Integrated Management System

Planning Approval Consistency Assessment Form

SM ES-FT-414

Sydney Metro Integrated Management System (IMS)

Assessment Name:	Pruning of Native Plant Community Types -Tree 2006
Prepared by:	Lucas Dobrolot (JHLOR)
Prepared for:	Sydney Metro
Assessment number:	SMC008 SMCSWSSJ-JHL-WEC-EM-REC-000026
Status:	Final
Version:	B
Planning approval:	SSI 8256 (C&SW)
Date required:	June 2022
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Form information – do not alter:

Applicable to:	Sydney Metro
Document Owner:	Director, Environment, Sustainability & Planning
System Owner:	Deputy Chief Executive, Operations, Customer & Place-making
Status:	Final
Version:	3.0
Date of issue:	27 November 2020

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The Planning Approval Consistency Assessment Form should be completed in accordance with the Sydney Metro Planning Approval Consistency Assessment Procedure (SM ES-PW-314) and Sydney Metro Environmental Planning and Approval Manual (SM ES-ST-216)

1.0 Existing Approved Project

Planning approval reference details (Application/Document No. (including modifications)):

Sydney Metro City & Southwest - Sydenham to Bankstown (SSI 8256)

Sydney Metro City & Southwest - Sydenham to Bankstown Modification 1 (Determined 22 October, 2020)

Date of determination:

Sydney Metro City & Southwest - Sydenham to Bankstown (SSI 8256) (Planning Approval Date – 12 December, 2018)

Sydney Metro City & Southwest - Sydenham to Bankstown Modification 1 (Determined 22 October, 2020)

Type of planning approval:

Critical State Significant Infrastructure

Description of existing approved project you are assessing for consistency:

Sydney Metro City and Southwest – Sydenham to Bankstown works includes the following;

- Station upgrades;
  - Installation of platform screen doors
  - Provision of operational facilities, such as station service buildings
  - Upgrades of 10 stations from Marrickville to Bankstown to provide lifts and level access where not available.
  - Accessibility upgrades for buildings
  - Works related to integration with other modes of transport
- Track and rail systems;
  - Upgrades of track at Bankstown
  - Rail cross-over at Campsie
- Other Project elements;
  - Security measures, such as fencing
  - Noise barriers
  - Augmentation of existing power supply, including new traction sub-stations
  - Bridge protection works

- Combined Service Route
- Drainage
- Utility and rail system protection

- Temporary works during construction;
  - Provision of temporary facilities to support construction, including construction compounds and work sites

It is assumed that construction activities would occur along the length of the rail corridor within the Project area. Construction areas would be generally accessed via existing corridor gates along the rail corridor.

Relevant background information (including EA, REF, Submissions Report, Director General's Report, MCoA):

- The Sydney Metro City & Southwest – Sydenham to Bankstown – State Significant Infrastructure Assessment (SSI 8256), 12th December 2018
- The Sydney Metro City & Southwest – Sydenham to Bankstown – Environmental Impact Statement, 7th September 2017;
- The Sydney Metro City & Southwest – Sydenham to Bankstown – Submissions and Preferred Infrastructure Report, June 2018;
- The Sydney Metro City & Southwest – Sydenham to Bankstown – Submissions Report, September 2018;
- The Sydney Metro City & Southwest – Sydenham to Bankstown – Instrument of Approval, 12th December 2018
- The Sydney Metro City & Southwest – Sydenham to Bankstown – Modification 1 – Bankstown Station, 22nd October 2020

All proposed works identified in this assessment would be undertaken in accordance with the mitigation measures identified in the EIS, Submissions and Preferred Infrastructure Report, the Submission Report and the conditions of approval.

2.0 Description of proposed development/activity/works

Describe ancillary activities, duration of work, working hours, machinery, staffing levels, impacts on utilities/authorities, wastes generated, or hazardous substances/dangerous goods used.

This Planning Approval Consistency Assessment (PACA) has been prepared to assess the impact and document the proposed pruning of tree 2006 (*Acacia longifolia*) which is located within a Planted Community Type (PCT) 1281 -*Degraded Turpentine – Grey Ironbark open forest on shale* (STIF) and forms part of the assemblage of species (NSW Threatened Species Scientific Committee, 31/05/2019). Pruning is required to allow the construction of Galvanised Steel Troughing (GST) post and trough works while minimising the potential for damage to the threatened species. As assessed by Urban Arbor, the proposed pruning would result in the removal of less than 10% of the overall live canopy, retaining the overall viability of the tree.

In accordance with the Southwest Metro Corridor Works (SWMC) Scope of Works and Technical Criteria (SWTC), JHLOR are required to install GST along the rail corridor boundary in a number of areas on the T3 Bankstown Line. One of those areas is located on the city-side of Alice Street North and Railway Parade, Wiley Park (Refer to Appendix A for location). As detailed in REMM B4, this area includes *Degraded Turpentine – Grey Ironbark open forest on shale*, a vegetation mapped as a Threatened Ecological Community (TEC) or native plant community types (PCT).

Tree 2006, common name *Acacia longifolia*, is part of PCT 1281 assemblage. The branches of Tree 2006 have been observed to overhang the proposed work area where JHLOR are required to install GST post and trough. Under current conditions, if plant and machinery were to access the area and complete GST works it is likely that tree 2006 would be impacted. In order to mitigate damage to the threatened *Acacia longifolia*, pruning is proposed to retain its overall health and viability.

The Planning Approval includes conditions that are related to the removal or trimming of trees and threatened ecological communities. These are listed below along with a review of consistency with each condition:

- *CoA-E5 states "The Proponent must commission an independent experienced and suitably qualified arborist, to prepare a comprehensive Tree Report(s) before removing any trees as detailed in the documents listed in Condition A1. The Tree Report may be prepared for the entire CSSI or separate reports may be prepared for individual areas where trees are required to be removed. The report(s) must identify the impacts of the CSSI on trees and vegetation within and adjacent to the Construction footprint. The report(s) must include:*
  - *a) A description of the conditions of the tree(s) and its amenity and visual value;*
  - *b) Consideration of all options to avoid tree removal, including relocation of services, redesign or relocation of ancillary components (such as substations, fencing etc.) and reduction of standard offsets to underground services; and*
  - *c) Measures to avoid the removal of trees or minimise damage to existing trees and ensure the health and stability of those trees to be protected. This includes details of any proposed canopy or root pruning, root protection zone, excavation, site controls on waste disposal, vehicular access, storage of materials and protection of public utilities.*

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

In accordance with CoA-E5, JHLOR conducted an inspection with an independent experienced and suitably qualified arborist where tree 2006 was observed, within the *Degraded Turpentine – Grey Ironbark open forest on shale*, adjacent to the proposed GST alignment. Pruning of tree 2006 is proposed to mitigate residual risks associated with plant and vehicle strike. As the degraded turpentine tree overhangs the proposed work area for the GST works, under current conditions, if plant and machinery were to complete works it is likely that the degraded turpentine tree would be impacted and damaged through vehicle or plant strike. To mitigate the risk of damage to the *Acacia longifolia tree*, a branch must be trimmed and the removal of less than 10% of the overall live canopy, as delineated in the updated Arboriculturally Report SWMC Tree Report Rev 16 [Section 9.1, p125] in Appendix C.

- *REMM B1 "Detailed design and construction planning would avoid direct impacts to vegetation mapped as threatened ecological communities or native plant community types, specifically*
  - *Downy Wattle (Acacia pubescens)*
  - *Turpentine - Grey Ironbark open forest on shale (ME041),*
  - *Degraded Turpentine - Grey Ironbark open forest on shale (ME041)*
  - *Broad-leaved Ironbark – Grey Box Melaleuca decora grassy open forest (ME004)*

JHLOR have designed GST to be located as far away from the *degraded turpentine* as practically possible to avoid direct impacts to vegetation mapped as threatened ecological community or native plant community types. Some pruning of tree 2006 is required for construction to be carried out in a manner that will not have direct impact upon the trees overall health and retention value.

- *REMM B4 for construction states that "Impacts to Downy Wattle Turpentine – Grey Ironbark open forest on shale, Degraded Turpentine – Grey Ironbark open forest on shale and Broad-leaved Ironbark – Grey Box would be avoided. The locations of these species and communities would be marked on plans, fenced on site and avoided."*

In accordance with CoA-E5, JHLOR would avoid impacts to the *degraded turpentine* tree during construction through the proposed pruning of the tree in accordance with the Australian Standards (AS4373-2007) and Arboriculturally Report SWMC Tree Report Rev 16.

In addition to protecting the health of the trees, safety risks would also be mitigated by maintaining a secure worksite through preventing the potential for tree branches to fall on the worksite and workers within the worksite.

Plant expected to be used for the GST works includes;

- Excavator
- Telehandler
- Tipper
- Power tools
- Chainsaws for trimming of EEC Trees

Works would involve 2-10 workers at any time.

Pruning works are proposed to occur during standard working hours.

There would be only minor amounts of waste generated from offcuts. No hazardous substances or dangerous goods are expected to be used as part of the GST works.

No change from EIS in regard to ancillary activities, duration of work, working hours, machinery, staffing levels, impacts on utilities/authorities, wastes generated, or hazardous substances/dangerous goods used.

3.0 Timeframe

When will the proposed change take place? For how long?

Pruning is proposed to occur after the review and approval of Tree Report Revision 13 by Sydney Metro and the Environmental Representative and submitting to the Secretary. In addition, pruning would occur after the review and approval of this PACA. The pruning is proposed to occur in June 2022.

4.0 Site description

Provide a description of the site on which the proposed works are to be carried out, including, Lot and Deposited Plan details, where available. Map to be included here or as an appendix. Detail of landowner.

The location of the PCT 1281 areas and key elements of the project subject to this consistency assessment are located within the existing rail corridor, from about 800 metres west of Sydenham Station in Marrickville, to about one kilometre west of Bankstown Station in Bankstown. The project is located in the Inner West and Canterbury-Bankstown local government areas.

The land to be occupied forms a portion of Lot's 5 & 6, DP1184797 as shown in Appendix D – Lot Details. The land is owned by Sydney Trains. Currently the land is used as a railway. There is no public access to this area and is currently intended for access for maintenance of existing CSR and railway.

5.0 Site Environmental Characteristics

Describe the environment (i.e., vegetation, nearby waterways, land use, surrounding land use), identify likely presence of protected flora/fauna and sensitive area.

Tree 2006 (*Acacia longifolia* is located within a Planted Community Type (PCT) 1281 -*Degraded Turpentine – Grey Ironbark open forest on shale* (STIF) and forms part of the assemblage of species in accordance with NSW Threatened Species Scientific Committee, Determination 31/05/2019.

PCT 1281 is located adjacent to Alice Street North and Railway Parade, Wiley Park, Chainage 15km 850 – 15km 600 (northbound), within a railway corridor access path currently used for maintenance of existing railway infrastructure. The PCT is surrounded by other vegetation and existing railway infrastructure, which make up the railway corridor. Tree 2006 is contained within the outer edge of The PCT.

GHD note threatened biota and habitat resources within the vicinity of pruning works. An Australian White Ibis roost colony is adjacent to tree 2006. The colony is to be managed and protected during pruning works.

6.0 Justification for the proposed works

Address the need for the proposed works, whether there are alternatives to the proposed works (and why these are not appropriate), and the consequences with not proceeding with the proposed work.

The EIS/SPIR identified direct and indirect impacts to biodiversity over the overall CSSI project of which trimming is not addressed as an impact. Pruning of tree 2006 would allow for vehicle and plant access without the need for tree removal. To safely undertake GST works, and to mitigate the risk of damage to the *degraded turpentine* tree through strike, a branch must be pruned and the removal of less than 10% of the overall live canopy area to avoid impacts from plant movement. This is considered to avoid the risk of any direct impacts to the threatened species and be the safest alternative.

Under current conditions the branch of tree 2006 overhangs the work area encroaching the plant envelope. This increases the difficulty of manoeuvrability, which in turn increases the likelihood of plant strike. Pruning of the *Acacia longifolia,* tree 2006 would reduce the probability of plant strike.

7.0 Environmental Benefit

Identify whether there are environmental benefits associated with the proposed works. If so, provide details:

The environmental benefit associated with the proposed work is to avoid direct impacts or to minimise accidental damage to the *degraded turpentine* tree during GST works by pruning of a branch and removal of a maximum of 10% of the overall canopy.

The health of tree 2006 is good and the structure medium. Pruning would save tree 2006 from any future direct impacts.

8.0 Control Measures

Will a project and site specific EMP be prepared? Are appropriate control measures already identified in an existing EMP?

Pruning would be undertaken in accordance with the JHLOR's approved CEMP and Tree Impact Assessment Rev12.

9.0 Impact Assessment – Construction

Attach supporting evidence in the Appendices if required. Make reference to the relevant Appendix if used.

Aspect	Nature and extent of impacts (negative and positive) during construction (if control measures implemented) of the proposed/activity, relative to the Approved Project	Proposed Control Measures in addition to project COA and REMMs	Minimal Impact Y/N	Endorsed	
				Y/N	Comments
Flora and fauna	An *Acacia Longifilia* tree forms part of the assembalage of the Degraded Turpentine - Grey Ironbark open forest on shale. Pruning is proposed to avoid uncontrolled impacts such as plant/equipment strike to the tree. The proposed pruning would result in the removal of less than 10% of the overall live canopy area, which would be consistent with the approved project.	Proposed works are consistent with EIS and SPIR as we are avoiding impact to degraded turpentine trees by pruning of tree 2006 to minimise accidental damage to a PCT member during construction. The proposed pruning to be completed by qualified arborist in accordance with Australian Standards (AS4373-2007). All works will comply with mitigation measures as stated within the CEMP and CEMP sub-plans.	Y		
Water	No changes from the approved project.	No additional measures required.	Y		
Air quality	No changes from the approved project.	No additional measures required.	Y		
Noise vibration	No changes from the approved project.	No additional measures required.	Y		
Indigenous heritage	No changes from the approved project.	No additional measures required.	Y		

Aspect	Nature and extent of impacts (negative and positive) during construction (if control measures implemented) of the proposed/activity, relative to the Approved Project	Proposed Control Measures in addition to project COA and REMMs	Minimal Impact Y/N	Endorsed	
				Y/N	Comments
Non-indigenous heritage	No changes from the approved project.	No additional measures required.	Y		
Community and stakeholder	No changes from the approved project.	No additional measures required.	Y		
Traffic	No changes from the approved project.	No additional measures required.	Y		
Waste	Changes are consistent with the approved project.	No additional measures required.	Y		
Social	No changes from the approved project.	No additional measures required.	Y		
Economic	No changes from the approved project.	No additional measures required.	Y		
Visual	Changes are consistent with the approved project.	No additional measures required.	Y		
Urban design	No changes from the approved project.	No additional measures required.	Y		
Geotechnical	No changes from the approved project.	No additional measures required.	Y		
Land use	No changes from the approved project.	No additional measures required.	Y		
Climate Change	No changes from the approved project.	No additional measures required.	Y		
Risk	No changes from the approved project.	No additional measures required.	Y		

Aspect	Nature and extent of impacts (negative and positive) during construction (if control measures implemented) of the proposed/activity, relative to the Approved Project	Proposed Control Measures in addition to project COA and REMMs	Minimal Impact Y/N	Endorsed	
				Y/N	Comments
Other	No changes from the approved project.	No additional measures required.	Y		
Management and mitigation measures	The relevant mitigation measures identified in the approval documentation would continue to apply to Proposed activity.	No additional measures required.	Y		

10.0 Impact Assessment – Operation

Attach supporting evidence in the Appendix if required. Make reference to the relevant Appendix if used.

Aspect	Nature and extent of impacts (negative and positive) during operation (if control measures implemented) of the proposed activity/works, relative to the Approved Project	Proposed Control Measures in addition to project COA and REMMs	Minimal Impact Y/N	Endorsed	
				Y/N	Comments
Flora and fauna	No changes from the approved project.	N/A			
Water	No changes from the approved project.	N/A			
Air quality	No changes from the approved project.	N/A			
Noise vibration	No changes from the approved project.	N/A			
Indigenous heritage	No changes from the approved project.	N/A			
Non-indigenous heritage	No changes from the approved project.	N/A			
Community and stakeholder	No changes from the approved project.	N/A			
Traffic	No changes from the approved project.	N/A			
Waste	No changes from the approved project.	N/A			
Social	No changes from the approved project.	N/A			
Economic	No changes from the approved project.	N/A			

Aspect	Nature and extent of impacts (negative and positive) during operation (if control measures implemented) of the proposed activity/works, relative to the Approved Project	Proposed Control Measures in addition to project COA and REMMs	Minimal Impact Y/N	Endorsed	
				Y/N	Comments
Visual	No changes from the approved project.	N/A			
Urban design	No changes from the approved project.	N/A			
Land use	No changes from the approved project.	N/A			
Climate Change	No changes from the approved project.	N/A			
Risk	No changes from the approved project.	N/A			

11.0 Consistency with the Approved Project

Based on a review and understanding of the existing Approved Project and the proposed modifications, is there is a transformation of the Project?	No. The proposed works would not transform the Project. The Project would continue to provide a metro line between Sydenham and Bankstown.
Is the project as modified consistent with the objectives and functions of the Approved Project as a whole?	Yes. The proposed works would be consistent with the objectives and functions of the Approved Project.
Is the project as modified consistent with the objectives and functions of elements of the Approved Project?	Yes. The changes identified in this assessment are consistent with the objectives and functions of elements of the Approved Project.
Are there any new environmental impacts as a result of the proposed works/modifications?	No. The Project's design does not result in any new environmental impacts beyond those considered in the Approved Project.
Is the project as modified consistent with the conditions of approval?	Yes, the Project would be consistent with the Conditions of Approval.
Are the impacts of the proposed activity/works known and understood?	Yes. The impacts of the proposed works are known and understood.
Are the impacts of the proposed activity/works able to be managed so as not to have an adverse impact?	Yes. The impacts of the proposed works can be managed so as to avoid an adverse impact.

12.0 Other Environmental Approvals

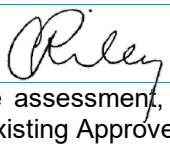
Identify all other approvals required for the project:	• JHLOR Tree Impact Assessment Report- Southwest Metro Corridor Works Revision 13, June 2022

Author certification

To be completed by person preparing checklist.

I certify that to the best of my knowledge this Consistency Checklist: • Examines and takes into account the fullest extent possible all matters affecting or likely to affect the environment as a result of activities associated with the Proposed Revision; and • Examines the consistency of the Proposed Revision with the Approved Project; is accurate in all material respects and does not omit any material information.			
Name:	Lucas Dobrolot	Signature:	
Title:	Environment Manager		
Company:	JHLOR	Date:	17/06/2022

This section is for Sydney Metro only.

Application supported and submitted by			
Name:	Yvette Buchli Carolyn Riley in lieu of	Date:	24 June 2022
Title:	Associate Director, Planning Approvals Director Environment, Sustainability & Planning	Comments:	
Signature:			

Based on the above assessment, are the impacts and scope of the proposed activity/modification consistent with the existing Approved Project?

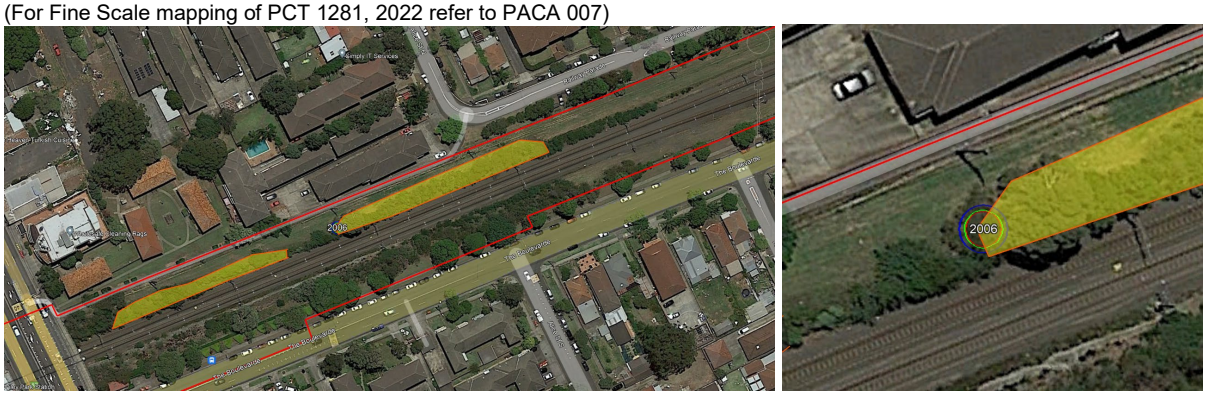
Yes ☐ The proposed activity/works are consistent and no further assessment is required.

No ☐ The proposed works/activity is not consistent with the Approved Project. A modification or a new activity approval/ consent is required. Advise Project Manager of appropriate alternative planning approvals pathway to be undertaken.

Endorsed by			
Name:	Fil Cerone	Date:	27 June 2022
Title:	Director, City & Southwest, Sustainability Environment and Planning	Comments:	
Signature:			

Appendix A – Tree 2006 & PCT 1281 Location

(For Fine Scale mapping of PCT 1281, 2022 refer to PACA 007)



Chainage 15km 850 – 15km 600 (northbound): Alice Street North and Railway Parade, Wiley Park

Appendix B – Proposed Pruning

Looking towards tree 2006, showing required canopy pruning. The 40mm first order branch at 3m above ground is to be removed. The branch has been marked yellow and the final pruning cut has been marked red. The pruning would result in the removal of less than 10% of the overall live canopy.

Appendix C – Arboricultural Report

(Screenshots of Section 9.10, pg.123 & 125)

URBAN ARBOR
The Trusted Name in Tree Management

9.10 **Wiley Park**

9.10.1 **Alice Street North:** Tree 3457, 3458 and 3459 are located within the footprint or directly adjacent to the proposed CSR and are recommended for removal to accommodate the development. Tree 2005, 2006, 2007, 2008, 3463 and G22 will require canopy pruning to allow for the installation of the GST post and trough. Smaller weed species are also to be removed within this area. The following trees have been identified in this area;

Tree ID	Species	SULE	Retention Value	TPZ Radius (M)	TPZ Area (m^2)	SRZ Radius (m)	Native or Exotic Species	Amenity/ Visual Value
2005	*Triadica sebifera*	2. Medium	A1	3.7	43.0	2.8	Exotic	Medium
2006	*Acacia longifolia*	2. Medium	A1	2.5	19.6	1.8	Native	Medium
2007	*Melaleuca styphelioides*	1. Long	A1	14.4	651.4	3.6	Native	High
2008	*Acacia longifolia*	3. Short	Z4	5.3	88.2	2.4	Native	Medium
3457	*Acacia longifolia*	5. Small/Young	Z1	2.0	12.6	1.7	Native	Low
3458	*Acacia longifolia*	5. Small/Young	Z1	2.0	12.6	1.6	Native	Low
3459	*Acacia longifolia*	5. Small/Young	Z1	2.0	12.6	1.6	Native	Low
3463	*Acacia saligna*	5. Small/Young	Z1	2.0	12.6	1.5	Native	Low
G22	*Wattle spp*	5. Small/Young	Z1	2.0	12.6	1.5	Native	Low

Image 163: Looking towards tree 3457, 3458 and 3459, recommended for removal due to development impacts from the proposed CSR.

Site Address: Southwest Metro, Marrickville to Bankstown, NSW.
Prepared for: John Holland Laing O'Rourke
Prepared by: Bryce Claassens, Urban Arbor Pty Ltd, sales@urbanarbor.com.au, (02) 8004 2802.
Date of prepared: 31 May 2022. Rev: 16.

URBAN ARBOR
The Trusted Name in Tree Management

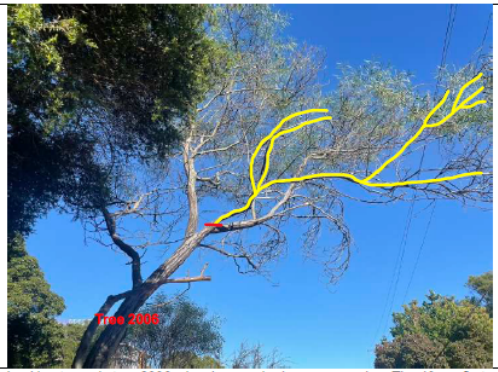
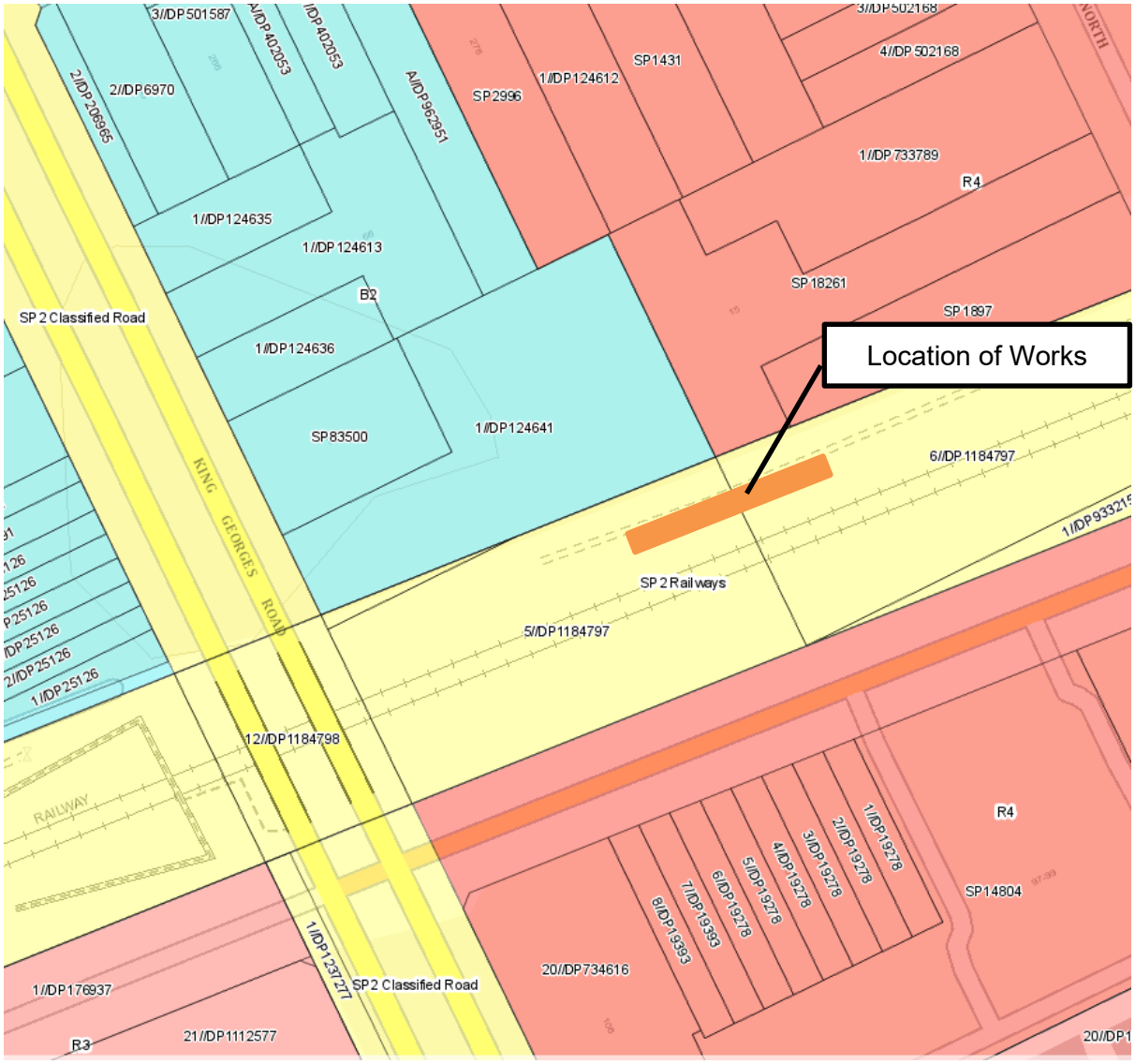


Image 166: Looking towards tree 2006, showing required canopy pruning. The 40mm first order branch at 3m above ground is to be removed. The branch has been marked yellow and the final pruning cut has been marked red. The pruning will result in the removal of less than 10% of the overall live canopy.

Image 167: Looking towards tree 2007, showing required canopy pruning (hatched yellow). The crown is to be raised by 4m to allow for the works. Final pruning cuts should not exceed 40mm in diameter. The pruning will result in the removal of less than 10% of the overall live canopy.

Site Address: Southwest Metro, Marrickville to Bankstown, NSW.
Prepared for: John Holland Laing O'Rourke
Prepared by: Bryce Claassens, Urban Arbor Pty Ltd, sales@urbanarbor.com.au, (02) 8004 2802.
Date of prepared: 31 May 2022. Rev: 16.

Appendix D – Lot Details



Appendix E – NSW Threatened Species Scientific Committee, Notice of and reasons for Final Determination, Proposed Publication date: 31/05/19

Proposed Publication date: 31/05/19

Notice of and reasons for Final Determination

The NSW Threatened Species Scientific Committee, established under the *Biodiversity Conservation Act 2016* (the Act), has made a Final Determination to list the Sydney Turpentine-Ironbark Forest in the Sydney Basin Bioregion as a CRITICALLY ENDANGERED ECOLOGICAL COMMUNITY in Part 1 of Schedule 2 of the Act and to remove the Sydney Turpentine-Ironbark Forest from Part 2 of Schedule 2 of the Act. Listing of ecological communities is provided for in Part 4 of the Act.

Summary of Conservation Assessment

Sydney Turpentine-Ironbark Forest in the Sydney Basin Bioregion is eligible for listing as Critically endangered, as the highest threat category met by the community across all categories, under Clauses 4.9 (a), 4.11 (a) and 4.12 (a) because the community has: i) undergone a very large reduction in geographic distribution; ii) experienced a very large degree of environmental degradation; and iii) experienced a very large disruption of biotic processes and interactions.

This determination contains the following information:

Parts 1 & 2: Section 1.6 of the Act defines an ecological community as "an assemblage of species occupying a particular area". These features of Sydney Turpentine-Ironbark Forest in the Sydney Basin Bioregion are described in Parts 1 and 2 of this Determination, respectively.

Part 3: Part 3 of this Determination describes the eligibility for listing of this ecological community in Part 1 of Schedule 2 of the Act according to criteria prescribed by the *Biodiversity Conservation Regulation 2017*.

Part 4: Part 4 of this Determination provides additional information intended to aid recognition of this community in the field.

Part 1. Assemblage of species

1.1 Sydney Turpentine-Ironbark Forest in the Sydney Basin Bioregion (hereafter referred to as Sydney Turpentine-Ironbark Forest) is characterised by the assemblage of species listed below.

Acacia falcata
Acacia floribunda
Acacia implexa
Acacia longifolia
Acacia parramattensis
Adiantum aethiopicum
Allocasuarina torulosa
Angophora costata
Anisopogon avenaceus
Aristida vagans
Arthropodium milleflorum
Austrostipa pubescens
Austrostipa rudis
Billardiera scandens
Breynia oblongifolia
Brunoniella australis
Brunoniella pumilio
Bursaria spinosa
Cayratia clematidea
Centella asiatica
Cheilanthes sieberi
Clematis aristata

Clematis glycinoides var*. glycinoides*
Commelina cyanea
Denhamia silvestris
Desmodium varians
Dianella longifolia
Dichelachne rara
Digitaria parviflora
Doodia aspera
Echinopogon ovatus
Elaeocarpus reticulatus
Entolasia stricta
Eucalyptus fibrosa
Eucalyptus notabilis
Eucalyptus pilularis
Eucalyptus resinifera subsp*. resinifera*
Eustrephus latifolius
Gahnia aspera
Glochidion ferdinandi var*. ferdinandi*
Glycine microphylla
Gonocarpus tetragynus
Goodenia heterophylla
Hibbertia diffusa
Imperata cylindrica
Kennedia rubicunda
Lepidosperma laterale
Lindsaea microphylla
Lomandra longifolia
Myrsine variabilis
Opercularia hispida
Oplismenus aemulus
Oxalis exilis
Pandorea pandorana
Paspalidium distans
Persoonia linearis
Pittosporum undulatum
Poa sieberiana var*. sieberiana*
Pomaderris intermedia
Pratia purpurascens
Pultenaea villosa
Rumex brownii
Sigesbeckia orientalis subsp*. orientalis*
Smilax glyciphylla
Syncarpia glomulifera subsp*. glomulifera*
Trema tomentosa var*. viridis*
Veronica plebeia
Clerodendrum tomentosum
Daviesia ulicifolia
Desmodium rhytidophyllum
Dianella caerulea
Dichelachne inaequiglumis
Dichondra spp*.*
Dodonaea triquetra
Echinopogon caespitosus var*. caespitosus*
Einadia hastata
Entolasia marginata
Eucalyptus acmenoides
Eucalyptus globoidea
Eucalyptus paniculata subsp*. paniculata*
Eucalyptus punctata
Eucalyptus saligna X *E. botryoides*
Exocarpos cupressiformis
Geranium solanderi var*. solanderi*
Glycine clandestina
Glycine tabacina
Goodenia hederacea subsp*. hederacea*
Hibbertia aspera subsp*. aspera*
Hydrocotyle sibthorpioides
Indigofera australis
Kunzea ambigua
Leucopogon juniperinus
Lomandra filiformis subsp*. filiformis*
Microlaena stipoides
Notelaea longifolia forma *longifolia*
Opercularia varia
Oplismenus imbecillis
Ozothamnus diosmifolius
Panicum simile
Passiflora herbertiana subsp*. herbertiana*
Pittosporum revolutum
Poa affinis
Polyscias sambucifolia
Poranthera microphylla
Pseuderanthemum variabile
Rubus parvifolius
Sarcopetalum harveyanum
Smilax australis
Solanum prinophyllum
Themeda triandra
Tylophora barbata
Zieria smithii

1.2 The total species list of the community across all occurrences is likely to be considerably larger than that given above. Due to variation across the range of the community, not all of the above species are present at every site and many sites may also contain species not listed above. Annual species and geophytes may not be detectable at certain times of the year such as the cooler months.

Characteristic species may be abundant or rare and comprise only a subset of the complete list of species recorded in known examples of the community. Some characteristic species show a high fidelity (are relatively restricted) to the community, but may also occur in other communities, while others are more typically found in a range of communities.

The number and identity of species recorded at a site is a function of sampling scale and effort. In general, the number of species recorded is likely to increase with the size of the site and there is a greater possibility of recording species that are rare in the landscape.

Species presence and relative abundance (dominance) will vary from site to site as a function of environmental factors such as soil properties (chemical composition, texture, depth, drainage), topography, climate and through time as a function of disturbance (*e.g.* fire, logging, grazing) and weather (*e.g.* flooding, drought, extreme heat or cold).

At any one time, above ground individuals of some species may be absent but the species may be represented below ground in the soil seed bank or as dormant structures such as bulbs, corms, rhizomes, rootstocks or lignotubers.

The species listed above are vascular plants, however the community also includes micro-organisms, fungi and cryptogamic plants as well as vertebrate and invertebrate fauna. These components of the community are less well documented.

Part 2. Particular area occupied by the ecological community

2.1.1 The assemblage of species listed in Part 1.1 above which characterises the Sydney Turpentine-Ironbark Forest occurs within the Sydney Basin Bioregion. This Bioregion is defined by SEWPaC (2012) Interim Biogeographic Regionalisation for Australia, Version 7. Department of Sustainability, Environment, Water, Population and Communities. http://www.environment.gov.au/parks/nrs/science/bioregion-framework/ibra/maps.html

2.2 It is the intent of the NSW Threatened Species Scientific Committee that all occurrences of the ecological community (both recorded and as yet unrecorded, and independent of their condition) that occur within this bioregion be covered by this Determination.

Part 3. Eligibility for listing

3.1 Reasons for determining eligibility for listing

3.1.1 Sydney Turpentine-Ironbark Forest in the Sydney Basin Bioregion (STIF) is listed as an Endangered Ecological Community under the *Biodiversity Conservation Act 2016*. Since the original listing new data have become available and the NSW Threatened Species Scientific Committee has undertaken a review of the conservation status of the ecological community to inform the current listing status under the Act.

3.1.2 Sydney Turpentine-Ironbark Forest corresponds to the community referred to by this name in Benson and Howell (1990) and includes vegetation occurring on the Hornsby Plateau, the eastern Cumberland Lowlands and the northern Woronora Plateau physiographic regions (*sensu* Chapman and Murphy 1989). This vegetation was described as map unit 9o by Benson (1992) and Benson and Howell (1994). More recent field surveys have shown that the community also occurs near the south eastern margin of the Cumberland Plain as described by NSW OEH (2013ab) (map unit S_WSF09), and to the south west and north west of the Cumberland Plain as described by Tozer *et al*. (2010) (map unit WSF p87). Sydney Turpentine-Ironbark Forest includes map units 15 and 43 of Tozer (2003). Sydney Turpentine-Ironbark Forest falls within the Northern Hinterland Wet Sclerophyll Forests Class of Keith's (2004) Wet Sclerophyll Forest Formation (OEH 2013b).

3.1.3 Sydney Turpentine-Ironbark Forest has undergone a very large reduction in distribution. Clearing of STIF for agricultural development commenced in the inner west of Sydney soon after European settlement and accelerated following the expansion of Sydney's suburbs in the nineteenth and early twentieth centuries (Benson and Howell 1994). Although the pre-European extent of STIF is uncertain, there is general agreement among sources that the reduction in extent exceeds 90%. Tozer (2003) estimated that 30,339 ha of STIF existed prior to European colonisation and approximately 1,183 ha (± 227 ha) remained in 1997 (3.9 ±0.7%), although this estimate was based only on the distribution of STIF on the Cumberland Lowlands and the Hornsby and Woronora Plateaux. Tozer *et al*. (2010) estimated some 2,300 ha of STIF remains, comprising <10% of its original distribution and including STIF occurring to the south west and north west of the Cumberland Plain in the lower Blue Mountains. NSW OEH (2013b) found that the original distribution of STIF was probably higher than 23,000 ha but concurred that less than 10% remains. Additional remnants of STIF have been mapped by BMCC (2003) (a total of 190 ha) and Smith and Smith (2008) (148 ha). Combining these maps with the maps of Tozer et al. (2010) and NSW OEH (2013ab) gives an estimated 2,940 ha of STIF remaining, or less than 10% of Tozer's (2003) estimated original distribution.

3.1.4 The distribution of Sydney Turpentine-Ironbark Forest is highly restricted. The extent of occurrence (EOO) of STIF is 4,479 km^2 based on a minimum convex polygon enclosing known occurrences of the community as interpreted in Sections 4.2 – 4.10 and using the method of assessment recommended by IUCN (Bland *et al.* 2017). The estimated area of occupancy (AOO) is 12 10 km x 10 km grid cells, the scale recommended for assessing AOO by IUCN and applying a minimum occupancy threshold of 1% (Bland *et al.* 2017).

3.1.5 Remnants of Sydney Turpentine-Ironbark Forest are poorly represented in the formal reserve network, and unreserved areas are subject to the threat of vegetation clearing. An estimated 280 ha of STIF (less than 1% of the pre-European extent) is distributed among 15 reserves (with a minimum area of 0.5 ha) under the management of the NSW National Parks and Wildlife Service (Tozer *et al.* 2010; BMCC 2003; Smith and Smith 2008; NSW OEH 2013a). This includes 112 ha in Bargo SCA, 49 ha in Blue Mountains NP, 25 ha in Lane Cove NP and 22 ha in Newington NR. A further 254 ha occurs in Crown Reserves and 36 ha is preserved in perpetuity under Biobanking or Conservation Agreements. The total area under reservation is estimated to be 570 ha, equivalent to less than 2% of the estimated pre-1750 distribution or 20% of the remaining extent.

3.1.6 Remnants of Sydney Turpentine-Ironbark Forest have historically been subjected to a range of anthropogenic disturbances including logging, grazing by domesticated livestock and burning at varying intensities (Benson and Howell 1994). These disturbances have affected the structure and potentially the composition of remnants. For example, the density and average basal diameter of trees in remnants sampled by Benson and Howell (1994) suggested that the removal of large older trees has led to higher densities of smaller trees such that remnants typically have the structure of regrowth forest. Increased fire frequencies associated with hazard reduction burning have led to declines in populations of slow-maturing, fire sensitive species and effected a structural simplification in some remnants of STIF. Conversely, remnants with a long-term history of fire-exclusion, particularly when coupled with increases in nutrient and moisture availability, are characterised by higher densities and cover of mesic species (such as *Pittosporum undulatum*, *Glochidion ferdinandi* and *Homalanthus populifolius*), larger and more diverse populations of exotic species and lower diversity of understorey species (Rose and Fairweather 1997, McDonald *et al*. 2002, Howell 2003). 'High frequency fire resulting in the disruption of life cycle processes in plants and animals and loss of vegetation structure and composition' and 'Loss of hollow-bearing trees' are listed as a Key Threatening Processes under the Act.

3.1.7 Remnants of Sydney Turpentine-Ironbark Forest are typically small and fragmented and are susceptible to continuing attrition through clearing for routine land management practices due to the majority of remnants being located in close proximity to rural land or urban interfaces (Benson and Howell 1994; Tozer 2003). Applications to the NSW Land and Environment Court demonstrate that there is ongoing pressure to clear STIF in the course of developing private properties or for the establishment of Asset Protection Zones (https://www.caselaw.nsw.gov.au accessed 19/11/2018). 'Clearing of native vegetation' is listed as a Key Threatening Process under the Act.

3.1.8 Remnants of Sydney Turpentine-Ironbark Forest are subject to ongoing invasion by an extensive range of naturalised plant species. Weed invasion is exacerbated by the proximity of remnants to areas of rural and urban development and the associated influx of both weed propagules from gardens and nutrients contained in stormwater runoff, dumped garden refuse and animal droppings (Leishman 1990, Benson and Howell 1994, Leishman *et al.* 2004, Smith and Smith 2010). Species such as *Ligustrum lucidum* (Large-leafed Privet) and *Ligustrum sinense* (Small-leafed Privet) are highly invasive under conditions of enhanced soil nutrients and have been recorded in at least half of all plots sampling STIF by Tozer (2003). Other frequently recorded species include the shrubs *Ochna serrulata* (Mickey Mouse Plant), *Phytolacca octandra* (Inkweed), *Sida rhombifolia* (Paddy's Lucerne) and *Chrysanthemoides monilifera* (Bitou Bush/Boneseed), the scandent shrubs *Lantana camara* (Lantana) and *Asparagus aethiopicus* (Asparagus Fern), the climbers *Araujia sericifera* (Moth Vine), *Asparagus asparagoides* (Bridal Creeper) and *Hedera helix* (English Ivy) and the grasses *Paspalum dilatatum* (Paspalum), *Ehrhata erecta* (Panic Veldtgrass) and *Setaria parviflora* (Tozer 2003). 'Invasion and establishment of exotic vines and scramblers', 'Invasion, establishment and spread of *Lantana* (*Lantana camara* L. *sens. lat.*)', 'Invasion of native plant communities by *Chrysanthemoides monilifera*', 'Invasion of native plant communities by exotic perennial grasses' and 'Loss and degradation of native plant and animal habitat by invasion of escaped garden plants, including aquatic plants'are listed as Key Threatening Processes under the Act.

3.1.9 The threats to Sydney Turpentine-Ironbark Forest listed above are ongoing and likely to cause continuing declines in geographic distribution and disruption of biotic processes and interactions.

3.2 Criteria for listing

Sydney Turpentine-Ironbark Forest in the Sydney Basin Bioregion is eligible to be listed as a Critically Endangered Ecological Community in accordance with Part 4 of the Act as, in the opinion of the NSW Threatened Species Scientific Committee, it is facing an extremely high risk of extinction in Australia in the immediate future, as determined in accordance with the following criteria as prescribed by the *Biodiversity Conservation Regulation 2017*:

Clause 4.9 – Reduction in geographic distribution of ecological community
(Equivalent to IUCN criterion A)
Assessment Outcome: Critically endangered under Clause 4.9 (a)

The ecological community has undergone or is likely to undergo within a time frame appropriate to the life cycle and habitat characteristics of its component species:			
	(a)	for critically endangered ecological communities	a very large reduction in geographic distribution
	~~(b)~~	~~for endangered ecological communities~~	~~a large reduction in geographic distribution~~
	~~(c)~~	~~for vulnerable ecological communities~~	~~a moderate reduction in geographic distribution~~

Clause 4.10 - Restricted geographic distribution of ecological community
(Equivalent to IUCN criterion B)
Assessment Outcome: Endangered under Clause 4.10 (b), (d) (i, ii, iii), e

The ecological community's geographic distribution is:				
	~~(a)~~	~~for critically endangered ecological communities~~		~~very highly restricted.~~
	(b)	for endangered ecological communities		highly restricted.
	~~(c)~~	~~for vulnerable ecological communities~~		~~moderately restricted.~~
and at least 1 of the following conditions apply:				
	(d)	there is a projected or continuing decline in any of the following:		
		(i)	a measure of spatial extent appropriate to the ecological community,	
		(ii)	a measure of environmental quality appropriate to characteristic biota of the ecological community,	
		(iii)	a measure of disruption to biotic interactions appropriate to characteristic biota of the ecological community,	
	(e)	There are threatening processes that are likely to cause continuing decline in either geographic distribution, environmental quality or biotic interactions within the near future,		
	~~(f)~~	~~The ecological community exists at:~~		
		~~(i)~~	~~for critically endangered ecological communities~~	~~an extremely low number of locations.~~

		~~(ii)~~	~~for endangered ecological communities~~	~~a very low number of locations.~~
		~~(iii)~~	~~for vulnerable ecological communities~~	~~a low number of locations.~~

Clause 4.11 – Environmental degradation of ecological community
(Equivalent to IUCN criterion Clause C)
Assessment Outcome: Critically endangered under Clause 4.11 (a)

The ecological community has undergone or is likely to undergo within a time span appropriate to the life cycle and habitat characteristics of its component species:			
	(a)	for critically endangered ecological communities	a very large degree of environmental degradation.
	~~(b)~~	~~for endangered ecological communities~~	~~a large disruption of biotic processes or interactions.~~
	~~(c)~~	~~for vulnerable ecological communities~~	~~a moderate degree of environmental degradation.~~

Clause 4.12 – Disruption of biotic processes or interactions in ecological community
(Equivalent to IUCN criterion D)
Assessment Outcome: Critically endangered under Clause 4.12 (a)

The ecological community has undergone or is likely to undergo within a time frame appropriate to the life cycle and habitat characteristics of its component species:			
	(a)	for critically endangered ecological communities	a very large disruption of biotic processes or interactions
	~~(b)~~	~~for endangered ecological communities~~	~~a large disruption of biotic processes or interactions~~
	~~(c)~~	~~for vulnerable ecological communities~~	~~a moderately large disruption of biotic processes or interactions~~

Clause 4.13 – Quantitative analysis of probability of collapse of ecological community
(Equivalent to IUCN criterion E)
Assessment Outcome: Data deficient

The probability of collapse of the ecological community is estimated to be:			
	~~(a)~~	~~for critically endangered species~~	~~extremely high~~
	~~(b)~~	~~for endangered ecological communities~~	~~a large disruption of biotic processes or interactions~~
	~~(c)~~	~~for vulnerable species~~	~~high~~

Dr Marco Duretto
Chairperson
NSW Threatened Species Scientific Committee

Part 4. Additional information about the ecological community

The following information is additional to that required to meet the definition of an ecological community under the Act but is provided to assist in the recognition of the Sydney Turpentine-Ironbark Forest in the Sydney Basin Bioregion (hereafter referred to as the Sydney Turpentine-Ironbark or STIF) in the field. Given natural variability, along with disturbance history, Sydney Turpentine-Ironbark may sometimes occur outside the typical range of variation in the features described below.

4.1 Sydney Turpentine-Ironbark Forest typically has the structural form of Open Forest (*sensu* Specht 1970) with a tree canopy ranging in height from the mid to upper range for this form (10-30 m) and with projected foliage cover at the mid to lower end of the range (30-50%) (Tozer *et al*. 2010). Remnants with a history of logging or other anthropogenic disturbance may resemble woodland or open woodland, with a sparser tree cover associated with lower tree densities and/or the selective removal of larger trees. Examples of STIF undergoing regrowth following tree removal may have higher densities of younger trees, and projected foliage cover at the high end of, or exceeding, the range given above. The dominant tree species include *Syncarpia glomulifera* and *Eucalyptus paniculata*. These species may have been characteristic of the community prior to European settlement but a range of other tree species may co-occur or even dominate STIF as a result of past disturbance or reflecting natural variation in the landscape (Benson and Howell 1994). These include *Eucalyptus globoidea*, *E. punctata*, *E. resinifera*, *E. pilularis* and *Angophora floribunda* (Benson and Howell 1994) and *E. acmenoides* (Tozer 2003). *Eucalyptus saligna* may have occurred locally in gullies or depressions (Benson and Howell 1994) or may be dominant at the upper end of the rainfall range over which STIF occurs (Tozer 2003). STIF is frequently characterised by a stratum of smaller trees which, in addition to saplings of the species listed above, is dominated by species such as *Pittosporum undulatum*, *Acacia parramattensis, Allocasuarina torulosa* and *Elaeocarpus reticulatus* (Tozer *et al*. 2010). The understorey may be either shrubby or grassy (Benson and Howell 1994). Frequently recorded shrub species include *Breynia oblongifolia*, *Bursaria spinosa*, *Denhamia silvestris, Hibbertia aspera* subsp. *aspera*, *Leucopogon juniperinus, Notelaea longifolia* forma *longifolia*, *Ozothamnus diosmifolius*, *Persoonia linearis*, *Pittosporum revolutum*, *Polyscias sambucifolia* (Tozer *et al.* 2010), *Dodonaea triquetra* and *Acacia falcata* (Benson and Howell 1994). Common herbaceous species include *Themeda triandra, Echinopogon caespitosus, Pseuderanthemum variable*, *Pratia purpurascens* (Benson and Howell 1994), *Lomandra longifolia*, *Dianella caerulea*, *Adiantum aethiopicum*, *Billardiera scandens*, *Dichondra* sp., *Echinopogon ovatus*, *Entolasia marginata*, *E. stricta*, *Imperata cylindrica*, *Microlaena stipoides* and *Oplismenus* spp. Climbers such as *Eustrephus latifolius, Glycine clandestina, Kennedia rubicunda, Pandorea pandorana* and *Tylophora barbata* are frequently present (Tozer *et al.* 2010).

4.2 Sydney Turpentine-Ironbark Forest has been reported as occurring in areas receiving moderate rainfall (900-1100 mm) on soils derived either from Wianamatta Shale or from Wianamatta Shale interbedded with Hawkesbury Sandstone (Benson and Howell 1994, Tozer 2003). In most of these locations STIF occurs up to approximately 100 m above sea level although it is found as high as 200 m above sea level on the western edge of the Hornsby Plateau where average annual rainfall falls below 1050 mm (Tozer 2003). Tozer *et al.* (2010) reported a broader range in elevation (up to 500 m a.s.l.) and rainfall (850–1250 mm) for the community in order to accommodate marginal examples at the upper (Heathcote) and lower (Thirlmere, Oakdale, east of Kurrajong) levels of the rainfall range.

Benson and Howell (1994) stated that STIF was the characteristic vegetation of inner western Sydney and was widespread between St Peters and Peakhurst and found as far west as Lansdowne. Sydney Turpentine-Ironbark Forest is also found on the Hornsby Plateau at locations between Ryde – Arcadia – Castle Hill (Benson and Howell 1994), on the Woronora Plateau at Menai and in the Lower Blue Mountains (Tozer *et al.* 2010).

4.3 Sydney Turpentine-Ironbark Forest occurs on low rolling hills characteristic of the Cumberland Lowlands and the broad, shale-capped ridges of the surrounding plateaux. These ridges often transition relatively abruptly to valleys incised into the underlying Hawkesbury Sandstone and in such situations STIF is replaced by Sandstone Ridgetop Woodland or Sandstone Gully Forest (Benson and Howell 1994, Tozer *et al.* 2010). As the depth of the shale cap decreases towards the ridge margin, an increasing component of the STIF flora is shared with adjoining sandstone vegetation communities. These areas correspond to the Turpentine-Ironbark Margin Forest (map unit 43) as described by Tozer (2003).

4.4 In the eastern parts of its range, Sydney Turpentine-Ironbark Forest has been described as a community intermediate between Cumberland Plain Woodland and Blue Gum High Forest along a gradient of increasing rainfall (Benson and Howell 1994). Moisture available for plant growth is determined by a range of factors including the timing and magnitude of rainfall events, soil depth and texture and topographic factors which influence rates of evapotranspiration. Collectively, these factors determine the points of transition between the three communities such that examples of STIF may occur outside the thresholds of annual rainfall described in Section 4.2. In areas where shale shallowly overlies sandstone, or where shale lenses are interbedded with sandstone, STIF intergrades with Shale Sandstone Transition Forest as described by Tozer (2003) and Tozer *et al*. (2010). In the western parts of its range STIF intergrades with Blue Mountains Shale Cap Forest with increasing elevation and rainfall (Benson 1992). The transition is characterised by the addition of *Eucalyptus deanei* and *E. cypellocarpa* as dominant species in association with *Syncarpia glomulifera, E. notabilis, E. globoidea* and *E. paniculata* Benson (1992).

4.5 The transition from Sydney Turpentine-Ironbark Forest to Blue Gum High Forest is associated with an increase in the height and projected foliage cover of the tree canopy and the replacement of *Syncarpia glomulifera* and *Eucalyptus paniculata* with *E. pilularis* and *E. saligna* as the dominant species. Based on plot samples analysed by Tozer *et al*. (2010), species which have been recorded more frequently in Blue Gum High Forest (WSFp153) compared with STIF (WSFp87) include, in decreasing order of diagnostic power*, *Platylobium formosum, Calochlaena dubia, Alphitonia excelsa, Smilax glyciphylla, Morinda jasminoides*, *Blechnum cartilagineum* and *Marsdenia rostrata.* Species which have been recorded more frequently in STIF include, in decreasing order of diagnostic power*, *Clematis glycinoides* var. *glycinoides, Solanum prinophyllum, Glycine microphylla, Bursaria spinosa, Echinopogon caespitosus* var. *caespitosus, Eucalyptus punctata, Acacia parramattensis, Panicum simile, Centella asiatica, Acacia floribunda, Hydrocotyle sibthorpioides, Veronica plebeia, Aristida vagans, Lomandra filiformis* subsp*. filiformis* and *Billardiera scandens*.

[*species listed in sections 4.5 – 4.8 generally occur in more than one of the related communities. Diagnostic power is a measure of the extent to which the records of a species are concentrated in the target community]

4.6 The transition from Sydney Turpentine-Ironbark Forest into Shale Sandstone Transition Forest is associated with a decrease in the height and cover of the tree canopy and the replacement of *Syncarpia glomulifera* and *Eucalyptus paniculata* with *E. crebra*, *E. fibrosa* and, to a lesser extent, *E. eugenioides* and *E. punctata*. Based on plot samples analysed by Tozer *et al*. (2010), species which have been recorded more frequently in Shale Sandstone Transition Forest (GWp2) compared with STIF (WSFp87) include, in decreasing order of diagnostic power*, *Goodenia hederacea* subsp. *hederacea, Allocasuarina littoralis, Lissanthe strigosa, Opercularia diphylla, Austrostipa pubescens, Vernonia cinerea* var. *cinerea, Lomandra filiformis* subsp. *coriacea, Stypandra glauca, Cymbopogon refractus, Laxmannia gracilis, Acacia decurrens, Lagenifera gracilis, Eragrostis brownii, Bossiaea prostrata, Calotis dentex, Jacksonia scoparia, Digitaria ramularis, Dichelachne micrantha, Dianella revoluta* var. *revoluta and Pimelea linifolia* subsp. *linifolia*. Species which have been recorded more frequently in STIF include, in decreasing order of diagnostic power*, *Eustrephus latifolius, Oplismenus imbecillis, Pandorea pandorana, Pittosporum undulatum, Imperata cylindrica, Clematis glycinoides* var. *glycinoides, Pseuderanthemum variabile, Adiantum aethiopicum, Pittosporum revolutum, Angophora costata, Polyscias sambucifolia, Oplismenus aemulus, Centella asiatica, Poa affinis, Denhamia silvestris, Clerodendrum tomentosum, Tylophora barbata, Kennedia rubicunda* and *Hydrocotyle sibthorpioides*.

4.7 Sydney Turpentine-Ironbark Forest is characterised by a number of frequently recorded species which are highly diagnostic of STIF but are much less frequently recorded in samples of the adjacent Sandstone Ridgetop Woodland and Sandstone Gully Forest (map units DSFp131 and DSFp142 of Tozer *et al.* (2010). These include, in decreasing order of diagnostic power*, *Pratia purpurascens, Dichondra* spp., *Eustrephus latifolius, Oplismenus imbecillis, Entolasia marginata, Breynia oblongifolia, Pittosporum undulatum, Bursaria spinosa, Hibbertia aspera* subsp. *aspera, Imperata cylindrica, Clematis glycinoides* var. *glycinoides, Pseuderanthemum variabile, Ozothamnus diosmifolius, Adiantum aethiopicum, Notelaea longifolia* forma *longifolia, Pittosporum revolutum, Solanum prinophyllum, Echinopogon caespitosus* var. *caespitosus, Leucopogon juniperinus, Glycine microphylla, Acacia parramattensis, Oplismenus aemulus, Panicum simile, Myrsine variabilis, Acacia floribunda, Echinopogon ovatus, Themeda triandra, Clerodendrum tomentosum, Tylophora barbata, Veronica plebeia* and *Aristida vagans* (Tozer *et al*. 2010).

4.8 Sydney Turpentine-Ironbark Forest may contain the following threatened animal and plant species listed under the BC Act or Commonwealth EPBC Act:

Plant Species	**Common Name**	**BC Act^**	**EPBC Act+**
Acacia pubescens	Downy Wattle	Vulnerable	Vulnerable
Acacia terminalis subsp. *terminalis*	Sunshine Wattle	Endangered	Endangered
Epacris purpurascens var. *purpurascens*		Vulnerable	
Eucalyptus benthamii	Camden White Gum	Vulnerable	Vulnerable
Grammitis stenophylla	Narrow-leaf Finger Fern	Endangered	
Persoonia mollis subsp. *maxima*		Endangered	Endangered
Pimelea curviflora var. *curviflora*		Vulnerable	Vulnerable
Zieria involucrata		Endangered	Vulnerable

Animal Species			
Artamus cyanopterus cyanopterus	Dusky Woodswallow	Vulnerable	
Callocephalon fimbriatum	Gang-gang Cockatoo	Vulnerable	
Calyptorhynchus lathami	Glossy Black-Cockatoo	Vulnerable	
Daphoenositta chrysoptera	Varied Sittella	Vulnerable	
Dasyurus maculatus	Spotted-tailed Quoll	Vulnerable	Endangered
Epthianura albifrons	White-fronted Chat	Vulnerable	
Falsistrellus tasmaniensis	Eastern False Pipistrelle	Vulnerable	
Glossopsitta pusilla	Little Lorikeet	Vulnerable	
Hieraaetus morphnoides	Little Eagle	Vulnerable	
Lathamus discolor	Swift Parrot	Endangered	Critically Endangered
Litoria aurea	Green and Golden Bell Frog	Endangered	Vulnerable
Lophoictinia isura	Square-tailed Kite	Vulnerable	
Miniopterus australis	Little Bentwing-bat	Vulnerable	
Miniopterus schreibersii oceanensis	Eastern Bentwing-bat	Vulnerable	
Mormopterus norfolkensis	Eastern Freetail-bat	Vulnerable	
Myotis macropus	Southern Myotis	Vulnerable	
Ninox connivens	Barking Owl	Vulnerable	
Ninox strenua	Powerful Owl	Vulnerable	
Pachycephala olivacea	Olive Whistler	Vulnerable	
Petaurus australis	Yellow-bellied Glider	Vulnerable	
Petaurus norfolcensis	Squirrel Glider	Vulnerable	
Petroica phoenicea	Flame Robin	Vulnerable	
Phascolarctos cinereus	KoalaKoala	Vulnerable	Vulnerable
Pommerhelix duralensis	Dural Land Snail	Endangered	Endangered
Pseudophryne australis	Red-crowned Toadlet	Vulnerable	
Pteropus poliocephalus	Grey-headed Flying-fox	Vulnerable	Vulnerable
Saccolaimus flaviventris	Yellow-bellied Sheathtail-bat	Vulnerable	
Scoteanax rueppellii	Greater Broad-nosed Bat	Vulnerable	
Tyto novaehollandiae	Masked Owl	Vulnerable	
Tyto tenebricosa	Sooty Owl	Vulnerable	

^ *Biodiversity Conservation Act* 2016
\+ *Environment Protection and Biodiversity Conservation Act 1999*

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