



CONSULTANCY
ARBORICULTURE
PLANT PATHOLOGY

ARBORICULTURAL IMPACT ASSESSMENT
&
TREE PROTECTION SPECIFICATION

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SITE ADDRESS | Curlewis Street, Bondi
PREPARED FOR | Northrop Consulting Engineers c/-33parallel
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1.0 EXECUTIVE SUMMARY |

- 1.1 The proposal, outlined in the supplied plans, show the streetscape upgrade and construction of a dual lane cycleway at Curlewis Street, Bondi.
- 1.2 A total of eighty-five (85) trees were assessed that were a mix of Australian native and exotic species with the majority street trees managed by Waverley Council.
- 1.3 The supplied plans show no works are proposed within the TPZs of Trees 3, 6, 7, 8, 9, 11, 13, 14, 16, 17, 24, 25, 30, 32, 34, 36, 37, 53, 56, 67, 70, 71 & 73. However, the tree protection measures outlined in this report should be implemented to avoid indirect impacts.
- 1.4 The proposed streetscape upgrades and cycleway are within the SRZs of Trees 1, 2, 5, 15, 18, 21, 23, 38, 43, 44, 45, 46, 47, 48, 51, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 68, 69, 72, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84 & 85 and represent a *Major Encroachment* (as defined by AS4970). The majority of the impact is from the replacement of existing kerbs, pavements and vehicular crossovers. Given that the proposed works are mostly within or beyond existing structures (i.e. the area of encroachment is within an existing road and beyond an existing kerb), the works are considered to be broadly acceptable under the Australian Standard AS4970, Clause 3.3.4, as existing structures are likely to have restricted root growth into the area of encroachment. Further, the negative impacts can be avoided if the tree sensitive construction methods and protection measures outlined in this report are carefully implemented.
- 1.5 However, given the size of encroachment, the proposal represents a significant risk to the tree's long term structural and physiological viability and therefore the tree sensitive construction methods and protection measures outlined in this report must be carefully implemented under the supervision of the Project Arborist. Significant departures from the detailed tree sensitive construction methods and protection measures are likely to result in a shortened ULE and/or tree removal.
- 1.6 Trees 4, 10, 12, 19, 20, 22, 26, 27, 28, 29, 31, 33, 35, 39, 40, 41, 42, 49, 50 & 52 are either within the proposed cycleway footprint or the TPZ encroachment is considered too large for their long-term viability, based on a consideration of their health, structure and the size of the encroachment. Consequently, these trees will need to be removed to accommodate the proposal. These trees were all assigned Low Landscape Significance Values, except for Tree 4 which was assigned a Moderate Landscape Significance Value.
- 1.7 The location of the underground services was not detailed in the supplied plans. The installation of underground services should be located outside of the TPZs detailed in this report. Where this is not possible, they should be installed around or below roots (>25mmØ) using either hydrovac or hand excavation and supervised by the Project Arborist.

2.0 INTRODUCTION |

2.1 Background

2.1.1 This Arboricultural Impact Assessment and Tree Protection Specification Report was prepared for Northrop Consulting Engineers c/-33parallel in relation to the proposed streetscape upgrade and construction of a dual lane cycleway on Curlewis Street, Bondi. This report has determined the impact of the proposed works on the trees at Curlewis Street, Bondi and neighbouring properties and where appropriate, has provided tree sensitive construction methods to minimise negative impacts to the trees.

2.1.2 In preparing this report, the author is aware of and has considered the objectives of the Waverley Council's *Waverley Council Tree Management Policy (2022)*; *Waverly Local Environmental Plan (2012)*, *Australian Standard 4970 Protection of Trees on Development Sites (2009)*, *Australian Standard 4373 Pruning of Amenity Trees (2007)* and *Safe Work Australia Guide for Managing Risks of Tree Trimming and Removal Work (2016)*.

2.1.3 Further methodology used in the preparation of this report is detailed in Appendix 1.

2.1.4 This Arboricultural Impact Assessment was based on an assessment of the following supplied documentation/plans only (Appendix 4). It should be noted that the Civil Plans have been updated since the completion of this report. Please refer to Appendix 1 of the REF for the latest plans.

- Civil Engineering Package. General Arrangement Plan. Rev. 01. (Dwg. No. C3010) Prepared by Northrop. Dated 07.10.2022.
- Civil Engineering Package. Siteworks Plan – Sheet 01. Rev. 01. (Dwg. No. C3100) Prepared by Northrop. Dated 07.10.2022.
- Civil Engineering Package. Siteworks Plan – Sheet 02. Rev. 01. (Dwg. No. C3101) Prepared by Northrop. Dated 07.10.2022.
- Civil Engineering Package. Siteworks Plan – Sheet 03. Rev. 01. (Dwg. No. C3102) Prepared by Northrop. Dated 07.10.2022.
- Civil Engineering Package. Siteworks Plan – Sheet 04. Rev. 01. (Dwg. No. C3103) Prepared by Northrop. Dated 07.10.2022.
- Civil Engineering Package. Siteworks Plan – Sheet 05. Rev. 01. (Dwg. No. C3104) Prepared by Northrop. Dated 07.10.2022.
- Civil Engineering Package. Siteworks Plan – Sheet 06. Rev. 01. (Dwg. No. C3105) Prepared by Northrop. Dated 07.10.2022.
- Civil Engineering Package. Siteworks Plan – Sheet 07. Rev. 01. (Dwg. No. C3106) Prepared by Northrop. Dated 07.10.2022.
- Civil Engineering Package. Siteworks Plan – Sheet 08. Rev. 01. (Dwg. No. C3107) Prepared by Northrop. Dated 07.10.2022.

2.2 The Proposal

2.2.1 The supplied plans show the show the streetscape upgrade and construction of a dual lane cycleway at Curlewis Street, Bondi.

3.0 RESULTS |

3.1 The Site

3.2 The site is an existing road with footpath that runs from the corner of Wellington Street and Curlewis Street to the end of Curlewis Street at Campbell Parade. The site has a fall from west to east.

3.3 The site is bounded by residential and commercial properties to the north, south, east and west.

3.4 The Trees

3.4.1 A Visual Tree Assessment (VTA) (Mattheck & Breloer, 2003) has been undertaken on trees growing within the site to determine their health and structural condition (Appendix 2). A full VTA of trees located outside of the site boundaries was not undertaken due to limited access. The species and trunk diameter were recorded for the purposes of determining Tree Protection Zone (TPZ) and Structural Root Zone (SRZ) calculations only. The distance of each tree from the site boundary is an approximation due to limited access.

3.4.2 The Australian Standard 4970: *Protection of Trees on Development Sites* (2009) Clause 2.3.2, requires the allocation of a Tree Retention Value. This value is based on the Useful Life Expectancy (ULE) and Landscape Significance, which considers the tree's health, structural condition and site suitability. The Retention Value does not consider any proposed development works and is 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

3.4.3 The Australian Standard 4970: *Protection of Trees on Development Sites* (2009) also requires the calculation of the Tree Protection Zone (TPZ) and Structural Root Zone (SRZ) for each tree (Appendix 1).

3.4.4 A total of eighty-five (85) trees and group trees were assessed which were a mix of Australian native and exotic species.

3.4.5 A search of the BioNet Atlas of NSW Wildlife Database was undertaken in November 2022. No individual threatened tree species that were listed within this database for the area were identified during the current field investigations of the site. The ecological significance and habitat value of the trees has not been assessed and is beyond the scope of this report.

3.4.6 Trees 1, 2, 3, 4, 5, 10, 12, 15, 18, 19, 21, 22, 23, 26, 27, 28, 31, 33, 35, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 55, 56, 57, 58, 60, 61, 63, 64, 65, 66, 67, 68, 69, 71, 72, 74, 75, 77, 78, 79, 80, 81, 82, 83, 84 & 85 are street trees and are managed by the Council.

3.4.7 Trees 3, 11, 12, 16, 20, 26, 29, 42, 53, 54, 55, 58, 62, 65, 73, 75, 82 & 85 are exempt from the Council's tree management controls.

3.4.8 Trees 6, 7, 8, 9, 11, 13, 14, 16, 17, 24, 25, 30, 32, 34, 36, 37, 53, 59, 70, 73 & 76 were located on adjacent properties. All trees on adjacent properties were allocated a Retention Value of *Priority for Retention*.

4.0 ARBORICULTURAL IMPACT ASSESSMENT |

4.1.1 Trees 6, 7, 8, 9, 11, 13, 14, 16, 17, 24, 25, 30, 32, 34, 36, 37, 53, 59, 70 & 73

4.1.2 Trees 6, 7, 8, 9, 11, 13, 14, 16, 17, 24, 25, 30, 32, 34, 36, 37, 53, 59, 70 & 73 were allocated adjusted Retention Values of *Priority for Retention*, given they were located outside of the site on residential properties.

4.1.3 The supplied plans show no works are proposed within the TPZs of Trees 6, 7, 8, 9, 11, 13, 14, 16, 17, 24, 25, 30, 32, 34, 36, 37, 53, 70 & 73. However, TPZ fencing has been specified in some situations to prevent indirect impacts. The TPZ fencing should be installed prior to any site works (including demolition) and remain in place for the duration of the construction. Materials, waste storage and temporary services should not be located within the TPZ fenced area. If works are required within the TPZ fenced area, then they should be supervised by the Project Arborist.

4.1.4 The tree protection measures must be inspected by the Project Arborist prior to the start of site works, including demolition.

4.1.5 Refer to AS4970 and Appendices 5, 6 & 7 for further details.

4.2 Tree 59

4.2.1 Tree 59 was identified as *Corymbia maculata* (Spotted Gum) and was allocated a High Landscape Significance Value and a Retention Value of *Priority for Retention*. The tree was located outside of the site at 51 Curlewis Street in the front garden.

4.2.2 The supplied plans show the proposed reconstruction of the existing vehicular crossing and new kerbs are within the TPZ of Tree 59. The overall TPZ encroachment was estimated to be 34.2% and also represents a *Major Encroachment* as defined by AS-4970. However, Clause 3.3.4 of AS-4970 does allow for major encroachments if design factors (e.g. tree sensitive construction methods) are used to minimise negative impacts and/or the presence of existing or past structures are likely to have been obstacles to root growth into the area of encroachment.

4.2.3 All of the proposed TPZ encroachment is within the footprint of an existing concrete footpath, crossing and road, which is likely to have created an inhospitable environment for root growth, and consequently, is likely to have reduced root growth in the area of the proposed works.

4.2.4 Refer to Appendix 5 for further detail.

4.2.5 Given the good physiological condition of the tree and the presence of existing structures, the proposed development can be accommodated. However, given the size of encroachment the proposal represents a significant risk to the tree's long term structural and physiological viability and therefore the following tree sensitive construction methods and protection measures must be carefully implemented under the supervision

of the Project Arborist. Significant departures from the detailed tree sensitive construction methods and protection measures are likely to result in a shortened ULE and/or tree removal.

- 4.2.6 TPZ fencing should be installed prior to any site works (including demolition) and remain in place for the duration of the construction. Materials, waste storage and temporary services should not be located within the TPZ fenced area. If works are required within the TPZ fenced area, then they should be supervised by the Project Arborist.
- 4.2.7 The tree protection measures must be inspected by the Project Arborist prior to the start of site works, including demolition.
- 4.2.8 Tree sensitive methods should be used for the removal of existing kerb and vehicular crossings within the TPZ areas. The existing concrete paving must be demolished and removed by hand to prevent damage to any structural roots (>25mmØ) and to avoid soil compaction. If machinery is required, then ground protection should be left in place and the machinery to work from the ground protection at all times.
- 4.2.9 The new concrete crossover and footpath (including sub-base materials) should be installed above or at existing grade and utilize existing sub-base layers.
- 4.2.10 Hand excavation and root pruning along any excavation lines shall be completed prior to the commencement of mechanical excavation to prevent tearing and shattering damage to the roots.
- 4.2.11 No over-excavation, battering, or benching shall be undertaken beyond the footprint of any structure unless approved by the Project Arborist.
- 4.2.12 Refer to AS4970 and Appendices 5, 6 & 7 for further details.

4.3 **Tree 76**

- 4.3.1 Tree 76 was identified as *Eriobotrya japonica* (Loquat tree) and was allocated a Moderate Landscape Significance Value and a Retention Value of *Priority for Retention*, given it was located off site. The tree was located outside of the site at 141 Glenayr Avenue in the front garden.
- 4.3.2 The supplied plans show the proposed reconstruction of the existing footpath is within the SRZ of Tree 76. Works within the SRZ represent a *Major Encroachment* as defined by AS-4970 as root severance within the SRZ can lead to the destabilisation of the tree. The overall TPZ encroachment was estimated to be 34% and also represents a *Major Encroachment* as defined by AS-4970. However, Clause 3.3.4 of AS-4970 does allow for major encroachments if design factors (e.g. tree sensitive construction methods) are used to minimise negative impacts and/or the presence of existing or past structures are likely to have been obstacles to root growth into the area of encroachment
- 4.3.3 All of the proposed TPZ encroachment is within the footprint of an existing concrete footpath and beyond an existing retaining wall and grade change. This is likely to have created an inhospitable environment for root growth, and consequently, is likely to have reduced root growth in the area of the proposed works.
- 4.3.4 Refer to Appendix 5 for further detail.
- 4.3.5 Given the good physiological condition of the tree and the presence of existing structures, the proposed development can be accommodated. However, given the size of encroachment the proposal represents a significant risk to the tree's long term structural and physiological viability and therefore the following tree sensitive construction methods and protection measures must be carefully implemented under the supervision of the Project Arborist. Significant departures from the detailed tree sensitive construction methods and protection measures are likely to result in a shortened ULE and/or tree removal.
- 4.3.6 Tree sensitive methods should be used for the removal of concrete footpath within the TPZ areas. The existing concrete paving must be demolished and removed by hand to prevent damage to any structural roots (>25mmØ) and to avoid soil compaction. If machinery is required, then ground protection should be left in place and the machinery to work from the ground protection at all times.
- 4.3.7 The new concrete footpath (including sub-base materials) should be installed above or at existing grade and utilize existing sub-base layers.
- 4.3.8 Hand excavation and root pruning along any excavation lines shall be completed prior to the commencement of mechanical excavation to prevent tearing and shattering damage to the roots.
- 4.3.9 No over-excavation, battering, or benching shall be undertaken beyond the footprint of any structure unless approved by the Project Arborist.
- 4.3.10 The existing retaining wall must remain in situ and be incorporated into the new design.
- 4.3.11 Refer to AS4970 and Appendices 5, 6 & 7 for further details.

4.4 **Trees 3, 67, 70, 71 & 73**

- 4.4.1 Trees 3, 67, 70, 71 & 73 was identified as *Cupaniopsis anacardioides* (Tuckeroo), *Plumeria rubra* (Frangipani), and *Syzygium paniculatum* (Brush Cherry), respectively and were allocated Low Landscape Significance Values, excepting Tree 70 which was allocated Moderate. The Trees were assigned Retention Values of *Consider for Removal*, excepting Tree 70 which was assigned *Consider for Retention*. Trees 67 & 71 were dead.

- 4.4.2 The supplied plans show no works are proposed within the TPZs of Trees 3, 67, 70, 71 & 73. However, TPZ fencing should be installed prior to any site works (including demolition) and remain in place for the duration of the construction. Materials, waste storage and temporary services should not be located within the TPZ fenced area. If works are required within the TPZ fenced area, then they should be supervised by the Project Arborist.
- 4.4.3 The tree protection measures must be inspected by the Project Arborist prior to the start of site works, including demolition.
- 4.4.4 Refer to AS4970 and Appendices 5, 6 & 7 for further details.
- 4.5 **Trees 4, 10, 12, 19, 20, 22, 26, 27, 28, 29, 31, 33, 35, 39, 40, 41, 42, 49, 50, 52, 54 & 55**
- 4.5.1 Trees 4, 10, 12, 19, 20, 22, 26, 27, 28, 29, 31, 33, 35, 39, 40, 41, 42, 49, 50, 52, 54 & 55 were identified as *Banksia integrifolia* (Coastal Banksia), *Lagerstroemia indica* (Crepe Myrtle), *Banksia integrifolia* (Coastal Banksia), *Callistemon viminalis* (Weeping Bottlebrush), *Ficus benjamina* (Weeping Fig), *Callistemon viminalis* (Weeping Bottlebrush) and *Banksia integrifolia* (Coastal Banksia), respectively and were allocated Low Landscape Significance Values and Retention Values of *Consider for Removal* or *Priority for Removal*, excepting Trees 4 & 5 which were assigned Moderate Landscape Significance Values and Retention Values of *Consider for Retention*.
- 4.5.2 Trees 12, 20, 26, 29, 42 & 54 are exempt from the Council's Tree Management controls based on dimensions.
- 4.5.3 Trees 54 & 55 had been removed at the time of the second survey.
- 4.5.4 The supplied plans show that Trees 4, 10, 12, 19, 20, 22, 26, 27, 28, 29, 31, 33, 35, 39, 40, 41, 42, 49, 50, 52, 54 & 55 are within the footprint of the proposed cycleway and streetscape upgrade and will need to be removed.
- 4.5.5 Removal and replacement with healthy advanced size specimens would replace the loss of amenity within a short to medium timeframe.
- 4.5.6 Refer to Appendix 5 for further detail.
- 4.6 **Trees 1, 2, 5, 15, 18, 21, 23, 38, 43, 44, 45, 46, 47, 48, 51, 57, 58, 60, 61, 62, 63, 64, 65, 66, 68, 69, 72, 74, 75, 77, 78, 79, 80 & 81, 82, 83, 84 & 85**
- 4.6.1 Trees 1, 2, 15, 18, 21, 23, 38, 43, 44, 45, 46, 47, 48, 51, 57, 61, 66, 68, 69, 72, 74, 77, 79, 80, 81 & 83 were allocated Moderate Landscape Significance Values, excepting Trees 74, 79 & 80 that were assigned High Landscape Significance Values. The Trees were assigned Retention Values of *Consider for Retention*. All other trees were assigned Low Landscape Significance values.
- 4.6.2 The supplied plans show the proposed streetscape upgrade and cycleway is within the SRZs of these trees. Works within the SRZ represent a *Major Encroachment* as defined by AS-4970 as root severance within the SRZ can lead to the destabilisation of the tree. The overall TPZ encroachment percentage was also considered a *Major Encroachment* as defined by AS-4970 (See Appendix 2 for percentages per tree). However, Clause 3.3.4 of AS-4970 does allow for major encroachments if design factors (e.g. tree sensitive construction methods) are used to minimise negative impacts and/or the presence of existing or past structures are likely to have been obstacles to root growth into the area of encroachment.
- 4.6.3 All of the proposed TPZ encroachments are within the footprint of an existing concrete footpath, road and beyond an existing kerb, which is likely to have created an inhospitable environment for root growth, and consequently, is likely to have reduced root growth in the area of the proposed works.
- 4.6.4 Additionally, trenching works associated with a new drainage system are within the SRZ of Tree 79 and must carefully managed to allow for tree retention.
- 4.6.5 Refer to Appendix 5 for further detail.
- 4.6.6 Given the physiological condition of the trees and the presence of existing structures, the proposed development can be accommodated. However, given the size of encroachments the proposal represents a significant risk to the trees' long term structural and physiological viability and therefore the following tree sensitive construction methods and protection measures must be carefully implemented under the supervision of the Project Arborist. Significant departures from the detailed tree sensitive construction methods and protection measures are likely to result in a shortened ULE and/or tree removal.
- 4.6.7 TPZ fencing should be installed prior to any site works (including demolition) and remain in place for the duration of the construction. Materials, waste storage and temporary services should not be located within the TPZ fenced area. If works are required within the TPZ fenced area, then they should be supervised by the Project Arborist.
- 4.6.8 The tree protection measures must be inspected by the Project Arborist prior to the start of site works, including demolition.
- 4.6.9 Installation of pavements and sub-base within the TPZ must be supervised by the Project Arborist. New surfaces and sub-base materials should be placed above grade to minimise excavations and retain roots (unless prior root mapping has determined that there are no roots within the area of construction).

- 4.6.10 If roots (>25mmØ) are encountered during the installation of the new sub-base and surfaces these roots must be retained undamaged and advice sought from the Project Arborist. The design and final levels must remain flexible to enable the retention of roots >25mmØ, where deemed necessary by the Project Arborist.
- 4.6.11 Compaction of the ground prior to the installation of fill is not permitted.
- 4.6.12 New sub-base material should be a 20mm no-fines road base (i.e. Benedict Sand & Gravel- Product Code 20NF/RB or similar). Recycled concrete aggregates should not be used to avoid raising soil pH levels.
- 4.6.13 If required, bedding sand should be washed river sand (no crushed paving blends). The bedding sand should be consolidated with a pedestrian operated plate compactor only. If possible, pavement material should be permeable.
- 4.6.14 Kerbs within the TPZ should be modified to bridge roots (>25mmØ) unless root pruning is approved and undertaken by the Project Arborist.
- 4.6.15 The trenching within the TPZ area of Tree 79 must either be by hydrovac or hand excavation and supervised by the Project Arborist.
- 4.6.16 Refer to AS4970 and Appendices 5, 6 & 7 for further details.
- 4.7 **Removal & Replacement Planting**
- 4.7.1 Removal works should be carried out by a practising arborist. The practising arborist should hold a minimum qualification equivalent (using Australian Qualifications Framework) of Level 3 or above in arboriculture or its recognised equivalent. The practising arborist should have a minimum of 3 years of practical experience. Pruning/removal works should be undertaken in accordance with the 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.
- 4.7.2 Replacement tree planting should be provided when trees are removed. Replacement trees should be supplied as advanced size stock to help offset the loss of amenity resultant from the tree removals.
- 4.7.3 Replacement planting should be supplied in accordance with Australian Standard 2303: Tree Stock for Landscape Use (2015).



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5.0 REFERENCES |

Mattheck & Breloer (2003), *The Body Language of Trees – A Handbook for Failure Analysis*.

NSW Office of Environment and Heritage's Atlas of NSW Wildlife (2011), *BioNet Atlas of NSW Wildlife*.

Standards Australia (2009) Protection of Trees on Development Sites AS4970.

Standards Australia (2007) Pruning of Amenity Trees AS4373.

Standards Australia (2015) Tree Stock for Landscape Use AS2303.

6.0 APPENDIX 1 | METHODOLOGY

- 6.1 This report was based on data from a site inspection conducted between 21.3.21, 10.11.22. The recommendations in this report are based on and limited to observations from these site inspections.
- 6.2 The subject tree(s) was assessed using the Visual Tree Assessment methodology described in *The Body Language of Trees – A Handbook for Failure Analysis* (Mattheck et al., 2003). Subject trees were assessed from the ground only to provide an Arboricultural Impact Assessment and Tree Protection Specification report. No internal diagnostic testing was undertaken as part of this assessment. Trees outside the subject site were assessed from the property boundaries only.
- 6.3 The dimensions of the subject tree(s) are an approximation only.
- 6.4 The location of the subject tree(s) was determined from the location plan provided. Trees not shown on this plan have been plotted in their approximate location only.
- 6.5 Tree Protection Zones & Structural Root Zones for the subject tree(s) was based on methods outlined in Australian Standard 4970: *Protection of Trees on Development Sites* (2009).
- 6.6 The health of the subject tree(s) was determined by assessing:
- Foliage size and colour
 - Pest and disease infestation
 - Extension growth
 - Crown density
 - Deadwood size and volume
 - Presence of epicormic growth
- 6.7 The structural condition of the subject tree(s) was assessed by:
- Visible evidence of structural defects or instability
 - Evidence of previous pruning or physical damage
- 6.8 The Useful Life Expectancy (ULE) is used to estimate a tree's longevity in its growing environment. The ULE is based on a tree's species, health, structural condition and site suitability. The tree(s) has been allocated one of the following ULE categories (modified from Barrell, 2001):
- 40 years +
 - 15-40 years
 - 5-15 years
 - Less than 5 years
- 6.9 The Landscape Significance is based on a qualitative assessment of a tree's cultural, environmental and aesthetic value. This provides a relative measure of a tree's Landscape Significance and can be used to determine its Retention Value. Trees are rated under the following categories:
- Very High
 - High
 - Moderate
 - Low
 - Insignificant

LANDSCAPE SIGNIFICANCE	DESCRIPTION
VERY HIGH	The subject tree is listed as a Heritage Item under the Local Environmental Plan with a local or state level of significance.
	The subject tree is listed on Council's Significant Tree Register.
	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 Threatened Species Conservation Act 1995 (NSW) or the Environmental Protection and Biodiversity Conservation Act 1999.
	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.

The above table was provided by Anna Hopwood of TreeIQ™ and was modified from the Earthscape Criteria for Assessment of Landscape Significance.

6.10 The Retention Value is based on a tree's ULE and Landscape Significance. The subject tree(s) has been allocated one of the following Retention Values:

- Priority for Retention
- Consider for Retention
- Consider for Removal
- 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 was provided by Anna Hopwood of TreeIQ™

- 6.11 The Tree Protection Zone (TPZ) is the area above and below ground required to preserve the vigour and long-term viability of the tree. The TPZ is based on scientific research and is generally considered by the arboricultural industry as the area required to provide adequate tree protection during construction. The TPZ is the primary means of protecting trees on development sites (Australian Standard 4970: *Protection of Trees on Development Sites*, 2009).
- 6.12 Works within the TPZ should be avoided. However, *Minor Encroachments*, defined in AS4970 as less than 10% of the TPZ area, are considered acceptable when it is compensated for elsewhere and contiguous within the TPZ. A *Major Encroachment*, defined in AS4970 as greater than 10% of the TPZ area or within the Structural Root Zone (SRZ), may require root investigations by non-destructive methods and tree sensitive construction methods.
- 6.13 The TPZ is the area within a circle that is centred on the trunk. The radius of the TPZ is calculated by the following formula:

$$TPZ = DBH \times 12$$

where

DBH= Diameter at Breast Height (1.4m)

- 6.14 The SRZ is the minimum area around the base of the tree required for the tree's stability. The SRZ only relates to tree stability and not the vigour and long-term viability of the tree.
- 6.15 The SRZ is the area within a circle that is centred on the trunk. The radius of the SRZ is calculated by the following formula:
$$SRZ = (D \times 50)^{0.42} \times 0.64$$

where
$$D = \text{Trunk diameter (m) above the root buttress}$$
- 6.16 Encroachment into SRZ (i.e. severance of structural roots >25mmØ) may lead to the destabilisation of the tree and the long-term viability must be demonstrated in such cases. This may require root investigations by non-destructive methods.
- 6.17 For further details on the TPZ and SRZ please refer to Australian Standard 4970: *Protection of Trees on Development Sites* (2009).

7.0 APPENDIX 2 | TREE ASSESSMENT SCHEDULE

Tree No.	Species	Height (m)	Radial Crown Spread (m)	DBH comb. (mm)	Radial TPZ (m)	TPZ Area (m²)	Radial SRZ (m)	Health Rating	Structural Rating	Age Class	ULE (years)	L/Sign	Retention Value	Comments	TPZ Encroachment (%)
1	<i>Casuarina glauca</i> (Swamp She Oak)	12	4	500	6	113	2.6	Good	Poor	Mature	5-15	Moderate	Consider for Retention	Potential crack in trunk. Small (<25mmØ) & medium (25-75mmØ) deadwood in high volumes. Mechanical damage to exposed surface roots.	23.9% (Within SRZ)
2	<i>Casuarina glauca</i> (Swamp She Oak)	10	4	300	4	41	2.1	Fair	Fair	Mature	5-15	Moderate	Consider for Retention	Crown density 50-75%. Mechanical damage to exposed surface roots. Wound(s), early signs of decay. Trunk cavity(s), minor.	38.5% (Within SRZ)
3	<i>Cupaniopsis anacardioides</i> (Tuckeroo)	4	3	106	2	13	1.5	Good	Good	Semi-mature	5-15	Low	Consider for Removal	Wound(s), no visible sign of decay. Structures within SRZ.	No Encroachment
4	<i>Banksia integrifolia</i> (Coastal Banksia)	10	4	525	6	125	2.6	Good	Good	Late Mature	5-15	Moderate	Consider for Retention	Small (<25mmØ) & medium (25-75mmØ) deadwood in high volumes. Mechanical damage to exposed surface roots. Wound(s), no visible sign of decay. Limited crown clearance. Structures within SRZ.	Within Development Footprint
5	<i>Banksia integrifolia</i> (Coastal Banksia)	10	4	400	5	72	2.3	Fair	Good	Mature	5-15	Moderate	Consider for Retention		42% (Within SRZ)
6	<i>Callistemon viminalis</i> (Weeping Bottlebrush)	5	4	175	2	14	1.7								No Encroachment
7	<i>Callistemon viminalis</i> (Weeping Bottlebrush)	5	4	160	2	13	1.6								No Encroachment
8	<i>Washingtonia robusta</i> (Washington Palm)	11	4	350	4	55	2.2								No Encroachment

Tree No.	Species	Height (m)	Radial Crown Spread (m)	DBH comb. (mm)	Radial TPZ (m)	TPZ Area (m²)	Radial SRZ (m)	Health Rating	Structural Rating	Age Class	ULE (years)	L/Sign	Retention Value	Comments	TPZ Encroachment (%)
9	<i>Callistemon viminalis</i> (Weeping Bottlebrush)	5	4	150	2	13	1.6								No Encroachment
10	<i>Banksia integrifolia</i> (Coastal Banksia)	7	4	300	4	41	2.1	Good	Good	Semi-mature	5-15	Low	Consider for Removal	Wound(s), no visible sign of decay. Structures within SRZ.	Within Development Footprint
11	<i>Banksia integrifolia</i> (Coastal Banksia)	4	2	50	2	13	1.5								No Encroachment
12	<i>Lagerstroemia indica</i> (Crepe Myrtle)	3	2	87	2	13	1.5	Fair	Fair	Semi-mature	5-15	Low	Consider for Removal	Small (<25mmØ) & medium (25-75mmØ) epicormic growth in moderate volumes. Co-dominant inclusions, minor. Wound(s), early signs of decay.	Within Development Footprint
13	<i>Ficus benjamina</i> (Weeping Fig)	10	4	250	3	28	1.9								No Encroachment
14	<i>Ficus benjamina</i> (Weeping Fig)	10	4	250	3	28	1.9								No Encroachment
15	<i>Banksia integrifolia</i> (Coastal Banksia)	11	4	575	7	150	2.7	Fair	Fair	Late Mature	5-15	Moderate	Consider for Retention	Crown density 75-95%. Small (<25mmØ) & medium (25-75mmØ) deadwood in high volumes. Wound(s), early signs of decay. Structures within SRZ. Phototrophic lean, slight.	54.5% (Within SRZ)
16	<i>Olea europea subsp. cuspidata</i> (African Olive)	6	4	354	4	57	2.2								No Encroachment
17	<i>Syagrus romanzoffianum</i> (Cocos Palm)	8	3	125	2	13	1.5								No Encroachment

Tree No.	Species	Height (m)	Radial Crown Spread (m)	DBH comb. (mm)	Radial TPZ (m)	TPZ Area (m²)	Radial SRZ (m)	Health Rating	Structural Rating	Age Class	ULE (years)	L/Sign	Retention Value	Comments	TPZ Encroachment (%)
18	<i>Banksia integrifolia</i> (Coastal Banksia)	14	4	450	5	92	2.5	Fair	Fair	Mature	5-15	Moderate	Consider for Retention	Crown density 50-75%. Small (<25mmØ) & medium (25-75mmØ) epicormic growth in moderate volumes. Root severance within SRZ. Wound(s), early signs of decay.	49.9% (Within SRZ)
19	<i>Banksia integrifolia</i> (Coastal Banksia)	9	4	300	4	41	2.1	Fair	Good	Semi-mature	5-15	Low	Consider for Removal	Crown density 50-75%. Wound(s), early signs of decay. Phototrophic lean, slight. Borer.	Within Development Footprint
20	<i>Banksia integrifolia</i> (Coastal Banksia)	4	4	100	2	13	1.5	Good	Good	Semi-mature	5-15	Low	Consider for Removal	Wound(s), no visible sign of decay. Structures within SRZ.	Within Development Footprint
21	<i>Banksia integrifolia</i> (Coastal Banksia)	12	4	500	6	113	2.6	Good	Good	Mature	5-15	Moderate	Consider for Retention	Crown density 75-95%. Small (<25mmØ) & medium (25-75mmØ) epicormic growth in moderate volumes.	61.1% (Within SRZ)
22	<i>Banksia integrifolia</i> (Coastal Banksia)	9	4	300	4	41	2.1	Fair	Good	Semi-mature	5-15	Low	Consider for Removal	Crown density 50-75%. Structures within SRZ.	Within Development Footprint
23	<i>Banksia integrifolia</i> (Coastal Banksia)	9	5	325	4	48	2.1	Good	Good	Semi-mature	5-15	Moderate	Consider for Retention	Crown density 75-95%. Small (<25mmØ) deadwood in moderate volumes. Small (<25mmØ) & medium (25-75mmØ) epicormic growth in moderate volumes.	50.5% (Within SRZ)
24	<i>Syagrus romanzoffianum</i> (Cocos Palm)	9	4	250	3	28	1.9								No Encroachment
25	<i>Syagrus romanzoffianum</i> (Cocos Palm)	8	3	125	2	13	1.5							Group of three trees.	No Encroachment
26	<i>Callistemon viminalis</i> (Weeping Bottlebrush)	2	1	50	2	13	1.5	Fair	Poor	Semi-mature	<5	Low	Priority for Removal	Lopped.	Within Development Footprint

Tree No.	Species	Height (m)	Radial Crown Spread (m)	DBH comb. (mm)	Radial TPZ (m)	TPZ Area (m²)	Radial SRZ (m)	Health Rating	Structural Rating	Age Class	ULE (years)	L/Sign	Retention Value	Comments	TPZ Encroachment (%)
27	<i>Ficus benjamina</i> (Weeping Fig)	7	4	375	5	64	2.3	Good	Fair	Mature	5-15	Low	Consider for Removal	Small (<25mmØ) & medium (25-75mmØ) epicormic growth in high volumes. Lopped. Co-dominant inclusions, major.	Within Development Footprint
28	<i>Banksia integrifolia</i> (Coastal Banksia)	8	4	100	2	13	1.5	Poor	Poor	Senescent	<5	Low	Priority for Removal	Crack. Crown density 0-25%. Mechanical damage to exposed surface roots. Wound(s), early signs of decay.	Within Development Footprint
29	<i>Callistemon viminalis</i> (Weeping Bottlebrush)	2	1	50	2	13	1.5	Good	Good	Young	5-15	Low	Consider for Removal		Within Development Footprint
30	<i>Olea europaea</i> var. <i>europaea</i> (European Olive)	10	4	200	2	18	1.8								No Encroachment
31	<i>Banksia integrifolia</i> (Coastal Banksia)	11	5	375	5	64	2.3	Fair	Good	Mature	5-15	Low	Consider for Removal	Crown density 50-75%. Small (<25mmØ) & medium (25-75mmØ) deadwood in moderate volumes. Small (<25mmØ) & medium (25-75mmØ) epicormic growth in low volumes. Mechanical damage to exposed surface roots. Wound(s), early signs of decay.	Within Development Footprint
32	<i>Syagrus romanzoffianum</i> (Cocos Palm)	9	3	100	2	13	1.5								No Encroachment
33	<i>Banksia integrifolia</i> (Coastal Banksia)	6	4	300	4	41	2.1	Fair	Good	Semi-mature	5-15	Low	Consider for Removal	Crown density 50-75%. Small (<25mmØ) deadwood in moderate volumes. Structures within SRZ.	Within Development Footprint
34	<i>Syagrus romanzoffianum</i> (Cocos Palm)	9	3	125	2	13	1.5								No Encroachment

Tree No.	Species	Height (m)	Radial Crown Spread (m)	DBH comb. (mm)	Radial TPZ (m)	TPZ Area (m²)	Radial SRZ (m)	Health Rating	Structural Rating	Age Class	ULE (years)	L/Sign	Retention Value	Comments	TPZ Encroachment (%)
35	<i>Banksia integrifolia</i> (Coastal Banksia)	7	4	250	3	28	1.9	Good	Good	Semi-mature	5-15	Low	Consider for Removal		Within Development Footprint
36	<i>Syagrus romanzoffianum</i> (Cocos Palm)	9	3	125	2	13	1.5								No Encroachment
37	<i>Syagrus romanzoffianum</i> (Cocos Palm)	9	3	125	2	13	1.5								No Encroachment
38	<i>Banksia integrifolia</i> (Coastal Banksia)	13	4	600	7	163	2.8	Fair	Good	Mature	5-15	Moderate	Consider for Retention	Crown density 50-75%. Small (<25mmØ) & large (>75mmØ) deadwood in moderate volumes. Wound(s), early signs of decay. Borer.	49.5% (Within SRZ)
39	<i>Banksia integrifolia</i> (Coastal Banksia)	7	5	300	4	41	2.1	Fair	Good	Semi-mature	5-15	Low	Consider for Removal	Crown density 50-75%. Small (<25mmØ) & medium (25-75mmØ) deadwood in high volumes. Structures within SRZ.	Within Development Footprint
40	<i>Banksia integrifolia</i> (Coastal Banksia)	14	4	300	4	41	2.1	Fair	Fair	Semi-mature	5-15	Low	Consider for Removal	Crown density 50-75%. Small (<25mmØ) & medium (25-75mmØ) epicormic growth in high volumes. Wound(s), early signs of decay. Borer.	Within Development Footprint
41	<i>Banksia integrifolia</i> (Coastal Banksia)	9	4	300	4	41	2.1	Fair	Good	Semi-mature	5-15	Low	Consider for Removal	Crown density 75-95%. Small (<25mmØ) & medium (25-75mmØ) epicormic growth in moderate volumes.	Within Development Footprint
42	<i>Banksia integrifolia</i> (Coastal Banksia)	2	1	50	2	13	1.5	Good	Good	Young	5-15	Low	Consider for Removal		Within Development Footprint
43	<i>Banksia integrifolia</i> (Coastal Banksia)	14	7	575	7	150	2.7	Fair	Fair	Mature	5-15	Moderate	Consider for Retention	Crown density 50-75%. Small (<25mmØ) & medium (25-75mmØ) epicormic growth in moderate volumes. Wound(s), early signs of decay. Trunk cavity(s), major. Structures within SRZ. Storm damage. Borer.	57.1% (Within SRZ)

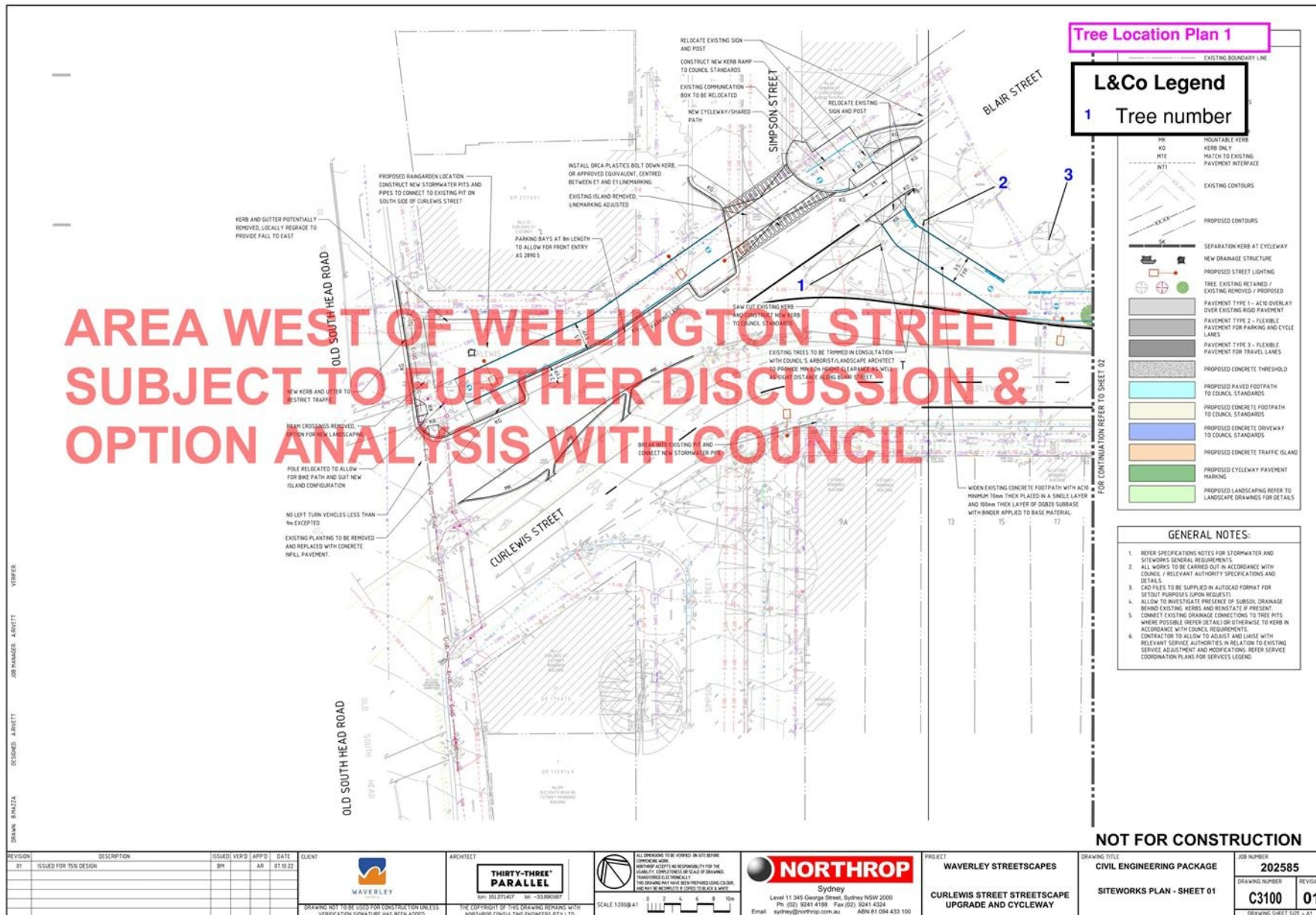
Tree No.	Species	Height (m)	Radial Crown Spread (m)	DBH comb. (mm)	Radial TPZ (m)	TPZ Area (m²)	Radial SRZ (m)	Health Rating	Structural Rating	Age Class	ULE (years)	L/Sign	Retention Value	Comments	TPZ Encroachment (%)
44	<i>Banksia integrifolia</i> (Coastal Banksia)	12	4	425	5	82	2.4	Fair	Fair	Mature	5-15	Moderate	Consider for Retention	Loss of crown density. Crown density 25-50%. Small (<25mmØ) & medium (25-75mmØ) epicormic growth in moderate volumes. Trunk cavity(s), major. Adaptive growth.	67.0% (Within SRZ)
45	<i>Banksia integrifolia</i> (Coastal Banksia)	10	6	575	7	150	2.7	Good	Fair	Semi-mature	5-15	Moderate	Consider for Retention	Root plate. Crown density 75-95%. Small (<25mmØ) & medium (25-75mmØ) deadwood in low volumes. Mechanical damage to exposed surface roots.	56.2% (Within SRZ)
46	<i>Banksia integrifolia</i> (Coastal Banksia)	12	7	707	8	226	3.0	Fair	Fair	Late Mature	5-15	Moderate	Consider for Retention	Crown density 75-95%. Small (<25mmØ) & medium (25-75mmØ) deadwood in moderate volumes. Wound(s), advanced stages of decay. Structures within SRZ. Previous branch failure(s). Adaptive growth. Borer.	60.3% (Within SRZ)
47	<i>Banksia integrifolia</i> (Coastal Banksia)	7	4	275	3	34	2.0	Good	Good	Semi-mature	5-15	Moderate	Consider for Retention	Small (<25mmØ) & medium (25-75mmØ) epicormic growth in low volumes. Wound(s), no visible sign of decay. Structures within SRZ.	58.6% (Within SRZ)
48	<i>Banksia integrifolia</i> (Coastal Banksia)	13	7	548	7	136	2.7	Good	Fair	Mature	5-15	Moderate	Consider for Retention	Small (<25mmØ) & medium (25-75mmØ) epicormic growth in moderate volumes. Mechanical damage to exposed surface roots. Co-dominant inclusions, minor. Borer.	55.1% (Within SRZ)
49	<i>Banksia integrifolia</i> (Coastal Banksia)	7	4	200	2	18	1.8	Good	Good	Semi-mature	5-15	Low	Consider for Removal		Within Development Footprint
50	<i>Banksia integrifolia</i> (Coastal Banksia)	7	4	160	2	13	1.6	Good	Fair	Semi-mature	<5	Low	Priority for Removal	Wound(s), advanced stages of decay. Trunk cavity(s), minor. Borer.	Within Development Footprint
51	<i>Banksia integrifolia</i> (Coastal Banksia)	11	5	425	5	82	2.4	Good	Fair	Mature	5-15	Moderate	Consider for Retention	Small (<25mmØ) & medium (25-75mmØ) epicormic growth in moderate volumes. Wound(s), early signs of decay. Trunk cavity(s), minor.	60.4% (Within SRZ)

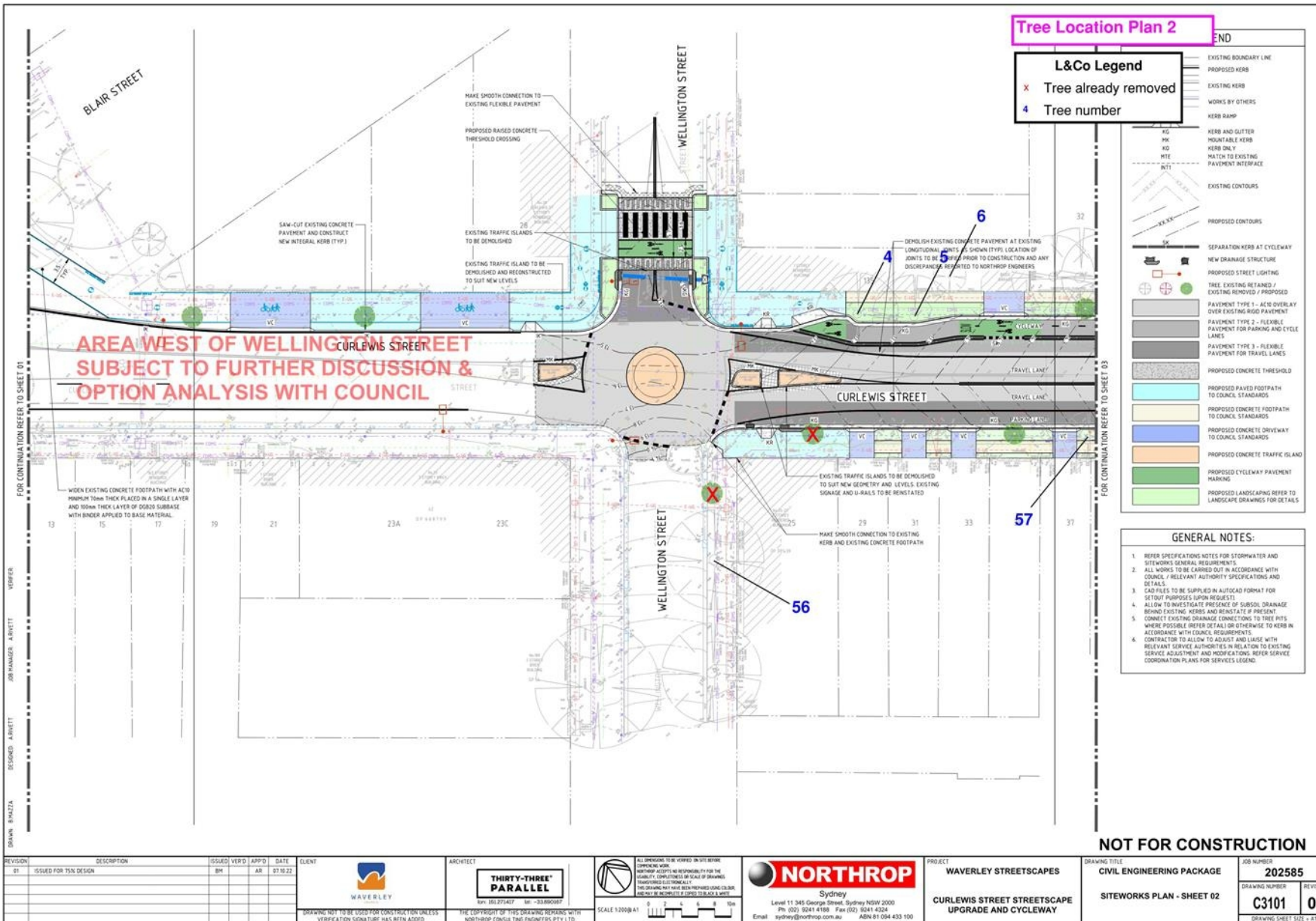
Tree No.	Species	Height (m)	Radial Crown Spread (m)	DBH comb. (mm)	Radial TPZ (m)	TPZ Area (m²)	Radial SRZ (m)	Health Rating	Structural Rating	Age Class	ULE (years)	L/Sign	Retention Value	Comments	TPZ Encroachment (%)
52	<i>Banksia integrifolia</i> (Coastal Banksia)	11	3	100	2	13	1.5	Good	Good	Semi-mature	5-15	Low	Consider for Removal	Structures within SRZ.	Within Development Footprint
53	<i>Syagrus romanzoffianum</i> (Cocos Palm)			100	2	13	1.5								No Encroachment
54	<i>Banksia integrifolia</i> (Coastal Banksia)	2	1	50	2	13	1.5	Good	Good	Young	5-15	Low	Consider for Removal	Removed.	Within Development Footprint
55	<i>Banksia integrifolia</i> (Coastal Banksia)	2	1	50	2	13	1.5	Good	Good	Young	5-15	Low	Consider for Removal	Removed.	Within Development Footprint
56	<i>Lophostemon confertus</i> (Brush Box)	12	5	400	5	72	2.3								No Encroachment
57	<i>Syzygium paniculatum</i> (Brush Cherry)	9	4	225	3	23	1.8	Good	Good	Mature	5-15	Moderate	Consider for Retention		42.0% (Within SRZ)
58	<i>Callistemon viminalis</i> (Weeping Bottlebrush)	3	2	50	2	13	1.5	Fair	Good	Young	5-15	Low	Consider for Removal		33.7% (Within SRZ)
59	<i>Corymbia maculata</i> (Spotted Gum)	25	9	1000	12	452	3.4	Good	No access to base. No rating.	Mature	40+	High	Priority for Retention		34.2%
60	<i>Banksia integrifolia</i> (Coastal Banksia)	9	4	175	2	14	1.7	Good	Good	Semi-mature	5-15	Low	Consider for Removal	Wound(s), no visible sign of decay.	26.4% (Within SRZ)

Tree No.	Species	Height (m)	Radial Crown Spread (m)	DBH comb. (mm)	Radial TPZ (m)	TPZ Area (m²)	Radial SRZ (m)	Health Rating	Structural Rating	Age Class	ULE (years)	L/Sign	Retention Value	Comments	TPZ Encroachment (%)
61	<i>Banksia integrifolia</i> (Coastal Banksia)	10	4	325	4	48	2.1	Fair	Good	Late Mature	5-15	Moderate	Consider for Retention	Loss of crown density. Crown density 25-50%. Structures within SRZ.	41.4% (Within SRZ)
62	<i>Banksia integrifolia</i> (Coastal Banksia)	4	3	150	2	13	1.6	Fair	Good	Semi-mature	5-15	Low	Consider for Removal	Crown density 25-50%. Small (<25mmØ) & medium (25-75mmØ) deadwood in high volumes. Chlorotic foliage.	35.8% (Within SRZ)
63	<i>Banksia integrifolia</i> (Coastal Banksia)	9	4	250	3	28	1.9	Fair	Fair	Mature	5-15	Low	Consider for Removal	Crown density 50-75%. Small (<25mmØ) & medium (25-75mmØ) deadwood in moderate volumes. Wound(s), no visible sign of decay. Trunk cavity(s), minor.	41.8% (Within SRZ)
64	<i>Banksia integrifolia</i> (Coastal Banksia)	7	3	200	2	18	1.8	Good	Good	Semi-mature	5-15	Low	Consider for Removal		28.9% (Within SRZ)
65	<i>Banksia integrifolia</i> (Coastal Banksia)	2	1	50	2	13	1.5	Good	Good	Young	5-15	Low	Consider for Removal		32.8% (Within SRZ)
66	<i>Banksia integrifolia</i> (Coastal Banksia)	7	4	225	3	23	1.8	Good	Good	Semi-mature	5-15	Moderate	Consider for Retention	Small (<25mmØ) deadwood in moderate volumes.	36.7% (Within SRZ)
67	DEAD			0	0	0	1.5								No Encroachment
68	<i>Banksia integrifolia</i> (Coastal Banksia)	7	4	225	3	23	1.8	Good	Good	Mature	5-15	Moderate	Consider for Retention	Mechanical damage to exposed surface roots.	36.7% (Within SRZ)
69	<i>Banksia integrifolia</i> (Coastal Banksia)	8	5	300	4	41	2.1	Good	Good	Mature	5-15	Moderate	Consider for Retention	Crown density 75-95%. Small (<25mmØ) deadwood in moderate volumes. Trunk cavity(s), minor. Phototrophic lean, slight.	39.5% (Within SRZ)

Tree No.	Species	Height (m)	Radial Crown Spread (m)	DBH comb. (mm)	Radial TPZ (m)	TPZ Area (m²)	Radial SRZ (m)	Health Rating	Structural Rating	Age Class	ULE (years)	L/Sign	Retention Value	Comments	TPZ Encroachment (%)
70	<i>Plumeria rubra</i> (Frangipani)	10	5	350	4	55	2.2	Good	No access to base. No rating.	Mature	5-15	Moderate	Consider for Retention		No Encroachment
71	DEAD			0	0	0	1.5								No Encroachment
72	<i>Banksia integrifolia</i> (Coastal Banksia)	8	5	300	4	41	2.1	Good	Fair	Mature	5-15	Moderate	Consider for Retention	Mechanical damage to exposed surface roots. Trunk cavity(s), major.	42.0% (Within SRZ)
73	<i>Syzygium paniculatum</i> (Brush Cherry)	4	4	71	2	13	1.5	Good	No access to base. No rating.	Mature	5-15	Low	Consider for Removal		No Encroachment
74	<i>Banksia integrifolia</i> (Coastal Banksia)	14	6	475	6	102	2.5	Good	Fair	Late Mature	5-15	High	Consider for Retention	Crown density 50-75%. Small (<25mmØ) & large (>75mmØ) deadwood in moderate volumes. Mechanical damage to exposed surface roots. Bark inclusion(s), minor. Wound(s), early signs of decay. Trunk cavity(s), major.	46.5% (Within SRZ)
75	<i>Banksia integrifolia</i> (Coastal Banksia)	3	1	50	2	13	1.5	Good	Good	Young	5-15	Low	Consider for Removal		36.8% (Within SRZ)
76	<i>Eriobotrya japonica</i> (Loquat tree)	8	4	224	3	23	1.8	Fair	No access to base. No rating.	Mature	5-15	Moderate	Consider for Retention	Crown density 50-75%. Small (<25mmØ) deadwood in moderate volumes.	25.2% (Within SRZ)
77	<i>Banksia integrifolia</i> (Coastal Banksia)	7	4	407	5	75	2.4	Fair	Fair	Late Mature	5-15	Moderate	Consider for Retention	Asymmetrical lean. Small (<25mmØ) deadwood in moderate volumes. Storm damage.	48.2% (Within SRZ)
78	<i>Banksia integrifolia</i> (Coastal Banksia)	7	2	0	2	13	1.5	Good	Good	Semi-mature	5-15	Low	Consider for Removal		17.6% (Within SRZ)

Tree No.	Species	Height (m)	Radial Crown Spread (m)	DBH comb. (mm)	Radial TPZ (m)	TPZ Area (m²)	Radial SRZ (m)	Health Rating	Structural Rating	Age Class	ULE (years)	L/Sign	Retention Value	Comments	TPZ Encroachment (%)
79	<i>Banksia integrifolia</i> (Coastal Banksia)	16	9	600	7	163	2.8	Fair	Fair	Late Mature	5-15	High	Consider for Retention	Crown density 25-50%. Small (<25mmØ) & medium (25-75mmØ) deadwood in moderate volumes. Lopped. Co-dominant inclusions, major. Trunk cavity(s), minor. Storm damage. Phototrophic lean, moderate.	49.2% (Within SRZ)
80	<i>Banksia integrifolia</i> (Coastal Banksia)	15	7	700	8	222	3.0	Fair	Good	Mature	5-15	High	Consider for Retention	Crown density 50-75%. Small (<25mmØ) & medium (25-75mmØ) deadwood in moderate volumes. Storm damage.	46.0% (Within SRZ)
81	<i>Banksia integrifolia</i> (Coastal Banksia)	8	4	225	3	23	1.8	Good	Fair	Semi-mature	5-15	Moderate	Consider for Retention	Wound(s), early signs of decay. Trunk cavity(s), minor.	44.6% (Within SRZ)
82	<i>Lagunaria patersonia</i> (Norfolk Island Hibiscus)	4	2	175	2	13	1.7	Poor	Poor	Senescent	<5	Low	Priority for Removal	Crown density 0-25%. Crown consists mainly of epicormic growth. Wound(s), advanced stages of decay. Trunk cavity(s), major.	38.9% (Within SRZ)
83	<i>Banksia integrifolia</i> (Coastal Banksia)	11	7	350	4	55	2.2	Fair	Poor	Late Mature	<5	Moderate	Priority for Removal	Lost central leader. Crown density 25-50%. Small (<25mmØ) & medium (25-75mmØ) deadwood in high volumes. Wound(s), early signs of decay. Trunk cavity(s), major. Storm damage.	57.0% (Within SRZ)
84	<i>Banksia integrifolia</i> (Coastal Banksia)	7	4	177	2	14	1.7	Poor	Fair	Senescent	<5	Low	Priority for Removal	Crown density 0-25%. Small (<25mmØ) & medium (25-75mmØ) deadwood in high volumes. Wound(s), early signs of decay. Trunk cavity(s), minor.	42.4% (Within SRZ)
85	<i>Cupaniopsis anacardioides</i> (Tuckeroo)	4	2	50	2	13	1.5	Good	Good	Young	5-15	Low	Consider for Removal		31.3% (Within SRZ)





Tree Location Plan 3

L&Co Legend

- Group of trees
- 7 Tree number

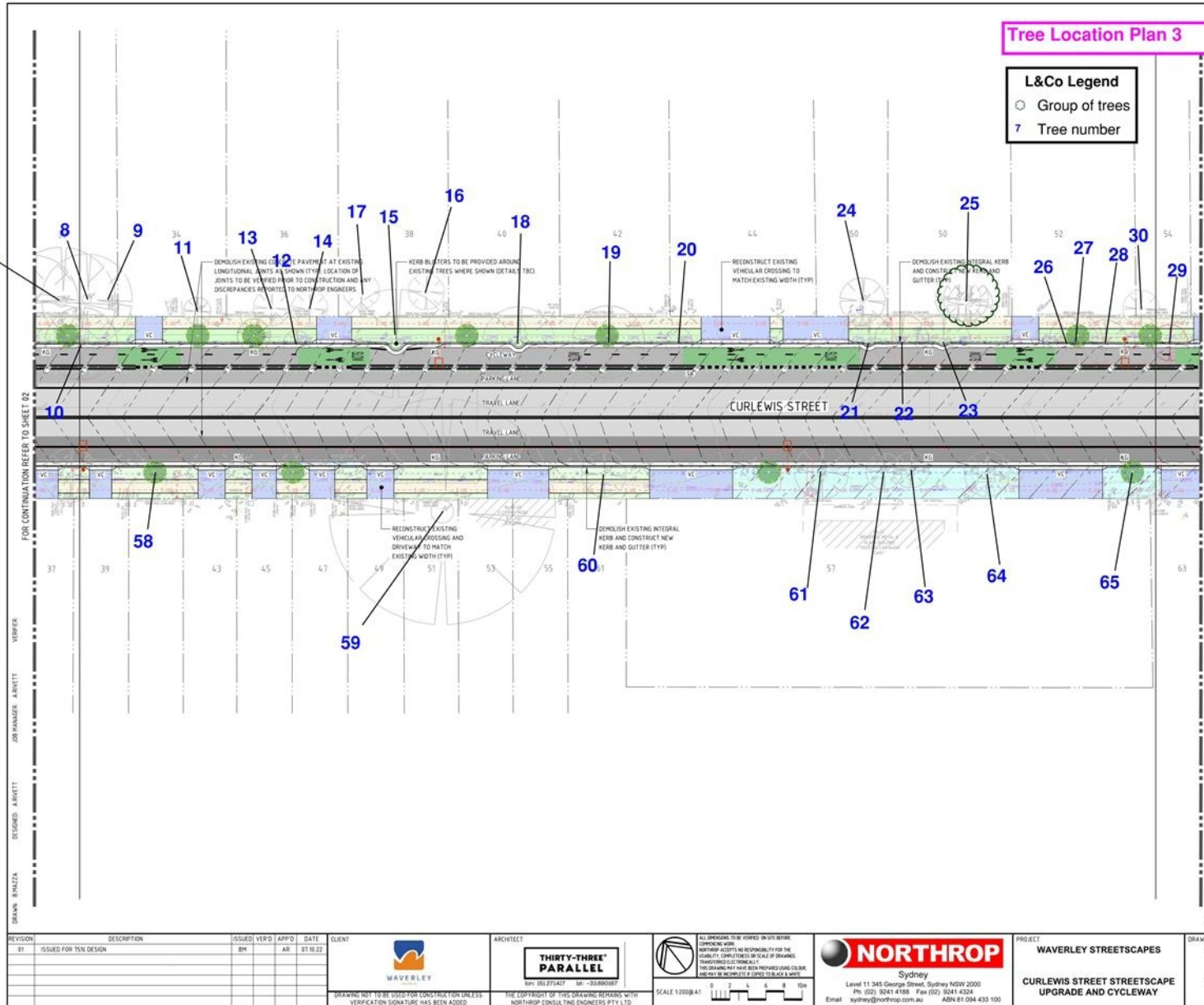
LEGEND

- EXISTING BOUNDARY LINE
- PROPOSED KERB
- EXISTING KERB
- WORKS BY OTHERS
- KERB RAMP
- KERB AND GUTTER
- MOUNTABLE KERB
- KERB ONLY
- MATCH TO EXISTING PAVEMENT INTERFACE
- EXISTING CONTOURS
- PROPOSED CONTOURS
- SEPARATION KERB AT CYCLEWAY
- NEW DRAINAGE STRUCTURE
- PROPOSED STREET LIGHTING
- TREE EXISTING RETAINED / EXISTING REMOVED / PROPOSED
- PAVEMENT TYPE 1 - AC10 OVERLAY OVER EXISTING RIGID PAVEMENT
- PAVEMENT TYPE 2 - FLEXIBLE PAVEMENT FOR PARKING AND CYCLE LANES
- PAVEMENT TYPE 3 - FLEXIBLE PAVEMENT FOR TRAVEL LANES
- PROPOSED CONCRETE THRESHOLD
- PROPOSED PAVED FOOTPATH TO COUNCIL STANDARDS
- PROPOSED CONCRETE FOOTPATH TO COUNCIL STANDARDS
- PROPOSED CONCRETE DRIVEWAY TO COUNCIL STANDARDS
- PROPOSED CONCRETE TRAFFIC ISLAND
- PROPOSED CYCLEWAY PAVEMENT MARKING
- PROPOSED LANDSCAPING REFER TO LANDSCAPE DRAWINGS FOR DETAILS

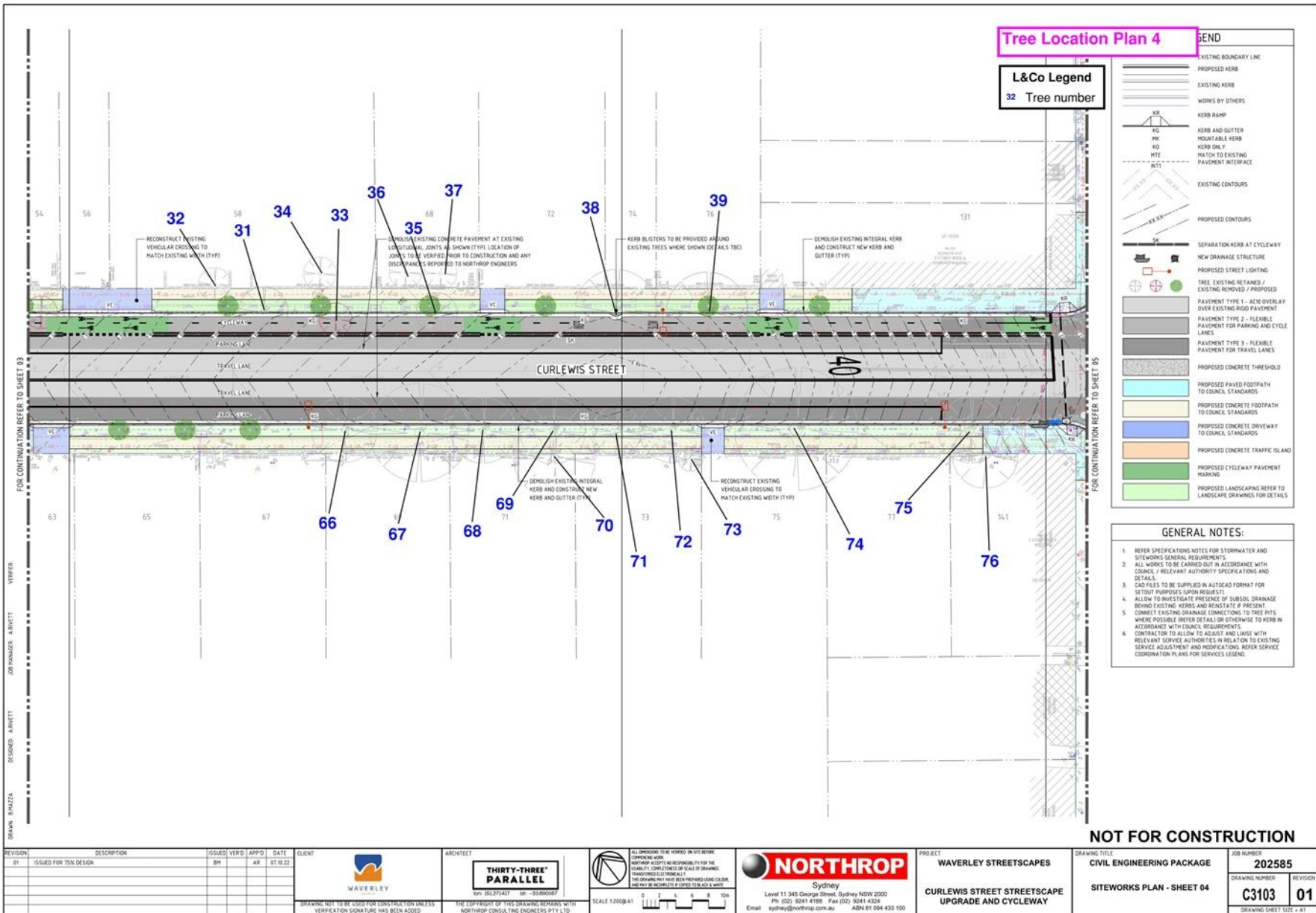
GENERAL NOTES:

1. REFER SPECIFICATIONS NOTES FOR STORMWATER AND SITEWORKS GENERAL REQUIREMENTS.
2. ALL WORKS TO BE CARRIED OUT IN ACCORDANCE WITH COUNCIL / RELEVANT AUTHORITY SPECIFICATIONS AND DETAILS.
3. CAD FILES TO BE SUPPLIED IN AUTOCAD FORMAT FOR SETOUT PURPOSES UPON REQUEST.
4. ALLOW TO INVESTIGATE PRESENCE OF SUBSOL DRAINAGE BEHIND EXISTING KERBS AND REINSTATE IF PRESENT.
5. CORRECT EXISTING DRAINAGE CONNECTIONS TO TREE PITS WHERE POSSIBLE (REFER DETAIL OR OTHERWISE TO KERB IN ACCORDANCE WITH COUNCIL REQUIREMENTS).
6. CONTRACTOR TO ALLOW TO ADJUST AND LIAISE WITH RELEVANT SERVICE AUTHORITIES IN RELATION TO EXISTING SERVICE ADJUSTMENT AND MODIFICATION. REFER SERVICE COORDINATION PLANS FOR SERVICES LEGEND.

NOT FOR CONSTRUCTION



REVISION	DESCRIPTION	ISSUED BY	VERIFIED BY	APPROVED BY	DATE	CLIENT	ARCHITECT	SCALE	PROJECT	DRAWING TITLE	JOB NUMBER	DRAWING NUMBER	REVISION
01	ISSUED FOR TSN DESIGN	BT	AR	BT	01/10/23	WAVERLEY	THIRTY-THREE PARALLEL	1:2000	WAVERLEY STREETSCAPES	CIVIL ENGINEERING PACKAGE	202585	C3102	01
DRAWING NOT TO BE USED FOR CONSTRUCTION UNLESS VERIFICATION SIGNATURE HAS BEEN ADDED							THE COPYRIGHT OF THIS DRAWING REMAINS WITH NORTHROP CONSULTING ENGINEERS PTY LTD	Scale 1:2000	CURLEW STREET STREETSCAPE UPGRADE AND CYCLEWAY	SITEWORKS PLAN - SHEET 03			



Tree Location Plan 5

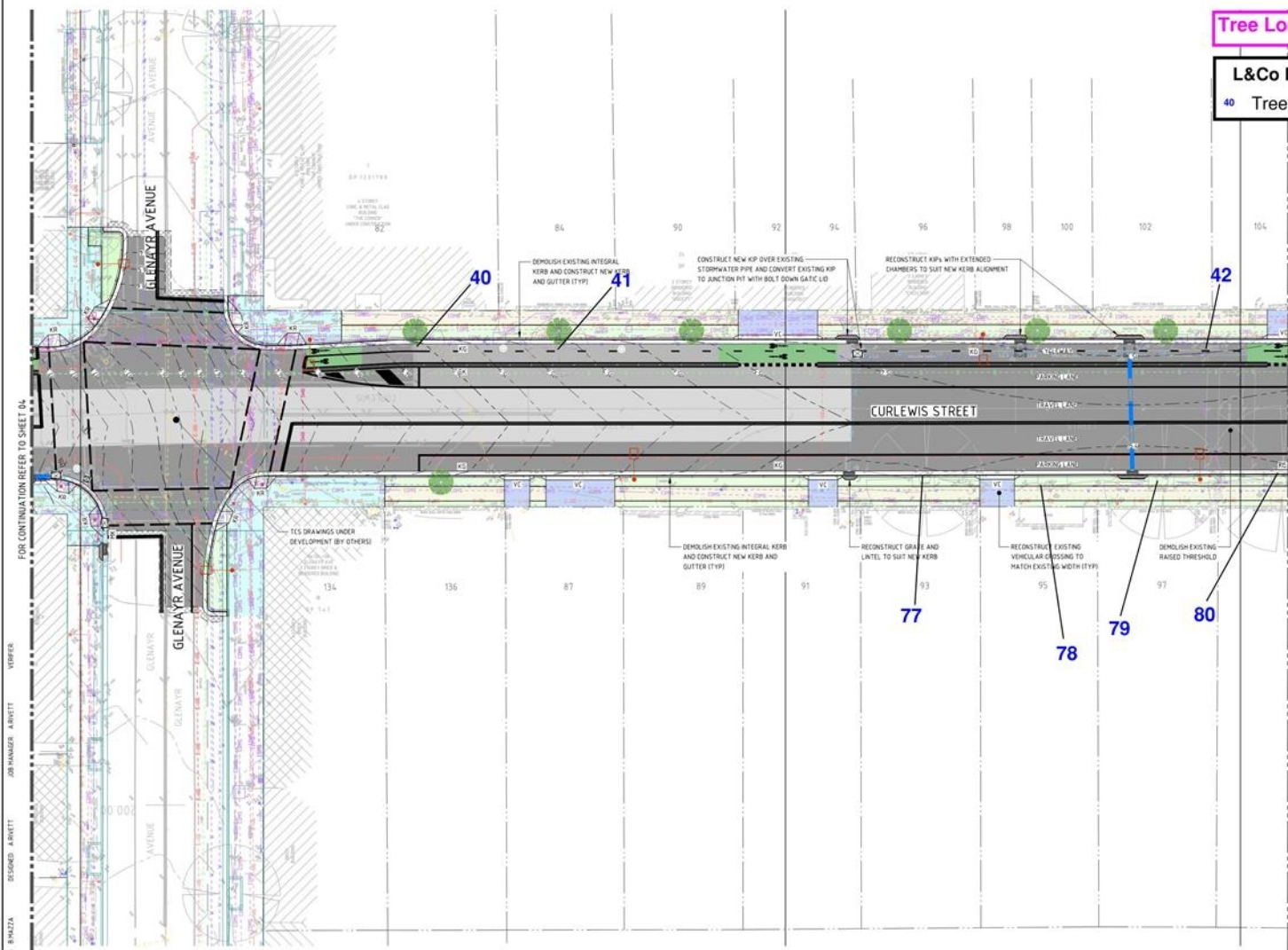
L&Co Legend

40 Tree number

PROPOSED KERB	BOUNDARY LINE
EXISTING KERB	
WORKS BY OTHERS	
KERB RAMP	
KERB AND GUTTER	
MOUNTABLE KERB	
KERB ONLY	
MTE	
MTT	
MATCH TO EXISTING PAVEMENT INTERFACE	
EXISTING CONTOURS	
PROPOSED CONTOURS	
SEPARATION KERB AT CYCLEWAY	
NEW DRAINAGE STRUCTURE	
PROPOSED STREET LIGHTING	
TREE EXISTING RETAINED / EXISTING REMOVED / PROPOSED	
PAVEMENT TYPE 1 - AC10 OVERLAY OVER EXISTING RIGID PAVEMENT	
PAVEMENT TYPE 2 - FLEXIBLE PAVEMENT FOR PARKING AND CYCLE LANES	
PAVEMENT TYPE 3 - FLEXIBLE PAVEMENT FOR TRAVEL LANES	
PROPOSED CONCRETE THRESHOLD	
PROPOSED PAVED FOOTPATH TO COUNCIL STANDARDS	
PROPOSED CONCRETE FOOTPATH TO COUNCIL STANDARDS	
PROPOSED CONCRETE DRIVEWAY TO COUNCIL STANDARDS	
PROPOSED CONCRETE TRAFFIC ISLAND	
PROPOSED CYCLEWAY PAVEMENT MARKING	
PROPOSED LANDSCAPING REFER TO LANDSCAPE DRAWINGS FOR DETAILS	

GENERAL NOTES:

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2. ALL WORKS TO BE CARRIED OUT IN ACCORDANCE WITH COUNCIL / RELEVANT AUTHORITY SPECIFICATIONS AND DETAILS.
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NOT FOR CONSTRUCTION

REVISION	DESCRIPTION	ISSUED BY	VERIFIED BY	APPROVED BY	DATE	CLIENT	ARCHITECT	SCALE	PROJECT	DRAWING TITLE	JOB NUMBER	DRAWING NUMBER	REVISION
01	ISSUED FOR TSN DESIGN	BT	AR	BT	01/10/23	WAVERLEY	THIRTY-THREE PARALLEL	1:2000 A1	WAVERLEY STREETSCAPES	CIVIL ENGINEERING PACKAGE	202585	C3104	01
									CURLEWIS STREET STREETSCAPE UPGRADE AND CYCLEWAY	SITEWORKS PLAN - SHEET 05			

Tree Location Plan 6

L&Co Legend

43 Tree number

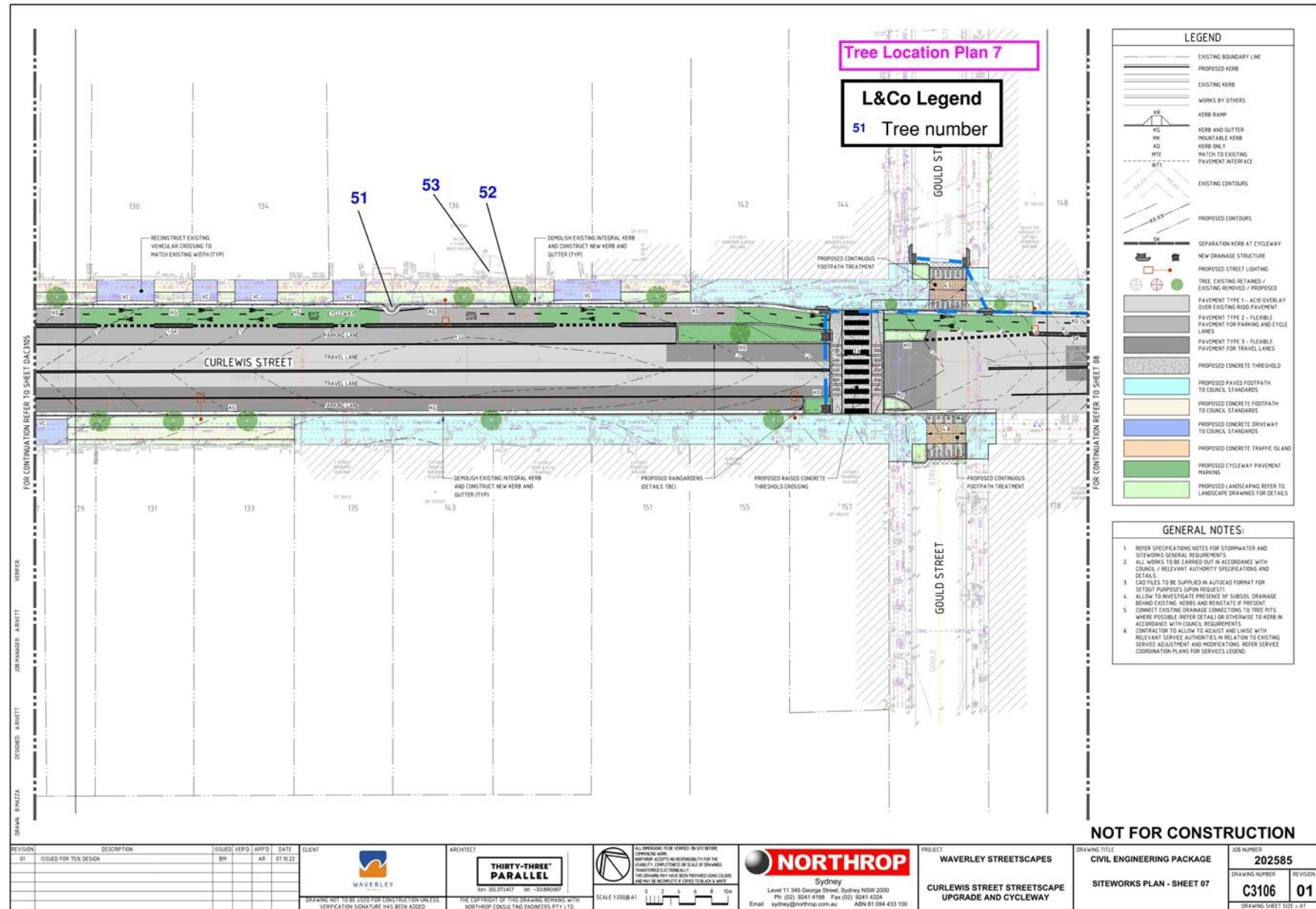
PROPOSED KERB	EXISTING KERB
WORKS BY OTHERS	KERB RAMP
KERB AND GUTTER MOUNTABLE KERB	KERB ONLY
MATCH TO EXISTING PAVEMENT INTERFACE	EXISTING CONTOURS
PROPOSED CONTOURS	SEPARATION KERB AT CYCLEWAY
NEW DRAINAGE STRUCTURE	PROPOSED STREET LIGHTING
TREE EXISTING RETAINED / EXISTING REMOVED / PROPOSED	PAVEMENT TYPE 1 - AC/10 OVERLAY OVER EXISTING RIGID PAVEMENT
PAVEMENT TYPE 2 - FLEXIBLE PAVEMENT FOR PARKING AND CYCLE LANES	PAVEMENT TYPE 3 - FLEXIBLE PAVEMENT FOR TRAVEL LANES
PROPOSED CONCRETE THRESHOLD	PROPOSED PAVED FOOTPATH TO COUNCIL STANDARDS
PROPOSED CONCRETE DRIVEWAY TO COUNCIL STANDARDS	PROPOSED CONCRETE TRAFFIC ISLAND
PROPOSED CYCLEWAY PAVEMENT MARKING	PROPOSED LANDSCAPING REFER TO LANDSCAPE DRAWINGS FOR DETAILS

GENERAL NOTES:

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REVISION	DESCRIPTION	ISSUED BY	VER'D BY	APP'D BY	DATE	CLIENT	ARCHITECT	SCALE	PROJECT	DRAWING TITLE	JOB NUMBER	DRAWING NUMBER	REVISION
01	ISSUED FOR TSN DESIGN	BT		AR	01/10/23	WAVERLEY	THIRTY-THREE PARALLEL	1:2000 A1	WAVERLEY STREETSCAPES	CIVIL ENGINEERING PACKAGE	202585	C3105	01
									CURLEWIS STREET STREETSCAPE UPGRADE AND CYCLEWAY	SITEWORKS PLAN - SHEET 06			



Tree Location Plan 8

L&Co Legend

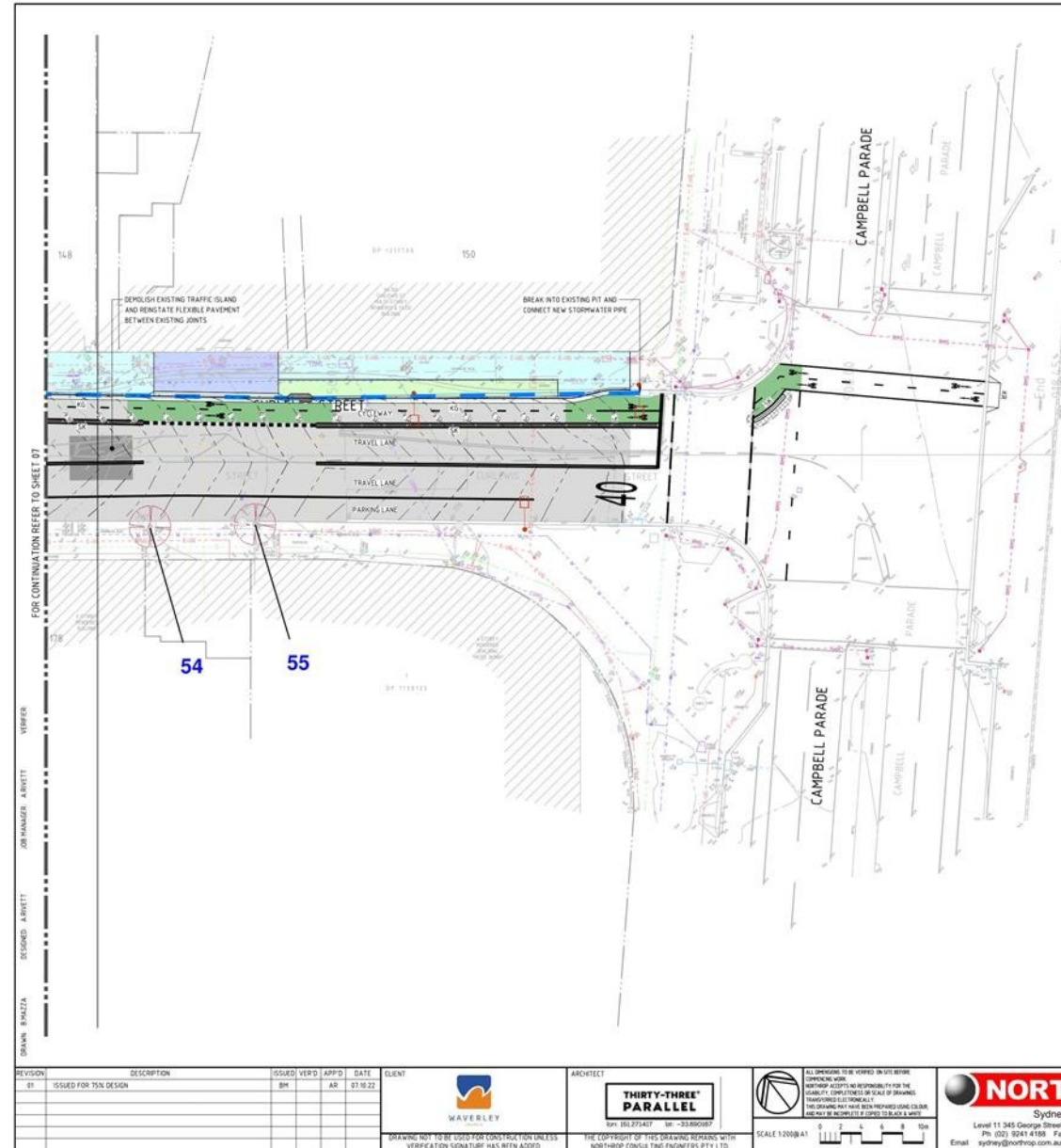
54 Tree number

LEGEND

	EXISTING BOUNDARY LINE
	PROPOSED KERB
	EXISTING KERB
	WORKS BY OTHERS
	KERB RAMP
	KERB AND GUTTER
	MOUNTABLE KERB
	KERB ONLY
	MATCH TO EXISTING PAVEMENT INTERFACE
	EXISTING CONTOURS
	PROPOSED CONTOURS
	SEPARATION KERB AT CYCLEWAY
	NEW DRAINAGE STRUCTURE
	PROPOSED STREET LIGHTING
	TREE EXISTING RETAINED / EXISTING REMOVED / PROPOSED
	PAVEMENT TYPE 1 - AC OVERLAY OVER EXISTING RIGID PAVEMENT
	PAVEMENT TYPE 2 - FLEXIBLE PAVEMENT FOR PARKING AND CYCLE LANES
	PAVEMENT TYPE 3 - FLEXIBLE PAVEMENT FOR TRAVEL LANES
	PROPOSED CONCRETE THRESHOLD
	PROPOSED PAVED FOOTPATH TO COUNCIL STANDARDS
	PROPOSED CONCRETE FOOTPATH TO COUNCIL STANDARDS
	PROPOSED CONCRETE DRIVEWAY TO COUNCIL STANDARDS
	PROPOSED CONCRETE TRAFFIC ISLAND
	PROPOSED CYCLEWAY PAVEMENT MARKING
	PROPOSED LANDSCAPING REFER TO LANDSCAPE DRAWINGS FOR DETAILS

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REVISION	DESCRIPTION	ISSUED BY	VER'D BY	APP'D BY	DATE	CLIENT	ARCHITECT	SCALE	PROJECT	DRAWING TITLE	JOB NUMBER	DRAWING NUMBER	REVISION
01	ISSUED FOR TSN DESIGN				01/02/23				WAVERLEY STREETSCAPES	CIVIL ENGINEERING PACKAGE	202585	C3107	01
									CURLWIS STREET STREETSCAPE UPGRADE AND CYCLEWAY	SITEWORKS PLAN - SHEET 08			

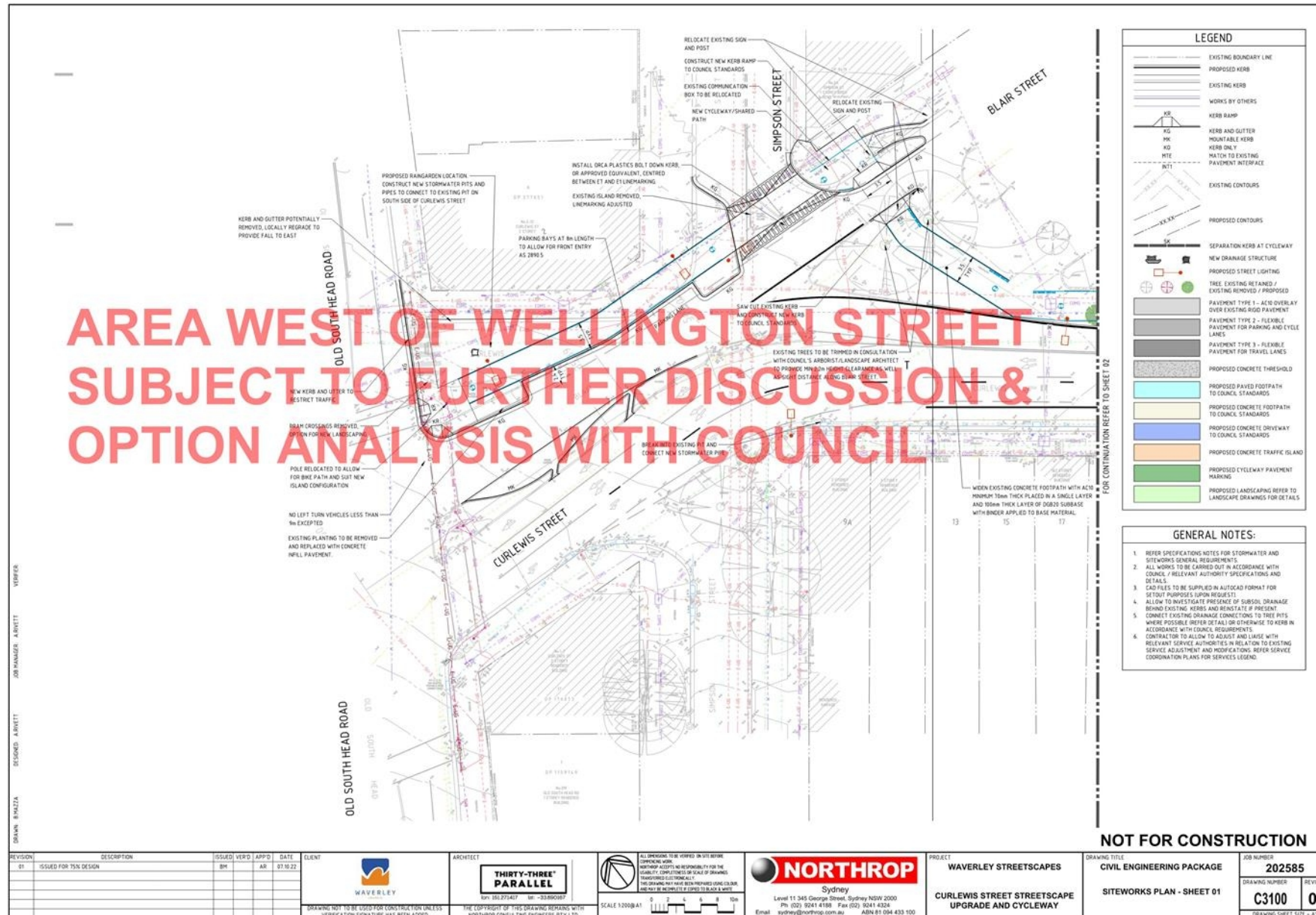


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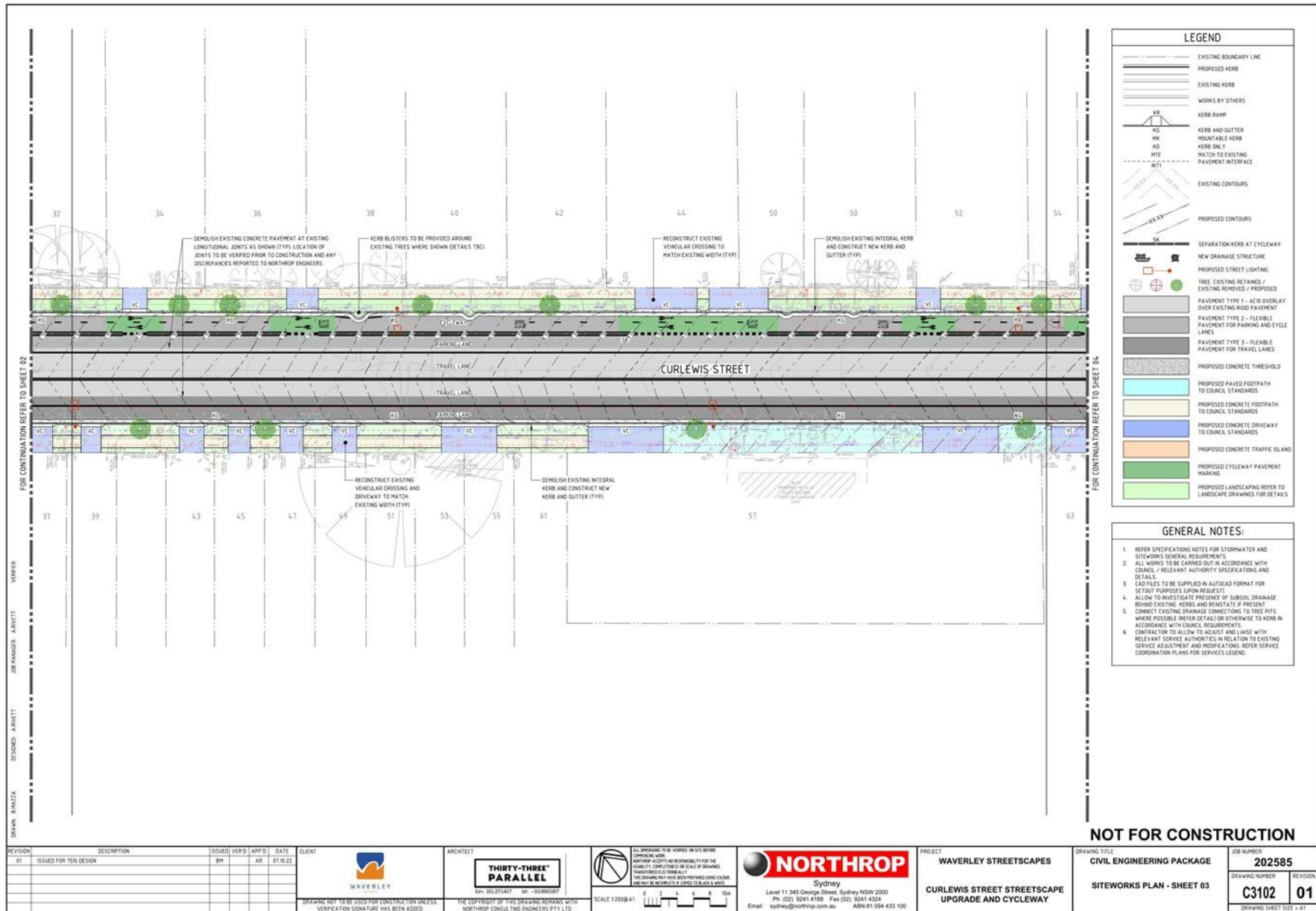
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									 THIRTY-THREE PARALLEL 33-33-33 33-33-33		CURLEW STREET STREETScape UPGRADE AND CYCLEWAY		GENERAL ARRANGEMENT PLAN		DRAWING NUMBER C3010		REVISION 01	
DRAWING NOT TO BE USED FOR CONSTRUCTION UNLESS VERIFICATION CONSULTANT HAS BEEN ADD'D									THE COPYRIGHT OF THE DRAWING REMAINS WITH NORTHROP CONSULTING ENGINEERS PTY LTD		NOT TO SCALE				DRAWING SHEET SIZE: A1			

PO Box 2169,
Clovelly, NSW 2031
info@laurenceto.com.au
0404 282 825
ACN: 625 300 530

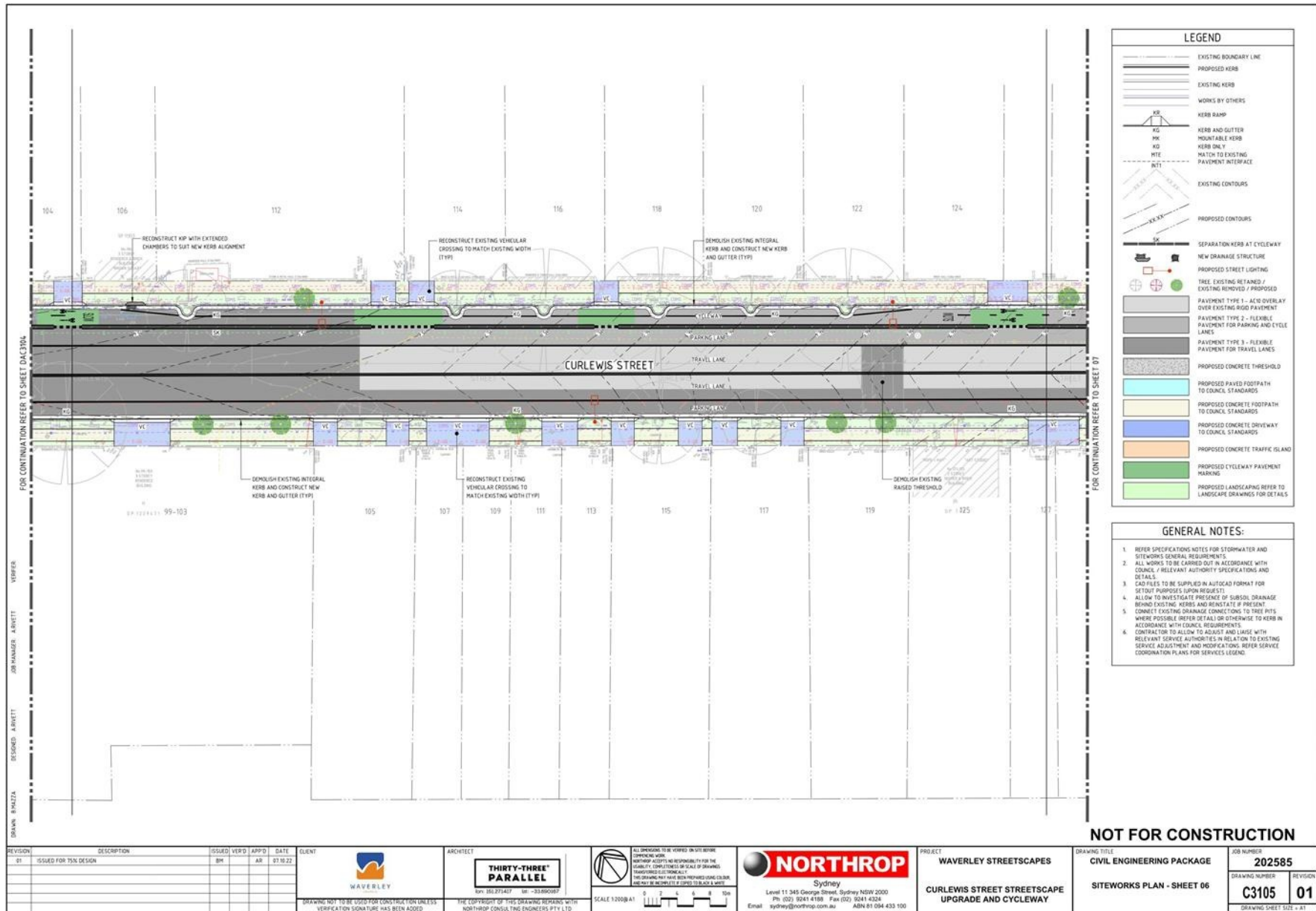
AREA WEST OF WELLINGTON STREET SUBJECT TO FURTHER DISCUSSION & OPTION ANALYSIS WITH COUNCIL

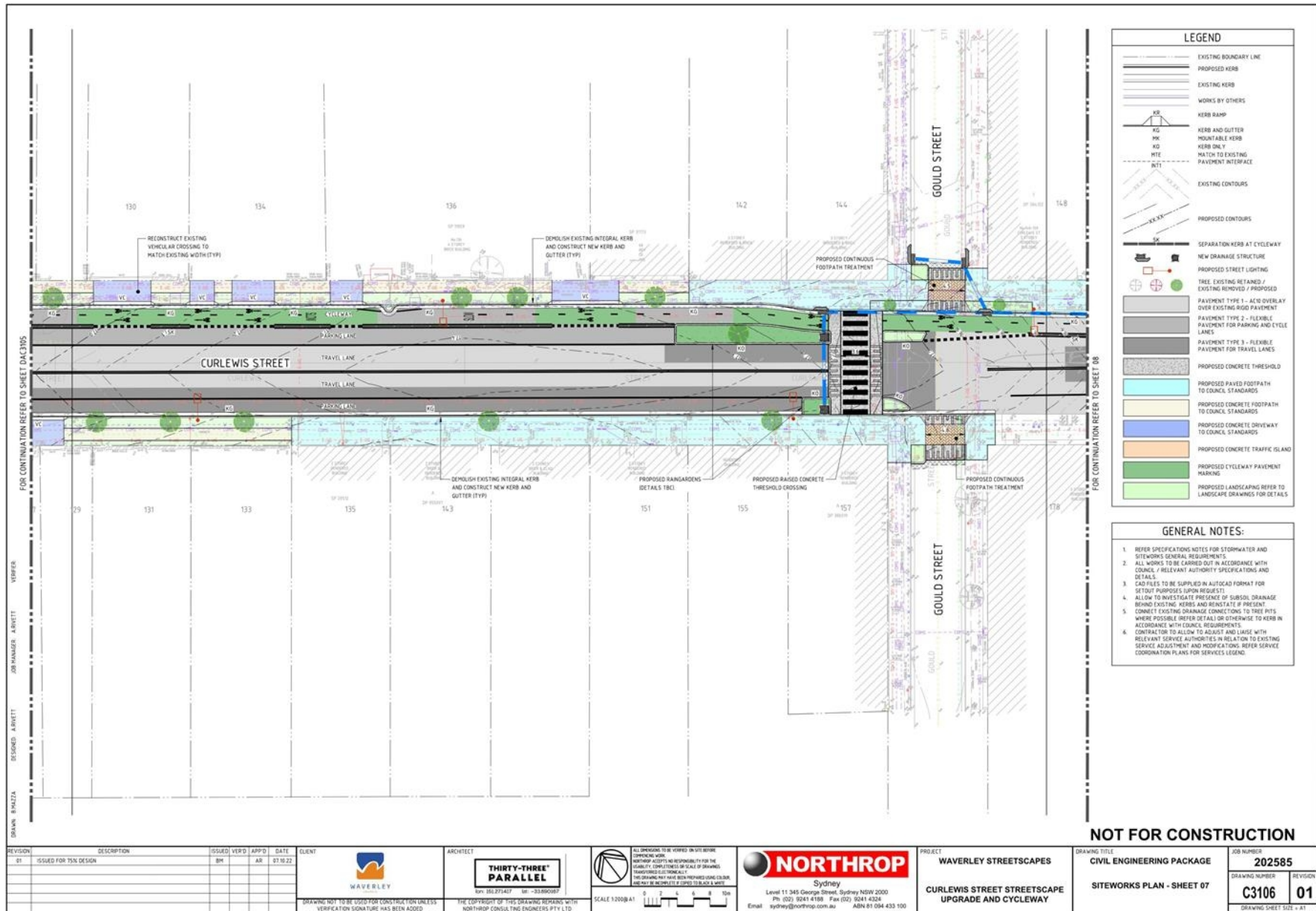




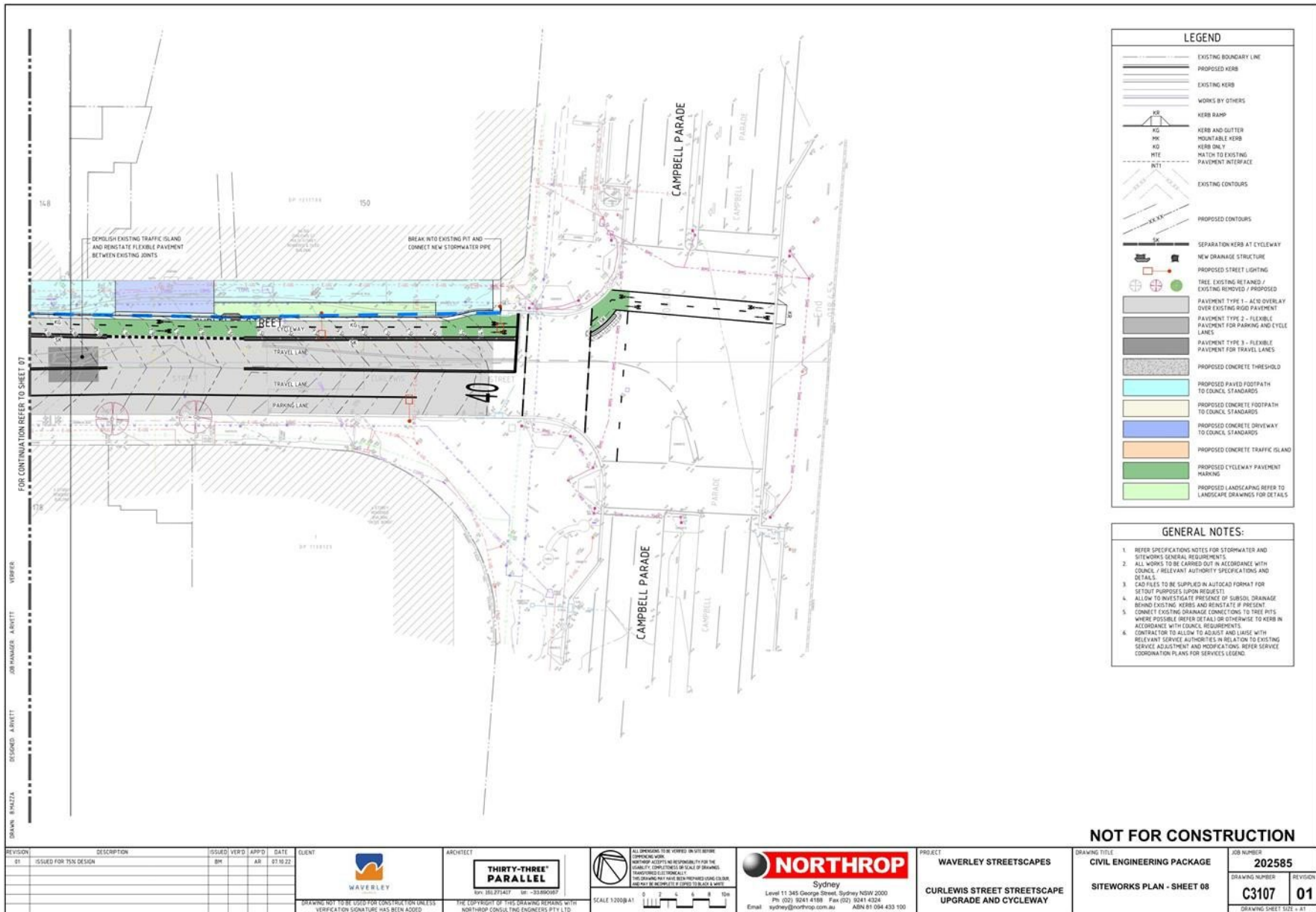








NOT FOR CONSTRUCTION



NOT FOR CONSTRUCTION

REVISION	DESCRIPTION	ISSUED BY	VER'D BY	APP'D BY	DATE	CLIENT	ARCHITECT	SCALE	PROJECT	DRAWING TITLE	JOB NUMBER	DRAWING NUMBER	REVISION
01	ISSUED FOR TSN DESIGN				07.10.23	WAVERLEY	THIRTY-THREE PARALLEL	1:2000 AT	WAVERLEY STREETSCAPES	CIVIL ENGINEERING PACKAGE	202585	C3107	01
DRAWING NOT TO BE USED FOR CONSTRUCTION UNLESS VERIFICATION SIGNATURE HAS BEEN ADDED							THE COPYRIGHT OF THIS DRAWING REMAINS WITH NORTHROP CONSULTING ENGINEERS PTY LTD		CURLEW STREET STREETSCAPE UPGRADE AND CYCLEWAY	SITEWORKS PLAN - SHEET 08			

AREA WEST OF WELLINGTON STREET SUBJECT TO FURTHER DISCUSSION & OPTION ANALYSIS WITH COUNCIL

Impact Assessment Plan 1

L&Co Legend

- SRZ
- TPZ
- TPZ encroachment
- 1 Tree number
- Tree retained

PROPOSED KERN

- EXISTING KERN
- WORKS BY OTHERS
- KERN RAMP
- KERN AND GUTTER
- MOUNTABLE KERN
- KERN ONLY
- MATCH TO EXISTING
- PAVEMENT INTERFACE

EXISTING CONTOURS

PROPOSED CONTOURS

- SEPARATION KERN AT CYCLEWAY
- NEW DRAINAGE STRUCTURE
- PROPOSED STREET LIGHTING
- TREE EXISTING RETAINED / EXISTING REMOVED / PROPOSED
- PAVEMENT TYPE 1 - AC10 OVERLAY OVER EXISTING RIGID PAVEMENT
- PAVEMENT TYPE 2 - FLEXIBLE PAVEMENT FOR PARKING AND CYCLE LANES
- PAVEMENT TYPE 3 - FLEXIBLE PAVEMENT FOR TRAVEL LANES
- PROPOSED CONCRETE THRESHOLD
- PROPOSED PAVED FOOTPATH TO COUNCIL STANDARDS
- PROPOSED CONCRETE DRIVEWAY TO COUNCIL STANDARDS
- PROPOSED CONCRETE TRAFFIC ISLAND
- PROPOSED CYCLEWAY PAVEMENT MARKING
- PROPOSED LANDSCAPING REFER TO LANDSCAPE DRAWINGS FOR DETAILS

- GENERAL NOTES:**
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 3. CAD FILES TO BE SUPPLIED IN AUTOCAD FORMAT FOR SETOUT PURPOSES UPON REQUEST
 4. ALLOW TO INVESTIGATE PRESENCE OF SUBSIL DRAINAGE BEHIND EXISTING KERBS AND REINSTATE IF PRESENT
 5. CONNECT EXISTING DRAINAGE CONNECTIONS TO TREE PITS WHERE POSSIBLE (REFER DETAIL OR OTHERWISE TO KERN IN ACCORDANCE WITH COUNCIL REQUIREMENTS)
 6. CONTRACTOR TO ALLOW TO ADJUST AND LIAISE WITH RELEVANT SERVICE AUTHORITIES IN RELATION TO EXISTING SERVICE ADJUSTMENT AND MODIFICATION. REFER SERVICE COORDINATION PLANS FOR SERVICES LEGEND.

NOT FOR CONSTRUCTION

REVISION	DESCRIPTION	ISSUED BY	VERD	APPD	DATE	CLIENT	ARCHITECT	PROJECT	DRAWING TITLE	JOB NUMBER
01	ISSUED FOR TSN DESIGN	BT	AR	07/10/23		WAVERLEY	THIRTY-THREE PARALLEL	WAVERLEY STREETSAPES	CIVIL ENGINEERING PACKAGE	202585
								CURLWIS STREET STREETSAPES UPGRADE AND CYCLEWAY	SITEWORKS PLAN - SHEET 01	C3100 01

Impact Assessment Plan 2

L&Co Legend	
	SRZ
	TPZ
	TPZ encroachment within existing structure or above grade
	Tree already removed
	Tree number
	Tree removal required
	Tree retained

PROPOSED CONTOURS	
	SEPARATION KERB AT CYCLEWAY
	NEW DRAINAGE STRUCTURE
	PROPOSED STREET LIGHTING
	TREE EXISTING RETAINED / EXISTING REMOVED / PROPOSED
	PAVEMENT TYPE 1 - AC10 OVERLAY OVER EXISTING RIGID PAVEMENT
	PAVEMENT TYPE 2 - FLEXIBLE PAVEMENT FOR PARKING AND CYCLE LANES
	PAVEMENT TYPE 3 - FLEXIBLE PAVEMENT FOR TRAVEL LANES
	PROPOSED CONCRETE THRESHOLD
	PROPOSED PAVED FOOTPATH TO COUNCIL STANDARDS
	PROPOSED CONCRETE FOOTPATH TO COUNCIL STANDARDS
	PROPOSED CONCRETE DRIVEWAY TO COUNCIL STANDARDS
	PROPOSED CONCRETE TRAFFIC ISLAND
	PROPOSED CYCLEWAY PAVEMENT MARKING
	PROPOSED LANDSCAPING REFER TO LANDSCAPE DRAWINGS FOR DETAILS

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REVISION	DESCRIPTION	ISSUED BY	VER'D BY	APP'D BY	DATE	CLIENT	ARCHITECT	PROJECT	DRAWING TITLE	JOB NUMBER	DRAWING NUMBER	REVISION
01	ISSUED FOR TSN DESIGN				01/10/23	WAVERLEY	THIRTY-THREE PARALLEL 100/102/27/147/181/33/80/007	WAVERLEY STREETSCAPES	CIVIL ENGINEERING PACKAGE	202585	C3101	01
								CURLWIS STREET STREETSCAPE UPGRADE AND CYCLEWAY	SITEWORKS PLAN - SHEET 02			

Impact Assessment Plan 3

- L&Co Legend**
- Group of trees
 - SRZ
 - TPZ
 - TPZ encroachment within existing structure or above grade
 - 7 Tree number
 - ✓ Tree removal required
 - ✓ Tree retained

- EXISTING CONTOURS**
- PROPOSED CONTOURS**
- SEPARATION KERB AT CYCLEWAY
 - NEW DRAINAGE STRUCTURE
 - PROPOSED STREET LIGHTING
 - TREE EXISTING RETAINED / EXISTING REMOVED / PROPOSED
 - PAVEMENT TYPE 1 - AC10 OVERLAY OVER EXISTING RIGID PAVEMENT
 - PAVEMENT TYPE 2 - FLEXIBLE PAVEMENT FOR PARKING AND CYCLE LANES
 - PAVEMENT TYPE 3 - FLEXIBLE PAVEMENT FOR TRAVEL LANES
 - PROPOSED CONCRETE THRESHOLD
 - PROPOSED PAVED FOOTPATH TO COUNCIL STANDARDS
 - PROPOSED CONCRETE DRIVEWAY TO COUNCIL STANDARDS
 - PROPOSED CONCRETE TRAFFIC ISLAND
 - PROPOSED CYCLEWAY PAVEMENT MARKING
 - PROPOSED LANDSCAPING REFER TO LANDSCAPE DRAWINGS FOR DETAILS

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01	ISSUED FOR TSN DESIGN	BT		AR	01.10.23	WAVERLEY	THIRTY-THREE PARALLEL	1:2000 A1	WAVERLEY STREETSCAPES	CIVIL ENGINEERING PACKAGE	202585	C3102	01
									CURLEWIS STREET STREETSCAPE UPGRADE AND CYCLEWAY	SITEWORKS PLAN - SHEET 03			

Impact Assessment Plan 4

L&Co Legend

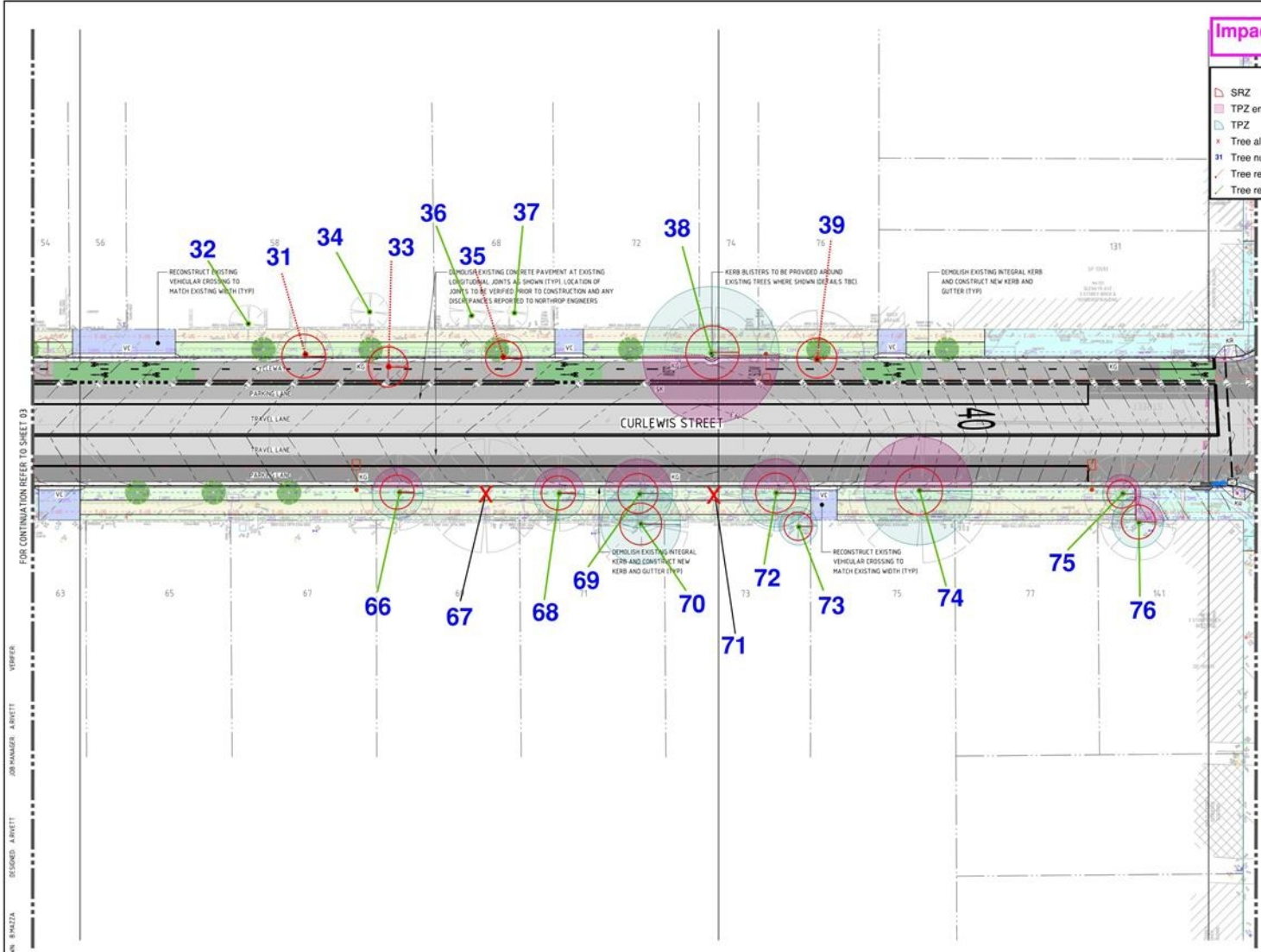
- SRZ
- TPZ encroachment within existing structure or above grade
- TPZ
- Tree already removed
- 31 Tree number
- Tree removal required
- Tree retained

EXISTING CONTOURS

PROPOSED CONTOURS

- SEPARATION KERB AT CYCLEWAY
- NEW DRAINAGE STRUCTURE
- PROPOSED STREET LIGHTING
- TREE EXISTING RETAINED / EXISTING REMOVED / PROPOSED
- PAVEMENT TYPE 1 - AC10 OVERLAY OVER EXISTING RIGID PAVEMENT
- PAVEMENT TYPE 2 - FLEXIBLE PAVEMENT FOR PARKING AND CYCLE LANES
- PAVEMENT TYPE 3 - FLEXIBLE PAVEMENT FOR TRAVEL LANES
- PROPOSED CONCRETE THRESHOLD
- PROPOSED PAVED FOOTPATH TO COUNCIL STANDARDS
- PROPOSED CONCRETE FOOTPATH TO COUNCIL STANDARDS
- PROPOSED CONCRETE DRIVEWAY TO COUNCIL STANDARDS
- PROPOSED CONCRETE TRAFFIC ISLAND
- PROPOSED CYCLEWAY PAVEMENT MARKING
- PROPOSED LANDSCAPING REFER TO LANDSCAPE DRAWINGS FOR DETAILS

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REVISION	DESCRIPTION	ISSUED BY	VER'D BY	APP'D BY	DATE	CLIENT
01	ISSUED FOR TSN DESIGN	BT		AR	01/10/23	

Waverley

DESIGNED: R. HAZZA
DRAWN: R. HAZZA
JOB MANAGER: A. BRETTE
VERIFIER: A. BRETTE

THIRTY-THREE PARALLEL

100% 100/27/14/7 100% 100/27/14/7 100% 100/27/14/7

NORTHROP

Sydney

Level 11 345 George Street, Sydney NSW 2000
Ph: (02) 9241 4188 Fax: (02) 9241 4324
Email: sydney@northrop.com.au

PROJECT

WAVERLEY STREETSCAPES

CURLEW STREET STREETSCAPE UPGRADE AND CYCLEWAY

DRAWING TITLE

CIVIL ENGINEERING PACKAGE

SITEWORKS PLAN - SHEET 04

JOB NUMBER

202585

DRAWING NUMBER

C3103

REVISION

01

DRAWING SHEET SIZE

A1

NOT FOR CONSTRUCTION

Impact Assessment Plan 5

- L&Co Legend**
- SRZ
 - TPZ
 - TPZ encroachment within existing structure or above grade
 - Tree number
 - Tree removal required
 - Tree retained

- PROPOSED CONTOURS**
- SEPARATION KERB AT CYCLEWAY
 - NEW DRAINAGE STRUCTURE
 - PROPOSED STREET LIGHTING
 - TREE EXISTING RETAINED / EXISTING REMOVED / PROPOSED
 - PAVEMENT TYPE 1 - AC10 OVERLAY OVER EXISTING RIGID PAVEMENT
 - PAVEMENT TYPE 2 - FLEXIBLE PAVEMENT FOR PARKING AND CYCLE LANES
 - PAVEMENT TYPE 3 - FLEXIBLE PAVEMENT FOR TRAVEL LANES
 - PROPOSED CONCRETE THRESHOLD
 - PROPOSED PAVED FOOTPATH TO COUNCIL STANDARDS
 - PROPOSED CONCRETE FOOTPATH TO COUNCIL STANDARDS
 - PROPOSED CONCRETE DRIVEWAY TO COUNCIL STANDARDS
 - PROPOSED CONCRETE TRAFFIC ISLAND
 - PROPOSED CYCLEWAY PAVEMENT MARKING
 - PROPOSED LANDSCAPING REFER TO LANDSCAPE DRAWINGS FOR DETAILS

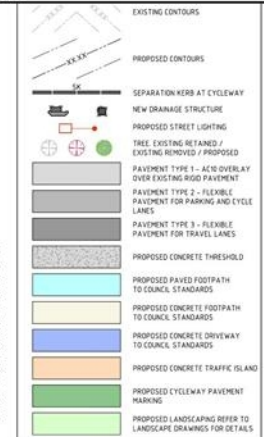
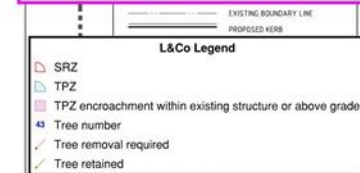
- GENERAL NOTES:**
- REFER SPECIFICATIONS NOTES FOR STORMWATER AND SITEWORKS GENERAL REQUIREMENTS.
 - ALL WORKS TO BE CARRIED OUT IN ACCORDANCE WITH COUNCIL / RELEVANT AUTHORITY SPECIFICATIONS AND DETAILS.
 - CAD FILES TO BE SUPPLIED IN AUTOCAD FORMAT FOR SETOUT PURPOSES (UPON REQUEST).
 - ALLOW TO INVESTIGATE PRESENCE OF SUBSOL DRAINAGE BEHIND EXISTING KERBS AND REINSTATE IF PRESENT.
 - CONNECT EXISTING DRAINAGE CONNECTIONS TO TREE PITS WHERE POSSIBLE (REFER DETAIL) OR OTHERWISE TO KERB IN ACCORDANCE WITH COUNCIL REQUIREMENTS.
 - CONTRACTOR TO ALLOW TO ADJUST AND LIAISE WITH RELEVANT SERVICE AUTHORITIES IN RELATION TO EXISTING SERVICE ADJUSTMENT AND MODIFICATION. REFER SERVICE COORDINATION PLANS FOR SERVICES LEGEND.

NOT FOR CONSTRUCTION

REVISION	DESCRIPTION	ISSUED	VER'D	APP'D	DATE	CLIENT
01	ISSUED FOR TSN DESIGN	01/10/23	AR	AR	01/10/23	WAVERTLEY

ARCHITECT	THIRTY-THREE PARALLEL	LEVEL 11 345 GEORGE STREET, SYDNEY NSW 2000	PH (02) 9241 4188 FAX (02) 9241 4324	EMAIL sydney@northrop.com.au
PROJECT	WAVERTLEY STREETSAPES	CURLEWIS STREET STREETSAPES UPGRADE AND CYCLEWAY		
DRAWING TITLE	CIVIL ENGINEERING PACKAGE	SITEWORKS PLAN - SHEET 05		
JOB NUMBER	202585			
DRAWING NUMBER	C3104	01		
DRAWING SHEET SIZE	A1			

Impact Assessment Plan 6



GENERAL NOTES:

1. REFER SPECIFICATIONS NOTES FOR STORMWATER AND SITEWORKS GENERAL REQUIREMENTS.
2. ALL WORKS TO BE CARRIED OUT IN ACCORDANCE WITH COUNCIL / RELEVANT AUTHORITY SPECIFICATIONS AND DETAILS.
3. CAD FILES TO BE SUPPLIED IN AUTOCAD FORMAT FOR SETOUT PURPOSES UPON REQUEST.
4. ALLOW TO INVESTIGATE PRESENCE OF SUBSOIL DRAINAGE BEHIND EXISTING KERBS AND REINSTATE IF PRESENT.
5. CORRECT EXISTING DRAINAGE CONNECTIONS TO TREE PITS WHERE POSSIBLE (REFER DETAIL OR OTHERWISE TO KERB IN ACCORDANCE WITH COUNCIL REQUIREMENTS).
6. CONTRACTOR TO ALLOW TO ADJUST AND LIAISE WITH RELEVANT SERVICE AUTHORITIES IN RELATION TO EXISTING SERVICE ADJUSTMENT AND MODIFICATION. REFER SERVICE COORDINATION PLANS FOR SERVICES LEGEND.

NOT FOR CONSTRUCTION

REVISION	DESCRIPTION	ISSUED BY	VER'D BY	APP'D BY	DATE	CLIENT	ARCHITECT	SCALE	PROJECT	DRAWING TITLE	JOB NUMBER	DRAWING NUMBER	REVISION
01	ISSUED FOR TSN DESIGN	BT		AR	01/10/23	WAVERLEY	THIRTY-THREE PARALLEL	1:2000 A1	WAVERLEY STREETSCAPES	CIVIL ENGINEERING PACKAGE	202585	C3105	01
									CURLEWIS STREET STREETSCAPE UPGRADE AND CYCLEWAY	SITEWORKS PLAN - SHEET 06			

Impact Assessment Plan 7

L&Co Legend

- SRZ
- TPZ
- TPZ encroachment within existing structure or above grade
- Tree number
- Tree removal required
- Tree retained

EXISTING CONTOURS

PROPOSED CONTOURS

SEPARATION KERB AT CYCLEWAY

NEW DRAINAGE STRUCTURE

PROPOSED STREET LIGHTING

TREE EXISTING RETAINED / EXISTING REMOVED / PROPOSED

PAVEMENT TYPE 1 - AC10 OVERLAY OVER EXISTING RIGID PAVEMENT

PAVEMENT TYPE 2 - FLEXIBLE PAVEMENT FOR PARKING AND CYCLE LANES

PAVEMENT TYPE 3 - FLEXIBLE PAVEMENT FOR TRAVEL LANES

PROPOSED CONCRETE THRESHOLD

PROPOSED PAVED FOOTPATH TO COUNCIL STANDARDS

PROPOSED CONCRETE FOOTPATH TO COUNCIL STANDARDS

PROPOSED CONCRETE DRIVEWAY TO COUNCIL STANDARDS

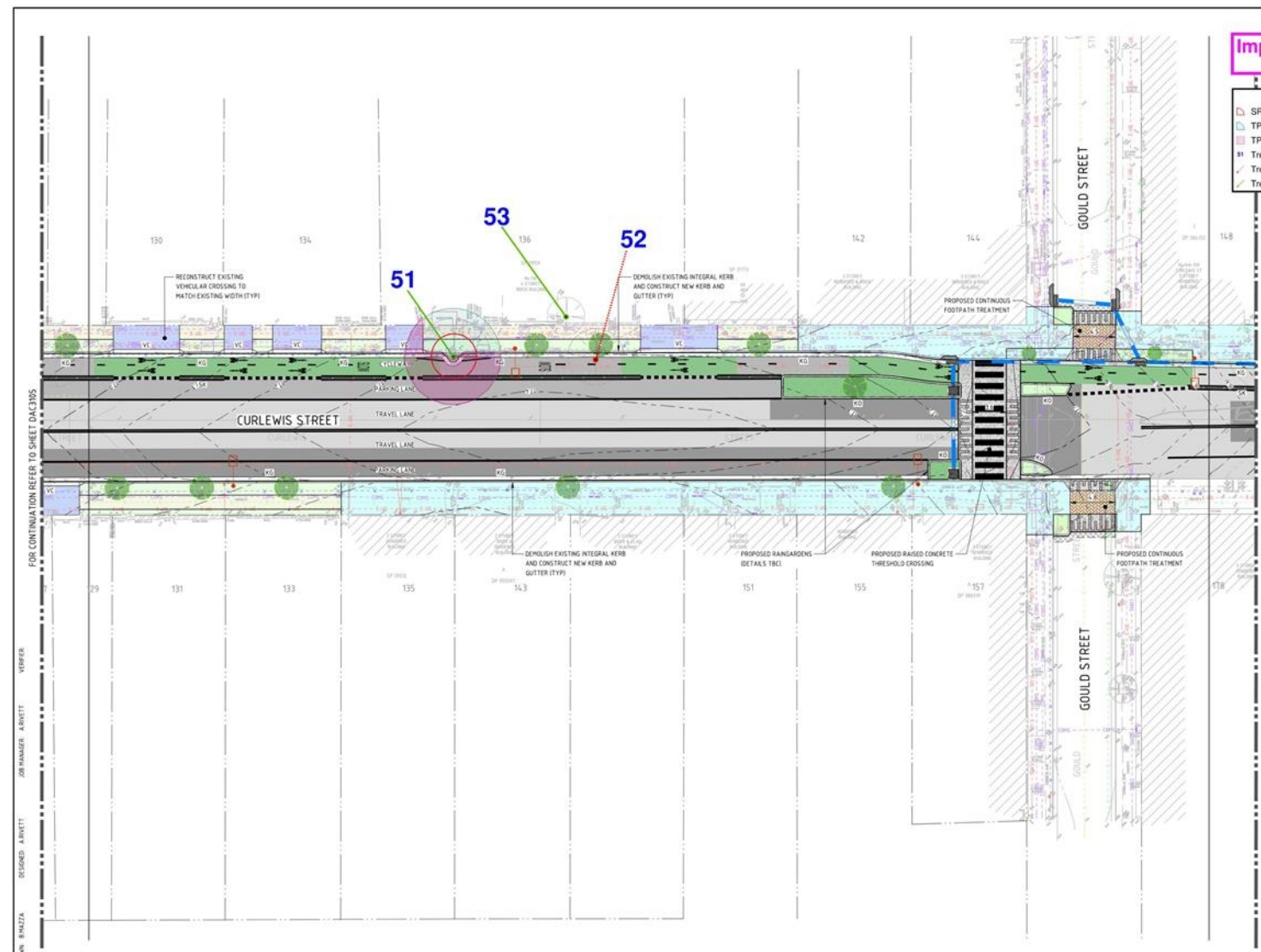
PROPOSED CONCRETE TRAFFIC ISLAND

PROPOSED CYCLEWAY PAVEMENT MARKING

PROPOSED LANDSCAPING REFER TO LANDSCAPE DRAWINGS FOR DETAILS

- GENERAL NOTES:**
1. REFER SPECIFICATIONS NOTES FOR STORMWATER AND SITESWORKS GENERAL REQUIREMENTS.
 2. ALL WORKS TO BE CARRIED OUT IN ACCORDANCE WITH COUNCIL / RELEVANT AUTHORITY SPECIFICATIONS AND DETAILS.
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REVISION	DESCRIPTION	ISSUED BY	VERIFIED BY	APPROVED BY	DATE	CLIENT	ARCHITECT	SCALE	PROJECT	DRAWING TITLE	JOB NUMBER	DRAWING NUMBER	REVISION
01	ISSUED FOR TSN DESIGN	BT	AR	BT	01.10.23	WAVERLEY	THIRTY-THREE PARALLEL	1:2000 A1	WAVERLEY STREETSCAPES	CIVIL ENGINEERING PACKAGE	202585	C3106	01
									CURLEWIS STREET STREETSCAPE UPGRADE AND CYCLEWAY	SITESWORKS PLAN - SHEET 07			

Impact Assessment Plan 8

L&Co Legend

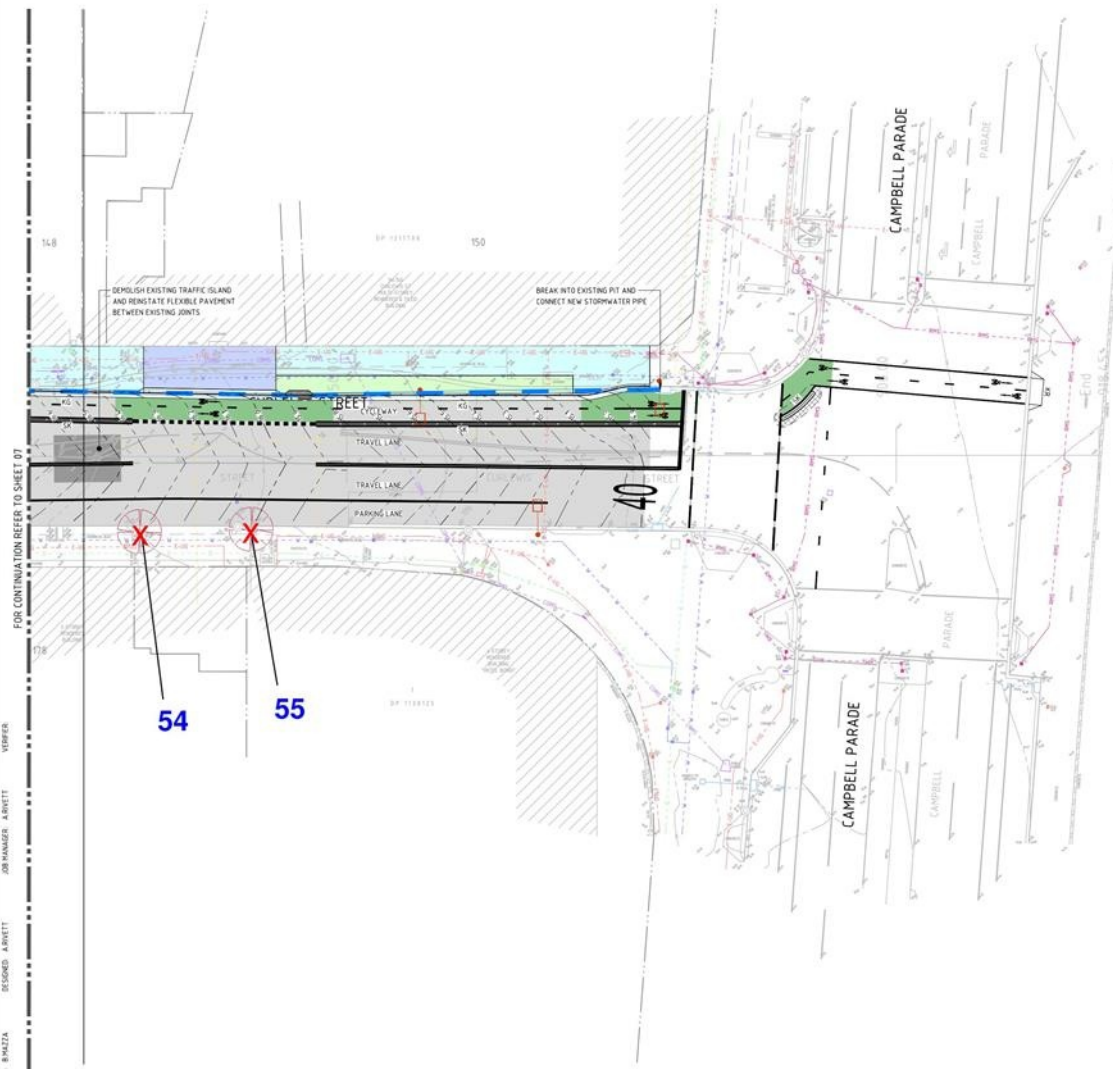
- x Tree already removed
- 54 Tree number

LEGEND

- EXISTING BOUNDARY LINE
- PROPOSED KERB
- EXISTING KERB
- WORKS BY OTHERS
- KERB RAMP
- KERB AND GUTTER
- MOUNTABLE KERB
- KERB ONLY
- MTE
- MTE
- MTE
- MTE
- EXISTING CONTOURS
- PROPOSED CONTOURS
- SEPARATION KERB AT CYCLEWAY
- NEW DRAINAGE STRUCTURE
- PROPOSED STREET LIGHTING
- TREE EXISTING RETAINED / EXISTING REMOVED / PROPOSED
- PAVEMENT TYPE 1 - AC10 OVERLAY OVER EXISTING RIGID PAVEMENT
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REVISION	DESCRIPTION	ISSUED BY	VER'D BY	APP'D BY	DATE	CLIENT
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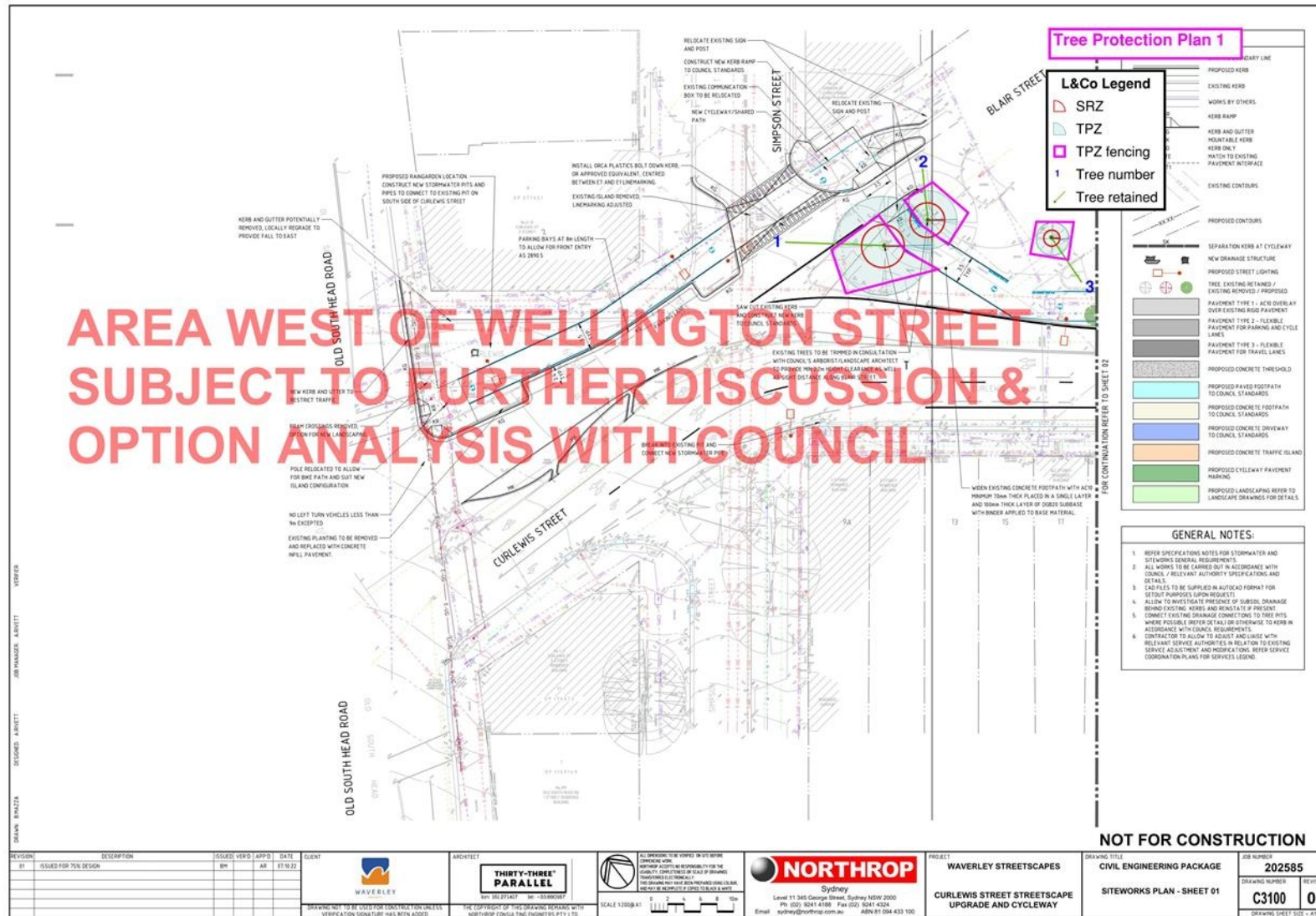


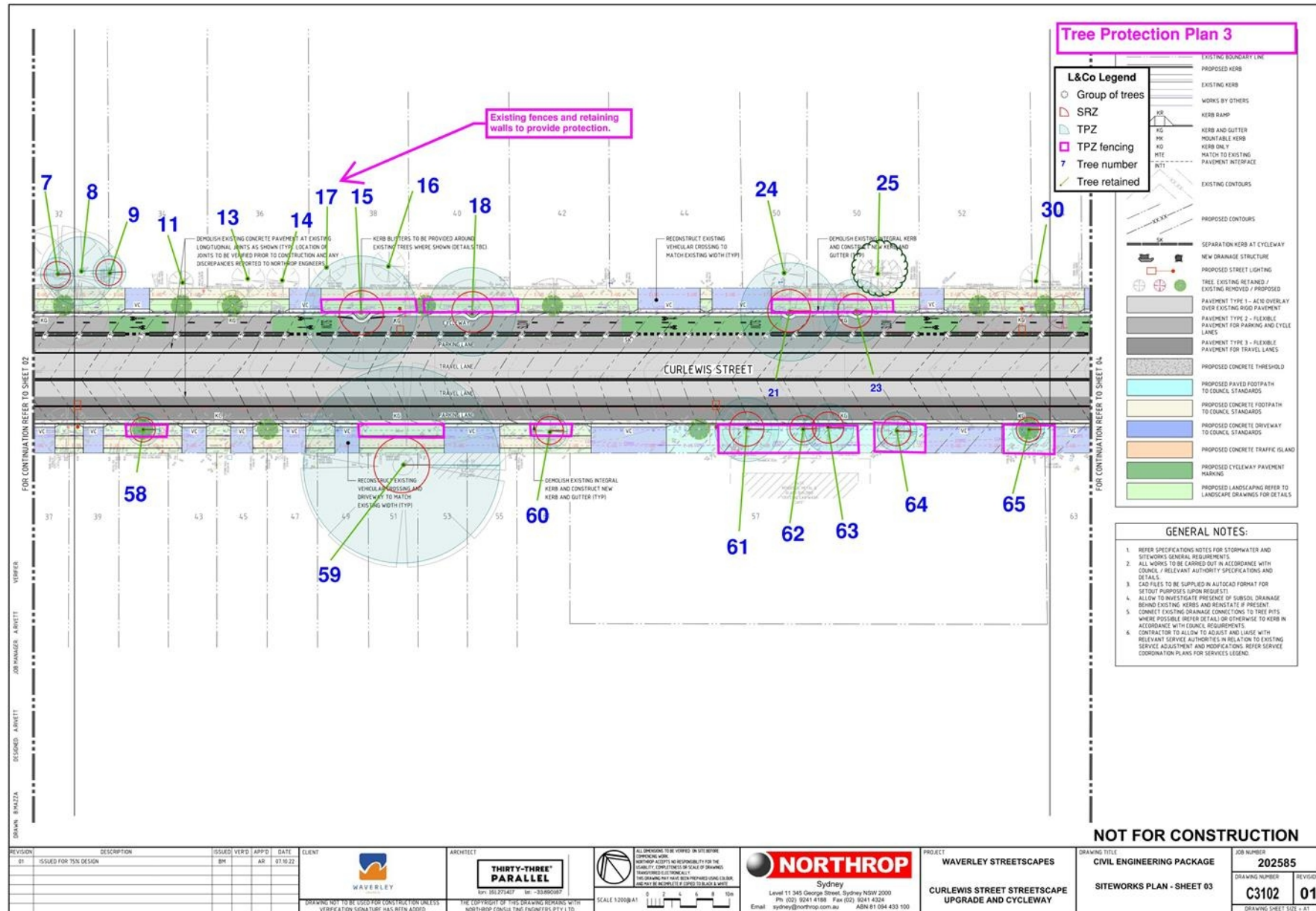
PROJECT
WAVERLEY STREETSCAPES
CURLEWIS STREET STREETSCAPE
UPGRADE AND CYCLEWAY

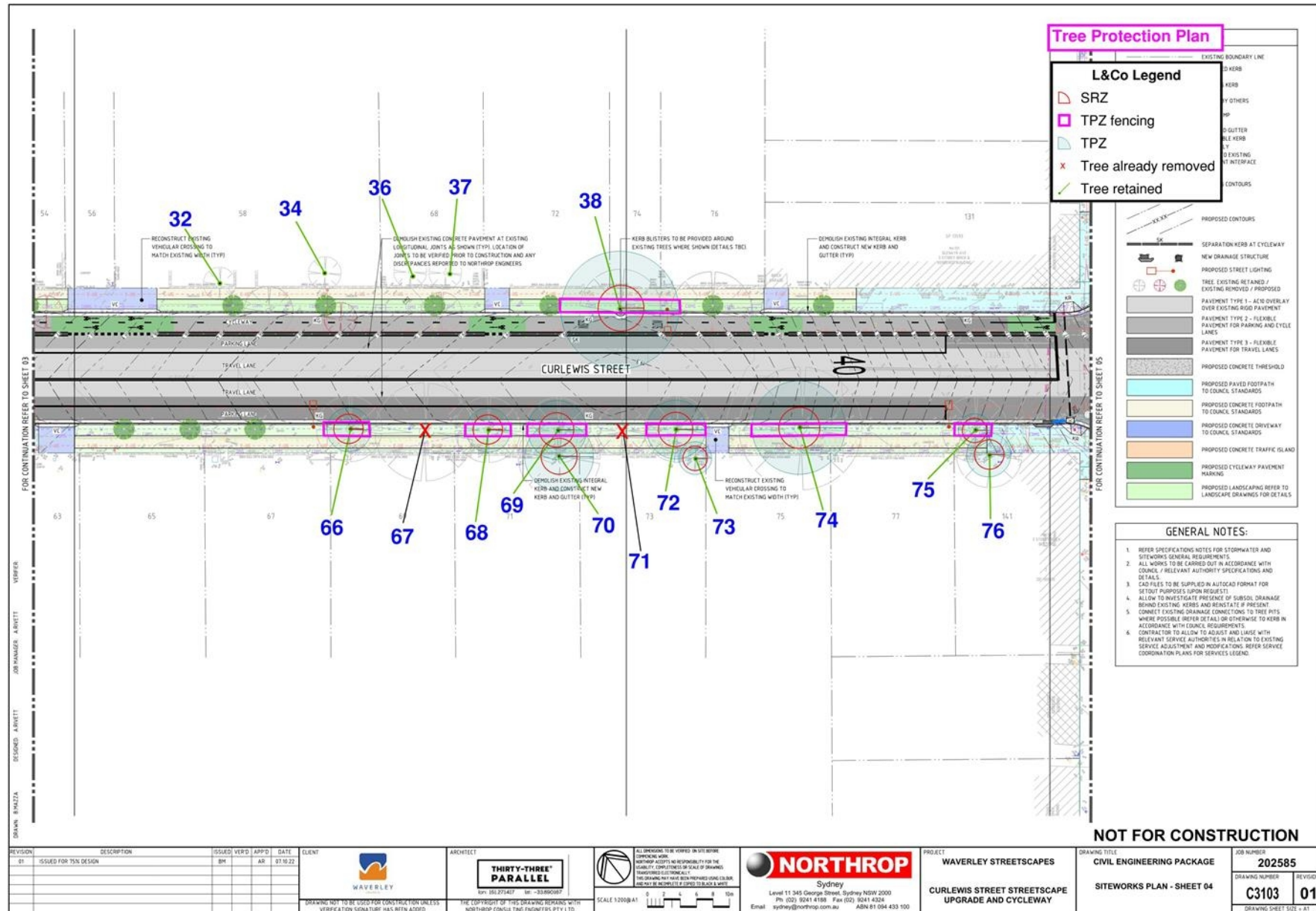
NOT FOR CONSTRUCTION

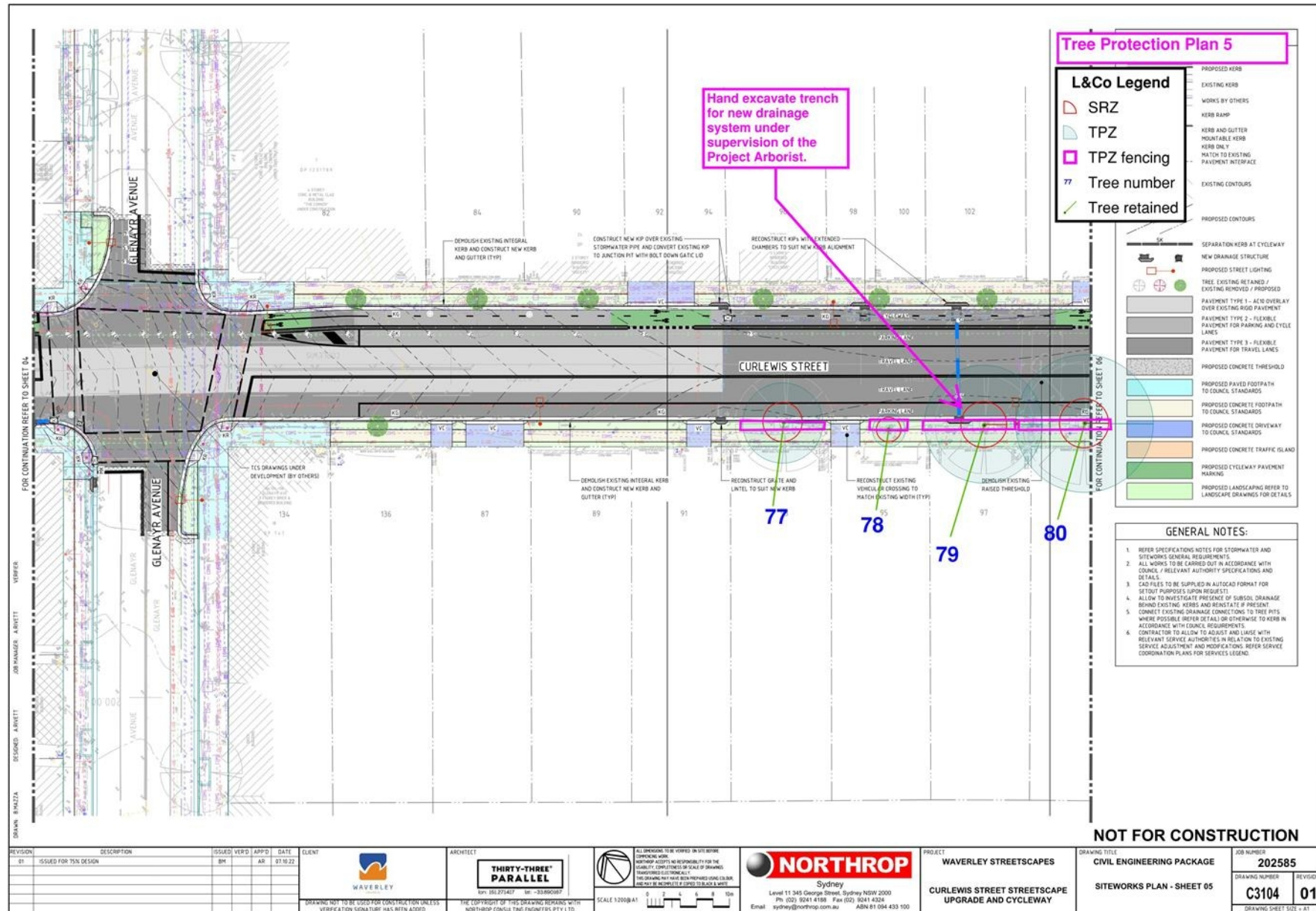
DRAWING TITLE CIVIL ENGINEERING PACKAGE SITEWORKS PLAN - SHEET 08	JOB NUMBER 202585 DRAWING NUMBER C3107 REVISION 01 DRAWING SHEET SIZE - A1
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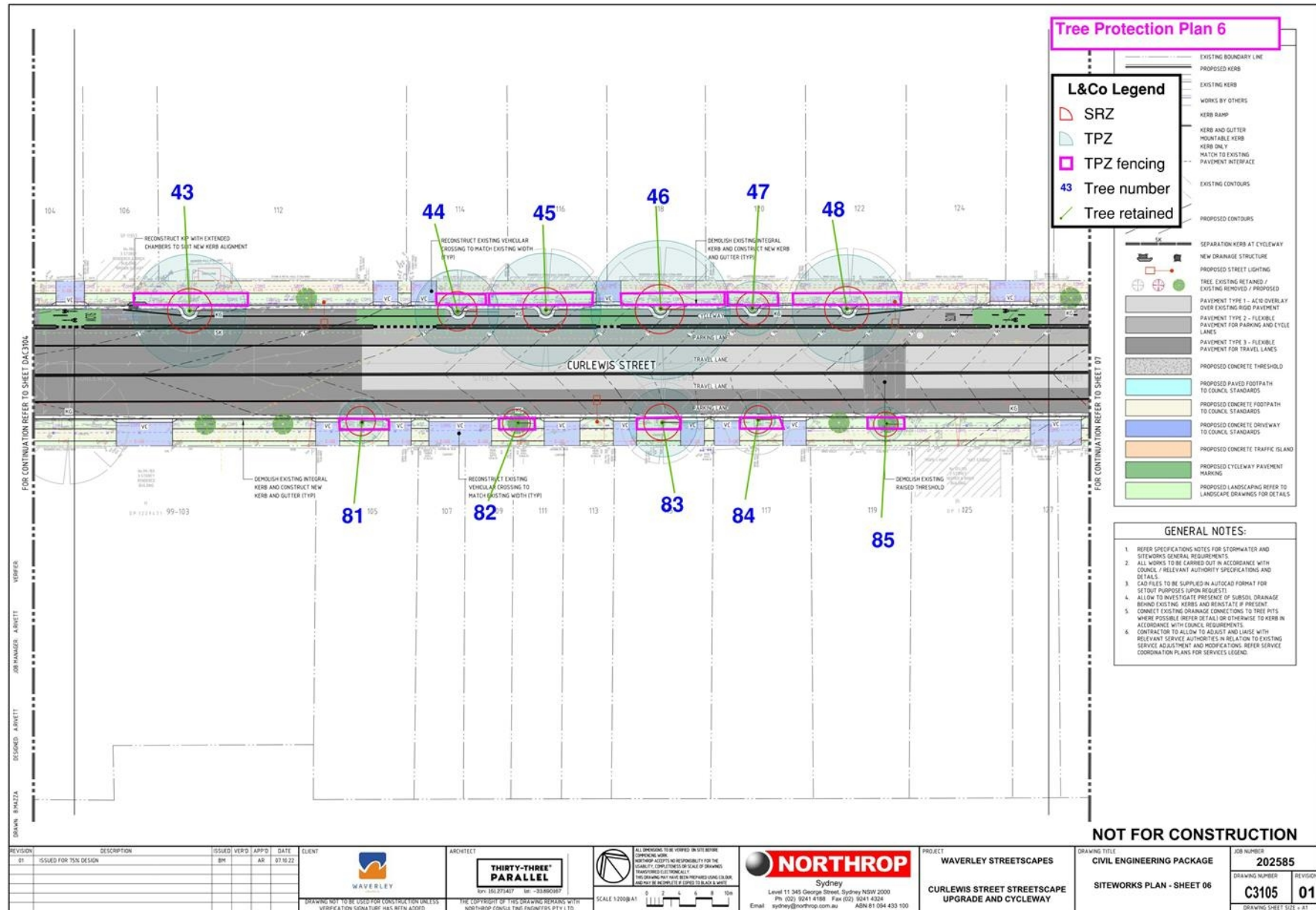
11.0 APPENDIX 6 | TREE PROTECTION PLAN

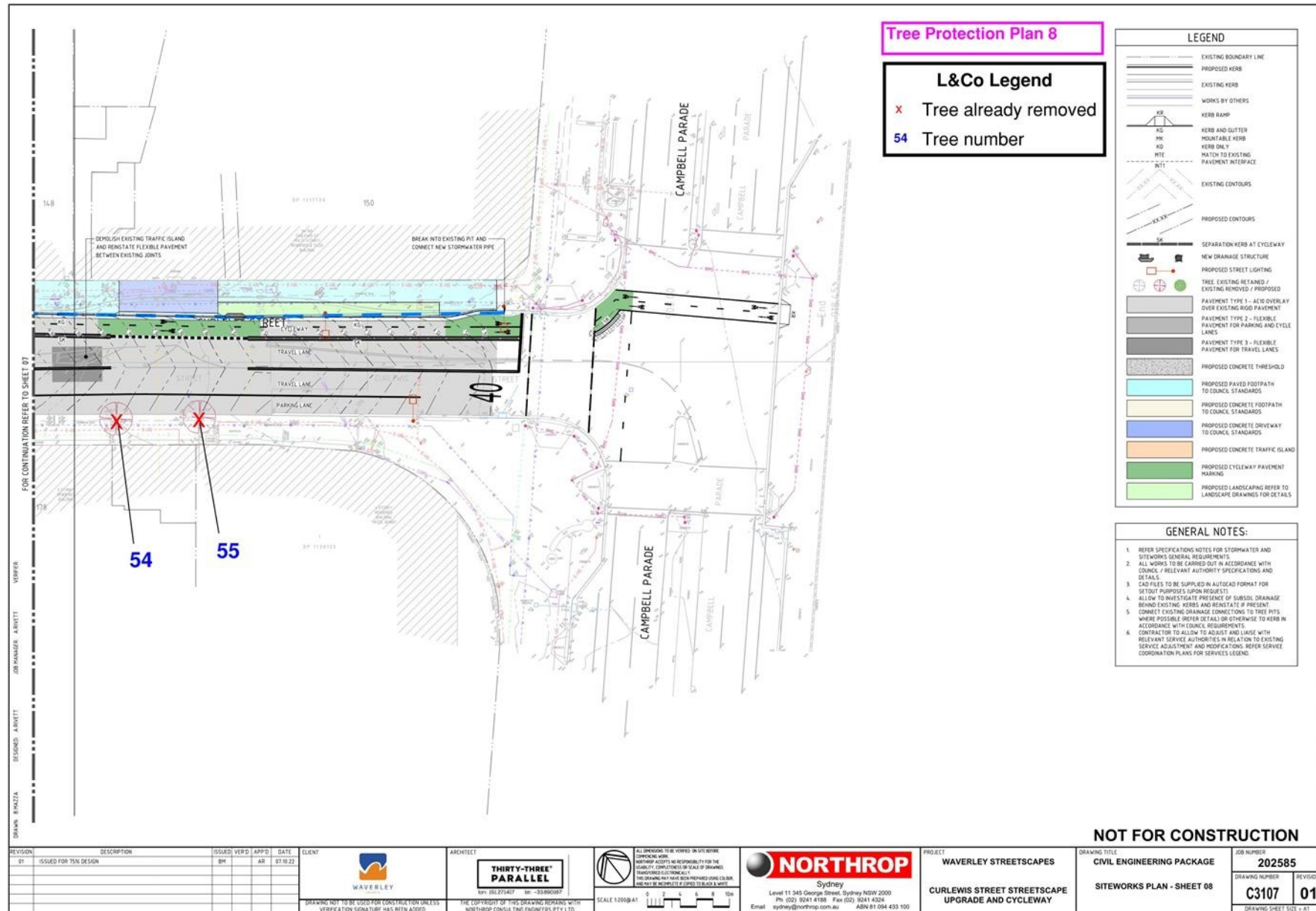




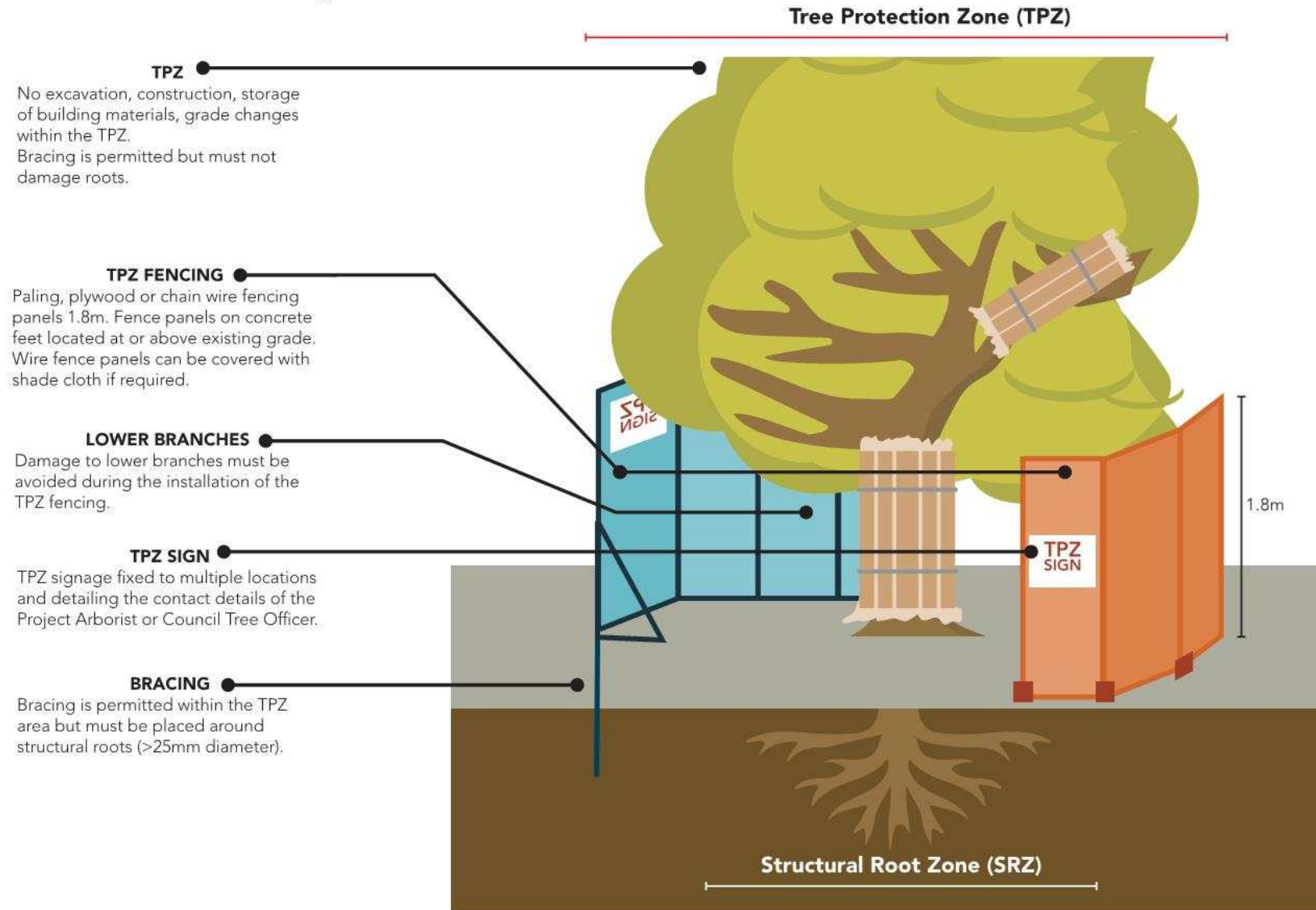






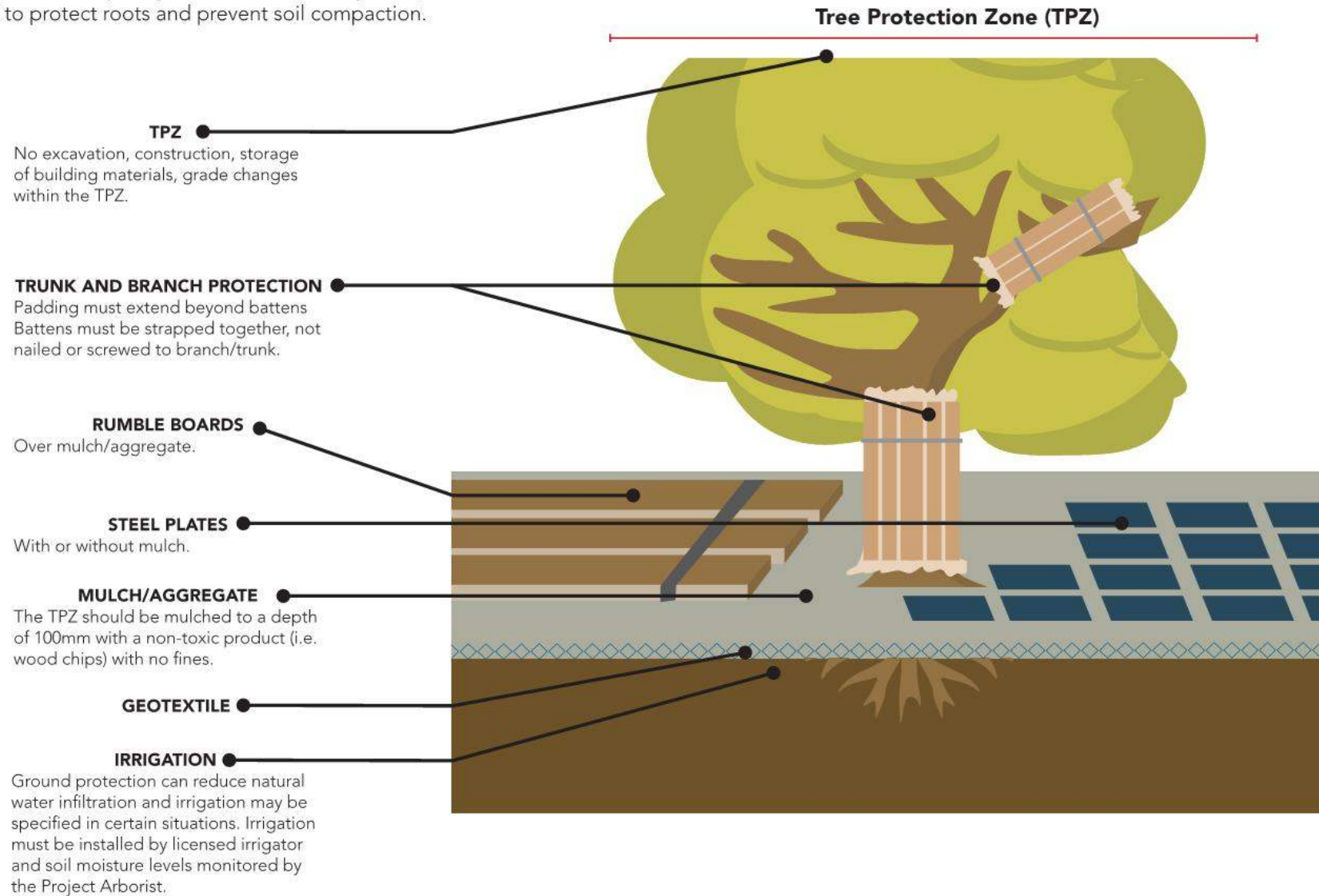


Tree Protection Detail - TPZ Fencing

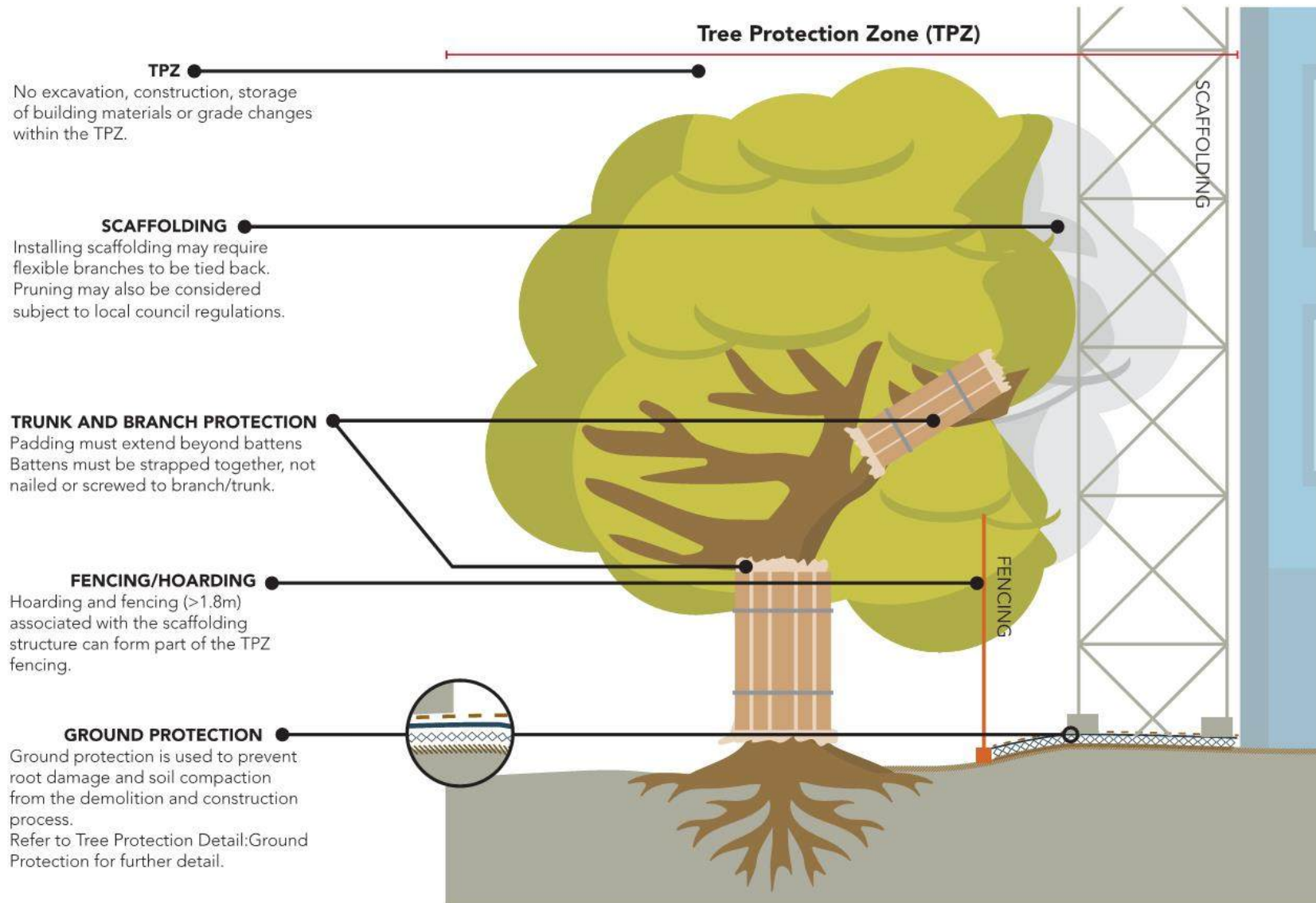


Tree Protection Detail - Ground Protection

Required if temporary access for machinery is required within the TPZ to protect roots and prevent soil compaction.



Tree Protection Detail - Scaffolding within TPZ



13.0 APPENDIX 8 | TREE PROTECTION SPECIFICATION

13.1 Appointment of Project Arborist

- 13.1.1 Prior to commencement of works a Project Arborist should be engaged to monitor compliance with the protection measures. The Project Arborist will inspect tree protection measures and prepare a compliance certification for the principal certifying authority prior to the release of compliance certification. Contractors and site workers are to receive these specifications at least 3 days prior to commencing works. Contractors and site workers working within the TPZ should sign the site log confirming they have read and understood these specifications prior to commencing works.

13.2 Compliance

- 13.2.1 The Project Arborist will conduct regular site visits to certify the works are compliant with this specification. A compliance document will be prepared by the Project Arborist following each site inspection. The compliance document will include evidence of compliance with the tree protection measures detailed in this specification.

13.3 Tree & Vegetation Removal

- 13.3.1 Tree and vegetation removal will be undertaken prior to installation of tree protection measures. Tree removal works should be undertaken in accordance with the *Safe Work Australia Guide for Managing Risks of Tree Trimming and Removal Work* (2016).
- 13.3.2 Tree and vegetation removal must not damage trees to be retained.

13.4 Tree Protection Zone

- 13.4.1 Trees that are to be retained must be protected prior to and during construction from works that could negatively impact their health and structural integrity. The following works should not occur within the TPZ unless authorised by the Project Arborist:

- Modification of existing soil levels, excavations and trenching
- Mechanical removal of vegetation
- Movement of naturally occurring rock
- Storage of materials, plant/equipment and building of sheds
- No signage or hoarding shall be fixed to the trees
- Preparation of building materials, refuelling or disposal of waste materials and chemicals
- No lighting of fires
- No pedestrian or vehicular traffic
- Temporary or permanent location of services, or works required for their installation
- Any other activities that may damage the tree

13.6 Tree Protection Fencing

- 13.6.1 The TPZ fencing must be positioned at the perimeter of the TPZ and may be combined to form a single area where the TPZs of multiple trees overlap. The approximate location of the TPZ fencing is outlined in the Arboricultural Impact Assessment with the exact location determined by consultation between the Principal Contractor/Project Manager and the Project Arborist prior to the commencement of works. Fencing may be setback to allow for demolition/construction access and for the installation of pavements only where appropriate ground protection is installed and approved by the Project Arborist. The TPZ fencing must be at least 1.8m above grade and made of wire mesh panels that are supported by concrete feet and fastened together to prevent sideways movement. Tree damage, including any low branches, must be avoided during the installation of the tree protection fencing. The TPZ fencing must include signage to identify the TPZ fencing and include the Project Arborist contact details.

13.7 Site Management

- 13.7.1 Materials, waste storage and temporary services should not be located within the TPZ.

13.8 Works within the Tree Protection Zones

- 13.8.1 In certain situations, works within the TPZ may be authorised by the determining authority. These works must be supervised by the Project Arborist. When working within the TPZ, special care should be taken to avoid damage to the tree's root system, trunks and lower branches.
- 13.8.2 If roots (>25mmØ) are encountered during excavation, demolition and construction works, these roots must be retained undamaged and advice sought from the Project Arborist. The design and final levels must remain flexible to enable the retention of roots >25mmØ where deemed necessary by the Project Arborist.

13.9 Ground Protection

- 13.9.1 The movement of machinery should be restricted to existing paved areas or in areas with temporary ground protection (i.e. steel road plates, ground mats) when deemed necessary by the Project Arborist.
- 13.9.2 Ground protection should be installed as per AS4970 and Appendix 7- *Typical Tree Protection Detail*.
- 13.9.3 If irrigation is considered necessary, it should be installed first and by a licensed irrigator under the supervision of the Project Arborist with no trenching.
- 13.9.4 The irrigation should be covered with a layer of geotextile and mulched to a depth of 100mm with a non-toxic product (i.e. woodchips) with no fines.
- 13.9.5 Once the irrigation, geotextile and mulch are in place then the ground protection boards (steel plates or rumble boards) can in be installed.
- 13.9.6 Boards should remain in place for the entire build.

13.10 Trunk & Branch Protection

- 13.10.1 If trunk protection is required it should be installed by wrapping the trunk and first order branching with padding (i.e. carpet underlay or 10mm thick geotextile) to a minimum height of 2m. Timber battens (90 x 45mm), spaced at 150mm centres should be strapped together and placed over the padding (Refer to AS4970 for further details).
- 13.10.2 Branch protection should be installed when considered necessary by the Project Arborist.
- 13.10.3 Branches should be wrapped with padding (i.e. Ableflex) to provide protection. Where possible, branches should be tied back and construction works to take place around branches (with appropriate branch protection installed as required). If pruning is unavoidable it should be in accordance with AS4373 and supervised by the Project Arborist.

13.11 Structure & Pavement Demolition

- 13.11.1 The Project Arborist should supervise the demolition of existing structures/pavement within the TPZ. Machinery is to be excluded from the TPZ unless operating from existing slabs, pavements or areas of ground protection. Machinery should not contact the tree's roots, trunks, branches and crown.
- 13.11.2 Existing pavement should be hand lifted to minimise disturbance to the existing sub-base and to prevent damage to tree roots. Wherever possible, the existing sub-base material should remain in situ.
- 13.11.3 When removing slab sections within the TPZ, machinery must work from the tree outwards to ensure the machinery always remains on the un-demolished section of slab. Wherever possible, footings or elements below grade should be retained to minimise disturbance to the tree's roots.
- 13.11.4 Structures must be shattered with hand-operated pneumatic/electric breaker before removal when considered necessary by the Project Arborist.
- 13.11.5 If roots (>25mmØ) are encountered during excavation, demolition and construction works these roots must be retained undamaged and advice sought from the Project Arborist. Exposed roots must be protected from direct sunlight, drying out and extremes of temperature by using 10mm thick jute geotextile fabric. This fabric should be kept moist at all times.
- 13.11.6 Where the Project Arborist determines that the tree is using underground elements (i.e. footings, pipes, rocks etc.) for support, these elements should be left *in situ*.

13.12 Pavement/Kerb Installation

- 13.12.1 Installation of pavements and sub-base within the TPZ must be supervised by the Project Arborist. New surfaces and sub-base materials should be placed above grade to minimise excavations and retain roots (unless prior root mapping has determined that there are no roots within the area of construction).
- 13.12.2 If roots (>25mmØ) are encountered during the installation of the new sub-base and surfaces these roots must be retained undamaged and advice sought from the Project Arborist. The design and final levels must remain flexible to enable the retention of roots >25mmØ where deemed necessary by the Project Arborist.
- 13.12.3 Compaction of the ground prior to the installation of fill is not permitted.
- 13.12.4 New sub-base material should be a 20mm no-fines road base (i.e. Benedict Sand & Gravel- Product Code 20NF/RB or similar). Recycled concrete aggregates should not be used to avoid raising soil pH levels.
- 13.12.5 If required, bedding sand should be washed river sand (no crushed paving blends). The bedding sand should be consolidated with a pedestrian operated plate compactor only. If possible, pavement material should be permeable.

- 13.12.6 Kerbs within the TPZ should be modified to bridge roots (>25mmØ) unless root pruning is approved and undertaken by the Project Arborist.
- 13.13 **Underground Services**
- 13.13.1 The installation of underground services should be located outside of the TPZ. Where this is not possible they should be installed around or below roots (>25mmØ) using either hydrovac or hand excavation and supervised by the Project Arborist.
- 13.13.2 Boring methods may be used for the installation of services 800mm below grade. Excavations for starting and receiving pits for the boring equipment should be located outside of the TPZ or located to avoid roots (>25mmØ, or determined by the Project Arborist).
- 13.13.3 Excavations, Root Protection & Root Pruning
- 13.13.4 Excavations and root pruning within the TPZ must be supervised by the Project Arborist and should be avoided where possible.
- 13.13.5 No over-excavation, battering, or benching should be undertaken beyond the footprint of any structure unless approved by the Project Arborist. Hand excavation and root pruning along the excavation line should be completed prior to the commencement of mechanical excavation to prevent tearing and shattering damage to the roots.
- 13.13.6 Roots >25mmØ should be pruned by the Project Arborist only. Roots <25mmØ may be pruned by the Principal Contractor. Root pruning should be undertaken with clean, sharp secateurs or a pruning saw to ensure a smooth wound face, free from tears.
- 13.13.7 Damaged roots should be pruned behind the damaged tissues with the final cut made to the undamaged part of the root.

14.0 APPENDIX 9 | PLATES



a) Showing Trees 4 and 5 with existing kerb and footpath in TPZ. b) Showing Tree 10. c) Showing Trees 15 & 18. d) Showing Tree 59 with existing vehicular crossovers in TPZ. e) Showing crown of Tree 59. f) Showing Tree 38 and the presence of wounds with early signs of decay.

15.0 APPENDIX 10 | LIMITATIONS & DISCLAIMERS

- 15.1 Subject trees were assessed from the ground only and for providing an Arboricultural Impact Assessment and Tree Protection Specification.
- 15.2 All recommendations in this Arboricultural Impact Assessment and Tree Protection Specification report are based on the observations made on the days of inspection (21.3.21, 10.11.22). There is no warranty, expressed or implied, that problems or deficiencies relating to the subject trees, or the subject site may not arise in the future.
- 15.3 Laurence & Co Consultancy takes care to obtain information from reliable sources. However, Laurence & Co Consultancy can neither guarantee nor be responsible for the accuracy of information provided by others. Plans, diagrams, graphs and photographs in this Arboricultural Impact Assessment and Tree Protection Specification 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.
- 15.4 This report has been prepared for exclusive use by the client. This report should not be viewed by others or for any other reason outside its intended target or without the prior written consent of Laurence & Co Consultancy. Unauthorised alteration or separate use of any section of the report invalidates the report.
- 15.5 Many factors may contribute to tree failure and cannot always be predicted. Laurence & Co Consultancy 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.
- 15.6 **Limitation of Liability.** Laurence & Co Consultancy shall be liable only for direct damages that result from negligence or wilful misconduct in the performance of its services. Under no circumstances shall Laurence & Co Consultancy be liable for indirect, consequential, special, or punitive damages, or for damages caused by the client's failure to perform its obligations under law or contract. Laurence & Co Consultancy shall not be liable for and Client shall indemnify Laurence & Co Consultancy from and against all claims, demands, liabilities and costs (including attorneys' and expert fees) arising out of or in any way related to our performance or non-performance of services, including all on-site activities except to the extent caused by Laurence & Co Consultancy's negligence or wilful misconduct. In no event shall Laurence & Co Consultancy's liability exceed the amount paid to Laurence & Co Consultancy by the Client for our professional services (net of reimbursable expenses) and Client specifically releases Laurence & Co Consultancy for any damages, claims, liabilities and costs in excess of that amount.
- 15.7 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.