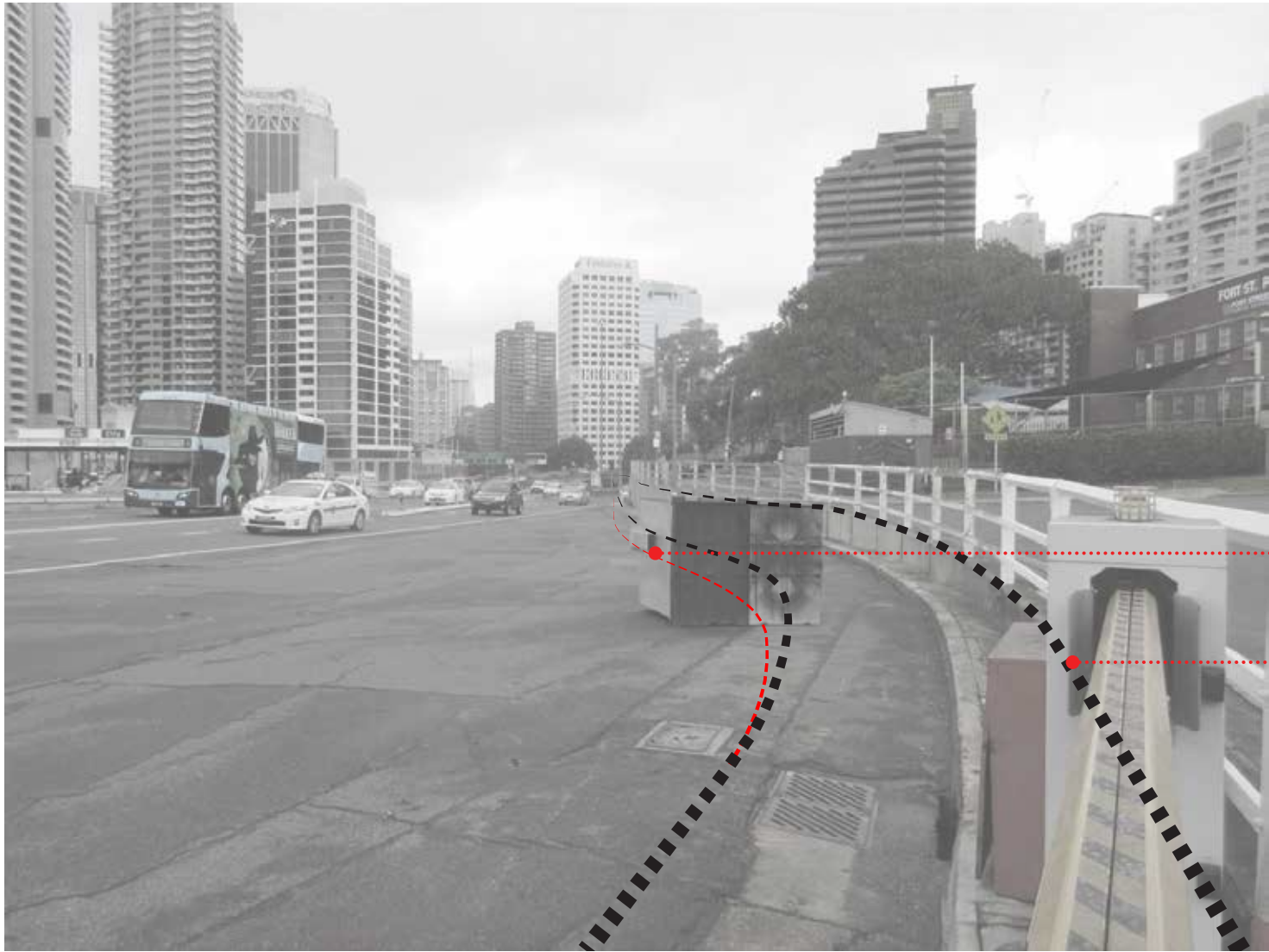
EXISTING WALL EDGE &
TIMBER FENCE



SECTION D
ELEVATED SEPARATED CYCLEWAY + FOOTPATH



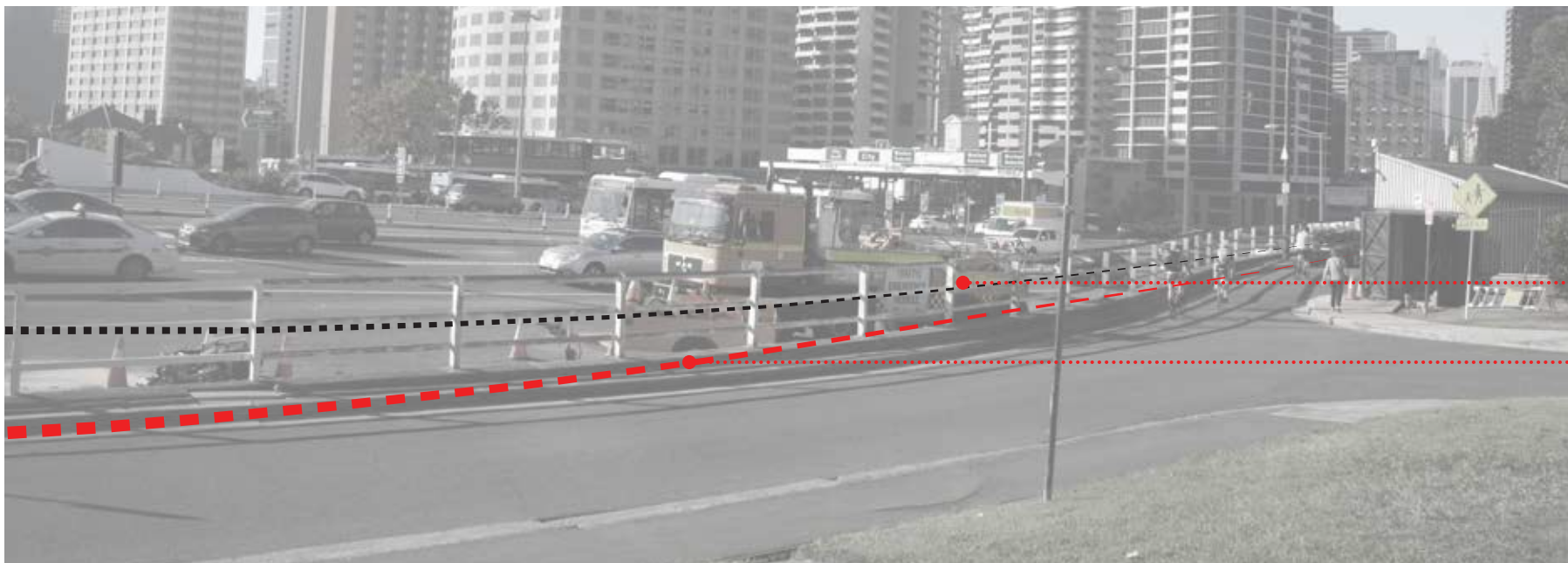
SECTION D (ALTERNATIVE)
CANTILEVERED, ELEVATED SEPARATED CYCLEWAY + FOOTPATH



LOCATION OF PROPOSED CYCLEWAY WITH RETAINING WALL

BASE OF PROPOSED
RETAINING WALL

PROPOSED CYCLEWAY
ALIGNMENT



LOCATION OF PROPOSED CYCLEWAY WITH FOOTPATH IN FRONT

PROPOSED CYCLEWAY
ALIGNMENT

PROPOSED KERB RE-
ALIGNMENT & FOOTPATH
EDGE



PRECINCT 3 PLAN
1:500

SEPARATED CYCLEWAY

PEDESTRIAN PATH EXTENDED TO
NEW RAMP

NEW STONE RETAINING WALL TO
REPLACE EXISTING CONCRETE
WALL

NEW PATH CONNECTING TO THE
NATIONAL TRUST / S.H. ERVIN
GALLERY

RETAINING WALL WITH 1.4 M
BARRIER FENCE

SPIRAL RAMP WITH SEPARATED
PATH DEFINED BY PAVEMENT
SURFACE AND LINEMARKING

ELEVATED CYCLEWAY BRIDGE
APPROACH RAMP

- **TYPE B** : EFFECTIVE WIDTH = 4.5M

- **TYPE C** : EFFECTIVE WIDTH = 4.5M

(WHEN LOCATED ABOVE LOWER RAMP)

TREES REMOVED TO

ACCOMMODATE THE SPIRAL RAMP

LOCATION OF EXISTING BRIDGE
TO BE DEMOLISHED

NEW BRIDGE OVERPASS
- EFFECTIVE WIDTH = 4.5M

ELEVATED BRIDGE APPROACH RAMP
- **TYPE B** : EFFECTIVE WIDTH = 4.5M

SEPARATED PATH

PEDESTRIAN ACCESS POINT
TO SEPARATED PATH

3.05

P3: BRIDGE CROSSING & S.H. ERVIN GALLERY FRONTAGE

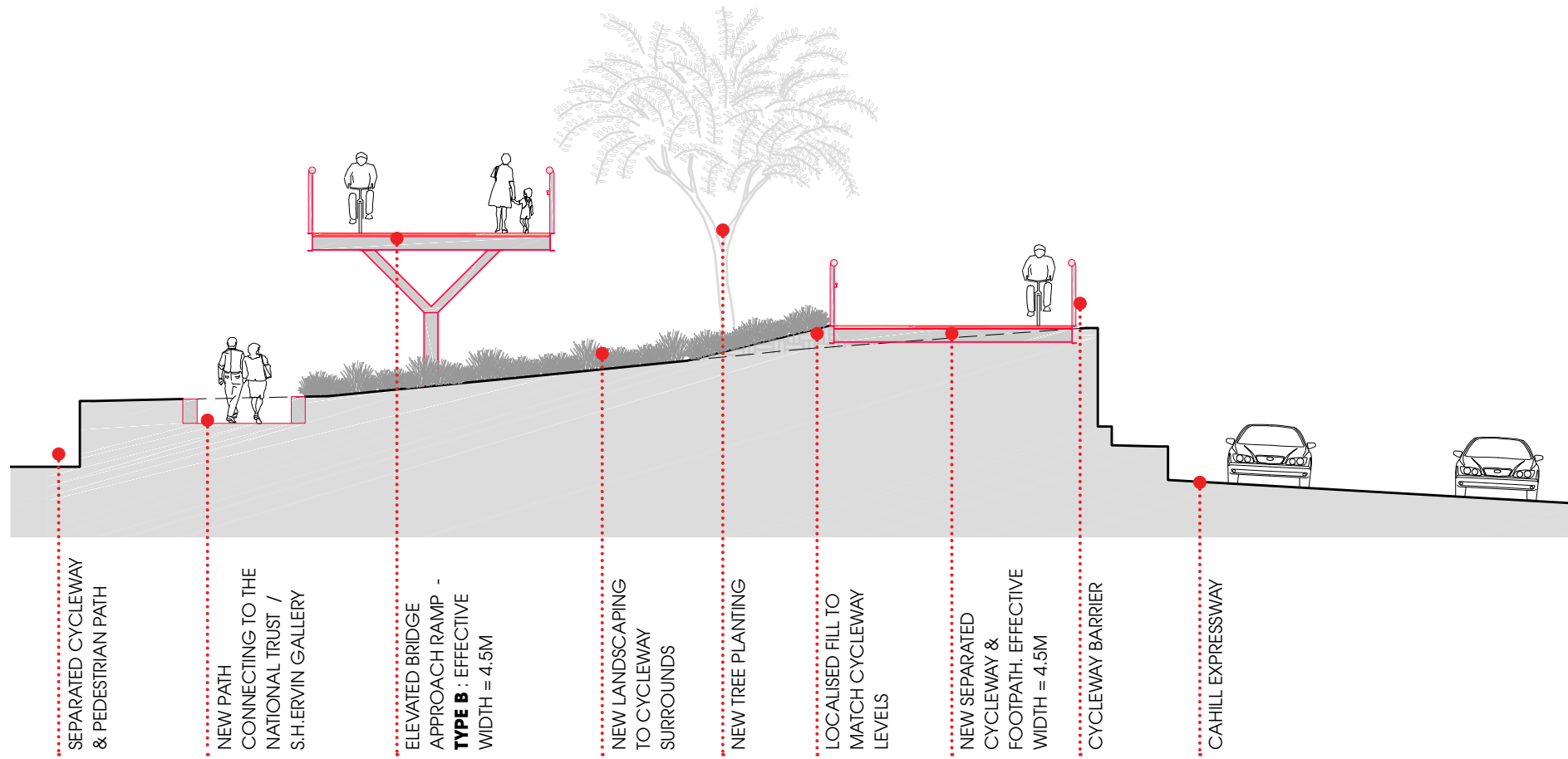
The third precinct of the study area consists of the proposed Cahill Expressway overpass bridge and associated approach ramp to the front of the S.H. Ervin Gallery.

The cycleway will travel over the Cahill Expressway atop a proposed overpass bridge truss structure. The benefits of this proposed overpass include:

- > Bridge truss structure at a raised level to achieve minimum required clearance (5.5M) heights to the expressway below.
- > Improved approach angle, gradient and sightlines from/to overpass.
- > Safety screen to new bridge

The proposed cycleway transitions to an elevated approach ramp structure once across the proposed overpass bridge. The approach ramp follows a greatly improved gradient of 1:14 down the spiralling structure and past the S.H. Ervin Gallery frontage. The benefits of this section of the cycleway include:

- > Improved gradient and sightlines to overpass.
- > Separation between cyclists and pedestrians using the cycleway, with pedestrians on the inside to avoid potential oversteer conflict with cyclists.
- > Ramp structure beyond main heritage viewshed to S.H. Ervin Gallery.
- > Provision of new footpath connection to S.H. Ervin Gallery, along with new landscaping beneath ramp, helping to re-define heritage curtilage of building
- > Replacement of existing concrete retaining wall with more aesthetically stone wall to match existing stone cutting.



SECTION E
ELEVATED CYCLEWAY AND PATH



EXISTING BRIDGE OVER
CAHILL EXPRESSWAY

EXISTING APPROACH
RAMP TO BRIDGE

EXISTING STAIR
CONNECTION TO S.H.
ERVIN GALLERY/NATIONAL
TRUST CENTRE



EXISTING



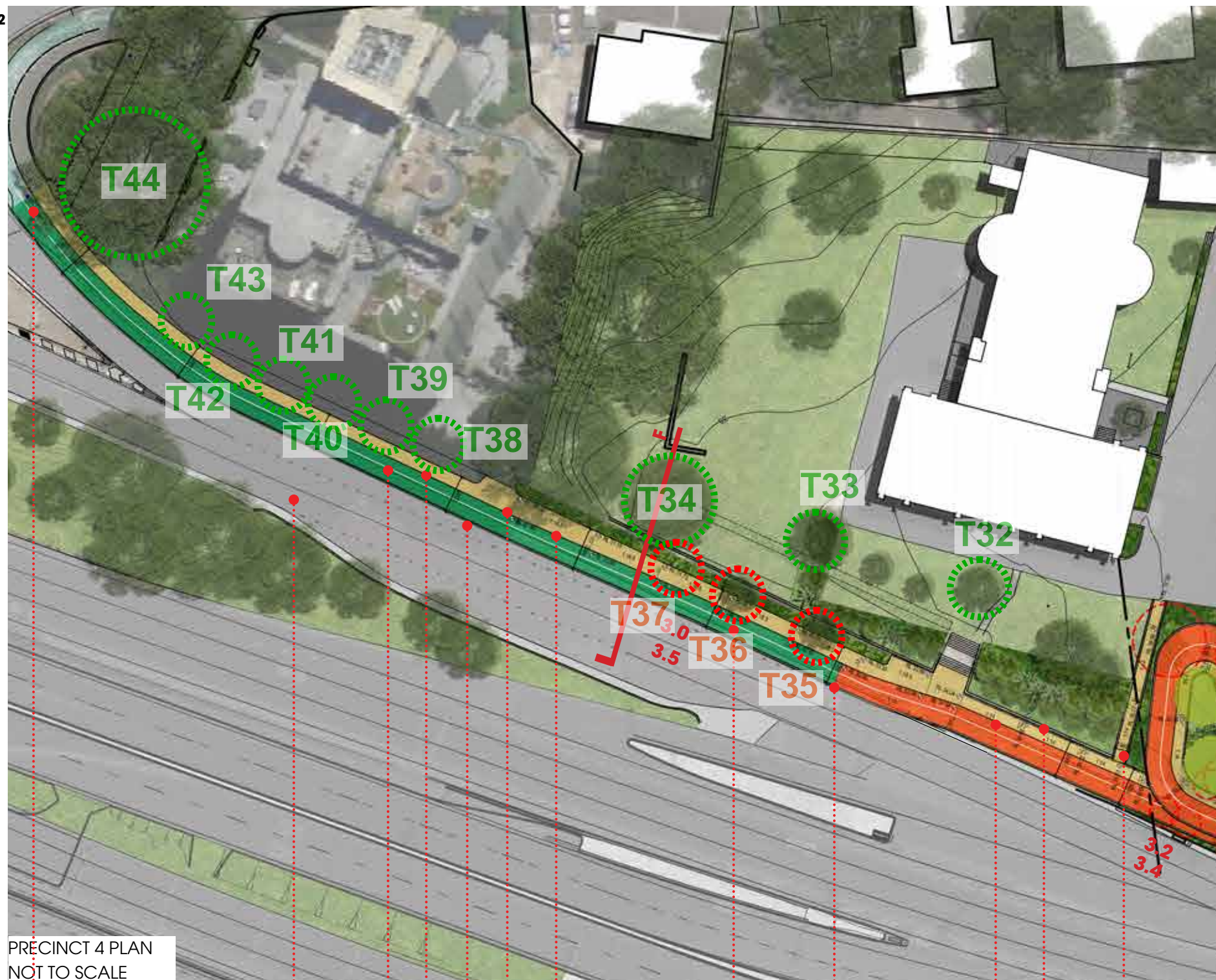
PROPOSED



EXISTING



PROPOSED



PRECINCT 4 PLAN
NOT TO SCALE

CONNECTION TO KENT ST
CYCLEWAY

TRAVEL LANES NARROWED TO
TRANSITION TO BRIDGE LANE
WIDTHS

EXISTING KERB LINE

NEW KERB TO FOOTPATH

FREE STANDING 'ELSHOLZ' KERB

FOOTPATH MEETS EXISTING
FOOTPATH LEVELS AND GRADE

FOOTPATH NARROWED TO
1800MM MIN

SEPARATED CYCLEWAY: EFFECTIVE
WIDTH = 2.75M

SEPARATED CYCLEWAY MEETS
EXISTING ROAD LEVELS

PEDESTRIAN PATH EXTENDED TO
NEW RAMP

NEW STONE RETAINING WALL TO
REPLACE EXISTING CONCRETE
WALL

NEW PATH CONNECTING TO THE
NATIONAL TRUST / S.H. ERVIN
GALLERY

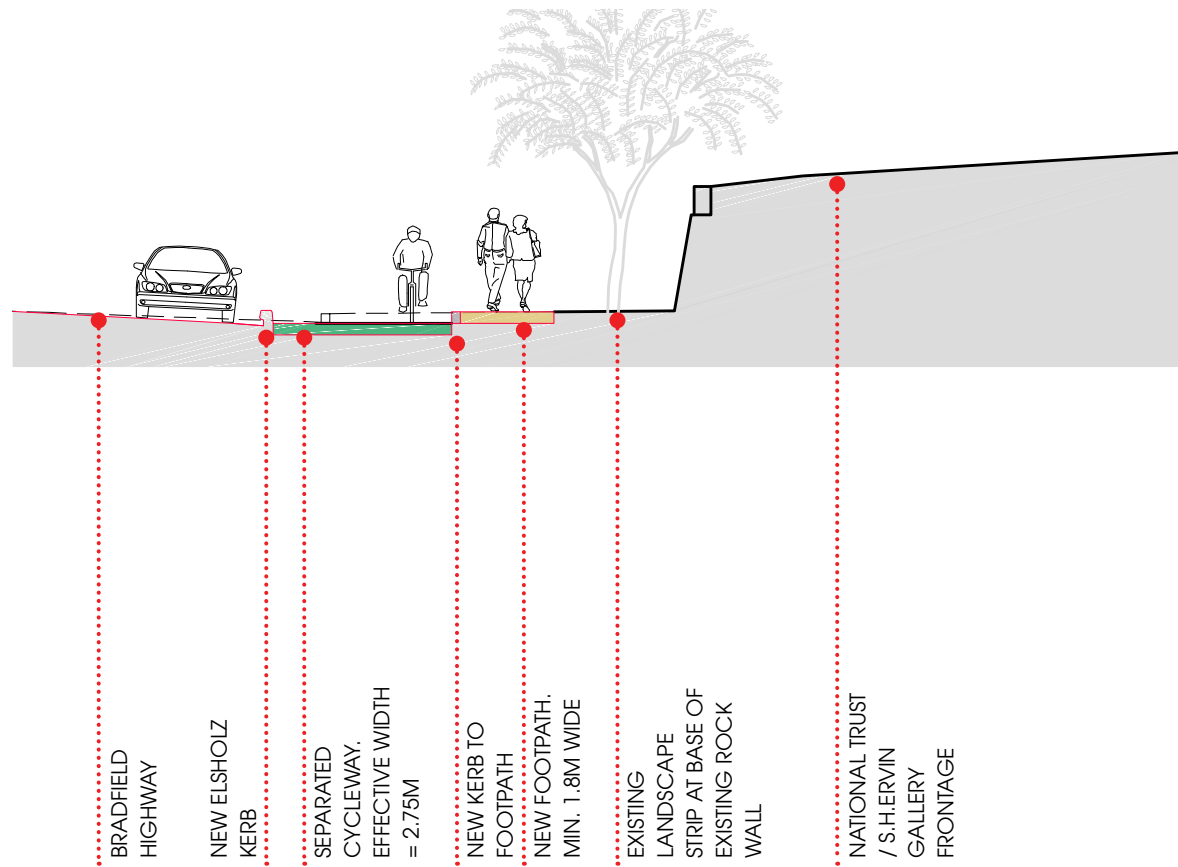
3.06

P4: S.H. ERVIN GALLERY FRONTAGE TO KENT STREET

The fourth precinct of the study area connects from the elevated ramp approach to the Kent Street separated cycleway. The separated bi directional cycleway is achieved through relocating the footpath and adjacent vehicle travel lanes.

This section of the proposed cycleway forms the important link from the proposed cycleway to the existing Kent Street cycleway as well as providing the following benefits:

- > Achieving a minimum 1.8M width footpath.
- > Physical separation between cyclists and pedestrians with the construction of a new kerb and level difference.
- > Physical separation between cyclists and vehicles with the construction of a new Elsholz kerb



SECTION F
SEPARATED CYCLEWAY AT ROAD LEVEL



Appendix 3: Tree Assessment Schedule

Tree No.	Species	DBH (m)	Height (m)	Crown Spread (m)	Health Rating	Structural Rating	Comments	ULE (years)	L/Sign	Retention Value	TPZ (m)	SRZ (m)	Implication
T1	<i>Ficus macrophylla</i> (Moreton Bay Fig)	400	10	6	Good	Good		40+	Moderate	Priority for Retention	4.8	2.3	Retain. No works within TPZ.
T2	<i>Jacaranda mimosifolia</i> (Jacaranda)	400	8	7	Good	Good	Superficial basal wound.	15-40	Moderate	Consider for Retention	4.8	2.3	Retain. Major encroachment, elevated cycleway. Reduction pruning required for clearance.
T3	<i>Butia capitata</i> (Jelly Palm)	450	7	4	Good	Good	Fig in crown.	15-40	Very high	Priority for Retention	5	n/a	Transplant.
T4	<i>Butia capitata</i> (Jelly Palm)	450	7	4	Good	Good	Phototropic lean, slight.	15-40	Very high	Priority for Retention	5	n/a	Transplant.
T5	<i>Butia capitata</i> (Jelly Palm)	450	7	4	Good	Good		15-40	Very high	Priority for Retention	5	n/a	Transplant.
T6	<i>Butia capitata</i> (Jelly Palm)	450	7	4	Good	Good	Fig in crown.	15-40	Very high	Priority for Retention	5	n/a	Transplant.
T7	<i>Butia capitata</i> (Jelly Palm)	450	7	4	Good	Good	Phototropic lean, slight.	15-40	Very high	Priority for Retention	5	n/a	Transplant.

Tree No.	Species	DBH (m)	Height (m)	Crown Spread (m)	Health Rating	Structural Rating	Comments	ULE (years)	L/Sign	Retention Value	TPZ (m)	SRZ (m)	Implication
T8	<i>Butia capitata</i> (Jelly Palm)	450	7	4	Good	Good	Phototrophic lean, slight.	15-40	Very high	Priority for Retention	5	n/a	Transplant.
T9	<i>Butia capitata</i> (Jelly Palm)	450	7	4	Good	Good		15-40	Very high	Priority for Retention	5	n/a	Transplant.
T10	<i>Jacaranda mimosifolia</i> (Jacaranda)	250	7	6	Good	Good		15-40	Moderate	Priority for Retention	3	2	Remove.
T11	<i>Jacaranda mimosifolia</i> (Jacaranda)	200	5	3	Good	Good		15-40	Moderate	Consider for Retention	2.4	1.7	Retain. Major encroachment, elevated cycleway. Reduction pruning required for clearance.
T12	<i>Banksia serrata</i> (Old Man Banksia)	100	4	1	Good	Good		15-40	Low	Consider for Removal	2	1.5	Remove.
T13	<i>Banksia serrata</i> (Old Man Banksia)	100	4	1	Good	Good	Basal bark split (appears to be growth split).	15-40	Low	Consider for Removal	2	1.5	Remove.
T14	<i>Banksia serrata</i> (Old Man Banksia)	200	7	2	Good	Fair	Wound(s), advanced stages of decay. Adaptive growth.	5-15	Moderate	Consider for Retention	2.4	1.7	Remove.
T15	<i>Eucalyptus cladocalyx</i> (Sugar Gum)	1100	11	8	Fair	Good	Small (<25mmØ) deadwood in moderate volumes. Crown density 75-95%. Small (<25mmØ) epicormic growth in moderate volumes. Large diameter pruning wounds, early stages of decay. Adaptive growth. Structures within SRZ. Fill at base. Hanger in crown. Habitat box.	15-40	High	Priority for Retention	13.2	3.5	Remove.

Tree No.	Species	DBH (m)	Height (m)	Crown Spread (m)	Health Rating	Structural Rating	Comments	ULE (years)	L/Sign	Retention Value	TPZ (m)	SRZ (m)	Implication
T16	<i>Eucalyptus robusta</i> (Swamp Mahogany)	250	10	4	Fair	Good	Partially suppressed. Small (<25mmø) deadwood in low volumes. Crown density 50-75%. Small (<25mmø) & medium (25-75mmø) epicormic growth in moderate volumes. Lerp damage to leaves.	5-15	Moderate	Consider for Retention	3	2	Remove.
T17	<i>Ficus rubiginosa</i> (Port Jackson Fig)	200 200 200 200 400	8	6	Good	Fair	Small (<25mmø), medium (25-75mm ø) & large (>75mmø) deadwood in low volumes. Co-dominant inclusions, major. Wound(s), advanced stages of decay. Previous branch failures. Lopped.	5-15	Moderate	Consider for Retention	6.6	2.6	Remove.
T18	<i>Schinus molle</i> var. <i>areira</i> (Peppercorn Tree)	250 250 250	7	6	Fair	Poor	Medium (25-75mmø) & large (>75mmø) & deadwood in moderate volumes. Crown density 50-75%. Wound(s), advanced stages of decay. Phototrophic lean, severe. Potential rootplate instability. Structures within SRZ. Lopped.	< 5	Low	Priority for Removal	5.3	2.4	Remove.
T19	<i>Schinus molle</i> var. <i>areira</i> (Peppercorn Tree)	400	7	6	Fair	Poor	Medium (25-75mmø) & large (>75mmø) & deadwood in moderate volumes. Crown density 50-75%. Wound(s), advanced stages of decay. Phototrophic lean, severe. Structures within SRZ. Lopped.	< 5	Low	Priority for Removal	4.8	2.3	Remove.
T20	<i>Schinus molle</i> var. <i>areira</i> (Peppercorn Tree)	200	7	6	Fair	Poor	Medium (25-75mmø) & large (>75mmø) & deadwood in moderate volumes. Crown density 50-75%. Wound(s), advanced stages of decay. Phototrophic lean, severe. Potential rootplate instability. Structures within SRZ. Lopped.	< 5	Low	Priority for Removal	2.4	1.7	Remove.
T21	<i>Schinus molle</i> var. <i>areira</i> (Peppercorn Tree)	350	7	6	Fair	Poor	Medium (25-75mmø) & large (>75mmø) & deadwood in moderate volumes. Crown density 50-75%. Wound(s), advanced stages of decay. Phototrophic lean, severe. Potential rootplate instability. Structures within SRZ. Lopped.	< 5	Low	Priority for Removal	4.2	2.2	Remove.
T22	<i>Ficus macrophylla</i> (Moreton Bay Fig)	400	10	5	Good	Good		40+	Moderate	Priority for Retention	4.8	2.3	Remove.

Tree No.	Species	DBH (m)	Height (m)	Crown Spread (m)	Health Rating	Structural Rating	Comments	ULE (years)	L/Sign	Retention Value	TPZ (m)	SRZ (m)	Implication
T23	<i>Olea europaea</i> var. <i>europaea</i> (European Olive)	75 75	3	3			Small (<25mmØ) deadwood in low volumes. Crown density 75-95%. Partially suppressed.	5-15	Low	Consider for Removal	2	1.5	Remove.
T24	<i>Celtis sinensis</i> (Chinese Nettle Tree)	150	6	3	Good	Good		5-15	Low	Consider for Removal	2	1.5	Remove.
T25	<i>Olea europaea</i> var. <i>europaea</i> (European Olive)	100 200 200	6	5	Fair	Good	Small (<25mmØ) deadwood in moderate volumes. Crown density 75-95%. Small (<25mmØ) epicormic growth in moderate volumes. Wound(s), early signs of decay.	5-15	Low	Consider for Removal	3.6	2	Remove.
T26	<i>Olea europaea</i> var. <i>europaea</i> (European Olive)	400	6	5	Fair	Good	Small (<25mmØ) deadwood in moderate volumes. Crown density 75-95%. Small (<25mmØ) epicormic growth in moderate volumes. Wound(s), early signs of decay.	5-15	Low	Consider for Removal	4.8	2.3	Remove.
T27	<i>Ficus macrophylla</i> (Moreton Bay Fig)	600	7	7	Good	Good	Lopped with resultant epicormics. Partially suppressed. Limited access to base.	5-15	Moderate	Consider for Retention	7.2	2.7	Remove.
T28	<i>Celtis sinensis</i> (Chinese Nettle Tree)	400	7	7	Good	Good	Partially suppressed. Limited access to base.	5-15	Moderate	Consider for Retention	4.8	2.3	Remove.
T29	<i>Olea europaea</i> var. <i>europaea</i> (European Olive)	250	6	6	Good	Good	Partially suppressed. Wound(s), early signs of decay. Lopped with resultant epicormics. Limited access to base.	5-15	Low	Consider for Removal	3	1.9	Remove.
T30	<i>Ficus macrophylla</i> (Moreton Bay Fig)	450	10	10	Good	Good		40+	Moderate	Priority for Retention	5.4	2.4	Retain. No works within TPZ.
T31	<i>Ficus macrophylla</i> (Moreton Bay Fig)	450	8	6	Good	Fair	Wound(s), various stages of decay. Large wound to topside of 1st order branch. Mechanical damage to exposed surface roots. Previous roots severance, no signs of rootplate instability. Unusual form.	15-40	Very high	Priority for Retention	5.4	2.4	Retain. No works within TPZ.

Tree No.	Species	DBH (m)	Height (m)	Crown Spread (m)	Health Rating	Structural Rating	Comments	ULE (years)	L/Sign	Retention Value	TPZ (m)	SRZ (m)	Implication
T32	<i>Ficus macrophylla</i> (Moreton Bay Fig)	250	8	5	Good	Good		40+	Moderate	Priority for Retention	3	2	Retain. No works within TPZ.
T33	<i>Ficus macrophylla</i> (Moreton Bay Fig)	400 400 200	8	6	Good	Good	Small (<25mmØ) deadwood in low volumes. Co-dominant inclusions, minor. Bark Inclusion(s), major. Crossing branches.	40+	Moderate	Priority for Retention	7.2	2.7	Retain. No works within TPZ.
T34	<i>Ficus macrophylla</i> (Moreton Bay Fig)	500	9	4	Good	Good	Mechanical damage to exposed surface roots.	40+	Moderate	Priority for Retention	6	2.5	Retain. No works within TPZ.
T35	<i>Ficus rubiginosa</i> (Port Jackson Fig)	350	6	5	Fair	Fair	Small (<25mmØ) deadwood in moderate volumes. Crown density 75-95%. Crossing branches. Pruning wound(s), early signs of decay.	5-15	Low	Consider for Removal	4.2	2.2	Remove.
T36	<i>Ficus rubiginosa</i> (Port Jackson Fig)	250 250 250 250 250 250	6	4	Good	Fair	Small (<25mmØ), medium (25-75mmØ) & large (>75mmØ) deadwood in low volumes. Bark inclusion(s), major. Pruning wound(s), early signs of decay. Lopped. Branch(s) in contact with rock shelf.	5-15	Low	Consider for Removal	7.2	2.7	Remove.
T37	<i>Leptospermum petersonii</i> (Lemon-Scented Tea Tree)	250 @ grade	4	3	Good	Poor	Small (<25mmØ) deadwood in low volumes. Bark inclusion(s), major. Wound(s), early signs of decay. Lopped.	< 5	Low	Priority for Removal	3	1.9	Remove.
T38	<i>Ficus microcarpa</i> var. <i>hillii</i> (Hills Weeping Fig)	900	12	10	Good	Fair	Small (<25mmØ) deadwood in low volumes. Asymmetrical crown form. Pruning wound(s), early stages of decay. Bark inclusion(s), minor. Phototrophic lean, slight. Structures within SRZ. Evidence of root spread beneath pavement.	5-15	High	Consider for Retention	10.8	3.2	Retain. Major encroachment, cycleway.
T39	<i>Ficus microcarpa</i> var. <i>hillii</i> (Hills Weeping Fig)	550	12	10	Good	Fair	Small (<25mmØ) deadwood in low volumes. Asymmetrical crown form. Bark inclusion(s), minor. Phototrophic lean, slight. Structures within SRZ. Evidence of root spread beneath pavement.	5-15	High	Consider for Retention	6.6	2.6	Retain. Major encroachment, cycleway.

Tree No.	Species	DBH (m)	Height (m)	Crown Spread (m)	Health Rating	Structural Rating	Comments	ULE (years)	L/Sign	Retention Value	TPZ (m)	SRZ (m)	Implication
T40	<i>Ficus microcarpa</i> var. <i>hillii</i> (Hills Weeping Fig)	600	12	10	Good	Fair	Small (<25mmø) deadwood in low volumes. Asymmetrical crown form. Crossing branches. Phototrophic lean, slight. Structures within SRZ. Evidence of root spread beneath pavement.	5-15	High	Consider for Retention	7.2	2.7	Retain. Major encroachment, cycleway.
T41	<i>Ficus microcarpa</i> var. <i>hillii</i> (Hills Weeping Fig)	400 400	12	10	Good	Fair	Small (<25mmø) deadwood in low volumes. Co-dominant inclusions, minor. Asymmetrical crown form. Phototrophic lean, slight. Structures within SRZ. Evidence of root spread beneath pavement.	5-15	High	Consider for Retention	6.8	2.7	Retain. Major encroachment, cycleway.
T42	<i>Ficus microcarpa</i> var. <i>hillii</i> (Hills Weeping Fig)	550	12	10	Good	Fair	Small (<25mm ø) deadwood in low volumes. Co-dominant inclusions, major. Phototrophic lean, slight. Structures within SRZ. Evidence of root spread beneath pavement.	5-15	High	Consider for Retention	6.6	2.6	Retain. Major encroachment, cycleway.
T43	<i>Ficus microcarpa</i> var. <i>hillii</i> (Hills Weeping Fig)	450 250	12	10	Good	Fair	Small (<25mm ø) deadwood in low volumes. Asymmetrical crown form. Co-dominant inclusions, major. Bark inclusion(s), minor. Phototrophic lean, slight. Structures within SRZ. Evidence of root spread beneath pavement.	5-15	High	Consider for Retention	6.2	2.6	Retain. Major encroachment, cycleway.
T44	<i>Ficus benjamina</i> (Weeping Fig)	550	12	10	Good	Fair	Co-dominant inclusions, major. Structures within SRZ. Restricted soil volume. Limited crown clearance. No access to base.	5-15	High	Consider for Retention	6.6	2.6	Retain. Major encroachment, cycleway.

Appendix 4: Plates



Plate 1: Showing Tree 1



Plate 2: Showing Trees 2-9



Plate 3: Showing Trees 10 & 11



Plate 4: Showing Trees 12-14

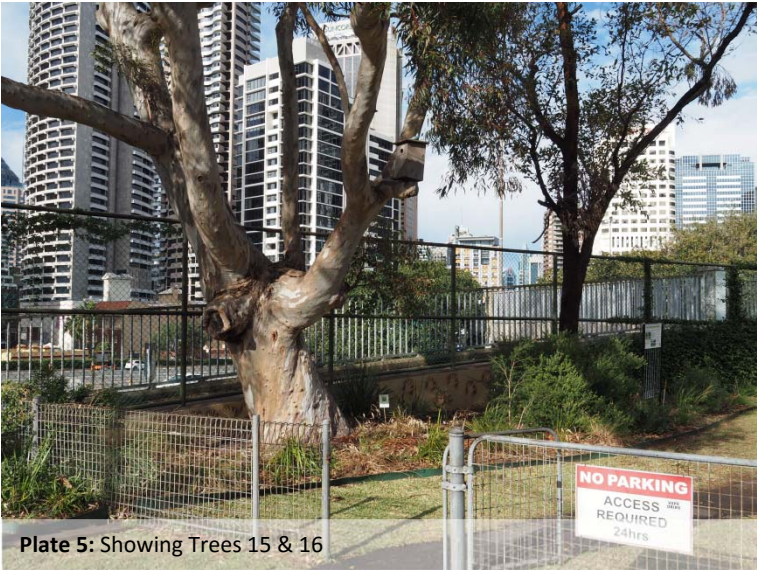


Plate 5: Showing Trees 15 & 16



Plate 6: Showing Tree 17



Plate 7: Showing Trees 18-21



Plate 8: Showing Tree 22



Plate 9: Showing Tree 23-29



Plate 10: Showing Tree 30 & 31



Plate 11: Showing Tree 33 & 34



Plate 12: Showing Tree 35-37



Plate 13: Showing Tree 38-43

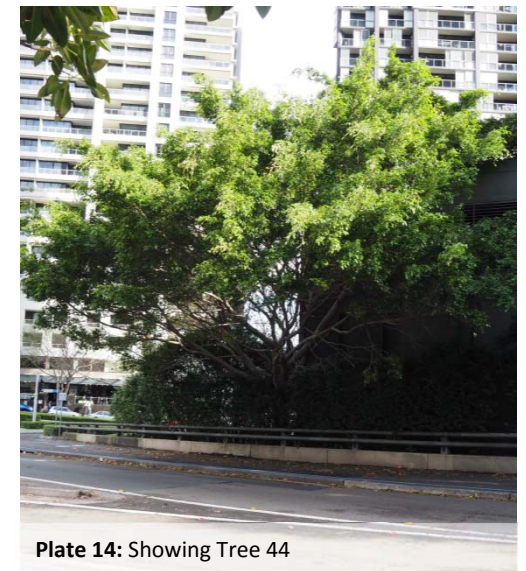


Plate 14: Showing Tree 44