7. ABOVE GROUND DEFECTS

7.1 IN SUMMARY

7.1.1 Above ground defects have been grouped under the categories of *Significant Inclusions, Deadwood, Branch Failure, Branch/Trunk Damage and Sunscald.* These five groupings were first adopted in the TWM report *Aerial Inspection Assessment of Figs, 2007* (undertaken in Hyde Park North only). The same categories were adopted for the 2012 assessment *Visual Tree Assessment (VTA) and Aerial Inspection* 2012.

7.1.2 During the aerial inspection from the 25 metre EWP, each individual defect was identified by height above the ground and bearing from centre of trunk and diameter. The assessor was Peter Castor the author of this report. This detail allowed the pruning contractor to locate the particular defect and prune accordingly during follow-up pruning works. The follow-up pruning works in 2007 were undertaken by CoS contractor TLC and certified by CoS. The summary table of defects from the 2007 report for the Central Avenue Hill's Figs only is presented below.

7.1.3 The purpose of Table 2 below is to demonstrate the reoccurrence of defects between 2007 and 2012 in Hyde Park North (Hyde Park South only assessed in 2012) despite the crown pruning undertaken. This is a reflection of the age and declining vigour of the planting and the expected or accelerated re-occurrence of the defects as the trees age. The 2012 aerial inspection was undertaken using the same defect categorisation, the same recording details and the same assessor.

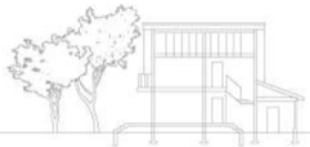
Table 3: Above Ground Defects in the Central Avenue Trees in Hyde Park NORTH

Year of Assessment	NUMBER OF TREES WITH EACH DEFECT									
	Significant Inclusions		Deadwood		Branch Failure		Branch/Trunk Defect		Sunscald	
	No.	%	No.	%	No.	%	No.	%	No.	%
2007 (79 trees)	5	**6**	74	**94**	14	**18**	13	**16**	10	**13**
2012 (75 trees)	9	**12**	42	**56**	17	**23**	39	**52**	17	**23**

7.1.4 The 2012 aerial inspection included the Central Avenue Figs in Hyde Park South. The extent of above ground defects in Hyde Park South is illustrated in Table 3 below

Table 4: Above Ground Defects in the Central Avenue Trees in Hyde SOUTH

Year of Assessment	NUMBER OF TREES WITH EACH DEFECT									
	Significant Inclusions		Deadwood		Branch Failure		Branch/Trunk Defect		Sunscald	
	No.	%	No.	%	No.	%	No.	%	No.	%
2007 (0 trees)	NA	-	NA	-	NA	–	NA	-	NA	-
2012 (22 trees)	5	**23**	14	**64**	4	**18**	11	**50**	9	**41**



7.2 SIGNIFICANT INCLUSIONS

7.2.1 In the TWM 2007 and 2012 aerial assessment reports, bark inclusions were recorded for the subject trees.

7.2.2 Inclusion (bark inclusion) refers to branch or trunk junctions with included bark (as opposed to occluded bark) within the branch union. The condition affects the junctions of co-dominant stems (predominantly) that is stems of equal or about equal size and deviating from one another at an acute angle, each trying to form the main trunk or branch. The bark covering the common wood at and immediately below such junctions grows into the wood and when it does the junction is weakened[2]. These junctions can be potentially unstable (predisposed to split) and are considered to be a defect. It is generally accepted in Arboricultural practice that bark inclusions are common in Hill's Figs. Marsden (The Sugar Factory, 2009) notes:

> *"While included bark is recognised as a defect, the condition is common to Hill's Figs and it would not be an appropriate treatment to remove all branches or fell all trees that display this characteristic. Not all branches with included bark fail. Anecdotally and empirically, failure due to included bark appears to be the exception and not the rule, given the high incidence of included bark on Hill's Figs and the relatively few reports of failure."*
>
> *"However, the tree assessor is required to reasonably foresee the failure of defective parts and put in place measures that will minimise or eliminate the risk of injury or damage to persons and property."*

7.2.3 In December 2000 a Park user was injured by a falling live branch from a Hill's Fig in Central Ave. The subject limb failed due to a bark inclusion. In the Judgement handed down by the NSW Supreme Court (Yun Hee Choi v City of Sydney Council & 4 others [2007] NSWSC 65, 2007) at Clause 18, Arboricultural Expert David Ford stated:

> *"This wound is as a result of a failed junction between two branches [inclusion], and I am informed that the falling branch section caused the injury to your client .....*
> *A distinct inclusion line is visible on a junction in the main branch, evidence of another, larger, weak junction."*

At Clause 23 Judge Barr stated:

> *"I am satisfied that the phototropic growth of the branch towards the west caused it to become significantly end-weighted and that the tree became unable to bear its weight at a fork weakened by included bark."*

7.2.4 A total of 5 trees (6%) recorded significant inclusions in 2007 (out of a total of 79 trees assessed) and a total of 14 trees (14%) recorded significant inclusions in 2012 (out of a total of 97 trees assessed). New trees have been recorded in 2012 due to improvements in the understanding of what constitutes a "significant" inclusion in Hill's Figs. The last two trees to fail in circumstances associated with significant inclusions were Trees 101N and 102N even though the attached Tree Schedule indicates that the reason for removal was "*storm damage*". Under reporting of significant inclusions is possible

7.2.5 It is worth noting that the vast majority of significant inclusions in the Central Avenue Figs occur in 1st or 2nd Order limbs, with very few observed high in the crown.

[2] NSW Supreme Court (Yun Hee Choi v City of Sydney Council & 4 others [2007] NSWSC 65, 2007) Clause 10

7.2.6 Reduction pruning (as per 7.3.2 and Fig. 5 of *AS4373 – 2007 Pruning of amenity trees*) has been recommended (TWM 2007 and TWM 2012) as an alternative to the complete removal of major limbs (1st or 2nd Order[3]) in specific trees where severe, included branch junctions, limb failure wounds, damaged limbs or sunscald damage have been recorded.

7.2.7 The aim of this type of pruning is to reduce the potential wind loading (leverage) on defective limbs, by shortening the branch beyond (distal end) the defect. It is generally accepted that shorter structures are more stable and less prone to collapse than are taller or longer structures[4]. Lonsdale 1999 notes:

> *"Wind-induced stresses can be reduced very effectively by shortening the 'lever arm' of the structure [106]. This is done by reducing the height of the tree or the length of an individual hazardous branch and by repeating such treatment if subsequent growth re-creates the hazard. The simplest assumption is that the amount of height or length reduction required is in proportion to the severity of the defect. Thus a fairly modest shortening, perhaps two or three metres for a 20-metre-high tree, can often significantly lessen the mechanical stresses."*

7.2.8 By retaining, rather than removing 1st or 2nd Order branches, entire trees can be retained, thus reducing the number of gaps formed in the avenue planting and gaps created in individual canopies. Reduction pruning is favoured over whole branch removal as further sunscald damage is likely where large sections of canopy are opened up.

7.2.9 A 20% reduction prune was recommended and undertaken on trees containing significant inclusions. These inclusions still exist in 2013, but the likelihood of failure has been reduced by the end load weight reduction. It is estimated that the individual trees will take approximately 3-5 years to replace the same leaf area as existed prior to the 2012 pruning. This estimation was supported by the Citywide AQF Level 5 staff who undertook the monitoring and pruning works in Central Avenue.

7.3 DEADWOOD

7.3.1 In the 2007 (Hyde Park North only) and 2012 aerial assessments, all deadwood with a diameter greater than 50mm was recorded as a separate defect for each tree. The diameter, height above ground and bearing from centre of trunk was recorded on the Tree Schedule to guide follow-up pruning. A bulk number of dead branches 20mm - 50mm diameter for each tree was recorded. Deadwood formation in the crown of a tree is a natural process. Deadwood formation will increase as a tree approaches an Over-mature age class.

7.3.2 For the Hill's Figs in Central Avenue included in this review, a total of 74 trees (94%) recorded deadwood in 2007 (out of a total of 79 trees assessed) and a total of 56 trees (58%) recorded deadwood in 2012 (out of a total of 97 trees assessed). Follow-up pruning was undertaken by Council's contractor TLC in 2007 for the Hyde Park North Figs identified with deadwood. We understand that since 2007 the frequency of inspections and pruning has increased. Despite this increase in inspection and pruning, 58% of trees still contained deadwood reflecting the mature age class and declining vigour and condition.

[3] A 1st Order branch arises from the main trunk. A 2nd Order branch arises from a 1st Order branch and so on.
[4] This is also applicable to trees and tree branches.

7.3.3 Deadwood falling from trees up to 26 metres in overall height can cause injury. The likely severity of injury will vary with size of the deadwood.

7.4 BRANCH FAILURE

7.4.1 In the 2007 (Hyde Park North only) and 2012 aerial assessments previous branch failure wounds were recorded where the wound was severe enough to allow further decay, potentially causing that limb to become defective. Failed limbs that were caught up in the canopy and were hanging were recorded as "hangers".

7.4.2 For the Hill's Figs in Central Avenue included in this review, a total of 14 trees (18%) recorded branch failure in 2007 (out of a total of 79 trees assessed) and a total of 21 trees (22%) recorded branch failure in 2012 (out of a total of 97 trees assessed). Some branch failure defects could not be removed by pruning. New branch failures were recorded (e.g. T220N) in the intervening period. It should be noted that branch failure is a separate crown defect from sunscald or branch/trunk damage.

7.4.3 Branch failure related wounds will continue into the future and to some degree will be related to the frequency and direction of storm winds as well as declining tree vigour and condition. The Citywide staff during on-site interview of 25 March, 2013 noted that trees exposed to the south suffered live limb drop most frequently. Trees 61N, 12N, 11N, 13N, 245N and 246N were noted as particularly prone to small diameter limb failure following southerly wind storms.

7.5 BRANCH/TRUNK DAMAGE

7.5.1 In the 2007 (Hyde Park North only) and 2012 aerial assessments, trunk and branch damage was recorded where it was deemed to be a potential hazard and where pruning could reduce or remove the hazard. There was a variety of damage recorded including; rubbing limbs, dieback of internal suppressed branches and other storm or mechanical damage. Where heavy "dieback" of branches was encountered with live epicormic growth at the base, the diameter of the branch at the position of the deadwood (dead end) was recorded

7.5.2 The recommendation is to undertake reduction pruning and in some instances to "lop" these suppressed "dieback" branches to remove the deadwood at the end, rather than remove the entire branch at the branch collar. The removal of the entire branch would, in most instances, initiate sunscald or epicormic growth on adjacent branches which is not a desired outcome. Many of the "dieback" branches were 1st Order branches and to remove these at branch collar would impact upon tree form. Rubbing branches (usually one or other) and other damaged branches are to be removed at nearest branch collar unless otherwise stated.

7.5.3 For the Hill's Figs in Central Avenue included in this review, a total of 13 trees (16%) recorded branch/trunk damage in 2007 (out of a total of 79 trees assessed) and a total of 50 trees (52%) recorded branch/trunk damage in 2012 (out of a total of 97 trees assessed). Some recordings were common to both studies (e.g. T61N and T79N) indicating that the damage could not or was not removed by pruning in 2007. Several new incidents of branch/trunk damage were found in Hyde Park North in 2012 (e.g. T80N, T81N and T82N).

7.5.4 Branch/trunk damage type crown defects will continue into the future and to some degree will be related to the frequency and direction of storm winds as well as declining tree vigour and condition.

7.6 SUNSCALD

7.6.1 In the 2007 (Hyde Park North only) and 2012 aerial assessments, damage caused by sun exposure following complete removal of adjacent trees was recorded. This damage appears initially as flaking and scaly bark, but often progresses to advanced decay with potential or actual branch fracture such as that which occurred in Tree 242N (Photo B). Epicormic growth has in some instances provided shading of exposed branches, but in other instances significant open bark wounds are present several years following the removal of an adjacent tree. Reduction pruning to approximately 20% of total leaf area of that particular damaged branch was recommended in instances where there was an opportunity for the wound to occlude.

7.6.2 For the Hill's Figs in Central Avenue included in this review, a total of 10 trees (13%) recorded sunscald in 2007 (out of a total of 79 trees assessed) and a total of 26 trees (27%) recorded sunscald in 2012 (out of a total of 97 trees assessed).

7.6.3 In some instances the entire branch has been pruned to the nearest branch collar where future wound occlusion was unlikely. There will however be the potential for new sunscald damage to adjacent branches which will need to be monitored. Crown pruning, where possible, should be undertaken during Autumn to minimise further sunscald damage to adjacent branches. Individual whole tree removal if required in the future should be undertaken during Autumn to similarly reduce the likelihood of sunscald damage to adjacent trees.

7.6.4 The tree removal in September 2005 (Spring) may have led to more sunscald damage during the Summer of 2005/2006 than if the works had been undertaken in Autumn.

7.6.5 The trees with sunscald damage will need ongoing monitoring from an EWP. The Tree Schedule contained in the 2012 report should be used to guide the assessor. Most sunscald damage is not visible from ground level and so cannot be monitored from a ground level Visual Tree Assessment (VTA).

8. CURRENT TREE MONITORING & MAINTENANCE

8.1 OVERALL RISK

8.1.1 The *Arboricultural Hazard Assessment* 2011 by UTM assessed the trunk defects associated with soil borne pathogens such as *Phellinus spp., Armillaria luteobubalina and Phytophthora*. In that report the ISA Hazard Rating Method was used which considers *failure potential*, *size of part (being assessed)* and *target rating* to provide a score between 3 and 12. This Hazard Rating only considers the hazard feature being assessed and does not allow for other, albeit less significant hazard element. Crown defects were not included in the Hazard Rating.

8.1.2 The *Arborist's Hazard Appraisal (Air Knife*) 2005 by TWM also assessed trunk defects associated with *Phellinus spp.* The Hazard Rating system used by TWM adapted the ISA Method by adding "*Other risk factor"* category with possible scores 0-2 which allows for total Hazard Rating scores 3-14 (rather than 12). "*Other risk factor"* did not consider crown defects (inclusions, deadwood, limb/trunk damage or sunscald).

8.1.3 The ISA Hazard Rating Method has limitations when assessing large trees (Size of part - 4) in public spaces with heavy (Constant use - 4) people movements. Even for trees with a low failure potential – 1 (with no trunk decay detected) will have a score of 9 from a possible 12.

8.1.4 The ISA Hazard Rating method needs to be applied to each individual hazard feature.

8.1.5 Public events within Hyde Park are increasing in size and frequency. Many events involve semi-permanent displays, structures beneath the canopy of Central Avenue trees. Such intensification of use increases the risk to Park users and infrastructure.

8.2 VTA-TYPE MONITORING

8.2.1 Citywide have the contract to monitor and manage the trees in Hyde Park including the Central Avenue Hill's Figs. At an on-site interview with Citywide Arboricultural staff the following points were made:

- VTA-type walk over inspections of Central Avenue are undertaken weekly by an AQF Level 5 Arborist.
- Specific VTA-type inspections are made following significant wind storms and prior to public events being held beneath the canopy spread of the trees.
- Following VTA–type inspections required pruning works are scheduled and undertaken.
- Trees exposed to southerly winds suffer more live limb damage than other trees. The following trees were identified in particular: Trees 61N, 12N, 11N, 13N, 245N and 246N.
- Cockatoo damage to small twigs and leaves was noted on Tree 184N. This a new type of crown damage not previously recorded.
- The general level of live and deadwood falling has been reduced by the 2012 hazard reduction pruning.

- It was confirmed that the time required for trees to return to the pre 2012 level of crown defect (deadwood, branch failure, branch/trunk damage) would be 2-3 years. The same period of time would be required for the 20% crown reduction leaf area to be replaced, returning those trees to pre-2012 levels of failure risk. It was confirmed that existing sunscald damage needs to be monitored. It was confirmed that epicormic growth will assist in protecting trees from further sunscald damage. Epicormic growth should be thinned only where necessary to reduce limb drop potential.

8.2.2 Independent Arborist are engaged at the request of CoS to undertaken specific tree management tasks as required.

8.3 PRUNING CERTIFICATION

8.3.1 The crown pruning undertaken by TLC in 2007 following the TWM aerial inspection report 2007 was certified by CoS.

8.3.2 The crown pruning undertaken by Citywide in 2012 following the VTA and Aerial inspection report 2012 was certified by TWM in October, 2012. Prior to the commencement of the pruning works in 2012 a briefing and trial pruning was undertaken to ensure the pruning contractor had a clear understanding of the hazard reduction pruning works required. In particular the whole tree 20% reduction pruning specification was trialled. The certification of the pruning works was undertaken from ground level using binoculars of the pruning specification.

8.3.3 The risk related to crown defects would have been minimised immediately following this detailed pruning program. Refer to 9.3 *Mitigating Strategies* for discussion of tree defects into the future.

8.4 SOIL DISEASE MANAGEMENT

8.4.1 We understand CoS, with assistance from RBG, are monitoring the incidence and spread of disease within the Central Avenue trees. We are not aware of Citywide's role in disease monitoring. Persons undertaking rootcrown assessments and inspections for fungal fruiting bodies should have specific training from RBG on fungal identification.

8.4.2 TWM has been engaged since 2003 to assess and report of disease incidence in the Hyde Park trees. On 19 June, 2012 TWM collected woody tissue samples from the base of twenty seven (27) trees (predominantly in Central Avenue) for DNA testing by RBG. The results of this testing for these tested trees was negative for fungal pathogens for all samples except for Tree 52N which was positive for *Ganoderma applanatum* a white rot fungus. A non-critical decay pocket was detected in this tree in the UTM report 2011.

8.4.3 TWM 2012 report included a VTA which included a rootcrown search for fungal fruiting bodies. Few fruiting bodies were recorded in the *Comments/Observations* column in the Tree Schedules of that 2012 report. Trees 69S and 84S had fruiting bodies recorded. Trunk decay has been reported by both TWM 2005 and UTM 2011 for these two trees.

8.4.4 The management of soil borne diseases will be limited by the existing poor sub-soil drainage conditions. In the event of tree removal, stump removal needs to be complete.

9. BLOCK REMOVALS AND ALTERNATIVE STRATEGIES

9.1 PLAN OF MANAGEMENT AND MASTERPLAN 2006

9.1.1 The proposed block removal and replacement of the Central Avenue Hill's Figs has been in print since the PoM and Masterplan 2006.

9.1.2 The block removal proposal is similarly detailed and recommended in the TMP 2006. The TMP 2006 at page 33 states:

> *"While dramatic, this is the only known and accepted approach to create growing conditions that allow for the uniform and consistent habit characteristic of avenues" (Tree Masterplan for Centennial Parkland 2002)*

We concur with this statement, however we support an alternate three stage option.

9.2 NATURAL ATTRITION (IN-FILL PLANTING)

9.2.1 The "*natural attrition"* alternative removal and tree replacement option is detailed at 7.2 of the TMP.

9.2.2 Given the tall and expansive crowns of the existing trees, the opportunity for symmetrical, crown growth of new replacement trees is extremely limited. The gaps created by the recent removal are, in many instances, small and have been further reduced in size by subsequent crown growth from adjacent trees. The gap on the western side of the Avenue adjacent to Trees 61N, 60N and 58N (Photo L) demonstrates the very limited opportunity for uniform growth of new plantings. A new tree planted into these gaps will grow towards the available light (under the principles of phototropism) and result in heavily skewed crown growth. Trees planted in the outer rows will grow towards the open spaces over the adjacent lawn areas.

9.2.3 This phototropism principle is demonstrated by existing plantings. Tree 10N is a mature Tallowwood, *Eucalyptus microcorys* growing adjacent to Hill's Figs 248N and 246N (Photo K). The trunk and crown of Tree 10N have been "forced" towards the west over the open lawn area.

9.2.4 Similarly there several heavily suppressed Hill's Figs located in the inner two rows of the Central Avenue. Hill's Fig 238N (Photo I) displays heavy suppression due to the competition from adjacent Hill's Figs. This suppression has resulted despite all the surrounding trees being of the same age. If Tree 238N were to be removed and replanted, the level of suppression would be such that the new replacement tree would grow very poorly. It is likely that the form of the tree will be "forced" up towards the existing available light in the very small canopy gap overhead.

9.2.5 The gap adjacent to Trees 58N, 60N and 61N was created by recent tree failures and removals due primarily to an *Armillaria luteobubalina* hot spot (as indicated on page 47 of the TMP. It is unknown whether the disease has been eradicated from this area. Tree 58N (Photo M) still displays rootcrown symptoms typical of *Armillaria luteobubalina* activity. Planting new trees into this gap without the opportunity for extensive soil removal or remediation could result in the premature death of the new trees. The block removal proposal allows for such soil remediation works to be undertaken.

9.2.6 The *natural attrition*, in-fill type removal and replacement option similarly does not allow for a systematic installation of subsoil drains which have been identified as a significant problem for the planting, which is likely to have supported the disease outbreaks. With piecemeal in-fill planting the subsoil drains will be difficult to construct with accurate fall to collection pits. Damage will occur to the roots of retained trees adjacent, further damaging these trees and exacerbating the existing disease problem. Tree pits 2-3 times the diameter of the new tree container are recommended in the SESL soil report. This extent of tree pit excavation will require the cutting of roots of adjacent to retained trees.

9.2.7 A block removal option will allow for the complete removal of diseased root plates of existing and previously removed trees and the extensive removal, grading and remediation of the soil profile.

9.2.8 Natural attrition removal will create more gaps in the planting. Wind loading is altered on adjacent trees when gaps are created which can lead to limb or whole tree failures. The Citywide staff confirmed 25 March, 2013 that most small limb failure occur in the southern exposure canopy gaps. In plantation forestry, tree failures at the edge of logging/felling coups, is a constant management issue. Dense, suppressed plantings will be more prone to edge effects than open, well spaced plantings. The Hill's Figs in the two inner rows on the Central Avenue are certainly sheltered from winds by the surrounding trees.

9.2.9 The in-fill planting of new trees adjacent to mature existing trees will not only cause phototropism problems for the crown growth, there will also be root competition from the adjacent trees potentially leading to stunted trees. This root competition will vary depending upon the proximity and number of adjacent trees, but will reduce the growth capacity of the new plantings to less than that that would be expected from new trees planted into a block removal open space.

9.2.10 A block removal option includes the staging of replanting with a single batch of selected stock, propagated from a superior specimen which had no observable 1st, 2nd or 3rd Oder bark inclusions. An infill, *natural attrition* option, which would require ad-hoc, unscheduled replanting, would not allow for a uniform batch of trees to be supplied.

9.2.11 In the event that an adjacent tree was to fail (trunk decay) or split (bark inclusion) damage could result to the new planting. Furthermore, in the event that adjacent trees need to be removed, the new plantings could be damaged depending upon crane access.

9.2.12 A *natural attrition* type removal and replanting is not appropriate in this instance, given the risk of whole tree failure. If the trees were to decline in a less catastrophic manner, there may be greater opportunity for infill replanting. A large number of trees have been identified with existing decay. More trees are expected to exhibit decay in the near future.

Despite the regular testing of the extent of decay and failure propensity, there is no guarantee that failures will not occur.

9.3 MINI-BLOCK REMOVAL

9.3.1 *Mini*-block removal and replacement implies something between the block removal and natural attrition removal option. There are no clear demarcations within the existing planting where such *mini*-blocks exist or could be created. The current block removal option uses existing major paths and Park Street to define the extent of removal. The staging of the removals allows for a buffering of the visual impacts.

9.3.2 We do not support the splitting north-south removing the eastern side or the western side of any particular *mini*-block. Altered wind loadings and exposure of the often heavily suppressed two inner rows of trees will lead to dramatic and unacceptable visual impacts and likely tree failures.

9.3.3 The removal and replanting of every 2nd or 3rd tree will have the same problems as the *natural attrition* option in that the potential growth of new trees will be compromised by adjacent trees and root damage to adjacent trees will result.

9.3.4 In some situations a new row of trees can be planted, parallel to the existing planting. Anzac Avenue Moore Park is such an example. In the case of Central Avenue Hyde Park it is not feasible to create a new row to the east and the west of the existing planting given the limited open space, the need to remove many other significant trees, the demand for open lawn areas and the inability of such wide planting to recreate the cathedral-like crown formation.

9.3.5 The wider spacing between the Archibald trees could possibly allow for individual trees to be removed rather than taking all seven (7) at once. However the original c1930 circle of trees has been so significantly broken by the recent removals, that there seems to be no merit in adopting a compromised, *mini*-block removal strategy.

9.4 MITIGATION STRATEGIES

9.4.1 Mitigating strategies which might increase the life expectancy of the existing planting are limited. The primary impediment is the Mature (approaching over-mature) age class of the planting.

9.4.2 The capacity of the individual trees to "defend" against disease infections is reduced as the trees age. Central Avenue trees with existing decay (49 from 99, UTM 2011) will continue to decay at an ever increasing rate.

9.4.3 The close spacing of trees has led to trees with limited leaf area and limited photosynthate production, particularly for the trees in the two inner rows. Many of the trees in the inner rows are comprised predominantly of epicormic shoots. Limited starch reserves, combined with Mature age, do not provide a good platform upon which to commence a strategy to increase life expectancy.

9.4.4 The disease problem will be exacerbated by a *natural attrition* (in-fill) type removal and replacement option. Root damage leading to further disease infection will occur to existing trees as part of new tree planting works. Soil improvement works around existing plantings is not simple and must usually be done with great care, by hand, so as to avoid damaging roots as far as possible (SESL page 34). In our opinion hand trenching on this scale would be cost prohibitive and root damage will be inevitable.

9.4.5 The SESL 2005 report goes further and at 7.3.3 states:

> *"While a range of options is given below to attempt improvements of the existing F. hillii avenue soil conditions there is little doubt that complete removal and soil replacement is the only perfectly satisfactory option."*

There are very few options for the control of this group of fungi [*Phellinus*] (Royal Botanic Gardens Trust, 2004).

9.4.6 The life expectancy of the planting is driven by the risk. The risk relates to the visitations (people movements). These visitations are not likely to decrease but in fact are increasing. Limiting people movements beneath the trees is an unlikely proposition, from our understanding of the demands on the Park and in particular the Central Avenue. It is not possible to fence off particular canopies as is often done with other dangerous, venerable trees.

9.4.7 Reducing the risk related to crown defects could be achieved by increasing the frequency of monitoring and increase in pruning frequency. There is however, no absolute certainty about limb drop (dead or live) or whole tree failure. The trees are constantly exposed to whatever weather conditions prevail. These weather conditions are becoming less predictable, making the management of tree risk even more challenging.

9.4.8 The sunscald damaged trees (26 from 99 TWM 2012) which continue to decay will similarly require increased EWP (aerial) monitoring. This is an expensive operation requiring large machines. A potential strategy for future tree removal would be to undertake removal in Autumn rather than Spring to lessen the likelihood of summer sunscald. Installation of shade cloth over exposed limbs on adjacent trees to crown heights of 26 metres is not a feasible option in a Hyde Park, given the significant visual impacts such installations would create.

ATTACHMENT A: PHOTOS

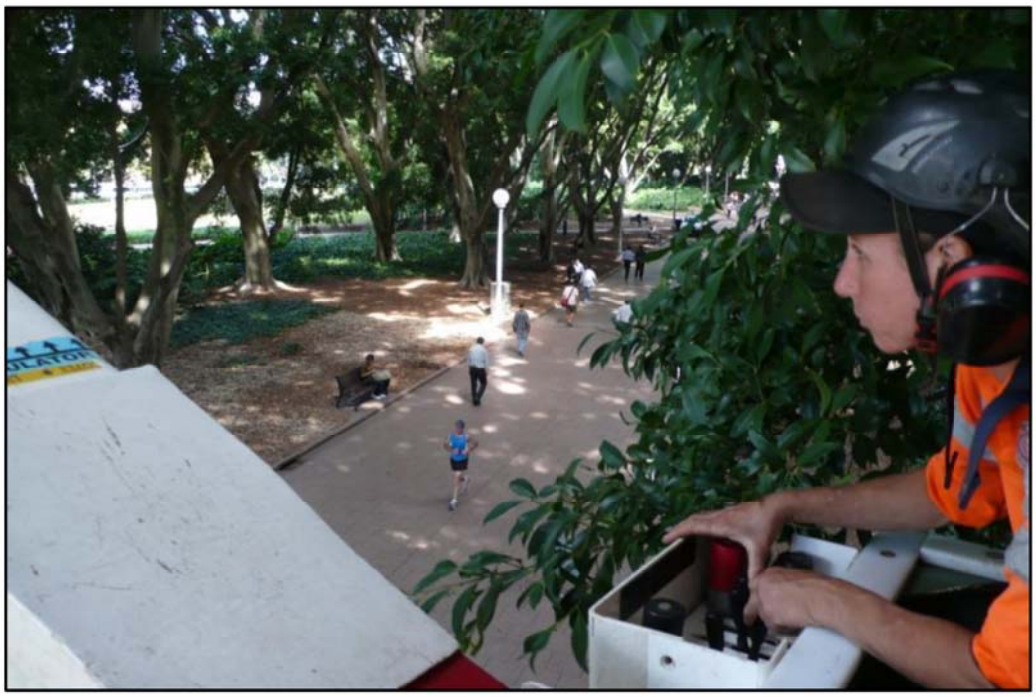


Photo A: Use of the 25m elevated Work Platform (EWP) to access all areas of the canopy for aerial inspection.

Photo B: Advanced sunscald damage leading to branch fracture (T242N).

Photo C: Typical sunscald damage showing advanced wood decay and associated structural defect (Tree 242N).

Photo D: Typical sunscald damage on the top surface of branches. This damage is often not visible from the ground due to the angle of the branch and the epicormic shoots in the view line. Degree of wound occlusion is variable and requires annual ongoing monitoring.

Photo E: Sunscald on Tree 144N in 2007. This damage is a result of the removal of Tree 254N in September 2005.

Photo F: Typical included branch junction (rare 3rd Order limb) to be treated with caution due to failure (splitting) potential. Reduction pruning to approximately 20% of leaf area of the crown beyond (distal) the junction has been recommended and undertaken.

Photo G: Epicormic growth associated with increased light levels after adjacent tree removal. Overcrowding of epicormic growth has been recommended for thinning on select trees

Photo H: Typical fruiting body of *Phellinus sp.* (Tree 1S). Ongoing rootcrown inspections and internal diagnostic testing is required to ensure the internal decay pocket does not become critical.

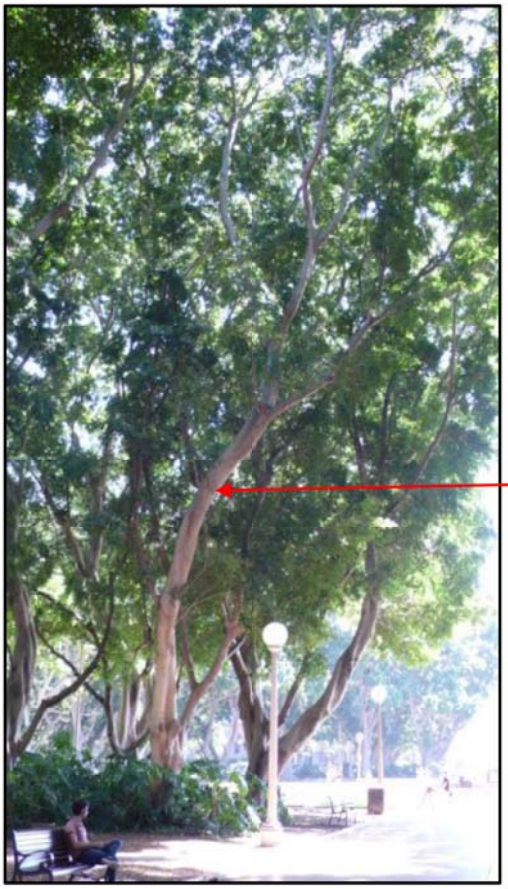


Photo I: Heavily skewed (suppressed) form of existing Tree 238N (25.03.13). If a new tree were to be planted in this location the growth of the new tree would be significantly more skewed (suppressed).

Photo J: View of the small crown gap above Tree 238N (Photo H). A new planting in this location would "reach" for this very small gap overhead. The growth of the new tree would be significantly suppressed.

Photo K: Heavily skewed (suppressed) form of existing Tallowwood Tree 10N (25.03.13) adjacent to Hill's Figs T248N and T246N. New Hill's Fig plantings in gaps on the outside rows will grow with an even greater level of crown skew due to the competition for available light

Photo L: Existing gap (outer row) adjacent to Trees 58N, 60N and 61N. The canopy of adjacent trees has enveloped a major portion of the air space over the gap such that a new planting will be heavily suppressed due to limited available light.

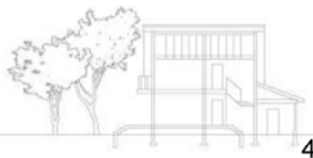
Photo M: Base of Tree 58N (25.03.13) showing typical symptoms of *Armillaria luteobubalina* damage. An *Armillaria luteobubalina* hot spot is recorded (TMP 2006) in this locality. In-fill planting of a new tree in this locality without complete soil removal, soil remediation could result in the death of the new planting and further root damage to Tree 58N.

Photo N: Photo D from TWM Report 1458 dated 16/8/04 indicating advanced decay within the root crown of Tree 64N.

Photo O: Cut stump (September, 2005) showing internal decay as mapped in the report of Tree Wise Men® Australia Pty Ltd (ref: 1487 dated September 2004).

.

ATTACHMENT B: TREE SCHEDULES



SCHEDULE OF CENTRAL AVENUE HILL'S FIGS, HYDE PARK (APRIL, 2013)

Hyde Park North

TREE No.	DBH (m)	HEIGHT (m)	CANOPY RADIUS (m)	AGE CLASS	VIGOUR	CONDITION	SRZ CALC	SRZ RADIUS (m)	TPZ CALC	TPZ RADIUS (m)	SULE	REMOVAL DATE	REASON FOR REMOVAL									ABOVE GROUND DEFECTS										BELOW GROUND DEFECTS									
																						TWM 2007						TWM 2012						TWM 2005						UTM 2011			
													Unknown Reason (U)	Failed (F)	Storm Damage (SD)	Decay/Hollow (D/H)	Inclusion (I)	Construction Damage (CD)	Fruiting Body/Phellinus (F/P)	Phytophthora (P)	Armillaria (A)	Significant Inclusions (I)	Deadwood (DW)	Branch Failure (BF)	Branch/Trunk Damage (B/D)	Sunscald (S)	Significant Inclusions (I)	Deadwood (DW)	Branch Failure (BF)	Branch/Trunk Damage (B/D)	Sunscald (S)	No Decay (a)	Some Decay (b)	Decay that fails Mattheck (c)	Decay that has broken out into Buttresses (d)	Not Assessed (NA)	No Decay (a)	Some Decay (b)	Decay that fails Mattheck (c)	Decay that has broken out into Buttresses (d)
11 N	1.0	26	N4, S8, E8, W12	M	G	F	3.3	3.3	12.0	12.0	S												DW			S						a					a			
12 N	1.3	26	N8, S8, E8, W6	M	F	F	3.7	3.7	15.6	15.0	S												DW					DW				a						b		
13 N	1.3	26	N8, S8, E8, W12	M	G	F	3.7	3.7	15.6	15.0	S												DW	BF				DW	BF			a					a			
50 N	1.1	26	N4, S10, E8, W8	M	G	F	3.4	3.4	13.2	13.2	S																	DW								NA		b		
51 N	1.4	26	N6, S10, E6, W12	M	G	F	3.8	3.8	16.8	15.0	S												DW	BF				DW	BF	B/D		a						b		
52 N	1.1	26	N8, S8, E8, W5	M	G	F	3.4	3.4	13.2	13.2	S												DW									a						b		
53 N	1.2	26	N8, S8, E8, W12	M	G	F	3.6	3.6	14.4	14.4	S												DW					DW		B/D		a						b		
54 N	0.7	26	N6, S1, E6, W4	M	G	P	2.8	2.8	8.4	8.4	S														B/D					B/D		a					a			
55 N	1.2	26	N6, S6, E6, W12	M	G	P	3.6	3.6	14.4	14.4	S												DW			S		DW			S	a						b		
56 N	0.9	26	N6, S3, E6, W6	M	G	F	3.2	3.2	10.8	10.8	S												DW			S				B/D		a					a			
57 N											Rm	05					I															b								

TREE No.	DBH (m)	HEIGHT (m)	CANOPY RADIUS (m)	AGE CLASS	VIGOUR	CONDITION	SRZ CALC	SRZ RADIUS (m)	TPZ CALC	TPZ RADIUS (m)	SULE	REMOVAL DATE	REASON FOR REMOVAL									ABOVE GROUND DEFECTS										BELOW GROUND DEFECTS									
																						TWM 2007						TWM 2012						BELOW GROUND DEFECTS									
																																TWM 2005					UTM 2011			
													Unknown Reason (U)	Failed (F)	Storm Damage (SD)	Decay/Hollow (D/H)	Inclusion (I)	Construction Damage (CD)	Fruiting Body/Phellinus (F/P)	Phytophthora (P)	Armillaria (A)	Significant Inclusions (I)	Deadwood (DW)	Branch Failure (BF)	Branch/Trunk Damage (B/D)	Sunscald (S)	Significant Inclusions (I)	Deadwood (DW)	Branch Failure (BF)	Branch/Trunk Damage (B/D)	Sunscald (S)	No Decay (a)	Some Decay (b)	Decay that fails Mattheck (c)	Decay that has broken out into Buttresses (d)	Not Assessed (NA)	No Decay (a)	Some Decay (b)	Decay that fails Mattheck (c)	Decay that has broken out into Buttresses (d)
58 N	0.8	26	N6, S6, E6, W4	M	G	P	3.0	3.0	9.6	9.6	S												DW							BF	B/D	S		b				a			
59 N											Rm	04									A																				
60 N	1.2	26	N6, S8, E8, W8	M	G	F	3.6	3.6	14.4	14.4	S													BF							S	a					a			
61 N	1.2	26	N8, S8, E6, W10	M	G	P	3.6	3.6	14.4	14.4	S												DW		B/D			DW	BF	B/D			b					b		
77 N											Rm	05		F																										
78 N	1.1	26	N4, S12, E10, W8	M	G	F	3.4	3.4	13.2	13.2	S												DW	BF					BF	B/D						NA	a			
79 N	1.3	26	N4, S10, E12, W8	M	G	F	3.7	3.7	15.6	15.0	S												DW		B/D		I			B/D		a					a			
80 N	1.0	26	N6, S8, E4, W5	M	G	F	3.3	3.3	12.0	12.0	S												DW	BF						B/D		a					a			
81 N	1.2	26	N6, S6, E14, W6	M	G	F	3.6	3.6	14.4	14.4	S												DW					DW	BF	B/D		a					a			
82 N	0.9	26	N4, S4, E3, W6	M	G	F	3.2	3.2	10.8	10.8	S												DW							B/D		a						b		
83 N	1.2	26	N6, S5, E14, W6	M	G	F	3.6	3.6	14.4	14.4	S												DW					DW		B/D		a					a			

TREE No.	DBH (m)	HEIGHT (m)	CANOPY RADIUS (m)	AGE CLASS	VIGOUR	CONDITION	SRZ CALC	SRZ RADIUS (m)	TPZ CALC	TPZ RADIUS (m)	SULE	REMOVAL DATE	REASON FOR REMOVAL									ABOVE GROUND DEFECTS										BELOW GROUND DEFECTS									
																						TWM 2007						TWM 2012						BELOW GROUND DEFECTS									
																																TWM 2005					UTM 2011			
													Unknown Reason (U)	Failed (F)	Storm Damage (SD)	Decay/Hollow (D/H)	Inclusion (I)	Construction Damage (CD)	Fruiting Body/Phellinus (F/P)	Phytophthora (P)	Armillaria (A)	Significant Inclusions (I)	Deadwood (DW)	Branch Failure (BF)	Branch/Trunk Damage (B/D)	Sunscald (S)	Significant Inclusions (I)	Deadwood (DW)	Branch Failure (BF)	Branch/Trunk Damage (B/D)	Sunscald (S)	No Decay (a)	Some Decay (b)	Decay that fails Mattheck (c)	Decay that has broken out into Buttresses (d)	Not Assessed (NA)	No Decay (a)	Some Decay (b)	Decay that fails Mattheck (c)	Decay that has broken out into Buttresses (d)
84 N	0.8	26	N6, S6, E6, W6	M	G	F	3.0	3.0	9.6	9.6	S												DW					DW		B/D			b					a			
85 N	1.3	26	N8, S6, E12, W10	M	G	P	3.7	3.7	15.6	15.0	S												DW			S		DW	BF	B/D		a						b		
86 N	1.0	26	N5, S6, E3, W8	M	G	F	3.3	3.3	12.0	12.0	S												DW						BF	B/D		a						b		
87 N											Rm	05							F/P		A																			
88 N											Rm	09					I					I	DW									b								
89 N	1.3	26	N6, S8, E12, W12	M	G	P	3.7	3.7	15.6	15.0	S												DW			S			BF			a						b		
101 N											Rm	11			SD								DW	BF								a						b		
102 N											Rm	11			SD								DW		B/D							a						b		
103 N	1.2	26	N4, S8, E5, W10	M	G	F	3.6	3.6	14.4	14.4	S												DW	BF				DW				a						b		
142 N											Rm	04	U																											
143 N											Rm	05		F																										

TREE No.	DBH (m)	HEIGHT (m)	CANOPY RADIUS (m)	AGE CLASS	VIGOUR	CONDITION	SRZ CALC	SRZ RADIUS (m)	TPZ CALC	TPZ RADIUS (m)	SULE	REMOVAL DATE	REASON FOR REMOVAL									ABOVE GROUND DEFECTS										BELOW GROUND DEFECTS								
																						TWM 2007						TWM 2012						BELOW GROUND DEFECTS								
																																TWM 2005					UTM 2011		
													Unknown Reason (U)	Failed (F)	Storm Damage (SD)	Decay/Hollow (D/H)	Inclusion (I)	Construction Damage (CD)	Fruiting Body/Phellinus (F/P)	Phytophthora (P)	Armillaria (A)	Significant Inclusions (I)	Deadwood (DW)	Branch Failure (BF)	Branch/Trunk Damage (B/D)	Sunscald (S)	Significant Inclusions (I)	Deadwood (DW)	Branch Failure (BF)	Branch/Trunk Damage (B/D)	Sunscald (S)	No Decay (a)	Some Decay (b)	Decay that fails Mattheck (c)	Decay that has broken out into Buttresses (d)	Not Assessed (NA)	No Decay (a)	Some Decay (b)	Decay that fails Mattheck (c)	Decay that has broken out into Buttresses (d)
144 N	1.1	26	N12, S5, E6, W8	M	G	P	3.4	3.4	13.2	13.2	S												DW			S					S	a						b		
153 N											Rm	05					I				A												c							
154 N											Rm	05					I			P	A												c							
155 N											Rm	05					I			P	A												c							
159 N											Rm	04	U																											
160 N											Rm	05								P												c							
162 N											Rm	05				D/H		CD														c							
167 N											Rm	05				D/H				P	A												c							
168 N											Rm	09					I			P	A		DW	BF									b							
169 N	1.2	25	N6, S12, E10, W8	M	G	F	3.6	3.6	14.4	14.4	S											I	DW		B/D		I	DW		B/D	S	a				a			
170 N											Rm	05				D/H																c							

TREE No.	DBH (m)	HEIGHT (m)	CANOPY RADIUS (m)	AGE CLASS	VIGOUR	CONDITION	SRZ CALC	SRZ RADIUS (m)	TPZ CALC	TPZ RADIUS (m)	SULE	REMOVAL DATE	REASON FOR REMOVAL									ABOVE GROUND DEFECTS										BELOW GROUND DEFECTS								
																						TWM 2007						TWM 2012					BELOW GROUND DEFECTS								
																																TWM 2005					UTM 2011			
													Unknown Reason (U)	Failed (F)	Storm Damage (SD)	Decay/Hollow (D/H)	Inclusion (I)	Construction Damage (CD)	Fruiting Body/Phellinus (F/P)	Phytophthora (P)	Armillaria (A)	Significant Inclusions (I)	Deadwood (DW)	Branch Failure (BF)	Branch/Trunk Damage (B/D)	Sunscald (S)	Significant Inclusions (I)	Deadwood (DW)	Branch Failure (BF)	Branch/Trunk Damage (B/D)	Sunscald (S)	No Decay (a)	Some Decay (b)	Decay that fails Mattheck (c)	Decay that has broken out into Buttresses (d)	Not Assessed (NA)	No Decay (a)	Some Decay (b)	Decay that fails Mattheck (c)	Decay that has broken out into Buttresses (d)
171 N	1.1	25	N8, S4, E8, W10	M	F	F	3.4	3.4	13.2	13.2	S												DW						DW			S	a					a			
172 N	0.9	25	N6, S8, E2, W6	M	F	F	3.2	3.2	10.8	10.8	S												DW								B/D		a					a			
173 N	1.1	25	N10, S10, E10, W8	M	F	F	3.4	3.4	13.2	13.2	S												DW						DW				a						b		
174 N	0.7	25	N5, S5, E2, W8	M	F	F	2.8	2.8	8.4	8.4	S												DW						DW				a					a			
175 N	1.0	25	N5, S8, E10, W8	M	F	F	3.3	3.3	12.0	12.0	S												DW						DW				a					a			
176 N	1.4	22	N8, S6, E6, W8	M	P	F	3.8	3.8	16.8	15.0	S												DW						DW		B/D		a						b		
177 N	1.0	22	N8, E6, S6, W8	M	F	F	3.3	3.3	12.0	12.0	S												DW								B/D		a						b		
184 N	1.4	25	N8, S12, E10, W8	M	G	F	3.8	3.8	16.8	15.0	S												DW					I	DW				a						b		
185 N	1.1	25	N10, S12, E6, W6	M	G	P	3.4	3.4	13.2	13.2	S												DW						DW				a							c	
186 N	1.2	25	N12, S12, E4, W5	M	G	F	3.6	3.6	14.4	14.4	S												DW					I			B/D		a						b		
188 N	1.4	26	N8, S8, E8, W10	M	G	F	3.8	3.8	16.8	15.0	S												DW					I	DW		B/D		a					a			

TREE No.	DBH (m)	HEIGHT (m)	CANOPY RADIUS (m)	AGE CLASS	VIGOUR	CONDITION	SRZ CALC	SRZ RADIUS (m)	TPZ CALC	TPZ RADIUS (m)	SULE	REMOVAL DATE	REASON FOR REMOVAL									ABOVE GROUND DEFECTS										BELOW GROUND DEFECTS								
																						TWM 2007						TWM 2012						BELOW GROUND DEFECTS								
																																TWM 2005					UTM 2011			
													Unknown Reason (U)	Failed (F)	Storm Damage (SD)	Decay/Hollow (D/H)	Inclusion (I)	Construction Damage (CD)	Fruiting Body/Phellinus (F/P)	Phytophthora (P)	Armillaria (A)	Significant Inclusions (I)	Deadwood (DW)	Branch Failure (BF)	Branch/Trunk Damage (B/D)	Sunscald (S)	Significant Inclusions (I)	Deadwood (DW)	Branch Failure (BF)	Branch/Trunk Damage (B/D)	Sunscald (S)	No Decay (a)	Some Decay (b)	Decay that fails Mattheck (c)	Decay that has broken out into Buttresses (d)	Not Assessed (NA)	No Decay (a)	Some Decay (b)	Decay that fails Mattheck (c)	Decay that has broken out into Buttresses (d)
189 N	0.9	25	N6, S5, E8, W4	M	F	G	3.2	3.2	10.8	10.8	S												DW							B/D		a					a			
190 N	0.9	25	N6, S6, E10, W1	M	G	F	3.2	3.2	10.8	10.8	S												DW							B/D		a					a			
191 N	1.1	25	N6, S6, E8, W12	M	G	F	3.4	3.4	13.2	13.2	S												DW					DW		B/D		a					a			
192 N	1.1	25	N6, S8, E10, W2	M	G	F	3.4	3.4	13.2	13.2	S												DW							B/D			b					b		
193 N	1.0	25	N10, S8, E8, W8	M	G	F	3.3	3.3	12.0	12.0	S												DW		B/D					B/D		a						b		
194 N	1.0	26	N8, S6, E4, W12	M	G	F	3.3	3.3	12.0	12.0	S												DW	BF									b				a			
195 N	1.2	26	N10, S6, E10, W10	M	G	F	3.6	3.6	14.4	14.4	S												DW		B/D			I	DW				a				a			
218 N	1.3	26	N5, S12, E12, W8	M	G	F	3.7	3.7	15.6	15.0	S												DW					I			B/D			b					b		
219 N	1.3	26	N4, S5, E12, W12	M	F	F	3.7	3.7	15.6	15.0	S												DW						DW		B/D		a					b		
220 N	1.4	26	N12, S12, E5, W8	M	G	F	3.8	3.8	16.8	15.0	S											I	DW							BF				b				b		
226 N											Rm	05				D/H																		d						

TREE No.	DBH (m)	HEIGHT (m)	CANOPY RADIUS (m)	AGE CLASS	VIGOUR	CONDITION	SRZ CALC	SRZ RADIUS (m)	TPZ CALC	TPZ RADIUS (m)	SULE	REMOVAL DATE	REASON FOR REMOVAL									ABOVE GROUND DEFECTS										BELOW GROUND DEFECTS								
																						TWM 2007						TWM 2012						BELOW GROUND DEFECTS								
																																TWM 2005					UTM 2011		
													Unknown Reason (U)	Failed (F)	Storm Damage (SD)	Decay/Hollow (D/H)	Inclusion (I)	Construction Damage (CD)	Fruiting Body/Phellinus (F/P)	Phytophthora (P)	Armillaria (A)	Significant Inclusions (I)	Deadwood (DW)	Branch Failure (BF)	Branch/Trunk Damage (B/D)	Sunscald (S)	Significant Inclusions (I)	Deadwood (DW)	Branch Failure (BF)	Branch/Trunk Damage (B/D)	Sunscald (S)	No Decay (a)	Some Decay (b)	Decay that fails Mattheck (c)	Decay that has broken out into Buttresses (d)	Not Assessed (NA)	No Decay (a)	Some Decay (b)	Decay that fails Mattheck (c)	Decay that has broken out into Buttresses (d)
227 N	1.3	25	N8, S8, E10, W10	M	G	F	3.7	3.7	15.6	15.0	S													BF		S	I				S	a					a			
228 N	1.5	25	N12, S4, E10, W12	M	F	F	3.9	3.9	18.0	15.0	S													BF		S				B/D	S		b				b			
229 N											Rm	05				D/H																	c							
235 N	1.3	26	N12, S5, E8, W10	M	G	F	3.7	3.7	15.6	15.0	S												DW			S		DW			S	a					a			
236 N	1.2	26	N12, S6, E6, W8	M	G	F	3.6	3.6	14.4	14.4	S												DW					DW		B/D			b				a			
237 N	1.2	26	N5, S5, E4, W14	M	G	F	3.6	3.6	14.4	14.4	S												DW					DW								NA	a			
238 N	0.8	26	N4, S3, E5, W4	M	G	F	3.0	3.0	9.6	9.6	S												DW					DW		B/D		a					a			
239 N	1.3	26	N6, S6, E5, W12	M	G	F	3.7	3.7	15.6	15.0	S												DW					DW	BF				b				a			
240 N											Rm	04	U																											
241 N	1.2	26	N8, S6, E8, W8	M	G	P	3.6	3.6	14.4	14.4	S												DW	BF				DW	BF		S		b					b			
242 N	1.0	26	N6, S6, E6, W8	M	G	F	3.3	3.3	12.0	12.0	S											I	DW			S				B/D	S	a					a			

TREE No.	DBH (m)	HEIGHT (m)	CANOPY RADIUS (m)	AGE CLASS	VIGOUR	CONDITION	SRZ CALC	SRZ RADIUS (m)	TPZ CALC	TPZ RADIUS (m)	SULE	REMOVAL DATE	REASON FOR REMOVAL									ABOVE GROUND DEFECTS										BELOW GROUND DEFECTS								
																						TWM 2007						TWM 2012						BELOW GROUND DEFECTS								
																																TWM 2005				UTM 2011			
													Unknown Reason (U)	Failed (F)	Storm Damage (SD)	Decay/Hollow (D/H)	Inclusion (I)	Construction Damage (CD)	Fruiting Body/Phellinus (F/P)	Phytophthora (P)	Armillaria (A)	Significant Inclusions (I)	Deadwood (DW)	Branch Failure (BF)	Branch/Trunk Damage (B/D)	Sunscald (S)	Significant Inclusions (I)	Deadwood (DW)	Branch Failure (BF)	Branch/Trunk Damage (B/D)	Sunscald (S)	No Decay (a)	Some Decay (b)	Decay that fails Mattheck (c)	Decay that has broken out into Buttresses (d)	Not Assessed (NA)	No Decay (a)	Some Decay (b)	Decay that fails Mattheck (c)	Decay that has broken out into Buttresses (d)
243 N	1.1	26	N6, S4, E6, W8	M	G	P	3.4	3.4	13.2	13.2	S												DW	BF				DW			S		b				b		
244 N	1.0	26	N6, S5, E6, W3	M	G	F	3.3	3.3	12.0	12.0	S												DW							B/D		a				a			
245 N	0.9	26	N3, S4, E6, W3	M	F	F	3.2	3.2	10.8	10.8	S												DW	BF								a					b		
246 N	2.2	26	N5, S5, E3, W12	M	G	F	4.6	4.6	26.4	15.0	S												DW					DW		B/D		a					b		
248 N	1.2	26	N6, S6, E4, W10	M	G	F	3.6	3.6	14.4	14.4	S												DW					DW	BF				b					b		
249 N											Rm	05				D/H																		d						
250 N											Rm	05				D/H																		c						
251 N	1.3	26	N5, S8, E4, W12	M	G	G	3.7	3.7	15.6	15.0	S										I		DW					DW	BF			a					a			
254 N											Rm	05				D/H																		c						
255 N	1.3	26	N10, S6, E10, W5	M	G	P	3.7	3.7	15.6	15.0	S												DW				I	DW		BD	S		b				b		
256 N	0.9	26	N5, S6, E4, W8	M	G	P	3.2	3.2	10.8	10.8	S												DW					DW				a					a			

TREE No.	DBH (m)	HEIGHT (m)	CANOPY RADIUS (m)	AGE CLASS	VIGOUR	CONDITION	SRZ CALC	SRZ RADIUS (m)	TPZ CALC	TPZ RADIUS (m)	SULE	REMOVAL DATE	REASON FOR REMOVAL									ABOVE GROUND DEFECTS										BELOW GROUND DEFECTS									
																						TWM 2007						TWM 2012						BELOW GROUND DEFECTS									
																																TWM 2005					UTM 2011			
													Unknown Reason (U)	Failed (F)	Storm Damage (SD)	Decay/Hollow (D/H)	Inclusion (I)	Construction Damage (CD)	Fruiting Body/Phellinus (F/P)	Phytophthora (P)	Armillaria (A)	Significant Inclusions (I)	Deadwood (DW)	Branch Failure (BF)	Branch/Trunk Damage (B/D)	Sunscald (S)	Significant Inclusions (I)	Deadwood (DW)	Branch Failure (BF)	Branch/Trunk Damage (B/D)	Sunscald (S)	No Decay (a)	Some Decay (b)	Decay that fails Mattheck (c)	Decay that has broken out into Buttresses (d)	Not Assessed (NA)	No Decay (a)	Some Decay (b)	Decay that fails Mattheck (c)	Decay that has broken out into Buttresses (d)
257 N	1.7	26	N5, S5, E12, W3	M	G	F	4.1	4.1	20.4	15.0	S												DW		B/D			DW		B/D	S	a					a			
259 N	1.0	26	N5, S10, E6, W8	M	G	P	3.3	3.3	12.0	12.0	S												DW		B/D						S		b				b			
260 N	1.3	26	N8, S8, E12, W4	M	G	P	3.7	3.7	15.6	15.0	S												DW		B/D				BF		S		b				b			
261 N											Rm	05				D/H																	c							
262 N	1.2	26	N3, S4, E12, W5	M	G	P	3.6	3.6	14.4	14.4	S												DW			S		DW			S	a						b			
263 N	1.0	26	N5, S5, E5, W8	M	G	F	3.3	3.3	12.0	12.0	S												DW		B/D					B/D		a						b			
264 N	1.2	26	N6, S6, E10, W8	M	G	F	3.6	3.6	14.4	14.4	S												DW		B/D			DW		B/D		a					a			
265 N	0.9	26	N4, S4, E2, W5	M	G	F	3.2	3.2	10.8	10.8	S												DW					DW	BF			a					a			
266 N	1.1	26	N6, S5, E10, W2	M	G	F	3.4	3.4	13.2	13.2	S												DW		B/D							a						b			
267 N	1.1	26	N5, S5, E5, W6	M	G	F	3.4	3.4	13.2	13.2	S												DW					DW	BF			a						b			
268 N	0.6	26	N2, S2, E6, W1	M	F	P	2.7	2.7	7.2	7.2	S												DW							B/D		a					a			

TREE No.	DBH (m)	HEIGHT (m)	CANOPY RADIUS (m)	AGE CLASS	VIGOUR	CONDITION	SRZ CALC	SRZ RADIUS (m)	TPZ CALC	TPZ RADIUS (m)	SULE	REMOVAL DATE	REASON FOR REMOVAL									ABOVE GROUND DEFECTS										BELOW GROUND DEFECTS								
																						TWM 2007						TWM 2012						BELOW GROUND DEFECTS								
																																TWM 2005					UTM 2011		
													Unknown Reason (U)	Failed (F)	Storm Damage (SD)	Decay/Hollow (D/H)	Inclusion (I)	Construction Damage (CD)	Fruiting Body/Phellinus (F/P)	Phytophthora (P)	Armillaria (A)	Significant Inclusions (I)	Deadwood (DW)	Branch Failure (BF)	Branch/Trunk Damage (B/D)	Sunscald (S)	Significant Inclusions (I)	Deadwood (DW)	Branch Failure (BF)	Branch/Trunk Damage (B/D)	Sunscald (S)	No Decay (a)	Some Decay (b)	Decay that fails Mattheck (c)	Decay that has broken out into Buttresses (d)	Not Assessed (NA)	No Decay (a)	Some Decay (b)	Decay that fails Mattheck (c)	Decay that has broken out into Buttresses (d)
269 N	1.1	26	N8, S4, E10, W8	M	G	F	3.4	3.4	13.2	13.2	S												DW					DW		B/D		a						b		
43 N*											Rm	Pre 04	U																											
94 AN*											Rm	Pre 04	U																											
95 N*											Rm	Pre 04	U																											
107 N*											Rm	Pre 04	U																											
119 N											Rm	Pre 04	U																											
123 N*											Rm	Pre 04	U																											
124 N*											Rm	Pre 04	U																											
50 NT?											Rm	Pre 04	U																											
89 NT?											Rm	Pre 04	U																											
109													12	2	2	9	6	1	1	5	7	5	74	14	13	10	9	42	17	39	17	58	19	11	2	3	37	39	1	0

Rm	TOTAL	34

TREE NUMBER – (*Based on currently adopted City of Sydney tree numbering system*)
N denotes location of tree in Hyde Park North and **S** denotes location of tree in Hyde Park South. **N*** denotes earlier (pre 2004) tree numbering system used. **NT?** denotes unnumbered tree with reference to the number of the tree adjacent to assist in locating. All trees in Hyde Park North and South have been numbered on the Plans in accordance with this numbering format.

DBH - Diameter at Breast Height - (*Based on TWM Report FinalRevC1487-2012Mon July, 2012)*
Tree trunk diameter measured at breast height (1.4 metres above ground level). Fabric diameter tape is used which assumes a circular cross section. Multiple measurements indicate multiple trunks. Where more than three trunks exist, the DBH indicated as the diameter "@ grade". Where DBH measurement cannot be taken at 1.4m, the height at which it has been taken, is indicated.

CANOPY SPREAD RADIUS - (*Based on TWM Report FinalRevC1487-2012Mon July, 2012)*
– Average canopy radius (widest + narrowest ÷ 2). Circular canopy depictions on Tree Plans are indicative only. Where canopy spread was significantly skewed, all four cardinal point measurements were recorded.

AGE CLASS - (*Based on TWM Report FinalRevC1487-2012Mon July, 2012)*
Immature (IM), Semi-mature (SM), Mature (M), Over-mature (OM). Assessment of the tree's current Age. A **Mature (M)** tree has reached a near stable size (biomass) above and below ground. Trees can have a Mature age class for >80% of life span. **Over-mature (OM)** trees show symptoms of irreversible decline and decreasing biomass.

VIGOUR – (*Based on TWM Report FinalRevC1487-2012Mon July, 2012)*
Good (G), Fair (F) or Poor (P). The general appearance of the canopy/foliage of the tree at the time of inspection. Vigour can vary with the season and rainfall frequency. A tree can have Good vigour but be hazardous due to Poor condition. A tree in Good vigour has the ability to sustain its life processes. Vigour is synonymous with health.

CONDITION – (*Based on TWM Report FinalRevC1487-2012Mon July, 2012)*
Good (G), Fair (F) or Poor (P). The general form and structure of the trunk/s and branching. Trunk lean, trunk/branch structural defects, canopy skewness or other hazard features identified in Aerial assessment and below ground findings of UTM 2011 report.

TPZ RADIUS – Tree Protection Zone - (*Based on TWM Report FinalRevC1487-2012Mon July, 2012)*
Radial offset (m) of twelve times (12X) trunk DBH measured from centre of trunk (for trees less than 0.2 metre DBH minimum TPZ is 2.0 metres). To satisfactorily retain a tree construction activity (both soil cut and fill) must be restricted within this offset. TPZ offsets are rounded to the nearest 0.1 metre. Existing constraints to root spread can vary TPZ. Generally an area equivalent to the TPZ should be available to the tree post development. Encroachment occupying up to 10% of the TPZ area is acceptable without detailed rootzone assessment. Encroachments greater than 10% require specific arboricultural assessment. Encroachments up to 25% may be justified depending upon tree species and type of encroachment.

SULE - Safe Useful Life Expectancy - (*Based on TWM Report FinalRevC1487-2012Mon July, 2012 and UTM 2011 report)*
A systematic pre-development tree assessment procedure developed by Jeremy Barrell, Hampshire, England. The SULE method used in this assessment has been adapted for simplified use within the field. It gives a length of time that the Arborist feels a particular tree can be retained with an acceptable level of risk based on the information available at the time of the inspection. SULE ratings are **Long (L)** (retainable for 40 years or more with an acceptable level of risk), **Medium (M)** (retainable for 15-40 years), **Short (S)** (retainable for 5-15 years) and **Removal (Rm)** (tree requiring immediate removal due to imminent hazard or absolute unsuitability).

REMOVAL DATE - (*Based on data supplied by City of Sydney Council and in TWM Report FinalRevC1487-2012Mon July, 2012)*
Date of removal as documented.

REASON FOR REMOVAL - (*Based on data supplied by City of Sydney Council and in TWM Report FinalRevC1487-2012Mon July, 2012)*
Apart from "*Unknown Reason*" reason for removal could be based on more than one defect.

ABOVE GROUND DEFECTS – (*Based on TWM Report 1487Aerial dated May, 2007 and TWM Report FinalRevC1487-2012Mon July, 2012). Note there was no assessment of Hyde Park South in 2007.* Aerial Inspections undertaken via a 25 metres reach Elevated Work Platform (EWP). Defects were recorded during the aerial inspection. The defects recorded were as follows: **Inclusions (I), Deadwood (DW), Branch Failure (BF), Branch/Trunk Damage (B/D), Sunscald (S).**

Significant Inclusion (I): This refers to branch or trunk junctions with included (as opposed to occluded) bark within the branch union. These junctions can be potentially unstable (predisposed to split) and for the purpose of this report are considered to be defect. Note: only significant inclusions have been recorded where obvious included bark was contained on both sides of the junction.

Deadwood (DW): All deadwood with a diameter greater than 50mm was recorded as individual limbs. A bulk number of dead branches between 20mm - 50mm diameter for each tree was recorded.

Branch Failure (BF): Previous branch failure wounds were recorded where the wound was severe enough to allow further decay, potentially causing that limb to become defective.

Branch/Trunk Damage (B/D): Trunk and branch damage was recorded where it was deemed to be a potential hazard and where pruning could reduce or remove the hazard. There was a variety of damage recorded including; rubbing limbs, dieback of internal suppressed branches and other storm or mechanical damage. Where heavy "dieback" of branches was encountered with live epicormic growth at the base, the diameter of the branch at the position of the deadwood was recorded.

Sunscald (S): Cambial damage caused by sun exposure following complete removal of adjacent trees was recorded. This damage appears initially as flaking and scaly bark, but often progressing to advanced decay with potential or actual branch fracture.

BELOW GROUND DEFECTS – (*Based on TWM Report 1605AK dated September, 2005 and UTM Report 14053 dated October, 2011)*
Whilst the methodologies for data collection differed, the four "categories of decay" used to describe the trees was as follows:

***(a)* No decay**
***(b)* Some decay**
(c) Decay that fails Mattheck
***(d)* Decay that has broken out into buttresses**
(NA) Not Assessed

SCHEDULE OF CENTRAL AVENUE HILL'S FIGS, HYDE PARK (APRIL, 2013)

Hyde Park South

TREE No.	DBH (m)	HEIGHT (m)	CANOPY RADIUS (m)	AGE CLASS	VIGOUR	CONDITION	TPZ RADIUS (m)	SULE	REMOVAL DATE	REASON FOR REMOVAL									ABOVE GROUND DEFECTS						BELOW GROUND DEFECTS									
																			TWM 2007	TWM 2012					TWM 2005					UTM 2011				
										Unknown Reason (U)	Failed (F)	Storm Damage (SD)	Decay/Hollow (D/H)	Inclusion (I)	Construction Damage (CD)	Fruiting Body/Phellinus (F/P)	Phytophthora (P)	Armillaria (A)	HYDE PARK SOUTH NOT ASSESSED	Significant Inclusions (I)	Deadwood (DW)	Branch Failure (BF)	Branch/Trunk Damage (B/D)	Sunscald (S)	No Decay (a)	Some Decay (b)	Decay that fails Mattheck (c)	Decay that has broken out into Buttresses (d)	Not Assessed (NA)	No Decay (a)	Some Decay (b)	Decay that fails Mattheck (c)	Decay that has broken out into Buttresses (d)	Not Assessed (NA)
13 S								Rm	06				D/H															NA					
14 S	0.7	19	N5, S6, E8, W10	M	G	P	8.4	S													DW			S						b			
61 S								Rm	05				D/H														c						
62 S	0.7	20	N8, S10, E8, W10	M	G	G	8.4	S															B/D			b			a				
63 S	0.8	20	N6, S8, E10, W10	M	G	F	9.6	S													DW		B/D	S		b			a				
64 S								Rm	04		F																						
65 S	0.7	20	N8, S8, E8, W8	M	G	P	8.4	S																S		b				b			
66 S								Rm	04							F/P																	
67 S								Rm	04							F/P																	
68 S								Rm	05				D/H														c						

TREE No.	DBH (m)	HEIGHT (m)	CANOPY RADIUS (m)	AGE CLASS	VIGOUR	CONDITION	TPZ RADIUS (m)	SULE	REMOVAL DATE	REASON FOR REMOVAL										ABOVE GROUND DEFECTS							BELOW GROUND DEFECTS									
																				TWM 2007	TWM 2012						TWM 2005					UTM 2011				
										Unknown Reason (U)	Failed (F)	Storm Damage (SD)	Decay/Hollow (D/H)	Inclusion (I)	Construction Damage (CD)	Fruiting Body/Phellinus (F/P)	Phytophthora (P)	Armillaria (A)	HYDE PARK SOUTH NOT ASSESSED	Significant Inclusions (I)	Deadwood (DW)	Branch Failure (BF)	Branch/Trunk Damage (B/D)	Sunscald (S)	No Decay (a)	Some Decay (b)	Decay that fails Mattheck (c)	Decay that has broken out into Buttresses (d)	Not Assessed (NA)	No Decay (a)	Some Decay (b)	Decay that fails Mattheck (c)	Decay that has broken out into Buttresses (d)	Not Assessed (NA)
69 S	0.7	22	N4, S8, E10, W10	M	G	P	8.4	S													I	DW			S		b					b			
70 S								Rm	05				D/H															c							
71 S	0.8	21	N6, S8, E8, W6	M	G	F	9.6	S													I	DW	BF	B/D	S	a					a			
72 S								Rm	05				D/H																d						
73 S	0.7	21	N5, S8, E10, W8	M	G	F	8.4	S														DW	BF			a						b			
74 S	0.9	21	N4, S8, E5, W10	M	F	F	10.8	S														DW					b				a				
75 S	0.8	21	N8, S6, E8, W8	M	G	F	9.6	S														DW				a					a				
76 S	0.9	21	N8, S8, E6, W8	M	F	F	10.8	S																BD	S		b				b				
77 S	1.1	21	N6, S12, E10, W12	M	G	F	13.2	S														DW		B/D	S	a					a				
78 S								Rm	05				D/H															c							
79 S	0.9	22	N6, S8, E8, W10	M	G	F	10.8	S														DW				a					a				

TREE No.	DBH (m)	HEIGHT (m)	CANOPY RADIUS (m)	AGE CLASS	VIGOUR	CONDITION	TPZ RADIUS (m)	SULE	REMOVAL DATE	REASON FOR REMOVAL									ABOVE GROUND DEFECTS						BELOW GROUND DEFECTS									
																			TWM 2007	TWM 2012					TWM 2005					UTM 2011				
										Unknown Reason (U)	Failed (F)	Storm Damage (SD)	Decay/Hollow (D/H)	Inclusion (I)	Construction Damage (CD)	Fruiting Body/Phellinus (F/P)	Phytophthora (P)	Armillaria (A)	HYDE PARK SOUTH NOT ASSESSED	Significant Inclusions (I)	Deadwood (DW)	Branch Failure (BF)	Branch/Trunk Damage (B/D)	Sunscald (S)	No Decay (a)	Some Decay (b)	Decay that fails Mattheck (c)	Decay that has broken out into Buttresses (d)	Not Assessed (NA)	No Decay (a)	Some Decay (b)	Decay that fails Mattheck (c)	Decay that has broken out into Buttresses (d)	Not Assessed (NA)
80 S	0.9	22	N6, S8, E10, W8	M	G	F	10.8	S																S		b				a			
81 S	1.2	23	N5, S6, E10, W12	M	G	P	14.4	S													DW		B/D	S		b					b		
82 S								Rm	04							F/P																	
83 S	1.3	22	N8, S6, E10, W10	M	G	F	15.0	S													DW	BF	B/D			b					b		
84 S	0.9	23	N10, S6, E12, W6	M	G	F	10.8	S															B/D			b					b		
85 S								Rm	Pre 04	U																							
86 S	0.6	22	N8, S5, E8, W8	SM	G	F	7.2	M												I									NA	a			
87 S								Rm	05				D/H																				
88 S								Rm	Pre 04	U																							
89 S	0.7	22	N8, S8, E6, W8	SM	G	F	8.4	M												I		BF	B/D						NA	a			
90 S	0.6	21	N8, S8, E8, W8	SM	G	F	7.2	M												I									NA	a			

TREE No.	DBH (m)	HEIGHT (m)	CANOPY RADIUS (m)	AGE CLASS	VIGOUR	CONDITION	TPZ RADIUS (m)	SULE	REMOVAL DATE	REASON FOR REMOVAL									ABOVE GROUND DEFECTS						BELOW GROUND DEFECTS									
																			TWM 2007	TWM 2012					TWM 2005					UTM 2011				
										Unknown Reason (U)	Failed (F)	Storm Damage (SD)	Decay/Hollow (D/H)	Inclusion (I)	Construction Damage (CD)	Fruiting Body/Phellinus (F/P)	Phytophthora (P)	Armillaria (A)	HYDE PARK SOUTH NOT ASSESSED	Significant Inclusions (I)	Deadwood (DW)	Branch Failure (BF)	Branch/Trunk Damage (B/D)	Sunscald (S)	No Decay (a)	Some Decay (b)	Decay that fails Mattheck (c)	Decay that has broken out into Buttresses (d)	Not Assessed (NA)	No Decay (a)	Some Decay (b)	Decay that fails Mattheck (c)	Decay that has broken out into Buttresses (d)	Not Assessed (NA)
91 S								Rm	Pre 04	U																							
92 S	1.2	23	N10, S8, E10, W8	M	G	F	14.4	S													DW		B/D									b		
93 S	1.2	23	N10, S6, E10, W10	M	G	F	14.4	S													DW		B/D									a		
94 S	1.2	23	N14, S6, E10, W10	M	G	F	14.4	S													DW		B/D									a		
36										3	1	0	7	0	0	3	0	0		5	14	4	11	9	5	10	4	1	8	13	9	0	0	0

Rm	TOTAL	14

TREE NUMBER – (*Based on currently adopted City of Sydney tree numbering system*)
N denotes location of tree in Hyde Park North and **S** denotes location of tree in Hyde Park South. **N*** denotes earlier (pre 2004) tree numbering system used. **NT?** denotes unnumbered tree with reference to the number of the tree adjacent to assist in locating. All trees in Hyde Park North and South have been numbered on the Plans in accordance with this numbering format.

DBH - Diameter at Breast Height - (*Based on TWM Report FinalRevC1487-2012Mon July, 2012)*
Tree trunk diameter measured at breast height (1.4 metres above ground level). Fabric diameter tape is used which assumes a circular cross section. Multiple measurements indicate multiple trunks. Where more than three trunks exist, the DBH indicated as the diameter "@ grade". Where DBH measurement cannot be taken at 1.4m, the height at which it has been taken, is indicated.

CANOPY SPREAD RADIUS - (*Based on TWM Report FinalRevC1487-2012Mon July, 2012)*
– Average canopy radius (widest + narrowest ÷ 2). Circular canopy depictions on Tree Plans are indicative only. Where canopy spread was significantly skewed, all four cardinal point measurements were recorded.

AGE CLASS - (*Based on TWM Report FinalRevC1487-2012Mon July, 2012)*
Immature (IM), Semi-mature (SM), Mature (M), Over-mature (OM). Assessment of the tree's current Age. A **Mature (M)** tree has reached a near stable size (biomass) above and below ground. Trees can have a Mature age class for >80% of life span. **Over-mature (OM)** trees show symptoms of irreversible decline and decreasing biomass.

VIGOUR – (*Based on TWM Report FinalRevC1487-2012Mon July, 2012)*
Good (G), Fair (F) or Poor (P). The general appearance of the canopy/foliage of the tree at the time of inspection. Vigour can vary with the season and rainfall frequency. A tree can have Good vigour but be hazardous due to Poor condition. A tree in Good vigour has the ability to sustain its life processes. Vigour is synonymous with health.

CONDITION – (*Based on TWM Report FinalRevC1487-2012Mon July, 2012)*
Good (G), Fair (F) or Poor (P). The general form and structure of the trunk/s and branching. Trunk lean, trunk/branch structural defects, canopy skewness or other hazard features identified in Aerial assessment and below ground findings of UTM 2011 report.

TPZ RADIUS – Tree Protection Zone - (*Based on TWM Report FinalRevC1487-2012Mon July, 2012)*
Radial offset (m) of twelve times (12X) trunk DBH measured from centre of trunk (for trees less than 0.2 metre DBH minimum TPZ is 2.0 metres). To satisfactorily retain a tree construction activity (both soil cut and fill) must be restricted within this offset. TPZ offsets are rounded to the nearest 0.1 metre. Existing constraints to root spread can vary TPZ. Generally an area equivalent to the TPZ should be available to the tree post development. Encroachment occupying up to 10% of the TPZ area is acceptable without detailed rootzone assessment. Encroachments greater than 10% require specific arboricultural assessment. Encroachments up to 25% may be justified depending upon tree species and type of encroachment.

SULE - Safe Useful Life Expectancy - (*Based on TWM Report FinalRevC1487-2012Mon July, 2012 and UTM 2011 report)*
A systematic pre-development tree assessment procedure developed by Jeremy Barrell, Hampshire, England. The SULE method used in this assessment has been adapted for simplified use within the field. It gives a length of time that the Arborist feels a particular tree can be retained with an acceptable level of risk based on the information available at the time of the inspection. SULE ratings are **Long (L)** (retainable for 40 years or more with an acceptable level of risk), **Medium (M)** (retainable for 15-40 years), **Short (S)** (retainable for 5-15 years) and **Removal (Rm)** (tree requiring immediate removal due to imminent hazard or absolute unsuitability).

REMOVAL DATE - (*Based on data supplied by City of Sydney Council and in TWM Report FinalRevC1487-2012Mon July, 2012)*
Date of removal as documented.

REASON FOR REMOVAL - (*Based on data supplied by City of Sydney Council and in TWM Report FinalRevC1487-2012Mon July, 2012)*
Apart from "*Unknown Reason*" reason for removal could be based on more than one defect.

ABOVE GROUND DEFECTS – (*Based on TWM Report 1487Aerial dated May, 2007 and TWM Report FinalRevC1487-2012Mon July, 2012). Note there was no assessment of Hyde Park South in 2007.* Aerial Inspections undertaken via a 25 metres reach Elevated Work Platform (EWP). Defects were recorded during the aerial inspection. The defects recorded were as follows: **Inclusions (I), Deadwood (DW), Branch Failure (BF), Branch/Trunk Damage (B/D), Sunscald (S).**

Significant Inclusion (I): This refers to branch or trunk junctions with included (as opposed to occluded) bark within the branch union. These junctions can be potentially unstable (predisposed to split) and for the purpose of this report are considered to be defect. Note: only significant inclusions have been recorded where obvious included bark was contained on both sides of the junction.

Deadwood (DW): All deadwood with a diameter greater than 50mm was recorded as individual limbs. A bulk number of dead branches between 20mm - 50mm diameter for each tree was recorded.

Branch Failure (BF): Previous branch failure wounds were recorded where the wound was severe enough to allow further decay, potentially causing that limb to become defective.

Branch/Trunk Damage (B/D): Trunk and branch damage was recorded where it was deemed to be a potential hazard and where pruning could reduce or remove the hazard. There was a variety of damage recorded including; rubbing limbs, dieback of internal suppressed branches and other storm or mechanical damage. Where heavy "dieback" of branches was encountered with live epicormic growth at the base, the diameter of the branch at the position of the deadwood was recorded.

Sunscald (S): Cambial damage caused by sun exposure following complete removal of adjacent trees was recorded. This damage appears initially as flaking and scaly bark, but often progressing to advanced decay with potential or actual branch fracture.

BELOW GROUND DEFECTS – (*Based on TWM Report 1605AK dated September, 2005 and UTM Report 14053 dated October, 2011)*
Whilst the methodologies for data collection differed, the four "categories of decay" used to describe the trees was as follows:

***(a)* No decay**
***(b)* Some decay**
(c) Decay that fails Mattheck
***(d)* Decay that has broken out into buttresses**
(NA) Not Assessed