

Tree Canopy Assessment

Kent Road Public School, Marsfield



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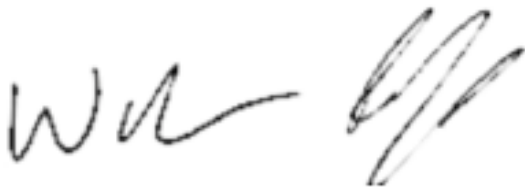
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DISCLAIMER

The preparation of this report is for the use of *Gardener and Wetherill Associates* and *Price Waterhouse Cooper* to assess the changes in tree canopy area within Kent Road Public School, Marsfield as a result of current development. The author of this report is *Temporal Tree Management Pty Ltd*. This report is not designed for any other purpose. The author accepts no responsibility for the use of this report for purposes other than assessment of changes in canopy coverage within the school associated with this project or if used by any other person / party.

All observations, recommendations and advice expressed within this report are based on the professional experience of the author, information gathered during the site assessments and information provided by the client. Trees are dynamically growing organisms that change over time. No guarantee is implied with respect to future tree safety beyond the advice and recommendations within the report.



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1. Summary

The purpose of this report is to evaluate the impact of the current development within Kent Road Public School, Marsfield on the tree canopy composition inside the property boundaries. Tree removal works required to facilitate the construction of three new buildings within the central portion of the school and tree planting associated with landscape plans were taken into account to assess the current reduction and future replenishment of the tree canopy assemblage within the school. This evaluation looks specifically into the consistency of this impact with the NSW Government target of 40 percent canopy coverage for sites across Greater Sydney.

There are 213 established tree specimens within and directly adjacent to this school's boundaries. An assessment of the trees' retention value and the recommendation of tree protection measures were outlined in an Arboricultural Impact Assessment prepared by William Dunlop of *Temporal Tree Management Pty Ltd* on 01/10/2018. The tree numbers from the AIA were used in this Tree Canopy Assessment.

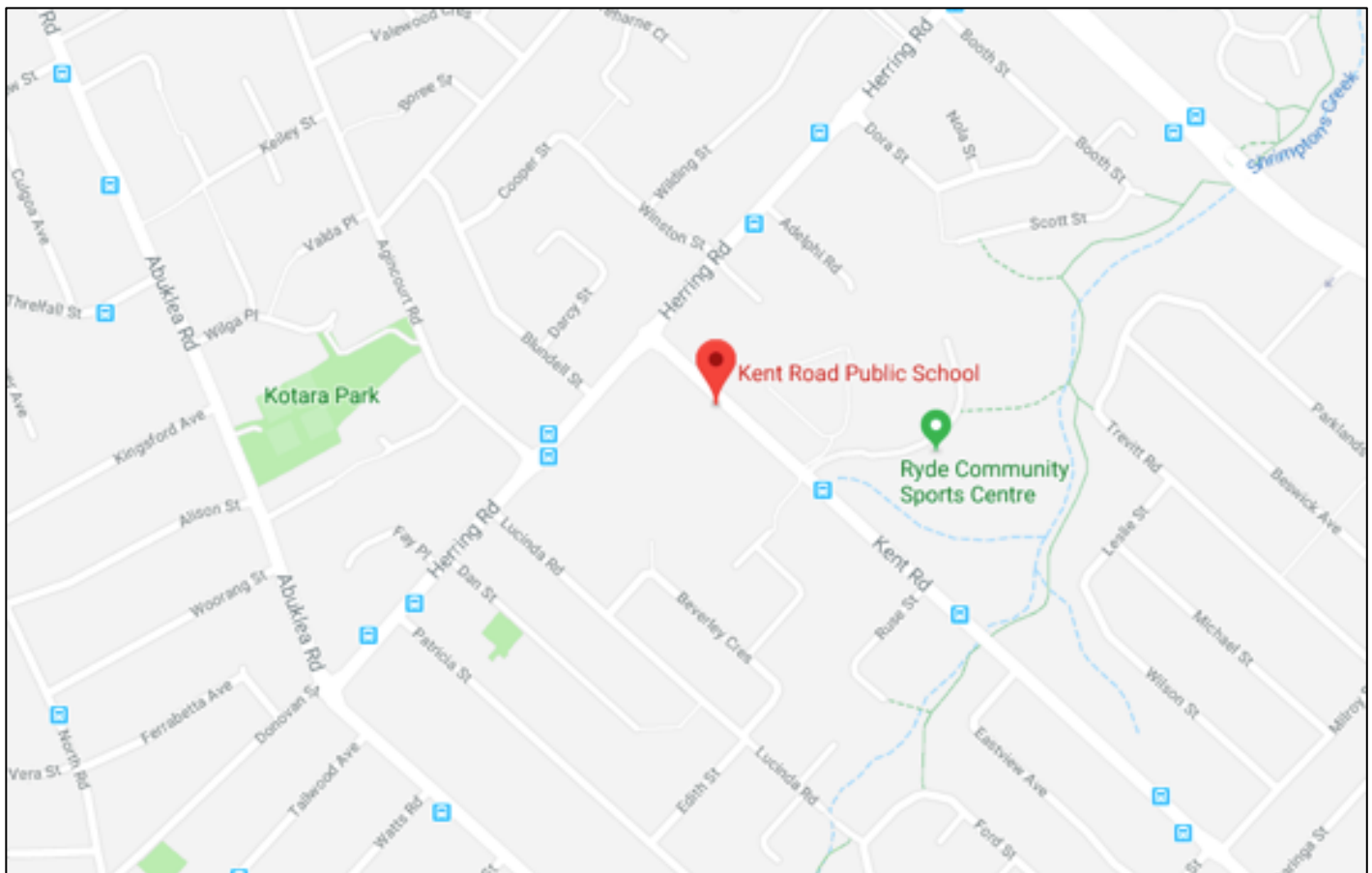
The NSW Government spatial mapping program *SixMaps* was used to determine the total area of the school and to determine the area of tree canopies (2016). In many areas within the school trees are positioned very close to one another. In such cases a polygon was drawn around the connected canopy of a group of trees. The satellite image used to calculate the area of the trees' canopies was taken on July 1st, 2016. The cumulative total of the individual and grouped trees canopies within the school was used to calculate the original baseline tree canopy area percentage of 37%.

A reduction of 14.19% in the school's tree canopy will occur as a result of the tree removal works required to facilitate the development, which will result in a tree canopy area of 31.75% within the school. The canopy area of trees to be planted as part of the landscape works was calculated at 2, 7 and 15 years based on the canopy area of existing trees of the same or similar species within the school. A replenishment of 15.01% is estimated for the school's tree canopy area after 15 years, which will satisfy the district target of 40% canopy coverage.

2. Location

2.1. Site Location

Kent Road Public School is located at the intersection of Kent and Herring Roads in Marsfield (Map 1). The surrounding land use is a mixture of residential and commercial. While this local area is well developed, its high density of medium and large trees provides a characterising feature. Kotara Park, ELS Hall and the Shrimptons Creek bush land are large green spaces located close to Kent Road Public School. The large tree population within this school plays an important role in maintaining the ecological connectivity within this area. This highlights the need for effective management of the its tree population throughout the proposed development for this site.



Map 1. Site location is at the intersection of Kent and Herring Road in Marsfield. Image sourced from Google (2018).

2.2. Relevant Environmental Overlays

Kent Road Public School is located within Ryde City Council. All trees within this site are protected under the Ryde City Council Tree Preservation Order, which is Part 9.5 of the City of Ryde Development Control Plan 2014 (Ryde City Council 2016). The canopy tree assemblage within this site also contains a number of species that comprise the Blue Gum High Forest ecological community, which is listed as endangered in Part 2 of Schedule 1A of *the Threatened Species Conservation Act 1995* (NSW Office of Environment and Heritage 2016). The retention of the emergent indigenous trees is therefore considered a high priority within this assessment.

2.3. Tree Locations

There are 213 trees within and directly adjacent to the property boundaries of Kent Road Public School. No tags or physical marks have been used. The location of all 213 trees assessed in this report is summarized in Map 2. The trees that will be removed to facilitate the development within the central portion of the school (fifty-two trees) area outlined in red (Map 2.).



Map 2. Location of 213 trees assessed within Kent Road Public School. Fifty-two trees to be removed are outlined in red. Image sourced from Google 2018.

3. Site Development Plans

Development plans for this site are currently at the preliminary construction stage. Due to the spatial variability of the various construction activities within the school the impacts on and management plans for the trees were separated into four zones in the AIA (A – D) (Figure 1).

Due to the size and significance of this project the primary works will be carried out as a State Significant Development (SSD) (Zone D in AIA). Construction of a new learning centre consisting of two three-storey classroom blocks and a two-storey administration block, which will be connected by a covered walkway and a new covered entryway, are to be built within the central portion of the school (Figure 1).

The position of the works proposed under the SSD is restricted by a range of overlays within this site including flood risk zoning within the western and central portions of the school, RMS land within the northern portion of the school and an established Blue Gum High Forest ecological community within the southern portion. To facilitate the SSD works fifty-two trees will require removal (Map 2, Figure 2). These trees were determined to be of low retention value in the AIA and therefore suitable for removal as part of this development.

Landscape works within the SSD area have been established to compliment the construction of the new learning centre. Thirty specimens of nine species are to be planted within the SSD area (Figure 3).

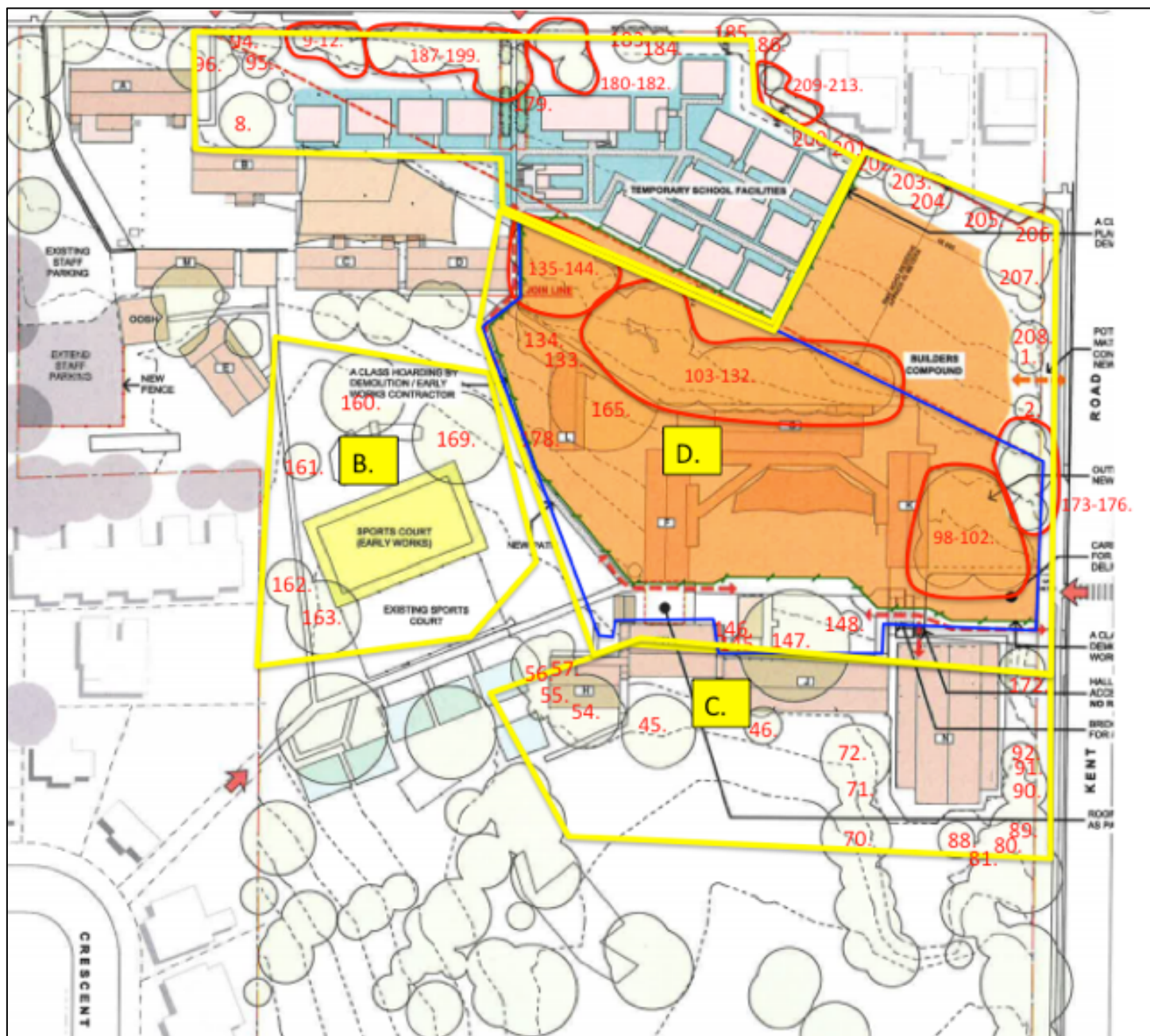


Figure 1. Proposed SSD area (blue bordered) within central portion of school. Trees located within four tree impact zones (yellow bordered) that are likely to be impacted upon by the proposed development at Kent Road Public School. Site drawing provided by *Gardner and Wetherill Associates* and annotated by *Temporal Tree Management* (21/09/2018).

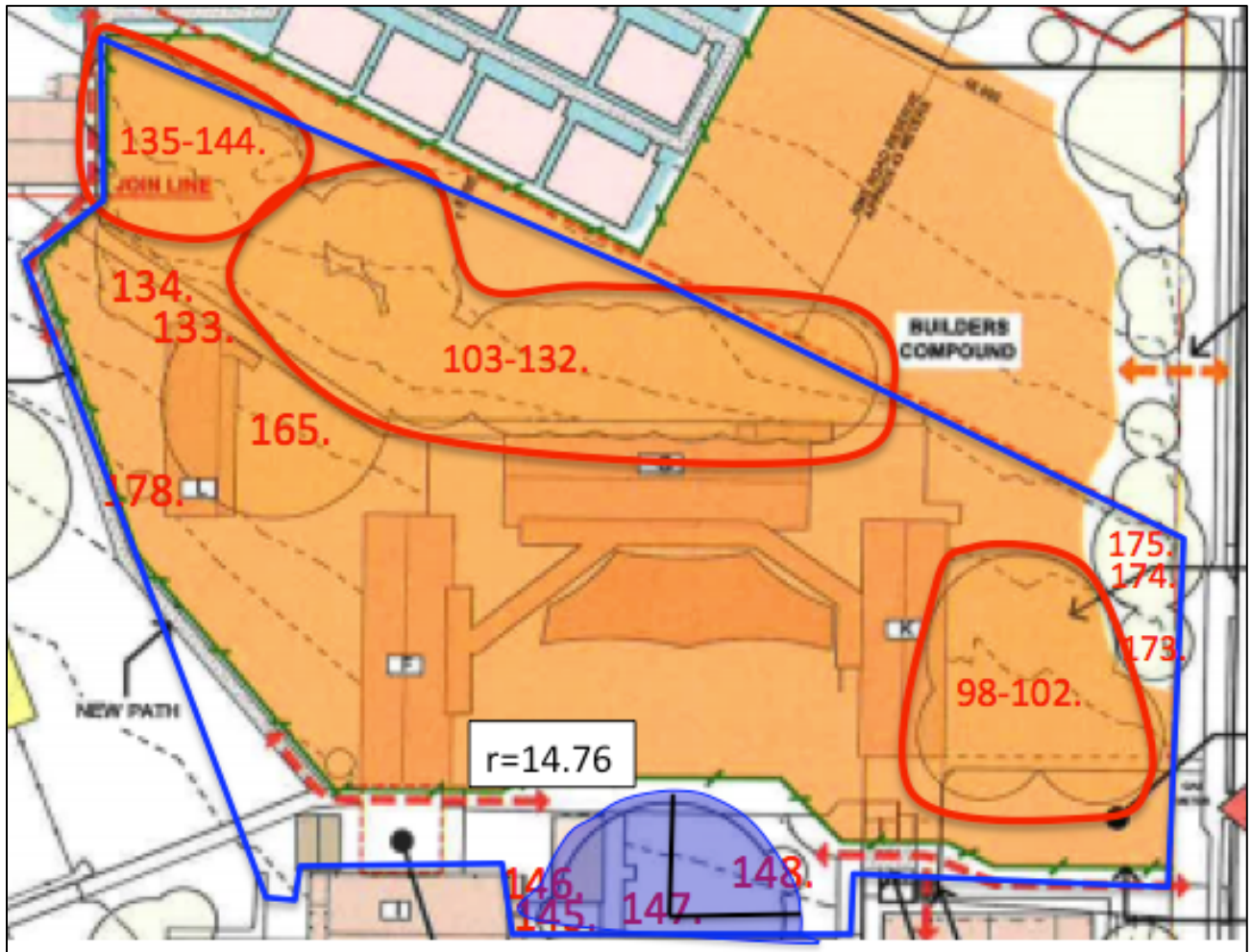


Figure 2. Fifty-six specimens area positioned within the SSD area inside the blue border. One tree (Tree 147) requires protection within this area while fifty-two specimens require removal. Site drawing provided by *Gardner and Wetherill Associates* and annotated by *Temporal Tree Management* (01/10/2018).

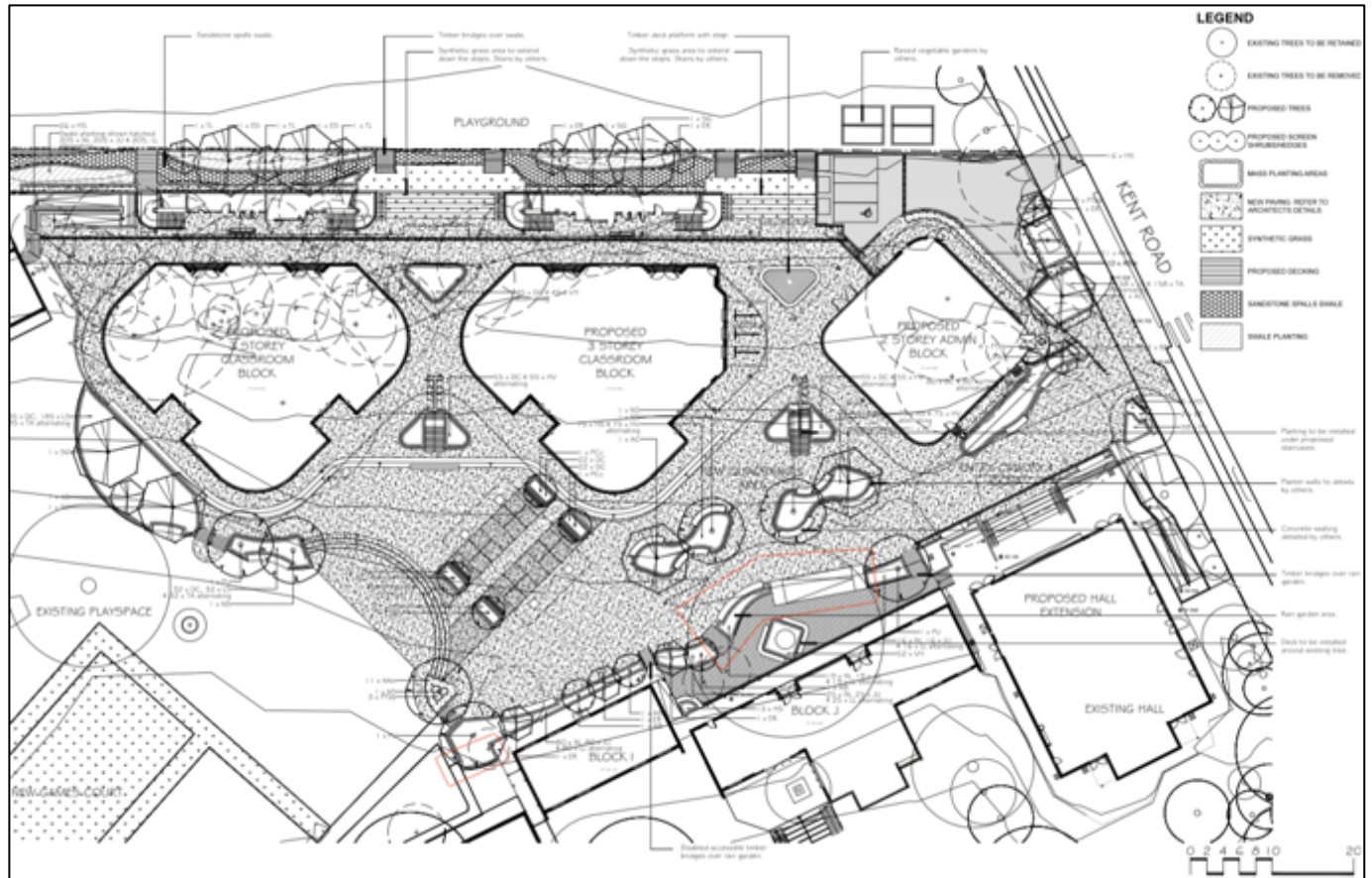


Figure 3. Landscape Plan within SSD area. Landscape Plan drawn by *iScape Landscape Architecture* (10/2018).

4. Tree Canopy Assessment

4.1 Assessment Methodology

The NSW Government spatial services mapping program *SixMaps* was used to measure the individual and grouped tree canopies within Kent Road Public School. The area mapping tool was used to determine the area of the school as well as the tree canopy areas within it. This technique was used to determine the area (m²) of the following parameters:

Ø Total School Area: The SixMaps area mapping tool was used to calculate the area (m²) of the school.

Ø Retained Canopy Area: The SixMaps area mapping tool was used to calculate the area (m²) of the tree canopies of the 161 specimens being retained as part of the current development at Kent Road Public School. Where tree canopies overlapped one another, they were grouped into larger area polygons.

Ø Removed Canopy Area: The SixMaps area mapping tool was used to calculate the area (m²) of the tree canopies of the 52 specimens being removed as part of the current development at Kent Road Public School. Where tree canopies overlapped one another, they were grouped into larger area polygons.

Ø Total Canopy Area: Calculated from the sum of the retained and removed canopy area values.

Ø Retained Canopy Percentage: This value was calculated from the Retained Canopy Area as a percentage of the Total School Area.

Ø Removed Canopy Percentage: This value was calculated from the Removed Canopy Area as a percentage of the Total School Area.

Ø Total Canopy Percentage: Calculated from the sum of the retained and removed canopy percentage values.

Ø Tree Canopy Area Percentages: The area of the Retained and Removed tree canopies were calculated as a percentage of the Total Tree Canopy area.

Ø Replenishment Area: Replenishment areas (m²) are based on the estimated canopy area of the trees to be planted both as part of the landscape plan and externally to it. Estimates were based on the known area of trees of the same or similar species to those being planted. Areas were calculated for canopy trees (nine specimens) and understorey trees (twenty-one specimens) to be planted as part of the landscape plans. Canopy area was also estimated for nineteen trees that have been planted by the school's grounds management staff separately to this development. Estimates were made for the trees' canopy area at two, seven and fifteen years after planting.

Ø Replenishment Percentage: This value was calculated from the Replenishment Area values as a percentage of the Total School Area.

4.2. Tree Data

Table 1. Canopy areas (m²) for trees to be retained and removed within Kent Road Public School. Canopy percentages were calculated from the **Total School Area of 40 060 m²**.

TotalCanopyArea(m2)	RetainedCanopyArea(m2)	RemovedCanopyArea(m2)
14822	12719	2103
TotalCanopy(%)	RetainedCanopy(%)	RemovedCanopy(%)
37	31.75	5.25
%TreeCanopyArea	85.81	14.19

Table 2. Replenishment areas (m²) and percentages for thirty trees to be planted as part of landscape works associated with the development and from nineteen trees planted separately by Kent Road grounds management staff. Canopy percentages were calculated from the **Total School Area of 40 060 m²**.

Replenishment (m2)	2 years	7 years	15 years
CanopyTrees (9)	180	576	1197
UnderstoreyTrees (21)	210	672	2289
AdditionalTrees (19)	380	1216	2527
Replenishment (%)	2 years	7 years	15 years
CanopyTrees (9)	0.45	1.44	2.99
UnderstoreyTrees (21)	0.52	1.68	5.71
AdditionalTrees (19)	0.95	3.04	6.31

5. Summary

A priority plan for the Ryde district is to increase the tree canopy cover to help maximize the benefits associated with trees. A NSW Government target of 40% canopy coverage has been set for sites like Kent Road Public School across the Greater Sydney Area. The spatial assessment of its tree canopy assemblage highlights the considerable size of the tree population within Kent Road Public School. In July 2016 when the SixMaps satellite image was taken 37% of the school's total area was covered by tree canopy (Table 1). This original tree coverage was very close to the 40% target.

The tree removal works associated with the SSD works within the central portion of Kent Road Public School will require the removal of fifty-two trees, which will result in a 14.19% reduction in the tree canopy area within the site. As a result of these removal works there will be a reduction in the tree canopy area from 37% to 31.75%. While considerable this reduction is not irreparable within a reasonable timeframe providing sufficient replenishment tree stock is planted.

Thirty trees will be planted as part of the landscape works associated with the SSD works. Of these nine were determined to be canopy tree species, which may grow taller than 20 metres (Costermans 2006). The nine canopy trees are all of Blue Gum High Forest species (2 x Sydney Blue Gums (*Eucalyptus saligna*), 3 x Smooth-barked Apples (*Angophora costata* subsp. *Costata*) and 4 x Turpentines (*Syncarpia glomulifera*)). The remaining twenty-one trees were of three native and three non-native understorey tree species (Figure 3). Estimates of the canopy area of the canopy trees and understorey trees were based on the areas of trees of different ages within the Ryde City Council of the same or similar species to those to be planted (SixMaps 2016).

Nineteen Blackbutt (*Eucalyptus pilularis*) and Sydney Blue Gum specimens were planted close to the south-western boundary between 2017 and 2018 separately to this development by the ground's administration staff for the school. The canopy area of these trees was also taken into account in the replenishment calculations (Table 2). Replenishment calculations were made at 2, 7 and 15 years, which reflects the establishment period of young trees (Ryder and Moore 2013).

The total canopy replenishment associated with the tree planting is estimated to be minimal within the first two years. However, after five years a total replenishment of 6.16% was estimated for the thirty landscaped trees and nineteen originally planted trees. A total tree canopy replenishment of 15.01% was estimated after 15 years, which will increase the total tree canopy area within the school to 46.76%.

6. Recommendations

The results suggest that, while there will be a 14.19% reduction in the tree canopy area within Kent Road Public School as a result of the current development, the canopy area will be restored to 46.76% after 15 years as a result of tree replanting. This outcome will see Kent Road Public school satisfy the target of 40% tree canopy coverage over a broader temporal scale.

Planning for the short-term should aim to increase the number of canopy trees being planted as part of the landscape plans for this development to increase the canopy area within the school sooner. It was a key recommendation of the Arboricultural Impact Assessment that all Blue Gum High Forest trees (11 x *Eucalyptus saligna* specimens and 2 x *Angophora costata* subsp. *costata* specimens) be replaced within 6 months of project completion in a suitable location within the school.

It is therefore a key recommendation of this report that an additional four Blue Gum High Forest canopy trees be planted within the school as part of the SSD landscape works. Planting four more canopy trees within the SSD area will not be suitable due to its confined area. These trees should therefore be planted within the south-eastern or north-western portions of the school where there is sufficient space for a new canopy tree to grow (Map 2).

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