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Arboricultural Report**Root Extent Investigations and
Recommendations****Prepared For:**

Auroville Consulting
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31st of July 2017

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1 Introduction

1.1 Brief:

I am instructed by Auroville Consulting to inspect the extent of the root system of the *Enterolobium cyclocarpum* tree at the Pony Farm, Auroville, to provide my interpretation of the data and to give my recommendations. The report will provide information on tree constraints and aid the design and location of a future development.

1.2 Qualifications and experience:

I have based this report on my site observations and the information provided. I have come to conclusions in the light of my experience. I have experience and qualifications in arboriculture, and include a summary in the arboricultural implications assessment report provided by myself, dated 27th of May 2017.

1.3 Documents and information provided:

Prabhakar from Auroville Consulting provided a scaled drawing of the plot with the existing layout, including the location of the tree.

This report is to be used in conjunction with the arboricultural implications assessment report provided by myself, dated 27th of May 2017.

1.4 Scope of this report:

This report provides recommendations based on the findings after digging around the tree at several locations to locate the extent of significant roots.

This report is to be used in conjunction with the arboricultural implications assessment report provided by myself, dated 27th of May 2017.

2 Site Visit and Observations/Collection of Data

2.1 Site visit:

I carried out several site visits from the 17th of July to the 25th of July 2017.

2.2 Brief site description:

The tree is in the middle of a field. A set of uninsulated electric lines runs approximately 5 meters to the east of its stem and under its canopy.

2.3 Identification and location of the trees:

There are a number of trees that could be affected by any development. These are situated throughout the site including several that are located just outside of the property. As I have only been instructed with the inspection of this tree, only this one has been inspected and plotted on the Tree Constraints Plan (Appendix 1).

2.4 Collection of basic data:

Trenches were dug by hand to inspect the roots. The trenches dug were a maximum 30cms wide and 60cms deep depending on what was found within the trench. A trench based on the Root Protection Area (RPA) radius of 15 meters was dug all around the tree. Two short trenches were also dug: A trench at 12 meters to get an indication of the

root density closer to the trunk and a trench at 17 meters to assess the size of roots that far out from the tree.

2.5 Findings:

- 2.5.1 A majority of the roots found were on the north-western side to the southern side following an anti-clockwise direction. This follows the layout of the land as this area is on the lower slope and therefore collects more water and nutrients during rains. Root growth will also be affected by the density of the soil; the area where few roots are present, little to no other vegetation is present.
- 2.5.2 All visible roots of 4cms and above have been plotted approximately on the attached plan (appendix 1). Where high densities of roots were found, it has also been indicated on the plan.
- 2.5.3 Very few roots were found to the east and north.

3 Information and Recommendations for the Design Team

3.1 Below ground Recommendations:

Based on the minimum required Root Protection Area (RPA) as indicated in the British Standard 5837(see references) and by the findings from digging I would recommend:

- 3.1.1 Excavating at a minimum of 14 meters away from the trunk on the northern side
- 3.1.2 Excavating at a minimum of 17 meters away from the trunk on the north-western side to the southern side following an anti-clockwise direction
- 3.1.3 Excavating at a minimum of 13 meters (~15% less than RPA) away from the trunk on the south-eastern to the north-eastern side following an anti-clockwise direction if the total RPA in area is retained (707m²)
- 3.1.4 Although the root system is mostly from the north-western side to the southern side following an anti-clockwise direction, any digging within 15 meters from the trunk should be done by hand. Any potential construction or installation of services within this zone should employ appropriate engineering solutions to mitigate root loss through direct damage, compaction etc...
- 3.1.5 When Excavating by mechanical means (e.g. JCB) within 17 meters of the trunk, area to be dug is to be 50cms from final distance away from trunk (if the trench is required at 16 meters from the trunk, the trench is to be dug at 17.5 meters from the trunk) this will allow access to dig to the limit by hand and prune the roots that require it (the roots will be exposed and easy to dig around to prune back to the required distance).

The above recommendations take into consideration the branch spread which could be pruned back to accommodate the structure or a ground floor erected at this distance and subsequent floors farther away from the trunk.

- 3.2 As its maximum height will be 30 meters and its spread (width of canopy) will be around 35-45 meters (judging by references and by its current dimensions, plotted on plan) I expect the roots to reach a maximum of 20 meters from each side of the trunk. However, in my opinion, the roots at a distance of only approximately 15 meters will be unobtrusive to any standardly built structure as they will likely not surpass 10cms in diameter (the largest root found at 15 meters was 8cms in diameter). The potential for damage to future structures from the roots would mainly be due to inadequate foundations. I am not an engineer and therefore cannot specify what is appropriate.
- 3.3 **Above Ground Recommendations:**
Based on the above recommendations for the closest area to be dug towards the tree, I have looked at the possible heights that can be attained by structures to minimise impeding the tree with minimal pruning.
- 3.3.1 A structure with a height restriction of 7 meters can be erected at 14 meters to the north of the trunk
- 3.3.2 A structure with no height restriction, except from its sunlight blocking nature, can be erected at 17 meters from the trunk on the north-western side to the southern side following an anti-clockwise direction
- 3.3.3 A structure with a height restriction of 7 meters can be erected at 13 meters from the trunk on south-eastern to the north-eastern side following an anti-clockwise direction
- 3.4 Some branches spreading out farther than their current maximum can be potentially pruned in the future to allow taller structures.
- 3.5 The height and proximity of the buildings may affect sunlight reaching the tree. This will limit the available energy and should therefore be taken into consideration. There is no set value on the amount of light a tree needs.
- 3.6 To ensure their long term survival, all trees to be retained after construction on the site should have their rooting zone or root protection area (RPA) protected by a construction exclusion zone (CEZ) during the build process. Any encroachment into these areas will require approved methods to be employed to prevent damage to the trees. CEZs are to be fenced off from all parties unless appropriate measures are employed to prevent contamination or compaction of the soil. See appendix 2 for a recommended fencing example.
- 3.7 Soil levels should not be changed within the RPA of the tree. The addition of mulch will not, however, be detrimental to the tree and will in fact be beneficial assuming a maximum thickness of 10cms is observed.
- 3.8 Average depth of roots found were 20 to 40cms deep.
- 3.9 All the required information should be contained in this report however, if anything else is required, please do not hesitate to contact me.

4 Other Considerations

4.1 Other nearby trees and trees located outside the property:

Care must be taken to ensure that nearby trees to be retained are not damaged during construction. I would take the *Lannea coromadelica* (Odia maram) to the west of the Enterolobium into consideration during planning and construction as it is a large, mature, tree in good condition.

4.2 Implementation of works:

All tree works should be carried out to BS3998 Tree work - *recommendations* as modified by more recent research. Tree Care, India can provide a quote to undertake any tree works.

4.3 Future considerations:

Trees, where targets (structure and people) exist, should be inspected on a regular basis (1-5 years) by a qualified arboriculturist.

5 References

BS 5837:2012 Trees in relation to design, demolition and construction. Recommendations.

BS 3998:2010 Tree work - Recommendations

Barwick M 2004.: *Tropical and Subtropical Trees*

<http://www.worldagroforestry.org>

<http://www.eol.org>

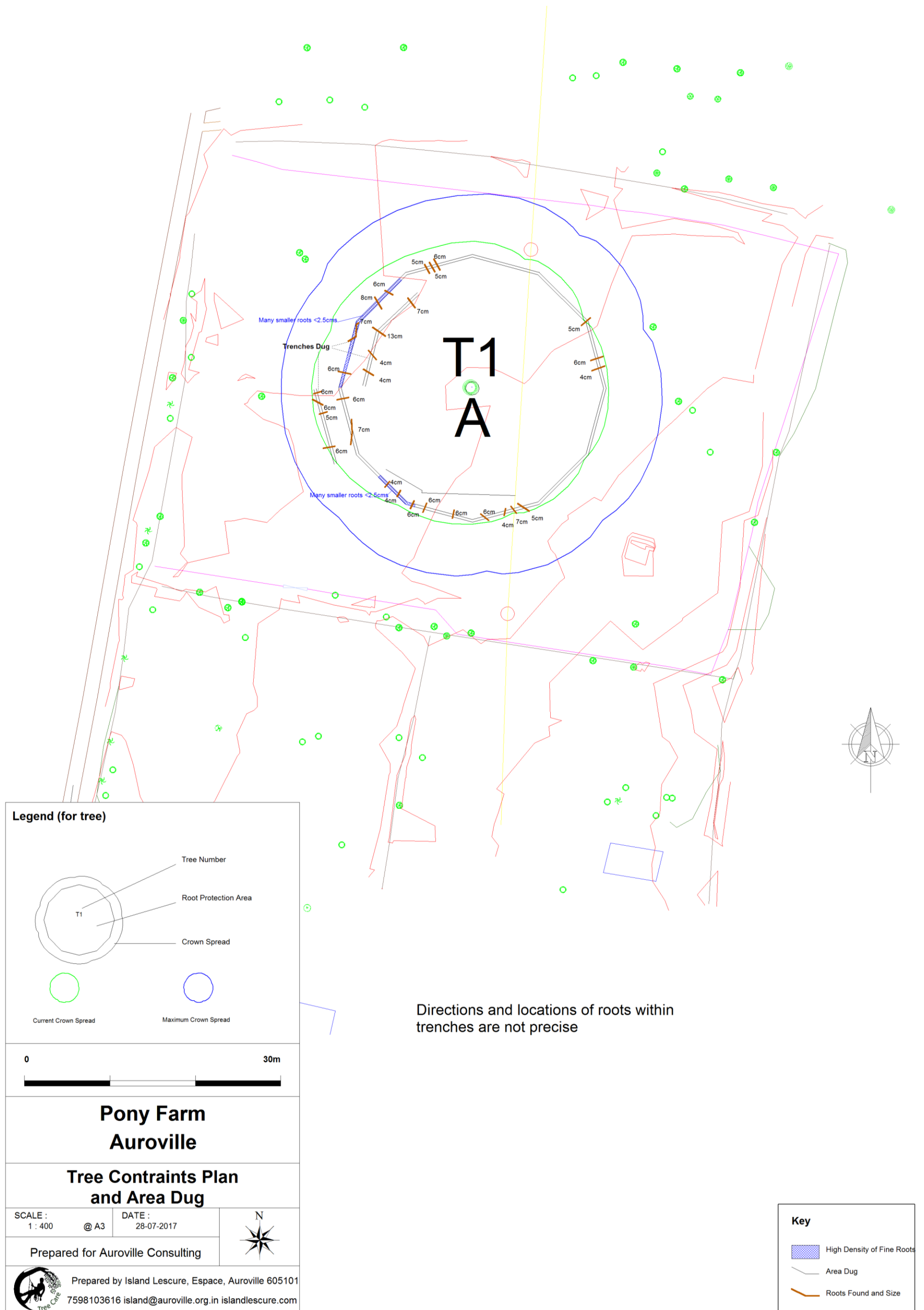
NJUG. 2007: Guidelines for the planning, installation and maintenance of utility services in proximity to trees. National Joint Utilities Group, London, UK

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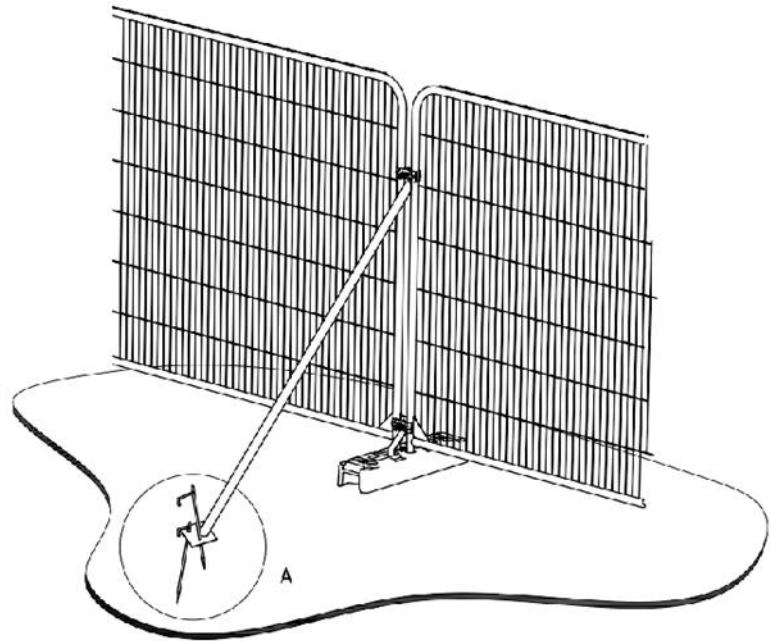
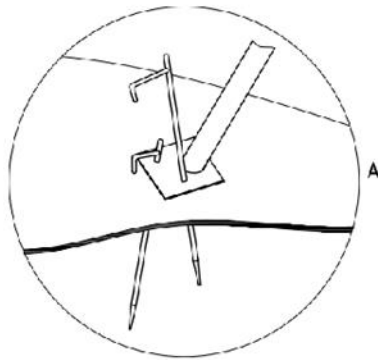
Roberts J. et al. 2006: Research for amenity trees number 8: Tree roots in the built environment

Mattheck C. et al. 2015: The Body Language of Trees

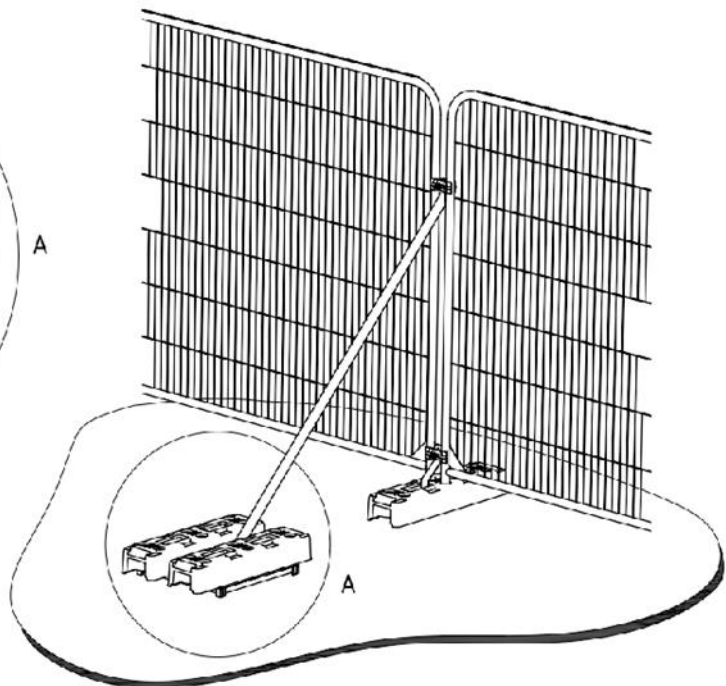
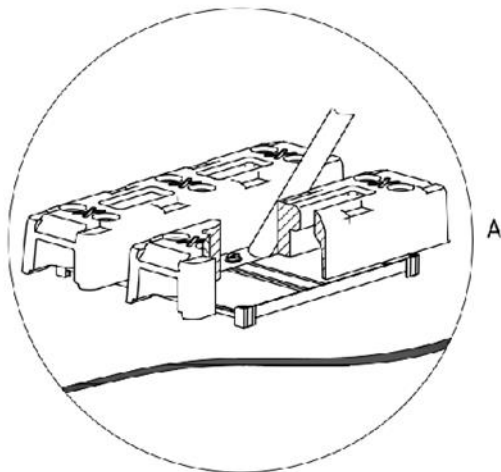
6 Appendix 1 - Tree constraints plan and area dug



7 Appendix 2 - Recommended Fencing Example



a) Stabilizer strut with base plate secured with ground pins



b) Stabilizer strut mounted on block tray