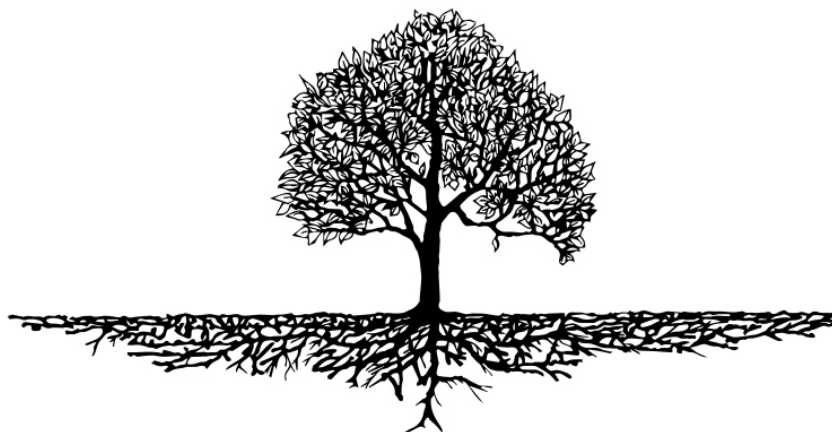


Client	Qantas c/o Michael Terrett, Senior Project Manager, APP
Location	Qantas, 297 King Street, Mascot.
Document Type	Arboricultural Impact Assessment
Date	14 th April 2019



The Ents Tree Consultancy

Development Reports | Hazard Assessments | Tree Management





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2. Introduction

2.1 On 21 January 2019, The Ents Tree Consultancy has been commissioned by Qantas Airways Ltd (Qantas) to prepare this report in accordance with the technical requirements of the Secretary's Environmental Assessment Requirements (SEARs), and in support of the **SSD 10154** for the development of a new flight training centre at 297 King Street, Mascot. The site is located at 297 King Street, Mascot and comprises land known as Lots 2 & 4 DP 234489, Lot 1 DP 202747, Lot B DP 164829 and Lot 133 DP 659434. The site is identified in Figure 1 below.



Figure 1 - The Site

Key features of the site are as follows:

- The site is approximately 5.417ha and is an irregular shape. It is approximately 240m in length and maintains a variable width of between approximately 321m in the northern portion of the site and approximately 93m along the King Street frontage (refer to Figure 1).
- The site possesses a relatively level slope across the site. An open Sydney Water drainage channel bisects the northern portion of the site in an east-west direction. There are some isolated changes in level immediately adjacent to this channel. A Site Survey Plan accompanies the application which details the topographic characteristics of the site.
- Multiple mature Plane Trees are scattered throughout the site. A variety of native and exotic trees and vegetation also exist around the perimeter of the site which help screen the site from surrounding uses.
- Site improvements include at-grade car parking for Qantas staff, an industrial shed to store spare aviation parts, a substation, a disused gatehouse, a Sydney Water Asset with two driveways over it, the Qantas catering facility and Qantas tri-generation plant.
- The site forms part of a larger land holding under the ownership of Qantas that generally extends between Qantas Drive to the west, Ewan Street to the south, Coward Street to the north, with the Qantas "Corporate Campus" fronting Bourke Road.
- Vehicular access to the site from the local road network is available from King Street. The site has intra-campus connections along the northern boundary in the form of two connecting driveways in the north-eastern and north-western corner of the site along the northern boundary which link it to the broader Mascot Campus.
- The site is located within the Bayside LGA.

Key features of the locality are:

- **North:** The site is bounded to the north by low scale industrial development, beyond which is Coward Street. Further north of the site is the Mascot Town Centre which is characterised by transport-oriented development including high density mixed-use development focussed around the Mascot Train Station.



- **East:** The site is bordered to the east by commercial development including a newly completed Travelodge hotel which includes a commercial car park. Additional commercial development to the east includes the Ibis Hotel and Pullman Sydney Airport fronting O’Riordan Street.
- **South:** The site is bounded to the south by King Street, beyond which is Qantas owned at-grade car parking and other industrial uses. Further south is the Botany Freight Rail Line and Qantas Drive beyond which is the Domestic Terminal at Sydney Airport.
- **West:** The site is bordered to the west by the Botany Freight Rail Line and Qantas Drive, beyond which lies Sydney Kingsford Smith Airport and the Qantas Jetbase (location of the current Flight Training Centre).

PROJECT DESCRIPTION

Safety is Qantas’ first priority. The flight training centre is a key pillar of this value. The facility enables pilots and flight crews to undertake periodic testing to meet regulatory requirements by simulating both aircraft and emergency procedural environments. The Project seeks consent for the construction and operation of a new flight training centre, and associated ancillary uses including a multi-deck car park. The Project is comprised of the following uses:

Flight Training Centre

The proposed flight training centre will occupy the southern portion of the site. It is a building that comprises 4 core elements as follows:

- An emergency procedures hall that contains;
 - cabin evacuation emergency trainers,
 - an evacuation training pool,
 - door trainers,
 - fire trainers
 - slide descent towers,
 - security room,
 - aviation medicine training and equipment rooms.
- A flight training centre that contains:
 - a flight training hall with 14 bays that will house aircraft simulators,
 - integrated procedures training rooms, computer rooms, a maintenance workshop, storerooms, multiple de-briefing and briefing rooms, pilot’s lounge and a shared lounge.
- Teaching Space that contains
 - training rooms,
 - classrooms and two computer based exam rooms.
- Office Space
 - Office space for staff and associated shared amenities including multiple small, medium and large meeting rooms, think tank rooms, informal meeting spaces, a video room and lunch/tea room.
- Ancillary spaces including the reception area at the ground floor, toilets, roof plant and vertical circulation. The external ground floor layout will include a loading dock, at-grade car parking for approximately 39 spaces and a bus drop-off zone at the northern site boundary.

Car Park

The proposed multi-deck car park will be located to the north-east of the flight training centre and adjacent the existing Qantas catering facility and tri-generation plant. The car park is 13 levels and will provide 2059 spaces for Qantas staff. Vehicle access to the car park will be provided via King Street, Kent Road and from Qantas Drive via the existing catering bridge.

2.2 This report will assess the nominated trees that are on and adjoining the site which may be impacted upon by the works or the associated activities. The client stated that the trees have been nominated to be inspected in relation to a proposed development, which involves the renovation of the existing land, for a new parking station and building with some landscape works. Consultation was sought with the client about the number and position of trees to be inspected prior to a survey being completed.



2.3 The site inspection of the nominated trees occurred on the 28th January 2019, Additional visits were made to the site to gather information in relation to the trees on site. This tree report will detail the condition of the nominated trees, observe the proposed works and recommend removal or retention of the trees on or adjoining the site. Recommendations for removal or retention will be based on the proposed works and compatibility of the trees with the works as well as the trees hazard potential or ULE Rating. The report will also assess any potential impacts for trees nominated to be retained and attempt to remove or minimise them where possible. Recommended tree protection measures as set out in the Australian Standard AS4970 Protection of Trees on development sites will be nominated as required.

2.4 The purpose of this report is to assess the proposed works as well as the health and suitability of the trees nominated at the time of the inspection. The report will also provide tree management options for trees on the site in regard to the proposed works. The Tree Protection Guidelines will be discussed for all trees nominated to be retained. The information in this report will be based on the information presented by the client at the time of the inspection as well as the site inspection. The Australian Standard AS4970 Protection of Trees on development sites will be used as a guide to manage the site. Additional Tree Protection measures are included in appendix 8.

2.5 To achieve the objectives of the report, the trees will be assessed noting the species, size, general condition. The trees will be assessed using the internationally recognised VTA assessment method for above ground parts only. The trees characteristics and eventual size will be taken into consideration as will the trees position in relation to structures and hard scapes. Recommendations will be outlined in section 5 of the report. A detailed list of the trees surveyed will be provided in Appendix 2 of the report and an existing numerical system has been used to identify them for this report and future reference on this job site.

3. Methodology

- 3.1 The trees were assessed using the standard Visual Tree Assessment technique (VTA). The trees were assessed from the ground for this report.
- 3.2 A Lufkin 6.5m diameter tape was used to obtain the Diameter at breast height (DBH) as recommended at 1.4 metres unless otherwise stated due to variations in the trees form.
- 3.3 The height of the trees was estimated and the spread of the trees canopy was paced out.
- 3.4 A Canon 5D Digital camera with a 24-105mm lens was used to take all photographs in this report.
- 3.5 The ULE rating system has been used as a guide to assist in determining the Useful Life Expectancy of the trees surveyed. Refer to Appendices 1.



4. Discussion

4.1 The trees nominated to be assessed are located on site at 297 King Street, Mascot and comprises land known as Lots 2 & 4 DP 234489, Lot 1 DP 202747, Lot B DP 164829 and Lot 133 DP 659434. Some of the trees are significant in the immediate landscape and some are likely to be considered important in the local areas landscape in terms of amenity and function. The trees are located on partially sheltered site with some protection from surrounding structures, trees and topography from most aspects. The soil on site appears to be a sandy loam that has been disturbed previously when the existing building and hardscapes were built and the site was cleared.

4.2 Based on the information provided by the client, the works involve the development of the existing land for a new building, car parking station and some landscape works. To achieve the works, some of the trees on and adjoining the site are proposed to be removed and replaced. Some of the trees on site and most trees adjoining the site will be protected for the duration of the works. The trees nominated to be retained, will be retained using sympathetic building activities to allow the works to proceed. Options for the managing the trees nominated to be retained adjoining the proposed works site will be provided. Any tree that is nominated to be retained on or adjoining site will be kept in good condition for the duration of the works using the Australian Standard AS4970 2009 Protection of trees on development sites for the basis of all tree management practices.

4.3 **Trees 1, 2 & 3** are council street trees that are located in the nature strip on the King Street frontage adjoining the site. These trees are compatible with the works and are proposed to be retained within a new landscape plan. There are limited impacts proposed for these trees in their projected structural root zones and tree protection zones. The impact to the trees will be for the installation of a path that will be permeable and built without excavation within the structural root zone and tree protection zone of each tree. No roots 50mm+ are permitted to be damaged or removed within the Structural Root Zone. The disturbance calculated for the tree protection zone is less than 10% for each tree. To the north of the trees some of the existing bitumen will be returned to garden bed and there will be some pier holes excavated for a boom gate. All of the proposed disturbances are acceptable for these species.

4.4 **Tree Protection for Trees 1, 2 & 3.** To protect the trees roots and vascular tissue, a 1.8m chain mesh tree protection fence will need to be installed at the edge of the existing gutter, the edge of the proposed path to the edge of the tree protection zones to the east and the west. This will protect the tree whilst allowing for the works to be completed and continued vehicular access. Once built the path will allow for pedestrian access. The tree protection fencing must be installed prior to the works and signed off by the AQF level 5 Arborist. Refer to the tree protection plan in appendix 4a.

4.5 **Trees 4 & 5** are council street trees that are in the position of the proposed driveway. These trees are proposed to be removed and replaced within a new landscape plan. **Trees 6 to 51** are trees within the existing car park area. Most of the trees are *Platanus orientalis* or *Platanus x hybrida*, Plane Trees. The majority of the trees have poor health and or poor form with insect and pest infestation such as Sycamore Lace Bug, Powdery Mildew and Anthracnose. These trees are not compatible with the works because they are either in the position of the proposed building or are in the position of the proposed new entry paths. An attempt will be made to replace some of the trees within a new landscape plan.

4.6 **Tree Group 52** is a stand of She Oaks, (*Casuarina glauca*). There are 3 parent trees that have been lopped in the past which has resulted in them having poor form and heavy suckering from the roots forming a dense thicket of suckers which will mature into trees. The trees are semi mature trees located on the eastern boundary of the site. There are minor disturbances planned for the trees projected structural root zone. The disturbance is for the installation of a concrete pathway that has no excavation within the trees structural root zone. The existing levels will be retained and there will be a pre-fabricated concrete slab installed (suspended) over the section of the structural root zone. The disturbance calculated for the projected tree protection zone (TPZ) is less than 25% (by area), which is at the upper limit of what is acceptable for this species at this age. In reality the disturbance will be lower as there is already hardstand over 25% of the root zone, taking the disturbance to 15-20%. This tree species has a moderate tolerance to construction impacts. These trees can be retained and protected for the duration of the works with minimal impacts anticipated for their health.

4.7 **Tree Protection for Tree Group 52.** To protect the trees roots and vascular tissue of the trees, a 1.8m chain mesh tree protection fence will need to be installed at the .5m off the edge of the proposed works covering the trees projected tree protection zone to the north and south zone on site, stopping at the client's boundary. The fence can be moved to the edge of the new garden bed once the demolition of the car park is removed. This will protect the tree whilst allowing for the works to be completed. No machinery access is permitted within the tree protection zone. The tree protection fencing must be installed prior to the works and signed off by the AQF level 5 Arborist. Refer to the tree protection plan in appendix 4a. All works within or at the edge of the structural roots zone of any tree will need to be supervised by the AQF level 5 site Arborist. An irrigation system will be required to be installed to ensure that the trees have adequate water applied during dry periods to minimise stress. The irrigation system can be an inline drip system installed under the mulch in the garden bed with no excavation.

4.8 **Tree Group 53** is a stand of She Oaks, (*Casuarina glauca*). There are 2 parent trees that have been lopped in the past which has resulted in heavy suckering from the roots forming a dense thicket of suckers which will mature into trees. The trees are semi mature trees located on the south - eastern boundary of the site. There are no disturbances planned for the trees projected structural root zone and a minor disturbance for the projected tree protection zone (TPZ). The proposed works increase the size of the garden area surrounding the trees which will improve their long-term viability. These trees can be retained and protected for the duration of the works with minimal impacts anticipated for their health. Any excavation works to remove bitumen within 2.5m of the trees will need to be supervised by the AQF level 5 site Arborist.



4.9 Tree Protection for Tree Group 53. To protect the trees roots and vascular tissue of the trees, a 1.8m chain mesh tree protection fence will need to be installed at the .5m off the edge of the proposed works covering the trees projected tree protection zone to the north and west on site, stopping at the client's boundary. The fence can be moved to the edge of the new garden bed once the demolition of the car park is removed. This will protect the tree whilst allowing for the works to be completed. No machinery access is permitted within the tree protection zone. The tree protection fencing must be installed prior to the works and signed off by the AQF level 5 Arborist. Refer to the tree protection plan in appendix 4a.

4.10 Tree Group 54 is a stand of She Oaks, (*Casuarina glauca*). There are 10 parent trees that have been lopped at 2-3m in the past which has resulted in the loss of the trees form and heavy suckering from the roots. The root system is forming a dense thicket of suckers which will mature into trees. The trees are semi mature trees located on the eastern boundary of the site. The crowns extend 7m to the west and the roots can be seen 5m to the west. There are some disturbances planned for the trees projected structural root zone which are for the installation of a pre-fabricated concrete footpath (suspended) above grade. The installation of the suspended slabs for each parent tree will remove the risk of destabilising the trees.

4.11 There is a disturbance of under 30% for the projected tree protection zone (TPZ) by area for the resurfacing of the road at the same level and the above-mentioned path. The trees have bitumen covering the roots in the areas proposed to be worked on and there are no excavations. The real disturbance to the tree's root zones will be under 20%. The species of tree has a moderate level of tolerance to construction impacts. These trees can be retained and protected for the duration of the works with minimal impacts anticipated for their health. Any excavation works to remove bitumen within 3m of the trees will need to be supervised by the AQF level 5 site Arborist.

4.12 Pruning of Tree Group 54 will be limited to a small amount of crown lifting for access to the western side of the trees to prevent impacts with branches or foliage from workers or equipment. The pruning to raise the crowns of the trees will also allow for adequate clearance above the pedestrian path and road. All pruning works must be completed by an AQF level 3 Arborist in accordance with the Australian Standard for the Protection of Trees on Development Sites AS4373.

4.13 Tree Protection for Tree Group 54. To protect the trees roots and vascular tissue of the trees, a 1.8m chain mesh tree protection fence will need to be installed at the .5m off the edge of the proposed works covering the trees projected tree protection zone to the north and south on site, stopping at the client's boundary. This will protect the tree whilst allowing for the works to be completed. No machinery access is permitted within the tree protection zone. The tree protection fencing must be installed prior to the works and signed off by the AQF level 5 Arborist. Refer to the tree protection plan in appendix 4a. Any works proposed to occur within 3m of these trees will need to be supervised by the AQF level 5 site Arborist. An irrigation system will be required to be installed to ensure that the trees have adequate water applied during dry periods to minimise stress. The irrigation system can be an inline drip system installed under the mulch in the garden bed with no excavation.

4.14 Trees 55 to 69 are a stand of mature trees located on the western boundary of the site. These trees are likely to have an asymmetrical root plate with a large portion of roots to the west in the noncompacted soil, limiting the potential for root disturbance. Based on the information provided by the client there are works planned within the structural root zone to remove the old surface and to renew it. There are level changes proposed to raise the subgrade slightly and no excavations planned for the trees projected structural root zones. As the works within the projected tree protection zones (TPZ) of the trees will be within limited to within the sub-grade of the existing road the disturbance to the trees will be limited as there will be no roots severed. The area of the tree protection zone proposed to be disturbed is 35%. The existing garden bed will be retained. These trees can be retained and protected with an anticipated impact of less than 20%. There are no long-term impacts anticipated to the tree health or viability.

4.15 Tree Protection for Trees 55 to 69. To protect the trees roots and vascular tissue, a 1.8m chain mesh tree protection fence will need to be installed along the edge of the proposed garden edge and cover the tree protection zone on the client's site to the north of the south separating the trees from the works. This will protect the tree whilst allowing for the works to be completed. No machinery access is permitted within the tree protection zone. The tree protection fencing must be installed prior to the works and signed off by the AQF level 5 Arborist. Refer to the tree protection plan in appendix 4a. An irrigation system will be required to be installed to ensure that the trees have adequate water applied during dry periods to minimise stress. The irrigation system can be an inline drip system installed under the mulch in the garden bed with no excavation.

4.16 Tree Group 70 is a stand of She Oaks, (*Casuarina glauca*) located in a stormwater channel on land belonging to a third party. There are 17 parent trees that are semi mature. The trees are located between .5m and 2m below the grade of the existing car park level and the closest trees are .5m from the edge of the car park. There are no disturbances planned for the trees projected structural root zone or for the projected tree protection zone (TPZ). The proposed works are for the regrading of the existing parking area with no excavation. The roots are below this grade and minimal impacts are anticipated for the trees. These trees can be retained and protected for the duration of the works with minimal impacts anticipated for their health. Any excavation works to remove bitumen within 3m of the trees will need to be supervised by the AQF level 5 site Arborist.

4.17 Tree Protection for Tree Group 70. To protect the trees roots and vascular tissue of the trees, a 1.8m chain mesh tree protection fence will need to be installed at the .5m off the edge of the existing carpark edge extending to the east and west on site, stopping at the end of the tree protection zone or linking with the fence of tree group 71. This will protect the trees whilst allowing for the works to be completed. No machinery access is permitted within the tree protection zone. The tree protection fencing must be installed prior to the works and signed off by the AQF level 5 Arborist. Refer to the tree protection plan in appendix 4a.



4.18 Tree Group 71 is a stand of She Oaks, (*Casuarina glauca*) located in a stormwater channel on land belonging to a third party. There are 24 parent trees that are semi mature. The trees are located between .5m and 2m below the grade of the existing car park level and the closest trees are .5m from the edge of the car park. There are limited disturbances planned for the trees projected structural root zone or for the projected tree protection zone (TPZ). The proposed works are for the regrading of the existing parking area. The roots are below this grade and minimal impacts are anticipated for the trees. These trees can be retained and protected for the duration of the works with minimal impacts anticipated for their health. Any excavation works to remove bitumen within 3m of the trees will need to be supervised by the AQF level 5 site Arborist.

4.19 Tree Protection for Tree Group 71. To protect the trees roots and vascular tissue of the trees, a 1.8m chain mesh tree protection fence will need to be installed at the .5m off the edge of the existing carpark edge extending to the east and west on site, stopping at the end of the tree protection zone or linking with the fence of tree group 70. This will protect the trees whilst allowing for the works to be completed. No machinery access is permitted within the tree protection zone. The tree protection fencing must be installed prior to the works and signed off by the AQF level 5 Arborist. Refer to the tree protection plan in appendix 4a.

4.20 Tree Group 72 is a stand of She Oaks, (*Casuarina glauca*) located in a stormwater channel on land. There are 30 parent trees that are semi mature. One tree is proposed to be removed as it is too close to the proposed works. The trees are located between the existing ground level and 1.5m below the grade of the existing car park level and the closest trees are .75m from the edge of the car park. The proposed level change will be higher using a permeable sub-base and paver or a suspended slab. The size of the garden bed will increase. There are some disturbances planned for the trees projected structural root zone for the installation of a retaining wall on the existing sub-base with a discontinuous pier and beam footing. The sub-grade will support the installation of a porous fill and permeable paver or will be built on a pier and beam system with a suspended slab over the root zone. This will limit assist in maintaining water and gaseous exchange, reducing any disturbances to the trees root zone.

4.21 The disturbance for for the projected tree protection zone (TPZ) is calculated as between 5 & 25% by area based on the position of the individual tree in relation to the works. The actual disturbance to the root zone will be much less reducing the disturbance to 0-15%. The proposed works are to resurface the existing road with an extension of the garden bed to the north to 2 & 5m from the trees. This increase in garden bed will allow for better growing conditions and long-term viability of the trees. The proposed level change will be accommodated by using a permeable sub-base and paver or a suspended slab. These trees can be retained and protected for the duration of the works with minimal impacts anticipated for their health. Any excavation works to remove bitumen within 3m of the trees will need to be supervised by the AQF level 5 site Arborist. Any pier holes within 5m of the trees will also need to be installed under the supervision of the AQF level 5 Arborist.

4.22 Tree Protection for Tree Group 72. To protect the trees roots and vascular tissue of the trees, a 1.8m chain mesh tree protection fence will need to be installed at the .5m off the edge of the existing carpark gutter extending to the east and west on site, stopping at the end of the tree protection zone or linking with the fence of tree group 73. This will protect the trees whilst allowing for the works to be completed. No machinery access is permitted within the tree protection zone. The tree protection fencing must be installed prior to the works and signed off by the AQF level 5 Arborist. Refer to the tree protection plan in appendix 4a.

4.23 Tree Group 73 is a stand of She Oaks, (*Casuarina glauca*) located in a stormwater channel on land belonging to a third party. There are 14 parent trees that are semi mature. The trees are located between the existing ground level and 1.5m below the grade of the existing car park level and the closest trees are .5m from the edge of the car park. There are some disturbances planned for the trees projected structural root zone for removal of bitumen to reinstate the garden area. There are no disturbances to the trees SRZ for construction works.

4.24 The disturbance to the projected tree protection zone (TPZ) is calculated at 5 & 15%. The proposed works are to install a retaining wall add permeable fill and permeable pavers to resurface the existing road at a new level or the new road will be built on a pier and beam system with a suspended slab over the root zone. This will limit assist in maintaining water and gaseous exchange, reducing any disturbances to the trees root zone. The works will have an extension of the garden bed to the north to 2m from the closest trees. This increase in garden bed will allow for better growing conditions and long-term viability of the trees. These trees can be retained and protected for the duration of the works with minimal impacts anticipated for their health. Any excavation works to remove bitumen within 3m of the trees will need to be supervised by the AQF level 5 site Arborist.

4.25 Tree Protection for Tree Group 73. To protect the trees roots and vascular tissue of the trees, a 1.8m chain mesh tree protection fence will need to be installed at the .5m off the edge of the existing carpark gutter extending to the east and west on site, stopping at the end of the tree protection zone or linking with the fence of tree group 72. This will protect the trees whilst allowing for the works to be completed. No machinery access is permitted within the tree protection zone. The tree protection fencing must be installed prior to the works and signed off by the AQF level 5 Arborist. Refer to the tree protection plan in appendix 4a.

4.26 Trees 74 is a tree located in the lower section of the stormwater channel. This tree is compatible with the works and is proposed to be retained within a new landscape plan. There are no impacts proposed for this tree in its projected structural root zone, however there are disturbances at the edge of the structural root zone to the north of the tree. If large roots are located sympathetic construction techniques will need to be implemented to retain large roots 50mm+ in diameter.

4.27 The disturbance to the tree protection zone is calculated to be 15% for the excavation for the ramp to the north which is acceptable for this species at this age. The renewing of the surface at the same level will not impact upon the tree as the existing subgrade will be retained. The tree has ivy in the tree which should be removed to improve the trees health. If pruning is required on this tree, the pruning should be completed in accordance with the Australian Standard for the Pruning of amenity trees AS4373.



4.28 Tree Protection for Tree 74. To protect the trees roots and vascular tissue, a 1.8m chain mesh tree protection fence will need to be installed at the edge of the existing garden bed and will need to be .5m off the proposed works. This will protect the tree whilst allowing for the works to be completed. The tree protection fencing must be installed prior to the works and signed off by the AQF level 5 Arborist. Refer to the tree protection plan in appendix 4a.

4.29 Trees 75 to 80 & trees 91 to 117 are trees within the existing car park areas or in narrow garden beds surrounding the car parking areas. All trees have been planted as they are in rows in graded soils and are of varying species. Most of the trees are *Casuarina cunninghamiana* (River She Oak), *Casuarina glauca* (Grey She Oak) and *Corymbia maculata* (spotted gums). The majority of the Spotted Gums have poor health. The River She Oaks are beginning to develop extensive root systems that are damaging hardscapes and one tree is dead. These trees are not compatible with the works because they are either in the position of the proposed carpark building or are in the position of the proposed new access roads. An attempt will be made to replace some of the trees within a new landscape plan.

4.30 Trees 81 to 90 are a stand of semi - mature trees located on southern side of an existing building. Based on the information provided by the client there are works planned within the structural root zone and tree protection zone to remove the old bitumen surface, replacing it with garden bed. There are no level changes proposed and no disturbances planned for the trees projected structural root zones. As the works within the projected tree protection zones (TPZ) of the trees will be limited to removal of the bitumen and the sub-grade, the disturbance to the trees will be limited as there will be no roots severed. The area of the tree protection zone proposed to be disturbed is 35%. The existing garden bed will be enlarged and the soil will be improved and mulched. This will improve the growing conditions of the trees negating the disturbances and providing a net gain for the trees overall. There are no long-term impacts anticipated to the tree health or viability.

4.31 Tree Protection for Trees 81 - 90. To protect the trees roots and vascular tissue, a 1.8m chain mesh tree protection fence will need to be installed along the edge of the proposed garden edge and cover the tree protection zone on the client's site to the north of the south separating the trees from the works. The bitumen will be removed under the supervision of the AQF level 5 site arborist with the machine remaining on the bitumen surface at all times. This will protect the tree whilst allowing for the works to be completed. No machinery access is permitted within the tree protection zone unless it is on the existing bitumen. The tree protection fencing must be installed prior to the works and signed off by the AQF level 5 Arborist. Refer to the tree protection plan in appendix 4a.

4.32 Tree 117 is a mature tree that is located in the existing carpark area in a small garden bed. This tree is not compatible with the works and is proposed to be removed and replaced within a new landscape plan.

4.33 Tree 118 is a mature tree that is located in the existing garden area to the east of the site. This tree is compatible with the works and is proposed to be retained within a new landscape plan. There are no impacts proposed for this tree in its projected structural root zones or to the tree protection zone. This is acceptable for this species at this age.

4.34 Tree Protection for Tree 118. To protect the trees roots and vascular tissue, a 1.8m chain mesh tree protection fence will need to be installed at the edge of the existing gutter and the boundary of the client's property. The fence will cover the area of the tree protection zone to the north and south. This will protect the tree whilst allowing for the works to be completed. The tree protection fencing must be installed prior to the works and signed off by the AQF level 5 Arborist. Refer to the tree protection plan in appendix 4a.

4.35 Tree Group 119 is a stand of She Oaks, (*Casuarina glauca*) located to the east of the site. There are 11 parent trees that are semi mature. The trees are located on a raised embankment above the grade of the existing road level. The closest trees are 4.5m from the edge of the path. There are no disturbances planned for the trees projected structural root zone or for the projected tree protection zone (TPZ). Any excavation works to remove bitumen within 3m of the trees will need to be supervised by the AQF level 5 site Arborist.

4.36 Tree Protection for Tree Group 119. To protect the trees roots and vascular tissue of the trees, a 1.8m chain mesh tree protection fence will need to be installed along the edge of the exiting path extending to the north and the south returning to the property boundary to the east of the site. This will protect the trees whilst allowing for the works to be completed. No machinery access is permitted within the tree protection zone. The tree protection fencing must be installed prior to the works and signed off by the AQF level 5 Arborist. Refer to the tree protection plan in appendix 4a.

4.37 Tree 120 is a mature tree that is located in the existing garden area to the east of the site. There are some impacts proposed for this tree in its projected structural root zone for the renewal of path at a new or higher level. There will be no root pruning as the structural root zone will be bridged by a prefabricated suspended slab. The disturbance to the tree protection zone has been calculated at 30% by area. The actual disturbance will be lower as the disturbance is for the resurfacing of the bitumen and there will be little impact to the tree protection zone, taking the disturbance of the roots down to 15% or less.

4.38 Tree Protection for Tree 120. To protect the trees roots and vascular tissue, a 1.8m chain mesh tree protection fence will need to be installed at the edge of the existing gutter and the boundary of the client's property. The fence will cover the area of the tree protection zone to the north and south. This will protect the tree whilst allowing for the works to be completed. The tree protection fencing must be installed prior to the works and signed off by the AQF level 5 Arborist. Refer to the tree protection plan in appendix 4a.



5. Recommendations

5.1 After reviewing the site and the information provided by the client, the works are proposed to proceed with the following actions,

5.2 To allow the works to proceed, trees 4 to 51, trees 75 – 80 and trees 91-117 are proposed to be removed. An attempt to replace as many of these trees as possible within a new landscape plan will be made. Trees 1, 2, 3 and tree Groups 52, 53, 54, trees 55 to 69, tree groups 70, 71, 72, 73, trees 74, trees 81 - 90, 118, Tree group 119 and tree 120 are proposed to be retained and protected for the duration of the works. The installation of the tree protection measures in section 4 of the report will assist in reducing the disturbance to the trees nominated to be retained.

5.3 It is recommended that all tree protection measures are in place as described in section 4 of the report prior to the commencement of any works. The AQF level 5 site Arborist will need to sign off on the tree protection measures prior to works commencing.

5.4 All works within or at the edge of any structural root zone of any tree will need to be supervised and recorded by the AQF level 5 site Arborist. Excavation works within the structural root zone of any tree will need to be supervised by the AQF level 5 site Arborist. Permission to sever the roots 100mm within the structural root zone of trees will require written consent from the local council prior to cutting. It is the client's responsibility to arrange site inspections and co-ordinate the works with the AQF level 5 site Arborist.

5.5 Monthly inspections and reporting is required to ensure the trees are adequately protected. At the end of the works period the tree will be inspected by an AQF 5 Arborist to determine if the tree has been maintained adequately. If this is done the compliance certificate will be issued. If trees have been damaged or breaches of the Australian Standards have occurred council will be contacted for further advice.

5.6 It is recommended that construction proceeds using the Australian Standard AS4970 2009 Protection of trees on development sites as a basis for tree protection on the site as well as the site-specific instructions listed in section 5 of this report. Additional Tree Protection measures are listed in Appendix 7 of the report to assist in the care of the trees on site.

Please do not hesitate to call 0422 265 128 if you have any questions regarding the contents of this report.

Regards

Hayden Coulter
AQF Level 5 Consulting Arborist
AQF Level 4 Advanced Certificate in Urban Horticulture



Disclaimer

All trees have been assessed based on the information and facts of the site and as presented by the client or relevant parties at the time of inspection. No responsibility can be taken for incorrect or misleading information provided by the client or other parties. The nominated tree/s are assessed for biological requirements and hazard potential with reasonable care. The trees are assessed from the ground and by visual means only unless otherwise stated. All tree protection and tree preservation measures are designed to minimise the damage to the tree/s or to reduce the hazard potential of the tree/s. No responsibility can be taken by the author of this report for future damage to structures by the existing trees or planted trees. Trees are inherently dangerous, therefore will always have a hazard potential. Trees fail in ways that are not predictable or fully understood. There is no guarantee expressed or implied that failure or deficiencies may not arise of the subject trees in the future. No responsibility is accepted for damage to property or injury/death caused by the nominated tree/s.

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Appendix 1 ULE Rating

Useful Life Expectancy (ULE): Useful life expectancy refers to an expected period of time the tree can be retained within the landscape before its amenity value declines to a point where it may detract from the appearance of the landscape and/or becomes potentially hazardous to people and/or property. ULE values consider tree species, current age, health, structure and location. ULE values are based on the tree at the time of assessment and do not consider future changes to the tree's location and environment which may influence the ULE value.

Category rating:	Category definition in years:	Category rating:
1	> 40 Years	High
2	15 to 40 Years	Medium
3	10-20 Years	Low
4	0 Years	Dead



Appendix 2 Assessment of Trees

Tree No	Species	Height (m)	DBH* & DAC**	Canopy Spread (m)	TPZ ***	Health #	Structure #	ULE Rating ****	Landscape Rating +	Stars Rating +	Observations and comments
1	<i>Agonis flexuosa</i> Western Australian peppermint	8	.80 DAC .85	8	9.6 SRZ 3.1	A	A	2	M	M	Council street tree
2	<i>Agonis flexuosa</i> Western Australian peppermint	10	.51 DAC .60	8	6 SRZ 2.7	A	A	2	M	M	Council street tree
3	<i>Eucalyptus scoparia</i> Wallangarra white gum	10	.50 DAC .60	8	6 SRZ 2.7	A	A	1	M	M	Council street tree
4	<i>Agonis flexuosa</i> Western Australian peppermint	9	.60 DAC .70	8	7.2 SRZ 2.85	A	A	2	M	M	Council street tree
5	<i>Eucalyptus scoparia</i> Wallangarra white gum	11	.60 DAC .70	9	7.2 SRZ 2.85	A	A	1	M	M	Council street tree
6	<i>Platanus x hybrida</i> London plane tree	7	2 x .25 DAC .45	9	5.5 SRZ 2.35	Ba	Ba	1	L	L	Suppressed
7	<i>Platanus x hybrida</i> London plane tree	10	.25 DAC .35	8	3 SRZ 2.15	A	A	1	M	M	Partially suppressed
8	<i>Platanus x hybrida</i> London plane tree	4	.10 DAC .15	3	2 SRZ 1.5	P	P	3	L	L	Partially suppressed
9	<i>Casuarina glauca</i> Swamp she-oak	17	.45 DAC .60	10	5.4 SRZ 2.7	A	A	1	M	M	Included primary union
10	<i>Platanus x hybrida</i> London plane tree	8	.15 DAC .20	5	2 SRZ 1.7	A	A	1	M	M	
11	<i>Lophostemon confertus</i> Brush box	8	.30 DAC .40	7	3.6 SRZ 2.25	A	A	1	M	M	
12	<i>Lophostemon confertus</i> Brush box	8	.25 DAC .35	6	3 SRZ 2.15	A	A	1	M	M	



Tree No	Species	Height (m)	DBH* & DAC**	Canopy Spread (m)	TPZ ***	Health #	Structure #	ULE Rating ****	Landscape Rating +	Stars Rating +	Observations and comments
13	<i>Lophostemon confertus</i> Brush box	7	.20 DAC .30	5	2.4 SRZ 2	A	A	1	M	M	
14	<i>Platanus x hybrida</i> London plane tree	9	.40 DAC .50	8	4.8 SRZ 2.5	A	A	1	M	M	
15	<i>Platanus x hybrida</i> London plane tree	7	.40 DAC .50	7	4.8 SRZ 2.5	A	A	1	M	M	
16	<i>Platanus x hybrida</i> London plane tree	9	.40 DAC .50	8	4.8 SRZ 2.5	A	A	1	M	M	
17	<i>Platanus x hybrida</i> London plane tree	7	.45 DAC .65	8	5.4 SRZ 2.75	A	Ba	2	M	M	Swelling at base
18	<i>Platanus x hybrida</i> London plane tree	7	.25 DAC .30	6	3 SRZ 2	A	A	2	L	L	Dieback
19	<i>Platanus x hybrida</i> London plane tree	7	.20 DAC .25	6	2.4 SRZ 1.85	Ba	A	1	L	L	Dieback and epicormic growth at the base.
20	<i>Platanus x hybrida</i> London plane tree	7	.25 DAC .35	6	3 SRZ 2.15	Ba	Ba	1	L	L	
21	<i>Platanus orientalis</i> Oriental plane	17	.50 DAC .60	10	6 SRZ 2.7	A	A	1	M	M	
22	<i>Platanus orientalis</i> Oriental plane	16	.45 DAC .55	9	5.4 SRZ 2.6	A	A	1	M	M	
23	<i>Platanus orientalis</i> Oriental plane	16	.50 DAC .60	11	6 SRZ 2.7	A	A	1	M	M	
24	<i>Platanus orientalis</i> Oriental plane	16	.40 DAC .50	10	4.8 SRZ 2.5	A	A	1	M	M	



Tree No	Species	Height (m)	DBH* & DAC**	Canopy Spread (m)	TPZ ***	Health #	Structure #	ULE Rating ****	Landscape Rating +	Stars Rating +	Observations and comments
25	<i>Platanus hispanica</i> London plane tree	6	.25 DAC .30	6	3 SRZ 2	Ba	Ba	1	L	L	
26	<i>Platanus orientalis</i> Oriental plane	16	.45 DAC .55	10	5.4 SRZ 2.6	A	A	1	M	M	
27	<i>Platanus orientalis</i> Oriental plane	8	.25 DAC .30	7	3 SRZ 2	A	A	1	L	L	
28	<i>Platanus orientalis</i> Oriental plane	10	.25 DAC .30	7	3 SRZ 2	A	A	1	L	L	
29	<i>Platanus orientalis</i> Oriental plane	7	.20 DAC .30	6	2.4 SRZ 2	P	Ba		L	L	Dieback and epicormic shoots
30	<i>Platanus orientalis</i> Oriental plane	8	.45 DAC .55	8	5.4 SRZ 2.6	Ba	Ba	1	L	L	Stunted
31	<i>Platanus orientalis</i> Oriental plane	4	.10 DAC .15	4	2 SRZ 1.5	P	P	1	L	L	Lopped & coppiced
32	<i>Platanus orientalis</i> Oriental plane	4	.10 DAC .15	4	2 SRZ 1.5	P	P	1	L	L	
33	<i>Platanus x hybrida</i> London plane tree	9	.50 DAC .60	11	6 SRZ 2.7	A	Ba	1	M	M	Girdled roots, lopped at 4m
34	<i>Platanus orientalis</i> Oriental plane	4	.10 DAC .15	3	2 SRZ 1.5	P	P	2	L	L	Dieback and epicormic shoots
35	<i>Platanus x hybrida</i> London plane tree	7	.20 DAC .30	5	2.4 SRZ 2	Ba	A	2	L	L	Deadwood
36	<i>Platanus orientalis</i> Oriental plane	6	.30 DAC .45	6	3.6 SRZ 2.35	Ba	Ba	2	L	L	Deadwood



Tree No	Species	Height (m)	DBH* & DAC**	Canopy Spread (m)	TPZ ***	Health #	Structure #	ULE Rating ****	Landscape Rating +	Stars Rating +	Observations and comments
37	Platanus orientalis Oriental plane	9	.30 DAC .40	6	3.6 SRZ 2.25	Ba	A	2	L	L	Deadwood
38	Platanus orientalis Oriental plane	5	2 x .20 DAC .25	5	3 SRZ 1.85	Ba	A	2	L	L	
39	Platanus orientalis Oriental plane	8	.35 DAC .40	7	4.2 SRZ 2.25	A	Ba	2	L	L	
40	Platanus orientalis Oriental plane	7	.25 DAC .30	6	3 SRZ 2	Ba	Ba	2	L	L	Deadwood
41	Platanus orientalis Oriental plane	7	4 x .10 DAC .50	6	6 SRZ 2.5	A	P	2	L	L	Anthracnose, Lopped
42	<i>Melaleuca quinquenervia</i> Paperbark	8	.35 DAC .45	7	4.2 SRZ 2.35	A	A	1	M	M	
43	Platanus orientalis Oriental plane	9	.27 DAC .35	7	3 SRZ 2.15	A	A	1	M	M	
44	Platanus orientalis Oriental plane	8	.30 DAC .35	7	3.6 SRZ 2.15	A	A	1	M	M	
45	Platanus orientalis Oriental plane	5	.15 DAC .20	4	2 SRZ 1.7	Ba	Ba	2	L	L	
46	<i>Eucalyptus saligna</i> Sydney blue gum	3	.05 DAC .10	2	2 SRZ 1.5	A	A	1	L	L	
47	<i>Platanus x hybrida</i> London plane tree	8	.30 DAC .40	8	3.6 SRZ 2.25	Ba	A	1	L	L	
48	<i>Melaleuca quinquenervia</i> Paperbark	9	.40 DAC .50	6	4.8 SRZ 2.5	A	A	1	M	M	



Tree No	Species	Height (m)	DBH* & DAC**	Canopy Spread (m)	TPZ ***	Health #	Structure #	ULE Rating ****	Landscape Rating +	Stars Rating +	Observations and comments
49	Platanus orientalis Oriental plane	10	.40 DAC .50	8	4.8 SRZ 2.5	Ba	Ba	2	L	L	Dieback
50	Platanus orientalis Oriental plane	8	.25 DAC .40	9	3 SRZ 2.25	Ba	Ba	2	L	L	Dieback. Lopped. Partially suppressed.
51	Platanus orientalis Oriental plane	9	.36 DAC .50	9	4.2 SRZ 2.5	Ba	Ba	2	L	L	Girdled roots, Sycamore Lace Bug, Powdery Mildew,
52	Casuarina glauca Swamp she-oak	17	.45 DAC .55	9	5.4 SRZ 2.6	A	A	1	M	M	3 Parent trees
53	Casuarina glauca Swamp she-oak	14	.43 DAC .53	7	5.4 SRZ 2.6	A	A	1	M	M	2 Parent trees
54	Casuarina glauca Swamp she-oak	16	.45 DAC .55	10	5.4 SRZ 2.6	A	A	1	M	M	10 Parent trees
55	Lophostemon confertus Brush box	11	.47 DAC .55	8	6 SRZ 2.6	A	A	1	M	M	5m crown NE
56	Lophostemon confertus Brush box	10	.41 DAC .50	7	4.8 SRZ 2.5	A	A	1	M	M	5m crown NE
57	Lophostemon confertus Brush box	9	.36 DAC .45	7	4.2 SRZ 2.35	A	A	1	M	M	5m crown NE
58	Lophostemon confertus Brush box	8	.31 DAC .40	7	3.6 SRZ 2.25	A	A	1	M	M	5m crown NE
59	Lophostemon confertus Brush box	9	.50 DAC .60	8	6 SRZ 2.7	A	A	1	M	M	5m crown NE
60	Lophostemon confertus Brush box	8	.40 DAC .50	8	4.8 SRZ 2.5	A	A	1	M	M	5m crown NE



Tree No	Species	Height (m)	DBH* & DAC**	Canopy Spread (m)	TPZ ***	Health #	Structure #	ULE Rating ****	Landscape Rating +	Stars Rating +	Observations and comments
61	<i>Schinus ariera</i> Peppercorn Tree	14	.25, .45 DAC .65	10	7.5 SRZ 2.75	A	A	1	M	M	7m crown NE
62	<i>Lophostemon confertus</i> Brush box	13	.50 DAC .65	8	6 SRZ 2.75	A	A	1	M	M	8m crown NE
63	<i>Lophostemon confertus</i> Brush box	11	.35 DAC .45	8	4.2 SRZ 2.35	A	A	1	M	M	8m crown NE
64	<i>Lophostemon confertus</i> Brush box	11	.20 DAC .30	9	2.4 SRZ 2	A	A	1	M	M	
65	<i>Lophostemon confertus</i> Brush box	9	.35 DAC .45	8	4.2 SRZ 2.35	A	A	1	M	M	
66	<i>Lophostemon confertus</i> Brush box	10	.55 DAC .65	10	6.6 SRZ 2.75	A	A	1	M	M	NE crown
67	<i>Lophostemon confertus</i> Brush box	10	.40 DAC .50	8	4.8 SRZ 2.5	A	A	1	M	M	
68	<i>Lophostemon confertus</i> Brush box	9	.40 DAC .50	8	4.8 SRZ 2.5	A	A	1	M	M	
69	<i>Lophostemon confertus</i> Brush box	9	.55 DAC .65	8	6.6 SRZ 2.75	A	A	1	M	M	
70	<i>Casuarina glauca</i> Swamp she-oak	16	.45 DAC .55	10	5.4 SRZ 2.6	A	A	1	M	M	17 Parent Trees
71	<i>Casuarina glauca</i> Swamp she-oak	16	.45 DAC .55	10	5.4 SRZ 2.6	A	A	1	M	M	24 Parent Trees
72	<i>Casuarina glauca</i> Swamp she-oak	17	.45 DAC .50	13	5.4 SRZ 2.5	A	A	1	M	M	30 Parent Trees



Tree No	Species	Height (m)	DBH* & DAC**	Canopy Spread (m)	TPZ ***	Health #	Structure #	ULE Rating ****	Landscape Rating +	Stars Rating +	Observations and comments
73	<i>Casuarina glauca</i> Swamp she-oak	17	.40 DAC .50	13	4.8 SRZ 2.5	A	A	1	M	M	14 Parent trees
74	<i>Melaleuca quinquenervia</i> Paperbark	16	4 x .50 DAC 1.2	15	15 SRZ 3.65	Ba	Ba	2	M	M	Partially suppressed. Covered in Ivy.
75	<i>Casuarina glauca</i> Swamp she-oak	16	.35 DAC .45	6	4.2 SRZ 2.35	Ba	Ba	2	M	M	Partially suppressed. Covered in Ivy.
76	<i>Casuarina glauca</i> Swamp she-oak	17	.40 DAC .50	8	4.8 SRZ 2.5	A	A	1	M	M	
77	<i>Casuarina glauca</i> Swamp she-oak	17	.40 DAC .50	7	4.8 SRZ 2.5	A	A	1	M	M	
78	<i>Casuarina glauca</i> Swamp she-oak	17	.40 DAC .50	7	4.8 SRZ 2.5	A	A	1	M	M	
79	<i>Casuarina glauca</i> Swamp she-oak	16	.20 DAC .30	8	2.4 SRZ 2	A	A	1	M	M	Partially suppressed
80	<i>Casuarina glauca</i> Swamp she-oak	16	.25 DAC .30	6	3 SRZ 2	A	A	1	M	M	Included union
81	<i>Casuarina glauca</i> Swamp she-oak	16	.35 DAC .45	7	4.2 SRZ 2.35	A	A	1	M	M	
82	<i>Casuarina glauca</i> Swamp she-oak	16	.35 DAC .45	8	4.2 SRZ 2.35	A	A	1	M	M	
83	<i>Casuarina glauca</i> Swamp she-oak	16	.30 DAC .40	8	3.6 SRZ 2.25	A	A	1	M	M	
84	<i>Casuarina glauca</i> Swamp she-oak	12	.30 DAC .40	6	3.6 SRZ 2.25	A	A	1	M	M	Partially suppressed



Tree No	Species	Height (m)	DBH* & DAC**	Canopy Spread (m)	TPZ ***	Health #	Structure #	ULE Rating ****	Landscape Rating +	Stars Rating +	Observations and comments
85	<i>Casuarina glauca</i> Swamp she-oak	12	.25 DAC .35	7	3 SRZ 2.15	A	A	1	M	M	Suppressed
86	<i>Acacia falcata</i> Wattle	8	3 x .15 DAC .30	8	3.6 SRZ 2	P	P	4	L	L	Suppressed. 90% of the crown has dieback.
87	<i>Casuarina glauca</i> Swamp she-oak	17	.30 DAC .40	8	3.6 SRZ 2.25	A	A	1	M	M	Covered in Ivy
88	<i>Casuarina glauca</i> Swamp she-oak	17	.30 DAC .40	6	3.6 SRZ 2.25	A	A	1	M	M	
89	<i>Casuarina glauca</i> Swamp she-oak	17	.20 DAC .30	6	2.4 SRZ 2	A	A	1	M	M	
90	<i>Casuarina glauca</i> Swamp she-oak	18	.30 DAC .40	5	3.6 SRZ 2.25	A	A	1	M	M	
91	<i>Casuarina glauca</i> Swamp she-oak	16	.30 DAC .40	8	3.6 SRZ 2.25	A	A	1	M	M	
92	<i>Casuarina glauca</i> Swamp she-oak	16	.30 DAC .40	8	3.6 SRZ 2.25	A	A	1	M	M	
93	<i>Casuarina glauca</i> Swamp she-oak	13	.25 DAC .35	6	3 SRZ 2.15	A	A	1	M	M	Partially suppressed
94	<i>Casuarina glauca</i> Swamp she-oak	17	.40 DAC .50	8	4.8 SRZ 2.5	A	A	1	M	M	
95	<i>Casuarina cunninghamiana</i> River she-oak	18	.60 DAC .70	10	7.2 SRZ 2.85	A	A	1	M	M	
96	<i>Casuarina glauca</i> Swamp she-oak	16	.30 DAC .40	8	3.6 SRZ 2.25	A	A	1	M	M	



Tree No	Species	Height (m)	DBH* & DAC**	Canopy Spread (m)	TPZ ***	Health #	Structure #	ULE Rating ****	Landscape Rating +	Stars Rating +	Observations and comments
97	<i>Casuarina glauca</i> Swamp she-oak	15	.20 DAC .25	6	2.4 SRZ 1.85	A	A	2	M	M	Partially suppressed
98	<i>Casuarina cunninghamiana</i> River she-oak	16	2 x .20 DAC .30	10	3.6 SRZ 2	A	Ba	1	M	M	
99	<i>Casuarina cunninghamiana</i> River she-oak	16	.55 DAC .65	14	6.6 SRZ 2.75	A	Ba	1	M	M	
100	<i>Casuarina cunninghamiana</i> River she-oak	14	.40 DAC .50	10	4.8 SRZ 2.5	A	Ba	1	M	M	
101	<i>Casuarina cunninghamiana</i> River she-oak	15	.45 DAC .55	10	5.4 SRZ 2.6	A	Ba	1	M	M	
102	<i>Casuarina cunninghamiana</i> River she-oak	15	.45 DAC .55	10	5.4 SRZ 2.6	A	Ba	1	M	M	Dead
103	<i>Casuarina glauca</i> Swamp she-oak	16	.25 DAC .35	6	3 SRZ 2.15	A	A	1	M	M	
104	<i>Casuarina cunninghamiana</i> River she-oak	16	.70 DAC .80	14	8.4 SRZ 3	A	A	1	M	M	
105	<i>Casuarina glauca</i> Swamp she-oak	14	.20 DAC .25	5	2.4 SRZ 1.85	A	A	1	M	M	
106	<i>Casuarina glauca</i> Swamp she-oak	13	.25 DAC .30	6	3 SRZ 2	A	A	1	M	M	
107	<i>Casuarina glauca</i> Swamp she-oak	16	2 x .25 DAC .30	7	3.6 SRZ 2	A	A	1	M	M	
108	<i>Casuarina cunninghamiana</i> River she-oak	16	.90 DAC 1.05	14	10.8 SRZ 3.4	A	A	1	M	M	



Tree No	Species	Height (m)	DBH* & DAC**	Canopy Spread (m)	TPZ ***	Health #	Structure #	ULE Rating ****	Landscape Rating +	Stars Rating +	Observations and comments
109	<i>Corymbia maculate</i> Spotted gum	15	.30 DAC .35	9	3.6 SRZ 2.15	Ba	Ba	2	L	L	Infested with Winter Bronzing <i>Thaumastichorid sp</i>
110	<i>Corymbia maculate</i> Spotted gum	14	.30 DAC .35	5	3.6 SRZ 2.15	Ba	Ba	2	L	L	
111	<i>Corymbia maculate</i> Spotted gum	9	.20 DAC .25	4	2.4 SRZ 2.15	Ba	Ba	2	L	L	
112	<i>Corymbia maculate</i> Spotted gum	14	.25 DAC .30	10	3 SRZ 2	Ba	Ba	2	L	L	
113	<i>Corymbia maculate</i> Spotted gum	8	.15 DAC .20	4	2 SRZ 1.7	Ba	Ba	2	L	L	
114	<i>Corymbia maculate</i> Spotted gum	8	.10 DAC .15	5	2 SRZ 1.5	Ba	Ba	2	L	L	
115	<i>Corymbia maculate</i> Spotted gum	8	.10 DAC .15	4	2 SRZ 1.5	Ba	Ba	2	L	L	
116	<i>Corymbia maculate</i> Spotted gum	8	.10 DAC .15	4	2 SRZ 1.5	Ba	Ba	2	L	L	
117	<i>Corymbia maculate</i> Spotted gum	14	.35 DAC .45	10	4.2 SRZ 2.35	Ba	Ba	2	L	L	
118	<i>Corymbia maculate</i> Spotted gum	11	.25 DAC .35	7	3 SRZ 2.15	Ba	Ba	2	L	L	
119	<i>Casuarina glauca</i> Swamp she-oak	14	.30 DAC .40	8	3.6 SRZ 2.25	A	A	1	M	M	4.5m from path
120	<i>Casuarina glauca</i> Swamp she-oak	16	.65 DAC .75	10	7.8 SRZ 2.95	A	A	1	M	M	

Explanatory Notes for Table

- *Dbh = Diameter of trunk at breast height.
- ** DAC = Diameter above the root collar used to measure the Structural Root Zone (SRZ).
- ***TPZ is the recommended TPZ 12x the DBH at 1.4m, SRZ is the trees structural root zone. Refer to AS4970 for details.
- **** ULE Explanation can be found in Appendix 1.
- + IACA Landscape value and S.T.A.R.S Rating system. Refer to Appendix 5
- # Health and Structure values represented above are P = poor, BA = Below Average, A = Average, G = Good



Appendix 3 Images of Tree



Image 1 above left shows tree 1 on site. Image 2 shows trees 2-5 on the council nature strip to the front of the site. Image 3 above right shows trees 6-9 on site. Image 4 shows tree 9 near the existing entry gate. Image 5 below centre shows trees 14 & 15. Image 6 below right shows trees 16 & 17.





Image 7 above right shows trees 18-20. Image 8 above right shows trees 21-24. Image 9 below left shows trees 25-29. Image 10 below centre shows trees 30-32. Image 11 below right shows trees 34-42.





Image 12 above right shows trees 37- 42. Image 13 shows trees 43 & 44. Image 14 above right shows trees 45-51. Image 15 below left shows tree group 52. Image 16 below centre shows tree group 52 from the side. Image 17 below right shows tree group 53 on site.





Image 18 shows tree group 53 from the west to review the crown profile. Image 19 above centre shows tree group 54 to the east of the site. Image 20 above right shows the regrowth from the base of a casuarina tree. Image 21 below right shows trees 54 from the site to show the crown profile to the west. Image 22 below left centre shows the parent tree (Blue Arrow) and the rest of the trees present are suckers from the roots. Image 23 below right centre shows trees 55-60 on the western side of the site. Image 24 below right shows the crown profile of trees 55-60 looking south.





Image 25 above left shows tree group 70. Image 26 above centre shows tree group 71. Image 27 above right shows tree 120. Image 28 below left shows tree group 72. Image 29 below centre shows the crown profile of tree group 72 to the north and the existing hardscapes. Image 30 below right shows tree group 73.

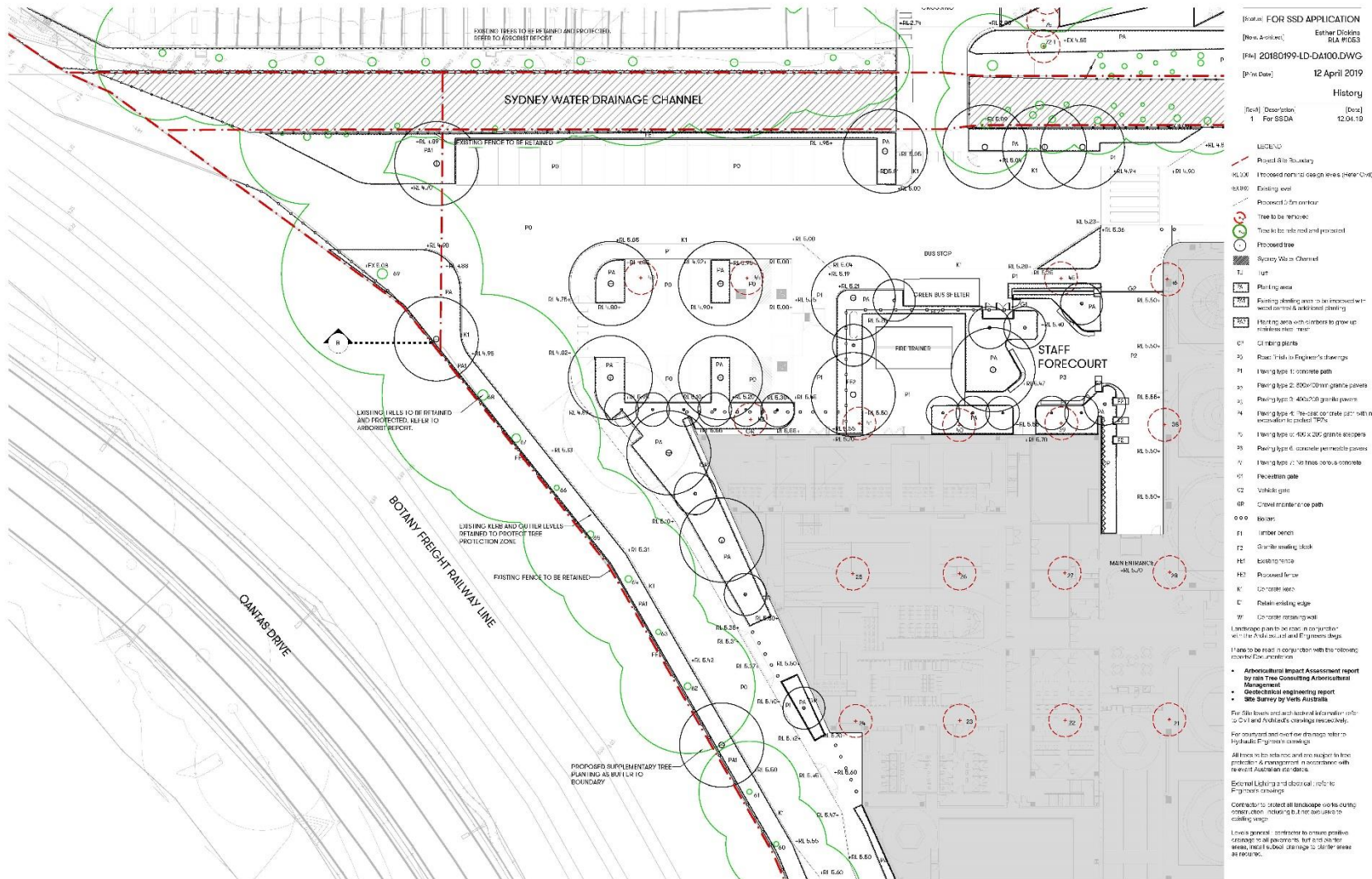




Image 31 shows the profile of tree group 73 and the adjoining hardscapes. Image 32 above left centre shows trees 75-86. Image 33 above right centre shows trees 87-108. Image 34 above right shows trees 112-118. Image 26 below left shows trees 110 & 111. Image 37 below centre shows tree group 119. Image 38 below right shows the developing root system of *Casuarina cunninghamiana* (River She Oak).



[illegible]



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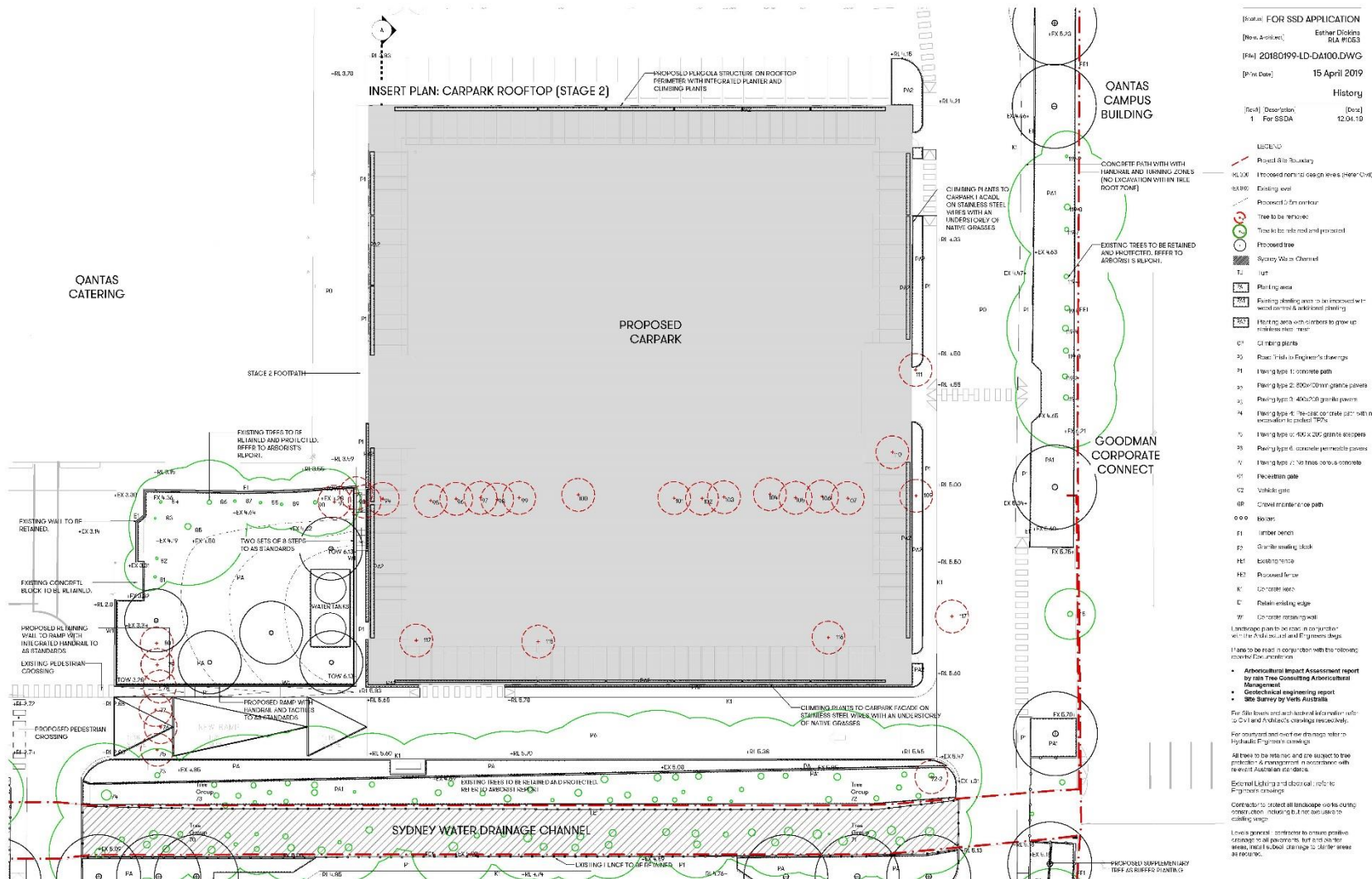
Project QANTAS GROUP FLIGHT TRAINING CENTRE
 [Drawn] QANTAS

Scale 1:200 @ A1
 [Book] 1:200 @ A1



LANDSCAPE GENERAL ARRANGEMENT 3
 Date 20180199 [Drawn] LD-DA103 [Rev] 1





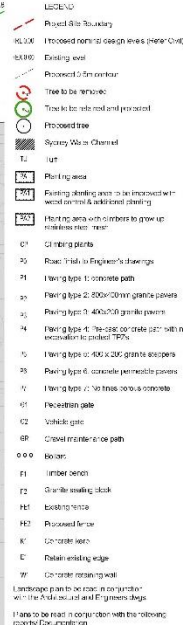
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Project: QANTAS GROUP FLIGHT TRAINING CENTRE
[Drawn] QANTAS

Scale: 1:200 @ A1
North arrow pointing up

LANDSCAPE GENERAL ARRANGEMENT 1
Date: 20180199 [Drawn] LD-DA101 [Rev] 1

[illegible]LANDSCAPE GENERAL ARRANGEMENT 4
[Ref] 20180199 [Dwg No.] LD-DA104 [Ver.] 1



Plans to be read in conjunction with the following reports: *See introduction*

- Arboricultural Impact Assessment report by rain Tree Consulting Arboricultural Management
- Geotechnical engineering report
- Site Survey by Verbs Australia

For film loans and archival information, visit
to Civil and Architect's drawings respectively.

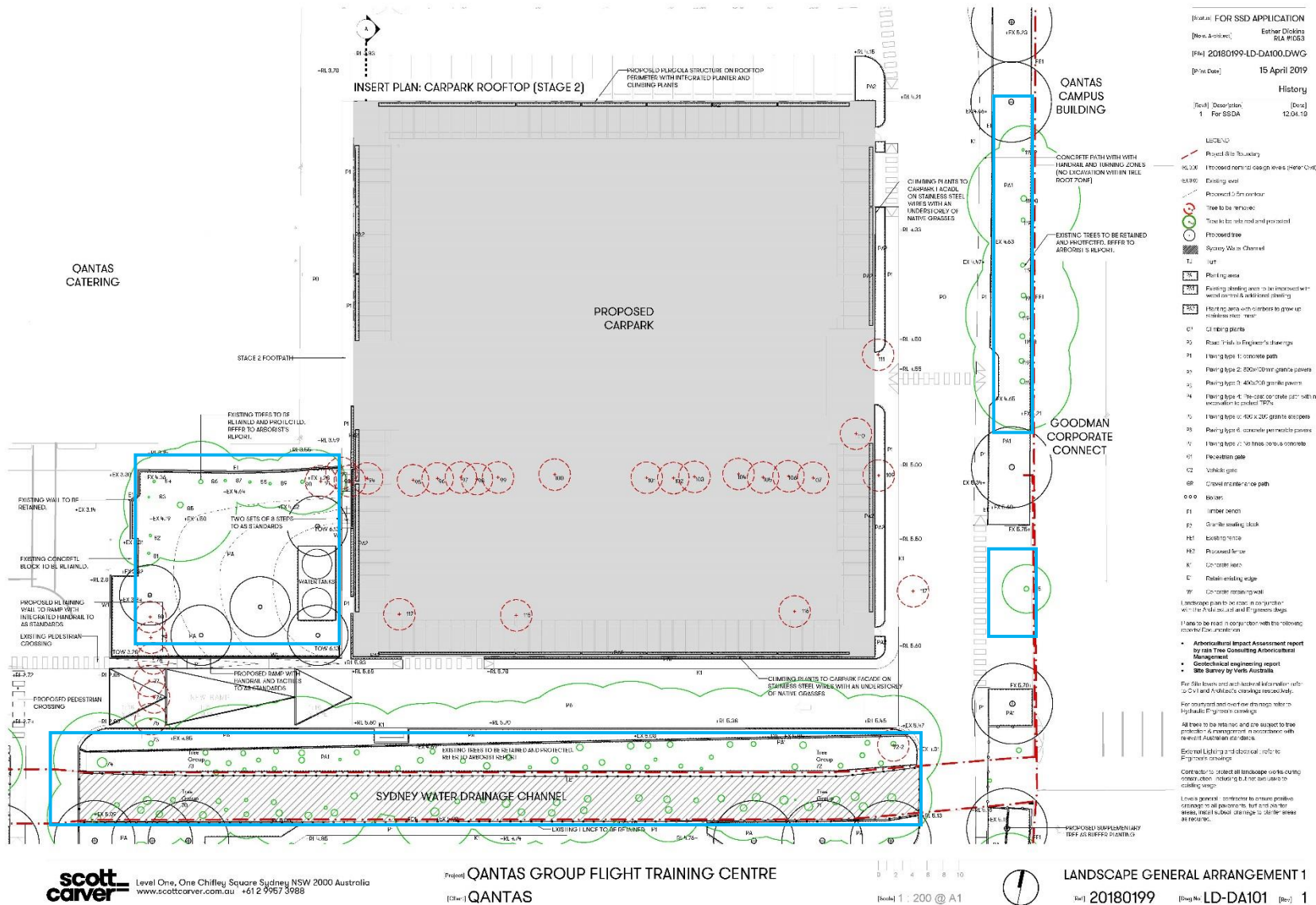
Hydraulic Engineer's earnings

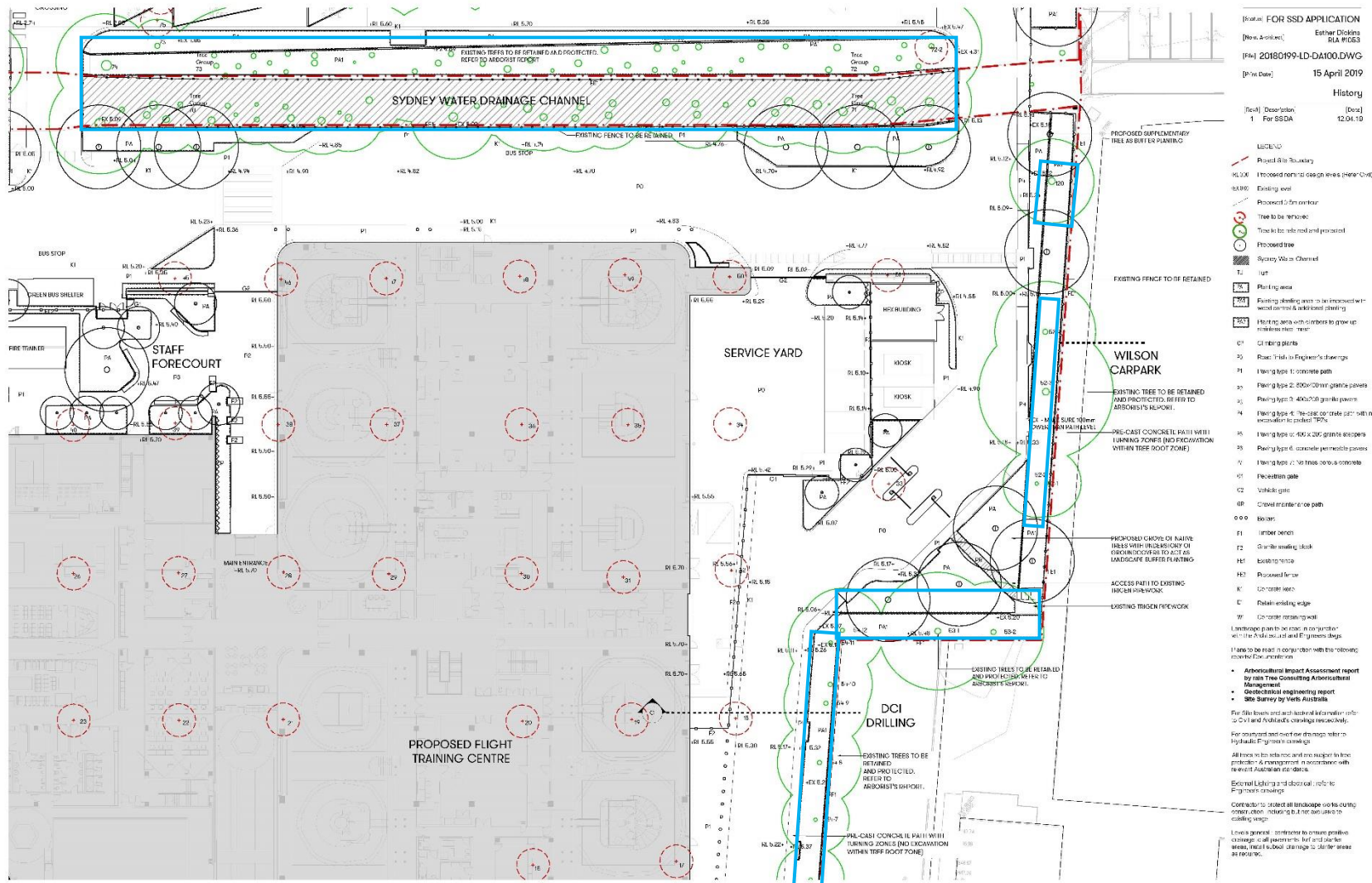
All trees in his sets are and are subject to fire protection & management in accordance with relevant Australian standards.

External Lighting and electrical : refer to Engineer's drawings

Contractor to protect all landscape works during construction, including but not be limited to existing slope.

Levels general - contractor to ensure positive drainage to all pavements, turf and planter areas, initial subsoil drainage to planter areas as required.





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[Book] 1: 200 @ A1



LANDSCAPE GENERAL ARRANGEMENT 2
[Draw] 20180199 [Draw No] LD-DA102 [Rev] 1



Appendix 5 Legend for S.T.A.R.S matrix assessment

IACA Significance of a Tree, Assessment Rating System (STARS) © (IACA 2010) ©

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 in June 2001.

The landscape significance of a tree is an essential criterion to establish 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. To assist this process all definitions for terms used in the *Tree Significance - Assessment Criteria* and *Tree Retention Value - Priority Matrix*, are taken from the IACA Dictionary for Managing Trees in Urban Environments 2009.

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 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 for individual trees only, however, can be applied to a monocultural stand in its entirety e.g. hedge.



Table 1.0 Tree Retention Value - Priority Matrix.

		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> <div style="text-align: right;"> </div>						
		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.				
		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.				
		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.				
		Priority for Removal - These trees are considered hazardous, or in irreversible decline, or weeds and should be removed irrespective of development.				

REFERENCES

- Australia ICOMOS Inc. 1999, *The Burra Charter – The Australian ICOMOS Charter for Places of Cultural Significance*, International Council of Monuments and Sites, www.icomos.org/australia
- Draper BD and Richards PA 2009, *Dictionary for Managing Trees in Urban Environments*, Institute of Australian Consulting Arboriculturists (IACA), CSIRO Publishing, Collingwood, Victoria, Australia.
- Footprint Green Pty Ltd 2001, *Footprint Green Tree Significance & Retention Value Matrix*, Avalon, NSW Australia, www.footprintgreen.com.au



Appendix 6 References

- Australia ICOMOS Inc. 1999, *The Burra Charter – The Australian ICOMOS Charter for Places of Cultural Significance*, International Council of Monuments and Sites, www.icomos.org/australia
- Draper BD and Richards PA 2009, *Dictionary for Managing Trees in Urban Environments*, Institute of Australian Consulting Arboriculturists (IACA), CSIRO Publishing, Collingwood, Victoria, Australia.
- Footprint Green Pty Ltd 2001, *Footprint Green Tree Significance & Retention Value Matrix*, Avalon, NSW Australia, www.footprintgreen.com.au
- Harris, R. W; Clark, J.R; & Matheny, N.P (2004). *Arboriculture: Integrated Management of Landscape Trees, Shrubs & Vines* 4th Edition, Prentice Hall, New Jersey
- Shigo, A.L. (1986). *A New Tree Biology*. Shigo & Trees, Associates, Durham, New Hampshire
- Hadlington, P. & Johnston, J. (1988). *Australian Trees: Their Care & Repair*. University of NSW Press, Kensington
- Lonsdale, D. (1999). *Principles of Tree Hazard Assessment & Management*. Forestry Commission, The Stationery Office, London
- Mattheck, C. & Breloer, H. (1994). *The Body Language of Trees*. Research for Amenity Trees No.4. The Stationery Office, London



Appendix 7 Glossary of Terms

Abiotic	Nonliving
Anthracoise	a fungal disease, causing dead areas on the leaves, buds, stems.
Arboriculture	The science and art of caring for trees, shrubs and other woody plants in landscape settings.
Barrier Zone	Protective boundary formed in new wood in response to wounding or other injury.
Biotic	Alive, pertaining to living organisms.
Branch attachment	The structural union of a lateral branch.
Callus	Undifferentiated tissue produced in response to wounding.
Canker	A dead spot or necrotic lesion that is caused by a bark inhabiting organism/pathogen.
Cavity	an open wound characterized by the presence of decay resulting in a hollow.
Collar	the ring of tissue that surrounds the lateral branch at its point of attachment.
Compartmentalization	A physiological process that creates the chemical and physical boundaries that act to limit the spread of disease and decay organisms.
Compression wood	A type of reaction wood that forms on the underside of branches which tends to maintain a branch angle of growth.
Crown	The above ground parts of the tree, including the trunk.
DBH	The diameter of a trees trunk measured at 1.4m.
Decay	Process of degradation of woody tissues by fungi and bacteria through the decomposition of cellulose and lignin.
Decline	Progressive decrease in health of organs or the entire plant usually caused by a series of interacting factors.
Drip line	The width of the crown, as measured by the lateral extent of the foliage.
Epicormic shoot	a shoot that arises from latent or adventitious buds that occur on stems, branches or the bases of trees.
Included bark	Pattern of development at branch junctions where bark is turned inward, rather than pushed out; contrast with the branch bark ridge.
Mortality Spiral	The sequence of events describing a change in the trees health from vigorous to declining to death.
Photosynthesis	The transformation in the presence of chlorophyll and light, of carbon dioxide from (the air) and water (primarily from soil) into a simple carbohydrate and oxygen.
Pruning	systematic removal of branches of a plant usually a woody perennial.
Reaction wood	Specialized secondary xylem that develops in response to a lean or similar mechanical stress to restore the stem to vertical.
Taper	The change in diameter over the length of trunks and branches. Important to mechanical support.
Tension wood	A type of reaction wood that trees form on the upper side of branches and stems and roots.
VTA	Visual Tree Assessment is a method of evaluating structural defects and stability in trees.
Wound	Any injury that induces a compartmentalization response.

Appendix 8, The Ents Tree Consultancy Tree Protection Guidelines

Definitions

- a) **Tree Protection Zone (TPZ)**, The TPZ is divided into 2 areas. 1 The Structural Root Zone delineated by an area nominated in table section 4 of the report and is assumed to contain most structural roots. The Tree Protection Zone that is twelve times the diameter of the tree trunk which is used to gauge the amount of feeder roots. No machinery works are permitted in these areas unless specified in this report or without written approval from the Council or the Arborist employed for this job site.
- b) **Qualified Arborist**, for supervision of works and reports level 5. For carrying out tree works level 3 Levels are recognised by the Australian training framework.

Standards, AS4970 2009, Protection of Trees on development sites. AS 4373: 1996, The pruning of amenity trees.

Tree Protection Generally

1. Prior to works commencing erect a 1800mm chain mesh fence to protect the trees trunk at 12x Dbh or as specified in this report. The Tree Protection Zones as nominated should be marked with line marking paint and observed as an area free from machinery for the duration of the works unless stated otherwise in the accompanying report. Do not remove, alter or relocate without the approval of the Council or the Arborist employed for this site.
2. Trees to be protected in the works contract are items entrusted to the Contractor /owner by the Council for carrying out the work under the Contract. The Contractor/owner has obligations to protect these trees as part of the care of the work in the contract conditions.
3. Prior to commencing work on Site confirm with the Council all trees to be protected for the duration of the Works. Confirm also all access and haulage routes, storage areas, tree protection measures and work procedures. Ensure that the protection measures are in place prior to commencing work.
4. Use suitably qualified Arborist (level 5) to supervise earthworks or activities within the Structural Root Zone of tree, Do not severe roots 50mm or greater, which may cause damage to or affect the health of trees. Pruning of trees by the contractor is not permitted. If pruning works are required a suitably qualified (Minimum level 3) arborist will complete all works in the crown. All root pruning must be completed and documented by the level 5 site arborist.
5. Ensure construction trailers, vehicles and equipment do not come in contact with any tree at any time. Do not locate storage areas within the nominated Tree Protection Zone. Do not deposit or store materials, spoil, contaminants, and waste or washout water within Tree Protection Zones.
6. Take all reasonable precautions to protect trees to be retained on site from damage and decline, maintaining their health during the Contract. Implement recognised best practice industry standards to satisfy horticultural requirements for tree care.
7. Assess and monitor water stress in relation to trees on site. This is of particular importance if earthworks have occurred. Apply sufficient water to the trees on site as required to keep the trees healthy. Immediately report to the Council and site arborist, any trees on site that are injured, damaged or are in decline.

NOTE: Failure to comply with any part of these tree protection guidelines or the Australian standard AS4970 or AS4373 will result in the party breaching the Tree Protection Guidelines taking responsibility for all associated consequences.

Appendix 9 Curriculum Vitae

Education and Qualifications

- 2018 Completing Graduate Certificate in Arboriculture Melbourne University (AQF Level 8).
- Arboriculture Australia 3 Day Tree Anatomy Workshop 2015
- QTRA basic certificate 2014, QTRA Advanced Certificate 2016
- TRAQ Qualification 2014
- 2005 Diploma of Arboriculture (AQF Cert 5), Ryde TAFE. Distinction Pass.
- Barrell Tree Care Workshop- Trees on Construction Sites (Brisbane 2005)
- Tree Logic seminar- Urban Tree Risk Management (Sydney 2005)
- Tree Pathology and Wood Decay Seminar Sydney (2004)
- Excelsior Training Claus Mattheck (Sydney 2001)
- 2000 Tree Climbing Course (AQF Cert 2), Ryde TAFE.
- 1999 Advanced Certificate in Urban Horticulture, (AQF Cert 4), Ryde TAFE. Distinction Pass.
- 1995 Greenkeepers Trade Certificate (AQF 3) Ryde TAFE. Credit Pass.
- 1991 Higher School Certificate.

Conference Attendance/presentation of Scientific Papers

- Barrell Tree Care Workshop- Trees on Construction Sites (Brisbane 2005)
- Tree Logic seminar- Urban Tree Risk Management (Sydney 2005)
- Tree Pathology and Wood Decay Seminar Sydney (2004)
- Excelsior Training Claus Mattheck (Sydney 2001)
- Managing Mature Trees NAAA (Sydney 2000), Presented a Paper "Habitat Value of Mature Trees"

Professional Membership Accreditation

- Institute of Australian Consulting Arborists ACM 0482014
- Arboriculture Australia Member number 2527

Presentation of Scientific Papers

- Managing Mature Trees NAAA (Sydney 2000), Presented a Paper "Habitat Value of Mature Trees"

Industry Experience

- **2004 to Date, Sole Trader, The Ents Tree Consultancy.** Writing of tree reports for development applications, master plans, hazard evaluations, tree management plans and expert witness reports. Hazard assessments, tree surveys and consultations. Clients include The Royal Botanic Gardens Sydney, UNSW Master Planning Works including SIRC building, Tyree Building, DP sports field redevelopment, Sydney University Mays Green Precinct, Taronga Zoo Coastline Precinct, Capital Insight, Campbelltown Hospital Redevelopment, Parramatta Park Trust multiple jobs, Woollahra Council multiple jobs and many other jobs.
- **2003 to 2008, Arborist University of New South Wales.** Survey all trees on site, developed a Tree Management Database. Minimise hazard potential of all trees on site through evaluation and works. Generate and prioritise works and tree assessment-based areas usage, tree conditions and staff required. Development of UNSW Tree Protection Guidelines for master planning works. Acting Supervisor December 2006 to May 2007.
- **2003 Tree management Officer Randwick Council.** Liaise with public to explain and enforce the councils Tree Preservation order. Management of internal staff and contractors. Project management and co-ordination of street tree planting and maintenance.
- **1999 to 2003 Animal Food Production Manager and Arborist.** Management of Koala Food Plantation, Management of animal food supply registry for herbivores/omnivores. Coordination of staff contractors and volunteers. Maintain and manage tree management database, complete tree works within zoo grounds and at zoo owned plantations. Acting supervisor 6-month period 2002 for grounds dept and asset management trade team.
- **1998 to 1999 Sole Trader Techniques Lawn & Garden Consultancy.** Lawn, garden and Tree care. Garden design and maintenance. Tree works and tree removal. Installation of irrigation equipment.
- **1997 to 1998 Greenkeeper / Horticulturist Muirfield Golf Course.** General grounds duties, machinery maintenance, horticultural works, tree works
- **1992 to 1997 Greenkeeper / Horticulturist Ashlar Golf Course.** General grounds duties, machinery maintenance, horticultural works, tree works

1. Standard terms

Please be aware that these are the standard terms to be used across all reports. They should be spelt out fully in the first instance and then contracted. All reports to refer to:

- Sydney Central Business District (CBD) not City, Sydney City etc.
- Sydney Kingsford Smith Airport (the Airport)
- Mascot Campus refers to all of Qantas' Mascot land
- The Site – when referring directly to the site as per attached images
- The Project – when referring to the proposal in its entirety
- Sydney Gateway Project (Gateway)
- Bayside Council Local Government Area (LGA)
- *Botany Bay Local Environmental Plan 2013* (BBLEP 2013)
- Botany Bay Development Control Plan 2013 (BBDCP 2013)

2. glossary

All consultants are to complete a table identifying all technical terms and their contractions to be included into the EIS' Glossary and abbreviations section. The current glossary and abbreviations used are outlined below, all consultants to provide tables in similar format including their own inputs to be incorporated.

GLOSSARY

Term	Definition
The Site	Qantas Airways Limited owned land in Mascot to the north of Sydney Kingsford Smith Airport consisting of Lots 2 & 4 DP 234489, Lot 1 DP 202747, Lot B DP 164829 and Lot 133 DP 659434. Current site improvements include including at-grade car parking for Qantas staff, an industrial shed to store spare aviation parts, a substation, a disused gatehouse, a Sydney Water Asset with two driveways over it, the Qantas catering facility and Qantas tri-generation plant.
The Project	The construction of a new Flight Training Centre and ancillary uses to replace the existing facility on the Qantas Jetbase that will be impacted by RMS' Sydney Gateway Project.
Mascot Campus	Over 19ha of Qantas Airways Limited controlled land in Mascot to the north of Sydney Kingsford Smith Airport consisting of freehold and leased land. The following lots are owned by Qantas: Lot 133 DP 659434; Lots 4 & 5 DP 38594 Lot 23 DP 883548; Lots 1 & 2 DP 738342; Lot 3 DP 230355; Lot 4 DP 537339; Lots 2 & 4 DP 234489; Lot 4 234489; Lot 1 DP 81210; Lot 1 DP 202093; Lot 1 DP 721562; Lot 2 DP 510447; Lot 1 DP 445957; Lot B DP 164829 and Lot 1 DP 202747 and equates to 16.5ha of land. The following lots are leased by Qantas: Lot 14 DP 1199594 and Lot 2 DP 792885 and equates to 2.7ha of land.
Jetbase	Qantas leased land within the boundaries of Sydney Kingsford Smith Airport.
Sydney Gateway Project	A RMS Project including a road and rail component that is intended to increase capacity and improve connections to the ports to assist with growth in passenger, freight and commuter movements across the region, by expanding and improving the existing road and freight rail networks.

ABBREVIATIONS

Acronym	Definition
ARTC	Australian Rail Track Corporation
BBLEP	<i>Botany Bay Local Environmental Plan 2013</i>
CASA	Civil Aviation Safety Authority
EP&A Act	<i>Environmental Planning and Assessment Act 1979</i>
EP&A Regulation	<i>Environmental Planning and Assessment Regulation 2000</i>
FTE	Full-time Equivalent
Gateway	Sydney Gateway Project
ha	Hectares
ISEPP	<i>State Environmental Planning Policy (Infrastructure) 2007</i>
LEP	Local Environmental Plan

Acronym	Definition
LGA	Local Government Area
NSW	New South Wales
Qantas	Qantas Airways Limited
RMS	NSW Roads and Maritime Services
SACL	Sydney Airport Corporation Limited
SEPP	<i>State Environmental Planning Policy</i>
SEPP 55	<i>State Environmental Planning Policy No. 55 - Remediation of Land</i>
SEPP SRD	<i>State Environment Planning Policy (State and Regional Development) 2011</i>
Simulators	Full Motion Flight Simulators
sqm	Square Metres
SSD	State Significant Development
the Airport	Sydney Kingsford Smith Airport
the Department	Department of Planning and Environment
the District Plan	<i>Eastern City District Plan</i> (2018)
the Minister	the Minister for Planning
the Region Plan	<i>A Metropolis of Three Cities – the Greater Sydney Region Plan</i> (2018)
the Strategy	<i>The Future Transport Strategy 2056</i> (2018)

3. Mitigation Measures and Environmental Risk Assessment

The SEARs require an environmental risk analysis to identify potential environmental impacts associated with the proposal.

The following represents the standard way in which risks, impacts and mitigation measures across all reports will be identified and quantified. This will form part of Urbis' EIS, however each consultant will need to prepare a table in the format of table 3 and provide it to Urbis for consolidation / inclusion. This should represent a comprehensive conclusion of all risks, impacts and associated mitigation measures identified across the project. Each consultant's environmental risk analysis will need to be conducted according to the methodology below.

This analysis comprises a qualitative assessment consistent with AS/NZS ISO 31000:2009 *Risk Management–Principles and Guidelines* (Standards Australia 2009). The level of risk was assessed by considering the potential impacts of the proposed development prior to application of any mitigation or management measures.

Risk comprises the likelihood of an event occurring and the consequences of that event. For the proposal, the following descriptors were adopted for 'likelihood' and 'consequence'.

Table 1 – Risk Descriptors

LIKELIHOOD		CONSEQUENCE	
A	Almost certain	1	Widespread and/or irreversible impact
B	Likely	2	Extensive but reversible (within 2 years) impact or irreversible local impact
C	Possible	3	Local, acceptable or reversible impact
D	Unlikely	4	Local, reversible, short term (<3 months) impact
E	Rare	5	Local, reversible, short term (<1 month) impact

The risk levels for likely and potential impacts were derived using the following risk matrix.

Table 2 – Risk Matrix

		LIKELIHOOD				
		A	B	C	D	E
CONSEQUENCE	1	High	High	Medium	Low	Very Low
	2	High	High	Medium	Low	Very Low
	3	Medium	Medium	Medium	Low	Very Low
	4	Low	Low	Low	Low	Very Low
	5	Very Low	Very Low	Very Low	Very Low	Very Low

The results of the environmental risk assessment for the proposed development are presented in **Table 3** and are based upon the range of technical and specialist consultant reports appended to this EIS.

The table has directly related mitigation measures responding to each impact (satisfying the SEAR for a consolidated summary of all proposed mitigation measures) also based upon the range of technical and specialist consultant reports appended to this EIS.

It is considered that with the mitigation measures required the impacts resulting from the proposal will be acceptable.

Table 3 – Risk Assessment and Mitigation Measures During Construction

Matter	Potential Impact	Likelihood	Consequence	Risk Level	Proposed Mitigation Measures
Trees	Damage to trees identified as being retained	C	2	Medium	<p>Adherence to all mitigation measures identified in Arboricultural Impact Assessment, including:</p> <ul style="list-style-type: none"> • Appointment of Site Arborist: A site arborist shall be appointed prior to the commencement of work on site. The Site Arborist shall clearly mark out all trees to be removed and ensure that all trees documented for retention are preserved with the implementation of tree protection zones, fencing and signage. The Site Arborist shall have a minimum qualification equivalent to a NSW TAFE Certificate Level 5 or above in Arboriculture. • Inspection Points: The Arborist will be given 5 working days notice to allow inspections to be undertaken at the following stages: • Installation of Tree Protection Zones including Tree Protection Fencing, Silt Fencing and Signage to be inspected and approved by the Site Arborist; • Any modification of the Tree Protection Zone will be discussed inspected and approved by the Site Arborist; • Works within the Tree Protection Zone will be supervised by the Site Arborist; and • Completion of Construction Works by the Site Arborist and Site Supervisor. • Education: Contractors and site workers shall receive a copy of these specifications prior to the commencement of work. Contractors and site workers undertaking any works within a TPZ shall sign the site log to confirm that they have read and understand these specifications prior to their undertaking. • Tree Protection Zones: Where applicable, all trees to be retained through the construction process shall be protected from mechanical damage and the indirect impacts of the construction process with the installation of Tree Protection Zones and sympathetic construction techniques.

Matter	Potential Impact	Likelihood	Consequence	Risk Level	Proposed Mitigation Measures
					<ul style="list-style-type: none"> • Tree Protection Fencing: Tree Protection Fencing shall be installed at the perimeter of the TPZ or as described in the Arborist report. As a minimum the Tree Protection Fencing shall be 1.8 meters high temporary chain fencing. This shall be fastened and supported to prevent sideways movement. The trees woody roots shall not be damaged during the installation of this Tree Protection Fencing. This Tree Protection Fencing shall be erected prior to the commencement of works on site and shall be maintained for the duration of the construction process. • Signage: Tree Protection Signage shall be attached to the TPZ and displayed in a prominent location. These signs shall be repeated in 10m intervals or closer where the fence changes direction. These shall be a minimum of a 72 font size and each sign at least 600 x 500mm. • Mulching: The area within the TPZ shall be mulched and maintained with 80mm of leaf litter mulch for the duration of the construction process. This mulch shall be spread by hand to limit the impact on underlying roots and shall be installed prior to the commencement of works on site. The Site Arborist shall inspect and approve the TPZ including mulching, signage, Tree Protection Fencing, Silt fencing and Signage prior to the commencement of works on site. • Site Management: Materials and waste storage, site sheds and temporary services shall not be located within the TPZ unless specified. Storage points shall be covered when not in use and be no greater than 2m in height. • Works within the TPZ: The TPZ may need to be modified during the works to allow access between the protected tree and the proposed construction. The TPZ shall remain as specified and only those works detailed in the proposed construction undertaken. All works within the TPZ will need to be approved by the AQF level5 site arborist. The works may need to be supervised by the AQF level 5 Arborist in the TPZ and will need to be supervised in the SRZ.

Matter	Potential Impact	Likelihood	Consequence	Risk Level	Proposed Mitigation Measures
					<ul style="list-style-type: none"> Completion of Works within specified TPZ: Upon the completion of works within a TPZ the protective fencing shall be reinstated as specified. Where the construction of new structures does not allow for the reinstallation of fencing the TPZ shall be modified by the Site Arborist.