#4 Attachment D - Transplant Feasibility Report (V3 Final)

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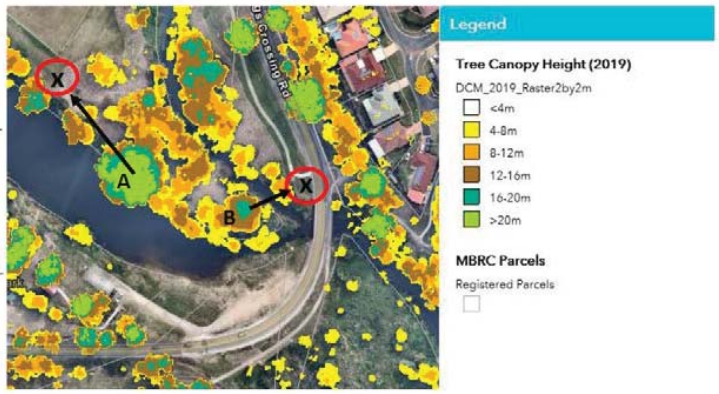
TRANSPLANT FEASIBILITY REPORT

TREE A
Ficus macrophylla
- Propose relocate @65m west

TREE B
Ficus obliqua
- Propose relocate @30m east



SITE: Youngs Cross Bridge, Joyner. Qld

PREPARED FOR: Moreton Bay Regional Council (MBRC)

CONTACT: Bernadette May (Principal Planner) for MBRC

DATE: October 2020

REPORT VERSION: Three (3)

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Limitation

This report is only concerned with the condition and management strategies required for the subject tree(s). It includes an assessment based on the site visits and the information that I have been advised.

This report does not take into account the possibility of extreme climatic events not normally expected in this locality. Such events could include, but are not restricted to, severe windstorms, floods or drought. This report also does not take into account the possibility of future outbreaks of pests or diseases.

Information contained in this report covers only the tree(s) that were examined and reflects the condition of the tree(s) at the time of inspection.

There is no warranty or guarantee, expressed or implied, that problems and/or deficiencies of a tree may not arise in the future.

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INTRODUCTION

This Tree Transplanting Feasibility Report (TTFR) was commissioned at the request of MBRC, in relation to the potential redevelopment of Youngs Crossing Road Bridge.

Due to the overall size of the two (2) Fig trees (subject tree(s)) and site constraints, the potential for transplanting the subject Fig tree(s) requires extensive planning, high level of expertise, comprehensive remedial tree care program and substantial expense.

Fig tree #A

Estimated tree dimensions: 28(m) high x 30(m) average canopy width x DBH exceeds 3(m).

Tree health: Good

Tree structure: Fair

Tree age: Late mature

Fig tree #B

Estimated tree dimensions: 18(m) high x 17(m) average canopy width x DBH 800(mm).

Tree health: Good

Tree structure: Fair

Tree age: Early mature

While all trees certainly have tree roots, different species have different characteristics of root systems, depending on their cultural preferences and evolutionary adaptation etc. Some trees are deep rooted with a less extensive lateral root arrangement. Others have very shallow roots that extend great distances from the trees. The subject trees are renowned for their aggressive rooting characteristics that extends both deep and wide, with enormous roots that can grow to become the diameter of large primary branches in some instances such as tree #A.

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Transplanting is the term used to describe the digging and replanting of trees from one location to a new location. Due to the lateral spread and morphology of the subject trees' root systems, transplanting of the subject trees involves substantial removal of tree roots.

The transplanting/relocation process in particular for large trees (as per these examples) to some degree requires substantial involvement of resources, time and expense.

This report requires a re-examination according to any subsequent changes to the proposed infrastructure design and project intent.

SOILS AND GROWING LOCATION

Due to the absence of any geotechnical investigations undertaken directly adjacent to the subject trees' canopy, a true indication of the soil type and structure is currently unavailable.

Tree #A has matured on the edge of a steep embankment with a marginal canopy trajectory toward the river area as depicted below:

Overall canopy form and growing location

Tree roots extend to and beyond the lower river embankment

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Top of the embankment with the arrow indicating the angle of fall

Lower trunk region

Canopy formation and density

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Tree #B is maturing on a relatively flat natural area as opposed to tree #A steep topography.

Buttressing

Lower trunk region

Emerging acute included bark ridge union between the two primary leaders

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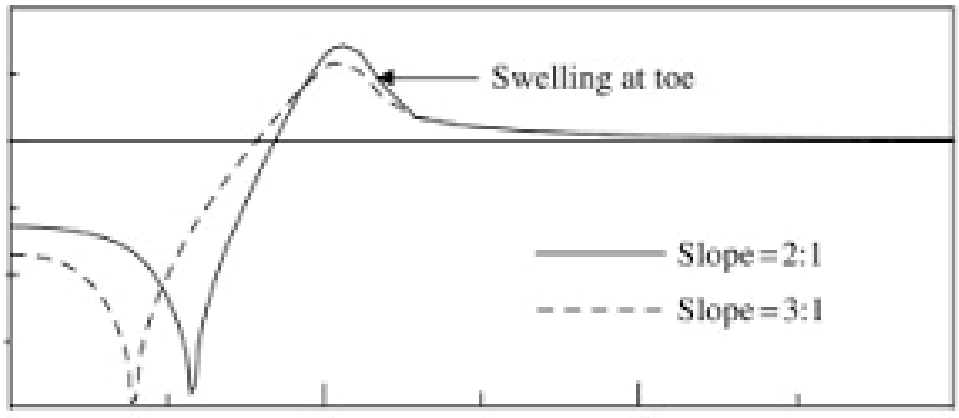
INITIAL TRANSPLANTING FEASIBILITY

There are many considerations necessary to provide a successful result regarding transplanting. This particular species of tree (Figs) is renowned for their tolerance to withstand the trauma of a transplanting, however as with any mature tree, the age and condition of the tree is a major factor in the consideration for tree transplanting.

There is an obvious delineation between different size trees in relation to the scale of transplanting when determining what relocation process is appropriate when reviewing the associated challenges and risks. The potential to transplant/relocate large mature trees is dependent on a range of variables that have the potential to impact on the success rate.

Tree #A is growing on a steep sloped river embankment area which falls over four (4) metres with an estimated grade between 2:1 to 3:1. Swelling at the top of the embankment was noted and assumed based on the presence of buttress roots over time.



Therefore, the formation of the Tree #A root ball is complex. Consequently, subject tree #A is considered not transplantable while retaining the subject tree's current canopy formation or even reducing the tree canopy area beyond 50%.

Therefore, the project should attempt to retain tree #A in its current location.

The use of equipment to perform comprehensive root investigation exploratory measures such as a hydro vacuum and/or Ground Penetration Radar (GPR) should be used for forensic investigation to help guide design outcomes and determine the potential tree impacts if excavation is required within or immediately adjacent to the canopy drip-line.

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The purpose of the comprehensive root investigation exploratory measures is to verify the quantity, size, depth and orientation of the tree roots along the perimeter of the proposed encroachment in order to make an informed judgement in relation to the potential impact on the subject tree.

The findings from the root investigation measures must illustrate the roots found in the comprehensive root investigation exploratory measure area. Additionally, the tree roots are to be labelled with the corresponding girth size, depth, position from the subject tree and functional contribution i.e. live, or dead or other as identified below.

Given the growing area and size of the tree #B, the subject tree can be successfully transplanted. The relocation method must be performed with the subject tree retained in an upright position. With consideration of the proposed relocation position, presence of included bark, the proposed transplanting method is jacking and sliding the subject tree using a steel box/beam arrangement, rather than lifting using slings and lifting pins.

The relocation route requires substantial preparation and finalisation along with a detailing lifting plan.

The availability of machinery, suitable qualified and experience operatives are key to ensuring the successfully relocation of the subject tree #B. We believe this is a key consideration and will need careful planning to coincide with relocation of the associated services, tree works and transplant preparation etc., to ensure the successful transition of the subject tree #B from its current location to its proposed location.

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The receptor site will need to reflect the subject tree #B current canopy orientation and requirement for excavation to seat the subject tree root ball.

The degree of success for transplanting, transporting and planting is not just based on the species tolerances but also on its ability to recover and initiation of new tree roots.

Based on our initial tree transplanting feasibility, subject tree #B has been classified as suitable. This process requires a high level of preparation, procedure and expense with a high likelihood of a successful re-establishment.

The proposed transplanting method will have measurable but somewhat limited impacts on the subject tree #B in comparison to other techniques.

Furthermore, the suitability for transplanting was based on the following circumstances given our interim appraisal. These practical factors take into consideration the potential for transplanting, transporting, and aftercare as listed below:

- health and vigour
- structural integrity
- age and useful life expectancy
- size of root ball and quality of the root system
- size of tree and pruning requirements
- canopy symmetry and/or current vertical alignment
- species tolerance to root disturbance
- species and conservation status
- current location & impediments re preparation for transplanting
- current edaphic and environmental growing conditions
- preparation of the root ball, jacking and sliding technique
- suitability of a receptor site
- protection during transplanting
- time for preparation and maintenance requirements
- aftercare
- site constraints, cost effectiveness and available resources
- safety precautions
- machinery, personal and equipment

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DISCUSSION

Lonsdale (1999) states, '*the general debilitation of trees due to root loss can make them more susceptible to invasion of some decay fungi's. Previously good anchorage roots can be impaired following a change in conditions or occurrence of diseases that causes the die back of fine roots, which form a link in the chain between the larger roots and the soil particles. Similarly, the risk of failure or tree decline can increase if large woody roots are severed, not adequately treated and becomes decayed'.*

Therefore, trees that are not appropriately transplanted or from soils that do not hold firm can result in a collapsed root plate which normally affects the biological process of a tree. Therefore, the root zone of subject tree #B is to be further supported if deemed necessary using various techniques such as the burlap technique(s).

FEASIBILITY OF TREE RETENTION

The retention of the subject tree #A in its current location along with engineering solutions, we believe, is a more sustainable outcome than a transplanting failure. The species is identified as having excellent construction tolerances and therefore can obtain a higher level of Tree Protection Zone (TPZ) encroachment than most urban trees.

We believe the application of diligent arboricultural management will avoid unnecessary tree removal or damage to the subject tree #A. Australian Standards AS4970-2009: Protection of Trees on Development Sites (AS4970-2009) provides guidance for:

- a balanced approach on deciding which trees are appropriate for retention
- effects of trees on design considerations
- means of protecting and monitoring retained trees during development.

The associated disturbance activities within the TPZ principally relate to the requirements for excavation and general construction of bridge infrastructure i.e. piers. The suggested comprehensive root investigation exploratory measures will help remove speculation and define the relevant work method statements and plant health care program to ensure the subject tree #A not only survives but thrives for years to come.

Successfully retaining the subject tree #A in its current location depends on several controls being in place, a determination and willingness by all parties.

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CONCLUSIONS

It was initially proposed to relocate tree #A until our investigations concluded tree #A is not feasible for transplanting. The steep embankment is hindering a reasonable size root ball, operational configuration and foreseen lifting plan.

Obtaining a viable root ball that will remain intact for the duration is highly unlikely, along with a tree canopy that does not have a high dependence of epicormic growth. Therefore, tree #A is considered impracticable to relocated and should be preserved in its current location. The retention of the subject tree #A in its current location along with engineering solutions we believe is to more sustainable outcome than transplanting.

Tree #B is classified as a suitable tree to relocate.

The overall feasibility for the proposed relocation of subject tree #B would appear to be a viable option with a success rate of approximately 85%. It should be noted that large tree transplanting of similar species is undertaken throughout Australia with similar overall success rates.

The findings and recommendation contained within this report are valid for a period of twelve months given trees are living organisms and their condition can change significantly over a relatively short period of time.

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Thank you for the opportunity to provide advice on this matter and if you have any questions about this report please contact the author on 1300 731 859.

Yours Faithfully

Treescience Pty Ltd

Jason-jay Fletcher (Director/Principal Arboricultural Scientist) for Treescience Pty Ltd

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CERTFICATION of PERFORMANCE

I Jason-jay Fletcher, certify I have formal qualifications that meet and exceed AQF level 8 in Arboriculture:

That I have personally inspected the tree(s) and/or the property referred to in this report, and have stated my findings accurately to the best of my ability. The extent of the evaluation and appraisal is stated in the report;

That I have no current or prospective interest in the vegetation or the property that is the subject of this report, and I have no personal interest or bias with respect to the parties involved;

That the analysis, opinions and conclusions stated herein are my own, and are based on current scientific procedures and facts;

That my compensation is not contingent upon the reporting of a predetermined conclusion that favours the cause of the client or any other party, nor upon the results of the assessment, the attainment of stipulated results, or the occurrence of any subsequent events;

That my analysis, opinions and conclusions were developed, and the report has been prepared according to commonly accepted arboricultural practices.

I further certify that I am a registered active professional member of the 'Institute of Australian Consulting Arborculturists' (#372010), registered approved tree consultant for the 'Queensland Arboricultural Association' (#1481), an active financial member of the world governing body 'International Society of Arboriculture' (#158995) were I have been a practicing certified international Arborist since 2006 (AU – 0026) and therefore meet the minimum qualification for writing arboricultural reports under the AQF (Australian Qualification Framework–Level 5).

I have been involved in Arboriculture since 1995, being an expert witness in the field of Arboriculture for the Planning and Environmental Courts of Australia. I have demonstrated commitment to ongoing professional development through regular attendance at and participation in arboriculture and other related conferences and seminars to retain by International Arborist Certification.

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