

Arboricultural Impact Assessment



Prepared For

CPB Dragados Samsung Joint Venture (CDS-JV)



Site Address

CAMPBELL ROAD – BETWEEN EUSTON & BURROWS ROAD
ST PETERS NSW 2044

Prepared by



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Tree Surgery Certificate

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Document no.

M5N-ES-RPT-LRW-0058

Revision 1

AUGUST 2019

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Introduction

1.1 Brief

This Arboricultural Impact Assessment (AIA) was prepared by Treeism Arboricultural Services and was commissioned by CPB Contractors, Dragados and Samsung C&T Joint Venture (CDS-JV).

The site is along Campbell Road between Euston Road and Burrows Road, St Peters, New South Wales.

The subject site is within Road and Maritime Service owned land and the adjoining properties. The site location is attached as Appendix J – Overall Site Location Plan.

The proposed works are part of the larger WestConnex New M5 project. The scope of works for the subject area includes the construction of a grassed drainage swale located north-east of the Campbell Road/Burrows Road intersection at St Peters. The drainage swale is part of local roads stormwater drainage network and has been designed to correct current flooding in the area. The previous design was in close proximity to multiple utility services, including gas and electrical lines, which necessitated the change.

Three (3) trees are proposed for removal as they are within the footprint of the proposed drainage swale. Changes to the design and batters used to form the drain will incur root loss at unacceptable limits and will cause instability and detriment to the subject trees.

This report gives recommendations for tree retention or removal and discusses the options of such. This report also provides guidelines for tree protection and maintenance.

Care has been taken to obtain all information from reliable sources. All data has been verified as far as possible; however, I can neither guarantee nor be responsible for the accuracy of information provided by others.

This report is not intended to be a comprehensive tree risk assessment; however, the report may make recommendations, where appropriate, for further assessment, treatment or testing of trees where potential structural problems have been identified, or where below ground investigation may be required.

This AIA is not intended as an assessment of any impacts on trees by any proposed future development of the site, other than the current discussed scope of work.

The purpose of this report is to assess the vigour and condition of the trees, and identify the potential impacts the proposed works may have on those trees to be retained in proximity to the works.

The author of this report holds an AQF Level 5 Diploma of Horticulture (Arboriculture) and has 26 years in the horticultural industry. 21 of these 26 years have been specifically within the field of arboriculture.

Previous roles varied from working actively as a tree climber in private contracting companies to Tree Management Officer at several local Councils and working with independent Consultants. The author is independent from the project.

This AIA has been commissioned to ensure compliance with the requirements set out by the Department of Planning and Environment (DPE) as per Condition B63 - Table 1 (below/next page).

Table 1 –Condition of Approval B63 Compliance Table

Condition	Requirement	Addressed in:
B63	The Proponent must commission an independent experienced and suitably qualified arborist, to prepare a comprehensive Tree Report(s) prior to removing any trees on the periphery and/or outside the construction footprint as identified in the figures in Section 6 of the document referred to in condition A2(b), including any tree(s) removed along Euston Road. The Tree Report may be prepared for the entire SSI or separate reports may be prepared for individual areas where trees are required to be removed. The report(s) must identify the impacts of the SSI on trees and vegetation within and adjacent to the construction footprint. The report(s) must include:	This Report - Overview & individual area as per Appendix H.
B63 (a)	a visual tree assessment with inputs from the design, landscape architect, construction team;	VTA noted in Appendix H & staff inputs as per Appendix D.
B63 (b)	consideration of all options to amend the SSI where a tree has been identified for removal, including realignment, relocation of services, redesign of or relocation of ancillary components (such as substations, fencing etc.) and reduction of standard offsets to underground services; and	Appendix D.
B63 (c)	measures to avoid the removal of trees or minimise damage to existing trees and is to ensure the health and stability of those trees to be protected. This includes details of any proposed canopy or root pruning, excavation works, site controls on waste disposal, vehicular access, storage of materials and protection of public utilities.	N/A
B63	A copy of the report(s) must be submitted to the Secretary for approval prior to the removal, damage and/or pruning of any trees, including those affected by site establishment works. All recommendations of the report must be implemented by the Proponent, unless otherwise agreed by the Secretary.	No tree removal, damage and/or pruning will occur to the subject trees prior to the Secretary's approval of this report.

1.2 Methodology

In preparation for this report, ground-level, visual tree assessments (VTA), or limited VTA (e.g. where access was limited), were completed by the author of this report on 20th and 21st March 2017 and surveyed by a CDS - JV surveyor to verify specific locations. Inspection details of these trees are provided in Appendix H —Schedule of Assessed Trees.

The tree heights were visually estimated or measured using a Nikon ForestryPro Laser measurer. Unless otherwise noted in Appendix E, the trunk Diameter at Breast Height were measured at 1.4 metres above ground level (DBH) using a diameter tape. Tree canopy spreads were stepped out with field observations written down, and photographs of the site and trees were taken using an iPhone 6.

No aerial inspections, root mapping or woody tissue testing were undertaken as part of this tree assessment.

Information contained in this report only reflects the condition of the trees at the time of inspection. Trees are dynamic, living things which can be subject to change without notice in certain circumstances.

Plans and documents referenced for the preparation of this report include:

- Tree report - M54-ES-RPT-LRW-0018-02 Campbell Rd North May 2017 Revision 7, authored by Treeism Arboricultural Services;
- AS4970-2009 Protection of trees on development sites, Standards Australia;
- Conditions B63 – (Table 1);
- WestConnex New M5 (SSI 6788) – Tree Report of Campbell Road, St Peters (Condition B62), reference. SS1 (6788), authored by Department of Planning & Environment, dated 22/6/2017(Appendix E—DPE Conditional Approval June 2017);

- Campbell Road, authored by CDS-JV, dated 27/8/2019 (Appendix J—Overall Site Location);
- St Peters Local Road, Campbell Road Drainage Plan, authored by CDS-JV, Document no. M5N-AJV-DWG-700-300-DR-7110, Revision 2, Sheet DR-7110, dated 6/6/2019 (Appendix G – Revised Drainage Location Plan);
- Campbell Road, Block 10 Swale Drain Tree Impact Cross Section, authored by CDS-JV, Document no. M5N-CDS-SKT-700-116-UT-0090, dated 27/8/2019 (Appendix K—Cross Section Detail – Tree U119).

The subject trees are shown as dot markings on Aerial photography excerpts provided by the client. These marked-up plans are attached as Appendix F—Tree Location Plan.

1.3 Tree Preservation and Management Guidelines

The proposed works form part of the approved WestConnex New M5 State Significant Infrastructure project (SSI 6788), which overrides the State Environmental Planning Policy (Vegetation in Non-Rural Areas) 2017 ‘Vegetation SEPP’ (which refers to prescribed and non-prescribed trees pursuant to the City of Sydney Development Control Plan 2012 (CoSDCP) Section 3.5.3).

What constitutes a ‘tree’ as per planning approval is any tree that:

- is equal to or greater than three (3) metres in height; or
- for a single trunk species, a trunk circumference of 300 millimetres at a height of one metre above ground level; or
- for a multi-trunk species, a trunk circumference exceeding 100 millimetres at a height of one metre above ground level.

However, this excludes any species listed under the Biosecurity Act 2015 (this Act overrules Noxious Weed Act 1993).

Observations and Discussion

2.1 Summary of Assessed Trees

Eleven (11) trees were assessed for the original report in March 2017, further review has not been carried out on these trees.

The prefix ‘U’ was used for tagging and numbering to denote tree surveying in relating to utilities works. Details of these trees are included in the Schedule of Assessed Trees – Appendix H. Of these trees:

- Five (5) are locally native species and are prescribed (i.e. considered a ‘tree’ under DPE approval/conditions) – Trees U113, U114, U117, U121 & U122;
- Six (6) are introduced native species and are prescribed (i.e. considered a ‘tree’ under DPE approval/conditions) – Trees U112, U115, U116, U118-U120;
- Four (4) trees have been ascribed a *high* Retention Value (RV- see Appendix C) – Tree U113, U114, U119 & U122;

- Three (3) trees has been ascribed a *medium* Retention Value – Trees U115, U118 & U120;
- Four (4) trees has been ascribed a *low* Retention Value – Trees U112, U116, U117 & U121.

Tree U113 was marked for removal in the previous Tree Report (M54-ES-RPT-LRW-0018-02 Campbell Rd North May 2017 Revision 7) however the Department of Planning And environment Conditional Approval, dated 22 June 2017 (see Appendix E) stated Tree U113 was to be retained.

2.2 Threatened Species

No subject tree is subject to threatened conservation status under Australian and/or State Government legislation (i.e. NSW Biodiversity Conservation Act 2016 and the Commonwealth Environment Protection and Biodiversity Conservation Act 1999).

2.3 Proposed Removal of Prescribed Trees

Three (3) prescribed trees are proposed to be removed as they are within the footprint of the proposed drainage swale – Trees U113, U117, U121.

Ground level changes (batter) to create the drainage swale will incur root loss at unacceptable limits and will cause instability and detriment to the subject trees.

As per discussion between CDS-JV Project Engineers relayed to the author (see Appendix D), discovery of existing utilities (HV and LV electrical conduits) have dictated the required relocation of the drainage swale from the previous location detailed within the original Tree Report (M54-ES-RPT-LRW-0018-02 Campbell Rd North May 2017 Revision 7).

The drainage swale has been designed to correct current flooding issues in the area and the location is limited to prevent an overload on the downstream drainage systems. A drainage pipe is not an option due to existing utilities (gas lines) within this location.

Tree U113- Broad-leaved Paperbark – located within the bounds of RMS managed land

This tree has been ascribed a *high* Retention Value (RV) however it is located within the footprint of the drainage swale. The proposed minimum depth the swale is 0.5m, tree roots generally sit within the top 0.5m of soil thus this tree cannot be safely retained.

Tree U117 - Sydney Red Gum – located within the bounds of RMS managed land

This immature, locally native tree is located within the footprint of the drainage swale. The proposed minimum depth the swale is 0.5m, tree roots sit within the top 0.5m of soil, thus this tree cannot be safely retained.

Tree U121 - Sydney Red Gum – located within the bounds of RMS managed land

This immature, *low* Retention Value tree is also located within the footprint of the drainage swale. The tree cannot be safely retained.

2.4 Proposed Retention of Prescribed Trees

Eight (8) trees are proposed for retention;

- Tree U112 - *Melaleuca* (formerly *Callistemon*) *viminalis* (Weeping Bottlebrush);
- Tree U114 - *Corymbia eximia* (Yellow Bloodwood);
- Tree U115 - *Eucalyptus* sp. (Gum);
- Tree U116 - *Melaleuca* (formerly *Callistemon*) *viminalis* (Weeping Bottlebrush);
- Tree U118 - *Eucalyptus* sp. (Gum);
- Tree U119- *Eucalyptus microcorys* (Tallowwood);
- Tree U120 - *Eucalyptus microcorys* (Tallowwood);
- Tree U122 - *Corymbia eximia* (Yellow Bloodwood).

2.5 Potential Impacts on Trees Proposed for Retention

Under the Australian Standard 4970-2009 Protection of trees on development sites (AS4970), encroachments less than 10% of the Tree Protection Zone (TPZ) are considered to be minor. No specifications are provided in AS4970 for potential impacts of 10% or greater. This 10% is interpreted as the threshold figure, and the trigger where arboricultural investigations into TPZ encroachments beyond this figure need to be considered.

Disturbance within the Structural Root Zone (SRZ), and extent of encroachments into the TPZ's of prescribed trees to be retained are summarised in Table 2, below.

Table 2: *Estimated encroachments into the SRZ and TPZ of trees proposed for retention.* Note 1: These figures are based on the SRZ and TPZ's offsets of the trees as calculated under AS4970 and do not necessarily reflect the actual root zones of the trees. Existing at or below ground structures, site topography and soil hydrology will influence the presence, spread and direction of tree root growth.

Tree No.	Tree Common name	SRZ affected	TPZ area (m ²)	TPZ encroachment (approx m ²)	TPZ encroachment (approx %)
U112	Weeping Bottlebrush	×	35	0	0
U114	Yellow Bloodwood	×	18	0	0
U115	Gum	×	48	0	0
U116	Bottlebrush	×	18	0	0
U118	Gum	×	35	0	0
U119	Tallowwood	×	137	12.1	8.8
U120	Tallowwood	×	137	0.9	0.7
U122	Yellow Bloodwood	×	72	0	0

Tree U112—Weeping Bottlebrush – located within adjoining property.

Structural Root Zone impacts:

- All proposed works are located outside the tree's SRZ.

Tree Protection Zone impacts:

- The proposed drainage swale is located outside the theoretical TPZ.

Pruning impacts:

- No pruning is required to accommodate the proposed works.

Tree U114— **Yellow Bloodwood** – located within adjoining property.

Structural Root Zone impacts:

- All proposed works are located outside the tree’s SRZ.

Tree Protection Zone impacts:

- The proposed works are located outside the tree’s TPZ.

Pruning impacts:

- No pruning is foreseen to accommodate the proposed works.

Tree U115— **Gum** – located within adjoining property.

Structural Root Zone impacts:

- All proposed works are located outside the tree’s SRZ.

Tree Protection Zone impacts:

- The proposed drainage swale is located outside the theoretical TPZ.

Pruning impacts:

- No pruning is required to accommodate the proposed works.

Tree U116—**Bottlebrush** – located within adjoining property.

Structural Root Zone impacts:

- All proposed works are located outside the tree’s SRZ.

Tree Protection Zone impacts:

- The proposed drainage swale is located outside the theoretical TPZ.

Pruning impacts:

- No pruning is required to accommodate the proposed works.

Tree U118—**Weeping Bottlebrush** – located within adjoining property.

Structural Root Zone impacts:

- All proposed works are located outside the tree’s SRZ.

Tree Protection Zone impacts:

- The proposed works are located outside the tree's TPZ.

Pruning impacts:

- No pruning is foreseen to accommodate the proposed works.

Tree U119— Tallowwood – located within adjoining property.

Structural Root Zone impacts:

- All proposed works are located outside the tree's SRZ.

Tree Protection Zone impacts:

- The proposed drainage swale has been estimated as a 12.1m² encroachment, equating to 8.8% of the TPZ (see Figure 1 below and Appendix K for Cross section detail). This is considered minor encroachment under AS4970 and detrimental effect on tree health or condition is not expected.

Pruning impacts:

- No pruning is foreseen to accommodate the proposed works.

Tree U120— Tallowwood – located within adjoining property.

Structural Root Zone impacts:

- All proposed works are located outside the tree's SRZ.

Tree Protection Zone impacts:

- The proposed drainage swale has been estimated as a 0.9m² encroachment, equating to a very *minor* 0.7% of the TPZ (see Figure 1 below). This level of encroachment will have a negligible effect on tree health or condition.

Pruning impacts:

- No pruning is foreseen to accommodate the proposed works.

Tree U122— Yellow Bloodwood – located within adjoining property.

Structural Root Zone impacts:

- All proposed works are located outside the tree's SRZ.

Tree Protection Zone impacts:

- The proposed drainage swale is located outside the theoretical TPZ.

Pruning impacts:

- No pruning is foreseen to accommodate the proposed works.

Recommendations

3.1 Tree Removal

Three (3) prescribed trees are required to be removed to accommodate the proposed works. Replanting will be undertaken in accordance with the conditions B63A-B63C.

Tree removal work shall be carried out by minimally qualified AQF Level 3 Arborist in compliance with the NSW Workcover Code of Practice for the Amenity Tree Industry, these contractors shall be advised of trees in close proximity being retained and instructed to avoid damage to such.

Stumps to be removed within the TPZ of trees to be retained, shall be removed in a manner that avoids damaging or disturbing roots.

3.2 Minimising Impacts on Trees to be Retained - General for all subject trees

Direct and continued liaison between CDS staff and the project arboriculturist or Council is highly recommended.

Project arboriculturist or Council is to advise on all aspects of tree protection prior to and during proposed works.

The tree protection devices cannot be relocated, removed or altered in any way without the project arboriculturist or Council approval.

The retention existing site features where possible – i.e existing walls/kerbs/vegetation protecting trees is strongly recommended.

The use of track vehicles is far more desirable than wheeled equipment though tight turning is not recommended. Vehicles are not to be parked within defined TPZ of trees to be retained.

Where practical, tree protection fencing should be continuous and unbroken to include groups of trees.

Any required pruning for equipment access must be carried prior to any works commencing, and if in excess of 10%, as advised by the project arboriculturist or Council. All work is to be to Australian Standard 4373-2007 Pruning of Amenity Trees and requires by a minimally qualified AQF Level 3 Arborist.

3.3 Specific Tree Retention Methods for subject trees to be retained -

Tree U112 – Weeping Bottlebrush – located within adjoining property.

- Any ground-level change within 3m of the tree is to be supervised by an arboriculturist with a minimum AQF5 in arboriculture or equivalent.
- Existing boundary fencing is adequate to protect the tree.

Tree U114 – Yellow Bloodwood – located within adjoining property.

- Any ground-level change within 2.5m of the tree is to be supervised by an arboriculturist with a minimum AQF5 in arboriculture or equivalent.
- Existing boundary fencing is adequate to protect the tree.

Tree U115 — **Gum** – located within adjoining property.

- Any ground-level change within 4m of the tree is to be supervised by an arboriculturist with a minimum AQF5 in arboriculture or equivalent.
- Existing boundary fencing is adequate to protect the tree.

Tree U116 — **Bottlebrush** – located within adjoining property.

- Any ground-level change within 2.5m of the tree is to be supervised by an arboriculturist with a minimum AQF5 in arboriculture or equivalent.
- Existing boundary fencing is adequate to protect the tree.

Tree U118 — **Weeping Bottlebrush** – located within adjoining property.

- Any ground-level change within 3.5m of the tree is to be supervised by an arboriculturist with a minimum AQF5 in arboriculture or equivalent.
- Existing boundary fencing is adequate to protect the tree.

Tree U119 — **Tallowwood** – located within adjoining property.

- Any ground-level change within 6.5m of the tree is to be supervised by an arboriculturist with a minimum AQF5 in arboriculture or equivalent.
- Tree protection devices are to be placed as advised by the project arboriculturist and prior to any site works commencing.
- Existing boundary fencing is adequate to protect the tree stem.
- In the unlikely event tree roots are encountered, works are to stop and contact made with the Project Arborist or Council.

Tree U120 — **Tallowwood** – located within adjoining property.

- Any ground-level change within 6.5m of the tree is to be supervised by an arboriculturist with a minimum AQF5 in arboriculture or equivalent.
- Tree protection devices are to be placed as advised by the project arboriculturist and prior to any site works commencing.
- Existing boundary fencing is adequate to protect the tree stem.
- In the unlikely event tree roots are encountered, works are to stop and contact made with the Project Arborist or Council.

Tree U122 — **Yellow Bloodwood** – located within adjoining property.

- Any ground-level change within 4.5m of the tree is to be directly supervised by an arboriculturist with a minimum AQF5 in arboriculture or equivalent.
- Existing boundary fencing is adequate to protect the tree.

Tree Protection Measures

4.1 Tree Protection Devices

The tree protection is to be in accordance with the following:

- Tree Protection Devices (TPD) may include mulching, tree guards and other devices other than fencing.
- The TPD must be in place prior to any site works commencing, including clearing, demolition or grading.
- The most appropriate fencing for tree protection is 1.8m chainlink with 50mm metal pole supports. During installation, care must be taken to avoid damage to significant roots. The practicality of providing this fencing on this site must be addressed by the arboriculturist.
- Locate large primary roots by careful removal of soil within the fencing area. Do not drive any posts or pickets into tree roots. Replace soil back over tree roots.
- Nothing should occur inside the tree protection fenced areas, so therefore all access is prohibited for personnel and machinery, storage of fuel, chemicals, cement and site sheds.
- Signage should explain exclusion from the area defined by TPD and carry a contact name for access or advice).
- The TPD cannot be removed, altered, or relocated without the project arborist's prior assessment and approval.

4.2 Stockpiling and Location of Site Sheds

- Any ground identified for proposed stockpiling that is within the TPZ of trees to be retained shall be covered with thick, coarse mulch, placement of wooden pallets over the mulch, covering of the pallets with a tarpaulin (or similar), and the placement of materials on top of this device to prevent loose or potentially contaminating materials from moving into the soil profile.

4.3 Fill Material

- Placement of fill material within the TPZ of trees to be retained should be avoided where possible. Where placement of fill cannot be avoided, the material should be a coarse, gap graded material such as 20 — 50mm crushed basalt or equivalent to provide some aeration to the root zone. Note that roadbase or crushed sandstone or other material containing a high percentage of fines is unacceptable for this purpose.
- The fill material should be consolidated with a non-vibrating roller to minimise compaction of the underlying soil.
- A permeable geotextile may be used beneath the sub-base to prevent migration of the stone into the sub-grade. No fill material should be placed in direct contact with the trunk.

4.4 Fencing and Walls within the SRZ and TPZ of Retained Trees.

- Where fencing and/or masonry walls are to be constructed along site boundaries, they must provide for the presence of any living woody tree roots greater than 50mm diameter.
- Hand digging must occur within the SRZ of trees to be retained.
- For masonry walls or fences it may be acceptable to replace continuous concrete strip footings with suspended in-fill panels (e.g. steel or timber pickets, lattice etc) fixed to pillars.

4.5 Pavements

- Where possible (new) pavements should be avoided within the TPZ of trees to be retained.

- Proposed paved areas within the TPZ of trees to be retained are to be placed above grade to minimise excavations within the root zone, avoiding root severance and damage.

4.6 Landscaping within Tree Root Zones.

- The level of introduced planting media into any proposed landscaped areas within the TPZ is not to be greater than 75mm depth, and be of a coarse, sandy material to avoid development of soil layers that may impede water infiltration.
- Container size of proposed plants within the SRZ of trees should be determined prior to purchase of plants. This is to identify planting locations, and container size of plants at the time of planting. Otherwise, any proposed landscaping within the SRZ must consist of tubestock only. This is required to ensure that damage to tree roots is avoided.
- Mattocks and similar digging instruments must not be used within the TPZ of the trees. Planting holes should be dug carefully by hand with a garden trowel, or similar small tool.
- Where possible, do not plant canopy trees beneath, or within 6 - 8m of, overhead power lines.

4.7 Hygiene Practices

- No washing or rinsing of tools or other equipment, preparation of any mortars, cement mixing, or brick cutting is to occur within 8m up slope of any palms/trees to be retained.

Post Construction Tree Care Measures

5.1 Mulching

The removal of mulch after construction to remove any contaminants and its replacement with a good quality mulch and addition of 10% organic matter will improve beneficial soil micro-organisms, retain moisture and improve aeration and water infiltration.

5.2 Irrigation

An arboriculturist should determine whether irrigation should be carried out during extended periods of drought.

5.3 Pest Management

Monitoring is required, as trees under stress are more prone to insect attack.

References

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August, 2019




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 ISA Tree Risk Assessment Qualification (TRAQ) 2016

Appendices

7.1 Appendix A - Terms and Definitions

Age classes

- Y** Young refers to an established but juvenile tree.
- SM** Semi-mature refers to a tree at growth stages between immaturity and full size.
- EM** Early-mature refers to a tree close to full sized still actively growing.
- M** Mature refers to a full sized tree with some capacity for further growth.
- LM** Late-Mature refers to a full sized tree with little capacity for growth that is not yet about to enter decline.
- OM** Over-Mature refers to a full sized tree with little capacity for growth that is entering or has entered decline.

Co-dominant: refers to stems or branches equal in size and relative importance.

Condition/Structure: refers to the tree's form and growth habit, as modified by its environment (aspect, suppression by other trees, soils) and the state of the scaffold (i.e. trunk and major branches), including structural defects such as cavities, crooked trunks or weak trunk/branch junctions. These are not directly connected with health and it is possible for a tree to be healthy but in poor condition/structure.

Deadwood: refers to any whole limb that no longer contains living tissues (e.g. live leaves and/or bark). Some dead wood is common in a number of tree species.

Diameter at Breast Height (DBH): Refers to the tree trunk diameter at breast height (1.4 metres above ground level).

Epicormic growth: adventitious branches that are considered to be a weak attachment in the short term due to minimal wood formation. There are generally formed following storm-related branch breakage or poor pruning practices. Should sufficient holding wood form in the long-term this growth is less of an issue.

Health: Refers to the tree's vigour as exhibited by the crown density, leaf colour, presence of epicormic shoots, ability to withstand disease invasion, and the degree of dieback.

Inclusion stem/bark: the pattern of development at branch or stem junctions where bark is turned inward rather than pushed out. This fault is located at the point where the stems/branches meet. This is normally a genetic fault and potentially a weak point of attachment as the bark obstructs healthy tissue from joining together to strengthen the joint.

Secondary Stem: refers to stems or branches with one of unequal size and relative importance.

SRZ: refers to the Structural Root Zone of the tree, this is the area required for tree stability.

TPZ: refers to the Tree Protection Zone of the tree, this is the primary method of protecting trees, it is a combination of the root area and the canopy and the SRZ is located within it.

Visual Tree Assessment (VTA): a procedure of defect analysis developed by Mattheck and Breloer (1994) that uses the growth response and form of trees to detect defects.

7.2 Appendix B - ULE Guide

ULE categories (after Barrell 1996, Updated 01/04/01)

The five categories and their sub-groups are as follows:

1. Long ULE - tree appeared retainable at the time of assessment for over 40 years with an acceptable degree of risk, assuming reasonable maintenance:
 - a) Structurally sound trees located in positions that can accommodate future growth
 - b) Trees which could be made suitable for long term retention by remedial care
 - c) Trees of special significance which would warrant extraordinary efforts to secure their long term retention
2. Medium ULE - tree appeared to be retainable at the time of assessment for 15 to 40 years with an acceptable degree of risk, assuming reasonable maintenance:
 - a) Trees which may only live from 15 to 40 years
 - b) Trees which may live for more than 40 years but would be removed for safety or nuisance reasons
 - c) Trees which may live for more than 15 years but would be removed to prevent interference with more suitable individuals or to provide space for new planting
 - d) Trees which could be made suitable for retention in the medium term by remedial care
3. Short ULE - tree appeared to be retainable at the time of assessment for 5 to 15 years with an acceptable degree of risk, assuming reasonable maintenance:
 - a) Trees which may only live from 5 to 15 years
 - b) Trees which may live for more than 15 years but would be removed for safety or nuisance reasons
 - c) Trees which may live for more than 15 years but would be removed to prevent interference with more suitable individuals or to provide space for new planting
 - d) Trees which require substantial remediation and are only suitable for retention in the short term.
4. Removal - trees which should be removed within the next 5 years:
 - a) Dead, dying, suppressed or declining trees because of disease or inhospitable conditions
 - b) dangerous trees through instability or recent loss of adjacent trees
 - c) Dangerous trees because of structural defects including cavities, decay, included bark, wounds or poor form
 - d) Damaged trees that are clearly not safe to retain
 - e) Trees which may live for more than 5 years but would be removed to prevent interference with more suitable individuals or to provide space for new planting
 - f) Trees which are damaging or may cause damage to existing structures within the next 5 years
 - g) Trees that will become dangerous after removal of other trees for the reasons given in (a) to (f)
 - h) Trees in categories (a) to (g) that have a high wildlife habitat value and, with appropriate treatment, could be retained subject to regular review
5. Small, young or regularly pruned - Trees that can be reliably moved or replaced:
 - a) small trees less than 5m in height
 - b) young trees less than 15 years old but over 5m in height
 - c) formal hedges and trees intended for regular pruning to artificially control growth

7.3 Appendix C – STARS – Significance of a Tree Assessment Rating System (IACA 2010)©

The landscape significance of a tree is an essential criterion for establishing the importance that a particular tree may have on a site. However, rating the significance of a tree becomes subjective and difficult to ascertain in a consistent and repetitive fashion due to assessor bias. It is therefore necessary to have a rating system utilising structured qualitative criteria to assist in determining the retention value for a tree.

This rating system will assist in the planning processes for proposed works, above and below ground where trees are to be retained on or adjacent a development site. The system uses a scale of *High*, *Medium* and *Low* significance in the landscape. Once the landscape significance and *Useful Life Expectancy* of an individual tree has been defined, the retention value can be determined.

Tree Significance - Assessment Criteria

1. High Significance in landscape.

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

2. Medium Significance in landscape.

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

3. Low Significance in landscape.

- The tree is in fair-poor condition and good or low vigour;
- The tree has form atypical of the species;
- The tree is not visible or is partly visible from surrounding properties as obstructed by other vegetation or buildings;
- The tree provides a minor contribution or has a negative impact on the visual character and amenity of the local area;
- The tree is a young specimen which may or may not have reached dimension to be protected by local Tree Preservation orders or similar protection mechanisms and can easily be replaced with a suitable specimen;
- The tree's growth is severely restricted by above or below ground influences, unlikely to reach dimensions typical for the taxa *in situ* - tree is inappropriate to the site conditions;
- The tree is listed as exempt under the provisions of the local Council Tree Preservation Order or similar protection mechanisms;
- The tree has a wound or defect that has potential to become structurally unsound.

Environmental Pest / Noxious Weed Species:

- The tree is an Environmental Pest Species due to its invasiveness or poisonous/ allergenic properties;
- The tree is a declared noxious weed by legislation.

Hazardous/Irreversible Decline:

- The tree is structurally unsound and/or unstable and is considered potentially dangerous;
- The tree is dead, or is in irreversible decline, or has the potential to fail or collapse in full or part in the immediate to short term.

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

Note: The assessment criteria are designed for individual trees only, but can be applied to a monocultural stand in its entirety e.g. hedge.

In the development of this document IACA acknowledges the contribution and original concept of the Footprint Green Tree Significance & Retention Value Matrix, developed by Footprint Green Pty Ltd and Andrew Morton in June 2001.


		Significance				
		1. High	2. Medium	3. Low		
		Significance in Landscape	Significance in Landscape	Significance in Landscape	Environmental Pest / Noxious Weed Species	Hazardous / Irreversible Decline
Estimated Life Expectancy	1. Long >40 years					
	2. Medium 15-40 Years					
	3. Short <1-15 Years					
	Dead					
<p><u>Legend for Matrix Assessment</u></p> 						
	<p>Priority for Retention (High) -These trees are considered important for retention and should be retained and protected. Design modification or re-location of building/s should be considered to accommodate the setbacks as prescribed by the Australian Standard AS4970 <i>Protection of trees on development sites</i>. Tree sensitive construction measures must be implemented e.g. pier and beam etc if works are to proceed within the Tree Protection Zone.</p>					
	<p>Consider for Retention (Medium) -These trees may be retained and protected. These are considered less critical; however their retention should remain priority with removal considered only if adversely affecting the proposed building/works and all other alternatives have been considered and exhausted.</p>					
	<p>Consider for Removal (Low) -These trees are not considered important for retention, nor require special works or design modification to be implemented for their retention.</p>					
	<p>Priority for Removal -These trees are considered hazardous, or in irreversible decline, or weeds and should be removed irrespective of development.</p>					

Table 1 - Tree Retention Value - Priority Matrix.

IACA, 2010, *IACA Significance of a Tree, Assessment Rating System (STARS)*, Institute of Australian Consulting Arboriculturists, Australia, www.iaca.org.au

7.4 Appendix D – Record of Meeting

The urban design and landscape plan will address the planting of trees, where feasible and reasonable, within the SSI boundary in accordance with the Conditions of Approval.

Below is the dialog between CDS-JV Project Engineers relayed to the author in relation to why additional tree removals are required in this instance.

[Redacted]

Subject: FW: Re: Tree lopping approval on Campbell Road (Between Euston Road and Burrows Road)

Hi [Redacted]

Some more information FYI

We missed each other's calls this morning couple of time! I called you to ask the TPZ and SRZ (in m) in the tree report, are these radius or diameters??

Regards,
[Redacted]

[Redacted]

Subject: RE: Re: Tree lopping approval on Campbell Road (Between Euston Road and Burrows Road)

Hi [Redacted]

As requested

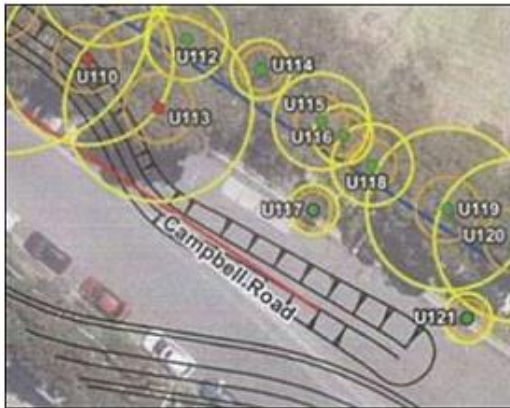
Justification for removal is key – this will be fed into the tree report.

Things to include:

- What changes have been made to the design and why?

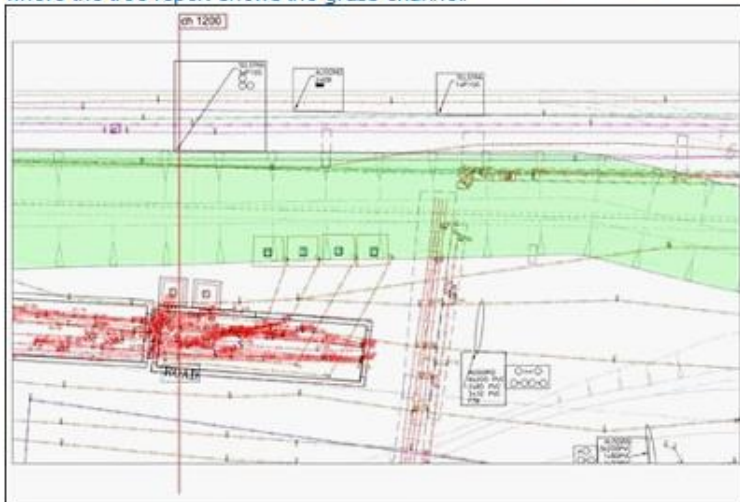
There has been an amendment in the location of the grassed channel, between the one provided in the tree report (early 2017), and the pre-IFC / IFC drainage drawings (2017/2018). The new design requires the removal of U113, U117, and U121.





- What are the constraints on site that feed into the design changes i.e. utilities, road corridor, drainage/size requirements

As per the combined utilities drawing, there is a pre-existing joint bay (mass of LV and HV electrical conduits) where the tree report shows the grass channel.



- What other options have been assessed to prevent impact/removal of trees?
 - o other drainage designs/realignment of drain

As per RFI 04158 alternatives were investigated due to clashes with the gas line. It was determined the channel is required to prevent an overload on the downstream drainage systems, and could not be deleted or moved.

- o other construction methodologies

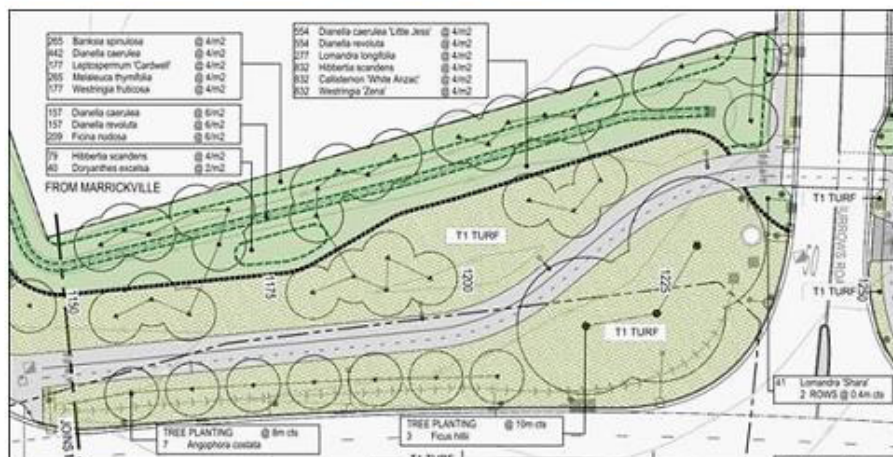
Use of drainage pipe, as opposed to a grassed channel would not be possible due to the number, and depth of utilities present in the ground at this location.

- Are the other options reasonable and feasible?

- o If not, this is a strong justification

As above, alternatives were not feasible due to pre-existing conduits at various depths at the adjacent locations.

As per landscape drawing M5N-HSL-DWG-700-800-UD-7130 (attached), there are a number of trees to be planted at this location once the channel has been completed.



Please advise of the outcome.



Subject: RE: Re: Tree lopping approval on Campbell Road (Between Euston Road and Burrows Road)

Hi [Redacted]

Can you please address this:

Justification for removal is key – this will be fed into the tree report.

Things to include:

- What changes have been made to the design and why?
- What are the constraints on site that feed into the design changes i.e. utilities, road corridor, drainage/size requirements
- What other options have been assessed to prevent impact/removal of trees?
 - o other drainage designs/realignment of drain
 - o other construction methodologies
- Are the other options reasonable and feasible?
 - o If not, this is a strong justification

[REDACTED]

[REDACTED]

Subject: RE: Re: Tree lopping approval on Campbell Road (Between Euston Road and Burrows Road)

[REDACTED]

The tree report was prepared on 20 April 2017.
The latest design drawing M5N-AJV-DWG-700-300-DR-7110 (attached) was prepared on 12 January 2018.

The latest drawing shows the trapezoidal channel running in a relatively straight line, whilst the tree report shows it deviating.
As such, the latest design requires U113, U117, U121 to be removed.



As per landscape drawing M5N-HSL-DWG-700-800-UD-7130 (attached), there are a number of trees to be planted at this location.



Mr [REDACTED]
Project Director, WestConnex Delivery Interface
Roads and Maritime Services
Locked Bag 928
North Sydney NSW 2059
Via email: philip.r.knudsen@rms.nsw.gov.au

Our ref: SSI 6788

Dear [REDACTED]

WestConnex New M5 (SSI 6788) –Tree Report for Campbell Road, St Peters (Condition B63)

I refer to the Tree Report titled '*Arboricultural Impact Statement: Campbell Road, St. Peters*', dated May 2017 (Revision 7). I note the report has been amended to address the Department's earlier reviews against the requirements of condition B63 of the WestConnex New M5 Infrastructure Approval.

I am satisfied the revised report addresses the requirements of the condition, subject to further information being provided to the Department demonstrating consideration of feasible options, during road construction works, to retain trees U102 and U113. I therefore conditionally approve the Tree Report, noting it limits the removal of trees to those listed in **Attachment 1**, excluding trees U102 and U113.

I also note that for any trees located on third party land adjoining the construction footprint, you must consult and reach agreement with the land owner prior to those trees being removed. In addition, any details of replacement plantings as agreed with landowners must be included in the Urban Design and Landscape Plan, required under condition B61. A register should be kept for all trees removed and their locations, for consideration in the preparation of the Urban Design and Landscape Plan.

Please also ensure the recommendations within the approved report are carefully implemented and, prior to impacting trees, you ensure appropriate notification is given in accordance with the approved Community Consultation Strategy.

You are also reminded of the need to ensure the report is made available on the project's website, as soon as possible.

Should you have further queries regarding this matter, please contact [REDACTED] on (02) 9274 6221.

Yours sincerely

[REDACTED]

Director
Infrastructure Management
As delegate of the Secretary

[REDACTED]

Department of Planning & Environment
320 Pitt Street Sydney NSW 2000 | GPO Box 39 Sydney NSW 2001 | T 02 9274 6111 | www.planning.nsw.gov.au

ATTACHMENT 1 – Trees approved for removal

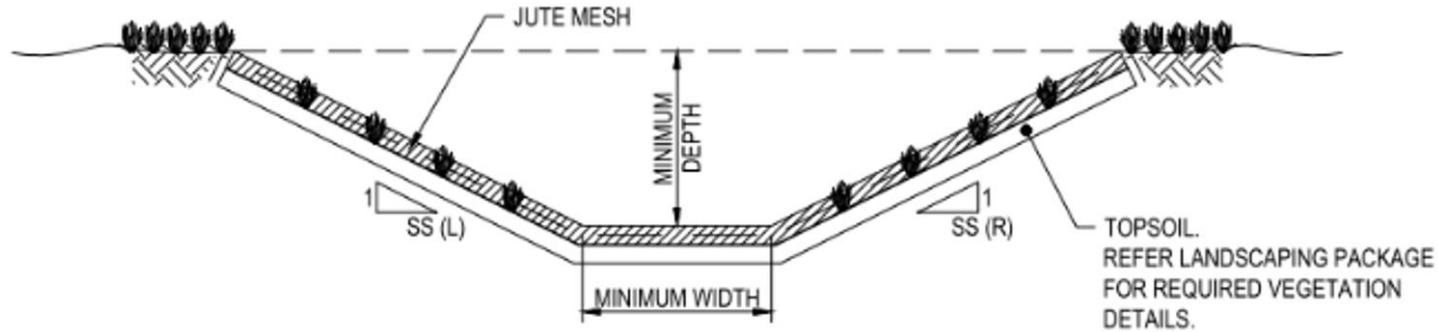
Location of Tree(s) to be removed	Tree (s) to be removed
Trees within road construction footprint	U35, U36, U42, U43, U46, U47, U49, U50, U51, U54, U56, U57, U60, U63, U65, U68 U71, U73, U75, U78, U80, U82, U85, U86, U87, U88, U90, U92, U93 - U99, U103, U105, U106, U108, U110
Trees adjacent to road construction footprint	U34, U39, U83, U84, U40
Trees outside of road construction footprint	U33, U39
Total trees to be removed	49

7.6 Appendix F – Tree Location Plan



Map 1 – Campbell Road, between Euston & Burrows Rd. Trees U112-U122 noted.

CHANNEL LOCATION/ MX STRING NAME				CHANNEL SIZE TABLE (Approx.)				LINING / SCOUR PROTECTION			
Number	Location	Type	MX Model String Name	Width Minimum (m)	Minimum Depth (m)	Approx. Side Slope (SSL-SSR) Package reference	Channel Length (m) approx.	Type	Approximate Length (m) Chainage (m)	Comment	D50
7B.SW05	CAMPBELL ROAD - BETWEEN EUSTON ROAD AND BURROWS ROAD (NORTH)	TRAPEZOIDAL	IE37 & ID37	5.0	0.500	REFER MODEL	134	GRASS LINED	118		N/A



TRAPEZOIDAL CHANNEL GRASS / VEGETATED LINED
N.T.S.

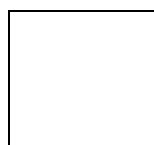
7.8 Appendix H – Schedule of Assessed Trees - Campbell St, St Peters. Site Inspection 20th & 21st March 2017.

All tree details as per previously submitted report known as **M54-ES-RPT-LRW-0018-02 Campbell Rd North Tree Report May 2017 Revision 7**. (Excerpt only of report below).

Tree No.	Genus & species Common Name	Ht (m)	Sp (m)	DBH (mm)	Age	V	C	Comments	ULE	TSR	RV	SRZ (m)	TPZ (m)	TPZ (area)
U112	<i>Melaleuca</i> (formerly <i>Callistemon</i>) <i>viminalis</i> Weeping Bottlebrush	4.5	5	*AB 275	M	G	G	Introduced native species. Located <u>within private property</u> . Sprawling specimen.	5B	L	L	2.0	3.3	35
U113	<i>Melaleuca quinquenervia</i> Broad-leaved Paperbark	12	10	625	M	G	G	Locally native species. Located along Campbell Street. Co-dominant @ 2m AGL, slightly included union. Previous fire at base of stem.	2A	H	H	2.8	7.6	180
U114	<i>Corymbia eximia</i> Yellow Bloodwood	9	10	*AB 200	M	G	G	Locally native species. Located <u>within private property</u> . Low limb over pathway.	1A	H	H	1.7	2.4	18
U115	<i>Eucalyptus</i> sp. Gum	14	11	*325	M	G	G-F	Native species. Located <u>within private property</u> . Low limb over pathway.	2A	M?	M	2.1	3.9	48
U116	<i>Callistemon/Melaleuca</i> sp. Bottlebrush	4.5	6	*AB 200	M	G	F	Introduced native species. Multiple, included stems at ground level.	3D	L	L	1.7	2.4	18
U117	<i>Angophora costata</i> Sydney Red Gum	4.2	2	100	Y	G	G	Locally native species. Located along Campbell Street. No special problems noted at time of assessment.	5	L	L	1.5	2	7
U118	<i>Eucalyptus</i> sp. Gum	9	8	*200/ 200	M	G	G	Native species. Located <u>within private property</u> . Co-dominant at ground level. Thin canopy, epicormic branches noted.	2A	M	M	2.0	3.3	35
U119	<i>Eucalyptus microcorys</i> Tallowwood	14. 5	12	*550	M	G	G	Introduced native species. Located <u>within private property</u> . Low branch over footpath.	1A	M	H	2.6	6.6	137
U120	<i>Eucalyptus microcorys</i> Tallowwood	14. 5	10	*550	M	G	G	Introduced native species. Located <u>within private property</u> . Unable to clearly assess due to lack of access/clear vision.	2A?	M?	M	2.6	6.6	137

Tree No.	Genus & species Common Name	Ht (m)	Sp (m)	DBH (mm)	Age	V	C	Comments	ULE	TSR	RV	SRZ (m)	TPZ (m)	TPZ (area)
U121	<i>Angophora costata</i> Sydney Red Gum	3	2	75 (100)	Y	G	G	Locally native species. Located corner of Campbell Street and Burrows Rd. No special problems noted at time of assessment.	5A	L	L	1.5	2	7
U122	<i>Corymbia eximia</i> Yellow Bloodwood	*12	8	*AB 400	M	G	G?	Locally native species. Located <u>within private property</u> . Unable to inspect due to lack of access and dense covering on fence.	1A?	H?	H	2.3	4.8	72

KEY



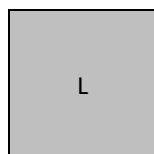
Tree to be retained.



Not classed as 'a tree' under DPE conditions (see Part 1.3).



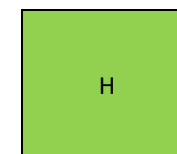
Tree proposed to be removed.



Low Retention Value-These trees are not considered important for retention.



Medium Retention Value-These trees may be retained & protected.



High Retention Value -These trees are considered important for retention and should be retained and protected.

* DBH is visually estimated (usually adjoining trees or those that are hard to access). AB – above *buttress roots*. AGL - above ground level.

** Determined by the largest number found (i.e. broadest branch spread or highest DBH) within a tree group to ensure ample tree protection zone.

H refers to the approximate height of a tree in metres, from base of stem to top of tree crown.

Sp refers to the approximate and average spread in metres of branches/canopy (the 'crown') of a tree.

DBH refers to the approximate diameter of tree stem at breast height i.e. 1.4 metres above ground (unless otherwise noted), and expressed in millimetres.

Age refer to Appendix A -Terms and Definitions for more detail.

V refers to the tree's vigour (health) Refer to Appendix A -Terms and Definitions for more detail.

C refers to the tree's structural condition. Refer to Appendix A -Terms and Definitions for more detail.

ULE refers to the estimated *Useful Life Expectancy* of a tree. Refer to Appendices A and B for details.

TSR The *Tree Significance Rating* considers the importance of the tree as a result of its prominence in the landscape and its amenity value, from the point of view of public benefit. Refer to Appendix C – Significance of a Tree Assessment Rating for more detail.

RV Refers to the retention value of a tree, based on the tree's ULE *and* Tree Significance. Refer to Appendix C – Significance of a Tree Assessment Rating for more detail.

SRZ Structural Root Zone (SRZ) refers to the critical area required to maintain stability of the tree and is noted in the above tree schedule in radial metres. Refer to Appendix A -Terms and Definitions for more detail.

TPZ Tree Protection Zone (TPZ) refers to the *tree protection zones* for trees to be retained and is noted in the above tree schedule in radial metres. Refer to Appendix A -Terms and Definitions for more detail.

7.9 Appendix I – Photographs



Plate 1 – U117 & U121 noted. Map courtesy of Google Mapping – Street view.



Plate 2 – U117 noted with arrow. Map courtesy of Google Mapping – Street view.



Plate 3 – U121 noted with arrow. Map courtesy of Google Mapping – Street view.

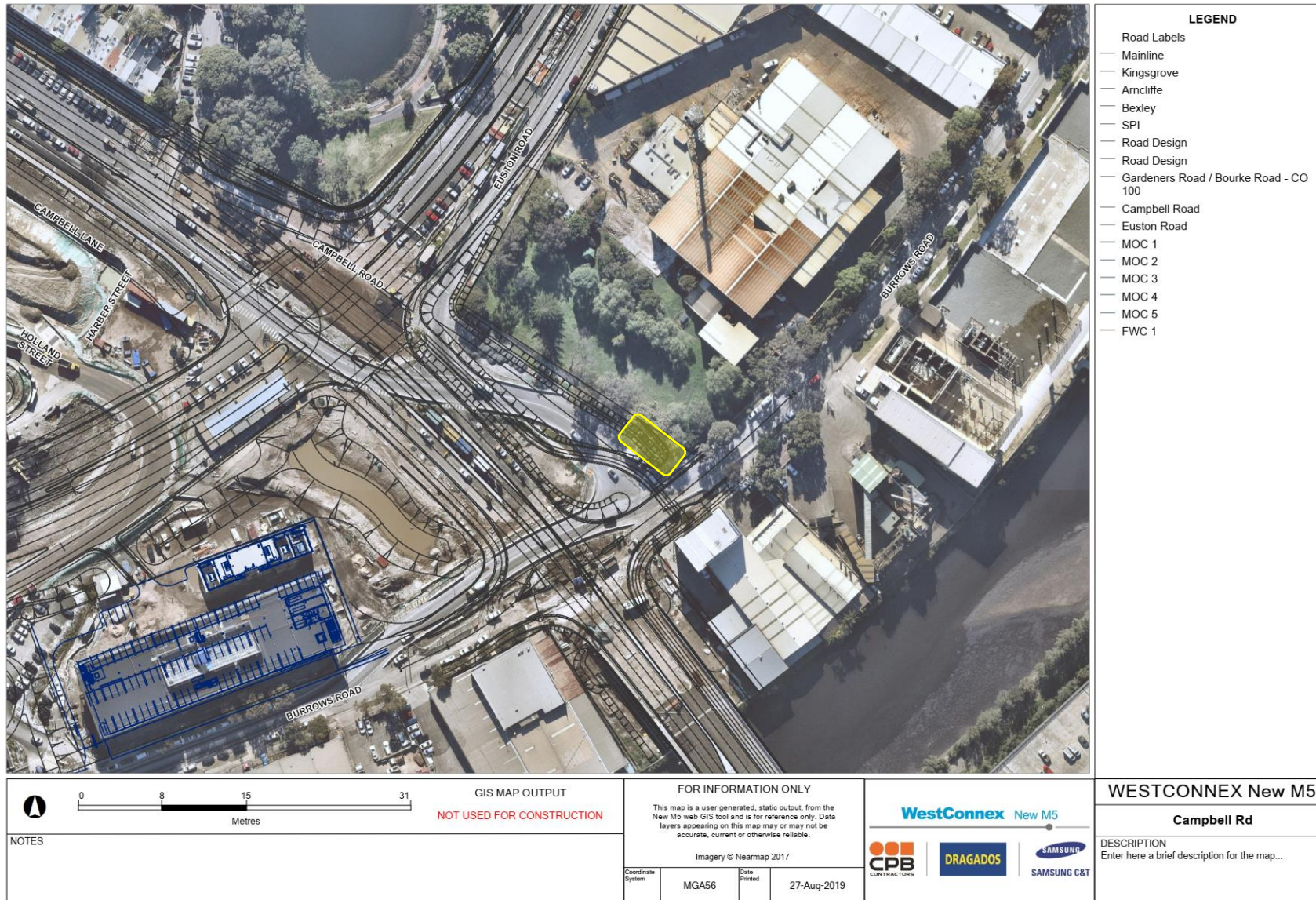


Plate 4 – U113 noted with arrow. Map courtesy of Google Mapping – Street view.



Plate 5 – U113 noted with arrow. Rest of trees in row has been removed with approval.

7.10 Appendix J – Overview Site Location Plan



Map 1 — Yellow area denotes specific area of subject tree location.



Our ref: SSI 6788

Mr [REDACTED]
Director Project Delivery
WestConnex New M5
Transport for NSW: Roads and Maritime Services
Locked Bag 928
North Sydney NSW 2059

By email only: [REDACTED]

Dear [REDACTED]

Aboricultural Impact Assessment: Campbell Road – between Euston & Burrows Roads, Condition B63 of WestConnex New M5 (SSI 6788)

I refer to your submission dated 2 October 2019 requesting approval of the Aboricultural Impact Assessment: Campbell Road Revision 1, dated August 2019 (tree report), in accordance with condition B63 of SSI 6788. I also acknowledge your response to the Department's requests for additional information.

The tree report identifies the removal of three trees (U113, U117, and U121) along Campbell Road, between Euston and Burrows Road.

I understand the trees must be removed to install a drainage swale and I note the tree report includes consideration of alternative design and construction techniques to avoid tree removal, as well as appropriate justification for the removal of the trees. The Department has carefully reviewed the tree report and considers that it meets the requirements of condition B63 for the three trees listed above and I therefore approve the tree report.

I note the tree report contains several management and mitigation measures, which must be fully implemented in accordance with condition B63.

Please ensure you update the tree register for the trees removed, ensure replacement trees are planted in accordance with the conditions of approval and the tree report is made publicly available on the project website.

If you have any questions, please contact [REDACTED] [planning.nsw.gov.au](mailto:[REDACTED]@planning.nsw.gov.au).

Yours sincerely,

[REDACTED]
Director
Infrastructure Assessments, Infrastructure Management

As delegate of the Planning Secretary