

The Eco-Conscious Tree and Plant Health Care Specialists

# CONSULTANCY

 [HERITAGECONSULTANCY.COM.AU](https://www.heritageconsultancy.com.au)

 1800 353 053

 [sales@heritagetrecare.com.au](mailto:sales@heritagetrecare.com.au)

 25 Spine Street, Sumner, QLD, 4074



# Plant Health Care.

## WHAT IS PLANT HEALTH CARE?

Plant Health Care is a holistic approach that combines scientific diagnosis, preventive treatments, and ongoing monitoring to maintain the overall health of plants. Instead of reactive treatments after symptoms begin to show, our PHC program focuses on keeping trees and plants healthy year-round, reducing the need for costly interventions.

## WHY IS IT SO IMPORTANT?

Disease, infestations and fungal infections can absolutely ravage an entire garden if not treated right away and can sometimes even have lasting damage on the wellbeing and fertility of your plants. Our Agronomists and Microbiologists are specifically trained to identify environmental stressors that affect individual plant and then provide a comprehensive list of solutions.

While spotting the symptoms of plant or tree stressors isn't usually too hard when you know what to look for; identifying the specific causes and tailoring detailed, handcrafted solution requires the expertise you can only find with Agronomists and Microbiologists.

Likewise, when it comes to growing and maintaining the healthy and fertility of vegetable gardens at home, plant healthcare is absolutely critical to its longevity. Horticulture is a critical science when it comes to cultivating fruits, vegetables, flowers and trees on a smaller scale and is exceptionally important in activities such as garden design.

Simply put, without adequate monitoring and effective care, many plants can struggle or even die without intervention, which is why it's such an important issue to focus on when managing your gardens and green spaces.



Aerial inspection for pest infestations, such as tree borers, along the trunk of the tree.



A pile of aging forest mulch to be used in soil remediation programs. Mulch increases the carbon content of soil, retains moisture and provides food for soil dwelling micro-organisms which will help with keeping the soil aerated.



Deep soil injection of dry fertilisers with a pneumatic geo-injector for soil decompaction and aeration.

# The Eco-Conscious Experts.

## HOW IS PLANT HEALTH MEASURED AND MONITORED?

Our Agronomist and Microbiologists use a wide range of tools and methods to identify everything to do with the soil, ranging from the identification of any soilborne diseases and fungal infections to the precise nutritional balance of the soil itself. Furthermore, we also conduct visual surveys of the environment to identify any stressors or potential pest infections that may pose a risk to the longevity of your gardens health and fertility. A basic list of tests we conduct include:

### » Soil Sampling

The retrieval of a sizeable soil sample and the testing from each 'horizon' layer of soil helps us identify the nutritional information from the different soil layers. This further allows us to formulate a comprehensive plan to remedy any potential nutrient deficiencies we detect within the soil to promote better plant and tree health.

### » Decompaction & Drainage

Compacted soil greatly restricts the flow of water and nutrients into the soil and slowly starves the plant, weakening it and potentially leaving it in a vulnerable state for pests or disease. We provide decompaction services that break the soil up and have several options to help prevent or reduce the rate of compaction in the future.

### » Canopy Assessment

Our arborists conduct canopy assessments for trees in order to assess the general health and wellbeing of trees and to determine whether or not they might need to be more closely inspected for issues. This form of monitoring helps us also track the progress of remediation efforts over a period of time to see if a tree is healing from prior health issues.



Vertical boring for investigation and soil sample retrieved for testing.



Tomograph testing being conducted to assess the tree's internal structure in a non-destructive manner.

## DID YOU KNOW?

Mulch acts as a fantastic protective layer around your plants and trees, preventing the growth of unwanted weeds and overtime improving the supply of nutrients to the soil once the mulch breaks down.

# Nutrition. Minerals. Fertility.

## SOIL NUTRITIONAL INFORMATION

In order to promote healthy growth and ensure sustainability with your green spaces, the soil requires as much attention as the plants in them. An improperly balanced soil mixture can be more of a hindrance to the wellbeing and overall health of your plants than if the soil was simply left alone, which is why we make every effort to first learn exactly what the soil needs to thrive thanks to soil testing before we begin applying anything to it.

When it comes to balancing the soil, a lot of factors need to be taken into consideration such as the composition of the different soil layers, the pH levels, the level of filtration possible and finally whether the soil has the correct balance of minerals and nutrients in it to promote healthy growth in the plants. We provide a very wide range of natural fertilisers to help balance the soil that can help manage everything from its pH levels, water filtration capabilities and to help infuse specific nutrients such as nitrogen, potassium and phosphorus.



Preparation of aerobic microbial compost tea with the bag of compost.

## HOW DO ALL THE DIFFERENT NUTRIENTS PROMOTE HEALTHY GROWTH?

Soil Nutrients all serve a different purpose in the process of managing the health and growth of plants which is why it's important to understand the different elements that promote this purpose. While most people are familiar with the three main nutrients for soil health; Nitrogen, Phosphorus and Potassium (NPK) there are a great many different nutrients that contribute to the overall fertility of soil.

Boron helps reinforce plant immunity and resistance against disease and is also a critical component of plant cell walls and reproductive structures. Because it is required in such small amounts, it is important to distribute it as evenly as possible when it's applied as a fertiliser. However, most traditional fertiliser blends containing Boron often struggle to achieve a uniform distribution of nutrients and thus, despite being such an important nutrient for plant health, is the second most widespread micronutrient deficiency behind Zinc.

Another important yet sometime overlooked nutrient in soil health is Calcium. Serving as both an essential component for plant cell structure as well as acting as a passive tool to slow or prevent the compaction of soil, especially in clay soils where water absorption is particularly poor.

Finally, Lime is often used in soil healthcare and nutritional management as a balancing agent for soil acidity. When crushed into a fine powder it can adjust and correct soil acidity levels by raising the pH-levels. Furthermore it is often used to break up heavy clay soils which reduces the damages caused from compacted and waterlogged soil.



Zeolite acts as an amendment that improves soil aeration as well as nutrient and water retention.



Biochar improves the health of soil by enhancing nutrient retention and increasing the pH-levels of acidic soils.

# Diseases. Pests. Management.

## PEST INFESTATIONS

While there is a very large range of diseases and pest infestations that might affect your garden here are a list of the most common along with some handy tips on how to deal with them. Generally speaking, the worst of all pest infections can be categorised into two groups: Borers and Psyllids.

**Borers** are a category to describe a collection of destructive pests that cause damage to certain trees and woody shrubs. As adults, borers are winged insects (usually moths or beetles) that utilize vulnerable timber in their breeding cycle. They will lay their eggs on the bark of a suitable plant or tree where, upon hatching, the larvae will burrow beneath the bark to devour the carbohydrates produced by the host. In most cases a tree can be killed off in less than a week if exposed to a severe infestation.

Borers can be dealt with by using certain species of parasitic wasps which lay their eggs inside the larvae, killing them from the inside once they hatch.

**Psyllids**, also known as Plant Lice, are small insects that affect a large range of plants. They are a significant problem in South-East Queensland as they feed off the sap of plants causing a wide range of problems. *Psylla australis* is also capable of transmitting diseases from tree-to-tree which further worsens the health of your garden or green space.

The most effective way to counter these common pests naturally is by introducing natural predators into the environment. Psyllids are preyed upon by many small bird species, ladybugs and predatory beetles.



Example of what a wood borer infestation looks like from the outside.



Wasp's play an important role in helping manage and prevent the outbreak of Psyllid's.

## PLANT DISEASES

Plant diseases can spread rapidly and cause significant damage if left unchecked. Our disease management service provides comprehensive monitoring and treatment options to safeguard your plants against infections caused by fungi, bacteria viruses. We conduct regular inspections for any signs of sickness and apply any necessary treatments when necessary.

A few of the most common diseases in South-East Queensland include Root Rot, Canker Disease, Leaf Spot, Powdery Mildew, Fungal Root Disease and Rust Disease. Most of these are directly caused by fungal pathogens and infections, usually spread through a variety of methods but the most common being poor infiltration in highly compacted soil or extremely humid environments.

Effective land management practices can usually prevent these from becoming problems but when it does occur we offer a variety of economical and environmentally friendly solutions to tackle the issue.



*Ganoderma* spp. produce enzymes that break down the structure of bark and wood, leading to significant decay in a tree's structure.

# Tree Consultancy.

## WHAT IS TREE CONSULTANCY?

Consultancy offers specialized consultancy and testing services designed to provide scientific insight and practical solutions for maintaining the health and longevity of your trees and plants.

Our experienced team of Microbiologists, Agronomists, and certified arborists, utilize advanced testing methods as well as detailed assessments to deliver both accurate diagnoses and customized care strategies.

## HOW IS IT DIFFERENT FROM PLANT HEALTH CARE?

We understand that every landscape is unique, which is why we take a personalized approach to each project. Our services extend beyond basic plant health assessments to include soil testing, pest and disease diagnosis, nutrient management plans, and long-term care strategies.

We strive to work alongside you to develop actionable recommendations, ensuring that your trees and plants thrive in their specific environments, boosting their appeal, health and overall appearance.

## WHAT KIND OF SERVICES ARE PROVIDED?

We provide a wide range of services focused on the health, growth and overall wellbeing of any trees on your property or business.

## INCLUDED SERVICES

### » Tree Management Plans

Our teams will create highly detailed and comprehensive plans and strategies to help care for your trees over time while also providing advice and consultation on the best course of action when it comes to the removal or relocation of any existing trees on the land.

### » Tree Risk Assessments

Similar to Tree Management Planning, we also provide detailed assessments of pre-existing trees to determine their overall health and stability and whether they pose a risk to their immediate surroundings, including but not limited to infrastructure, housing, construction sites and pedestrians.

### » GPS Mapping

GPS Mapping is utilised to great effect to monitor the transformation and changes to large groups of trees in an area over a set amount of time. This helps us both monitor the effectiveness of treatment plans for large tree clusters and whether there may be other problems that need to be addressed.

# Experienced. Trusted. Reliable.

## EAL TESTING SUITES

Environmental Analysis Laboratories (EAL) Testing Suites offer a comprehensive suite of diagnostic tests that analyse soil, plant tissue, and water quality. This data-driven approach allows us to assess key environmental factors influencing plant health; such as nutrient levels, soil composition, salinity, and even contamination.

These insights guide the development of precise fertilization and irrigation strategies, ensuring that your landscape has the ideal conditions for growth. EAL Testing Suites are essential for anyone looking to optimise the health of their soil, improve plant vitality, or address environmental stressors.

## SOIL MINERAL TESTING & MANAGEMENT

Analysing the mineral composition of soil is an essential practice in agriculture, horticulture and landscaping for several important reasons. Soil is at the very foundation of plant and tree health where its mineral content plays a critical role in the growth, development and overall health of these organisms.

## SOIL MICROBIAL ASSESSMENT

The health of your plants is deeply tied to the microorganisms present in your soil. Our Soil Microbial Assessment provides a detailed analysis of the microbial life in the soil, including beneficial bacteria, fungi, and other organisms that contribute to nutrient cycling and disease suppression.

By understanding the balance of microbial populations, we can recommend specific treatments to enhance soil health, such as adding organic matter, applying compost teas, or incorporating bio-stimulants. This service is especially useful for promoting long-term soil fertility and resilience in both urban and rural landscapes or gardens.



EAL Testing Suites provide agronomists with highly accurate and targeted information that is vital towards identifying problems with the soil being inspected.



Bleeding holes in the trunk of a Jacaranda tree suspected to have been poisoned.

## The-Wood-Wide-Web

Also known as a Mycorrhizal Network, this symbiotic relationship between the roots of all kinds of plant life and specific types of fungi connects the roots of individual plants together, forming an interconnected network that greatly extends the plants access to nutrients and water while also helping protect it from diseases that could otherwise decimate entire forests.



Ganoderma spp. and Phellinus spp. are common wood decay fungi that are a threat to many tree's across South East Queensland.



Fruiting bodies give a clear indication of the soil conditions present around a tree.

# Greener. Stronger. Healthier.

## TREE HEALTH SCORING

Our specialists are trained to provide you accurate and informed information on the health and status of your trees. Ranging along a scale from Excellent Health to Dead, we provide you with the knowledge and understanding to make the correct decisions when they matter most.

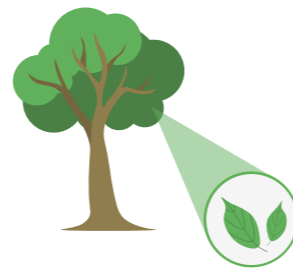
## EXCELLENT HEALTH

A tree given this score is often regarded as being in perfect condition, with a sufficient balance of nutrients and no environmental stressors present which also includes the absence of any diseases or pests. Trees in this state often have a rich, colourful crown of foliage that covers the entire canopy.



## GOOD HEALTH

A tree given this score can be considered to be healthy but with room for improvement. They have a full but slightly unbalanced crown in some areas that covers most of, if not the entire canopy. The foliage is a good, healthy size and colour and there is often minimal to no pathogens or pest damage present.



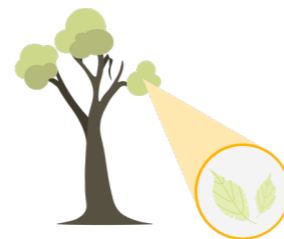
## FAIR HEALTH

A tree in this state has a generally unbalanced crown of foliage that, while generally showing good colour and size, is struggling overall. This can usually be the result of pathogenic or pest infestations. Another big sign is if the tree has deadwood, or branches that have died off, present.



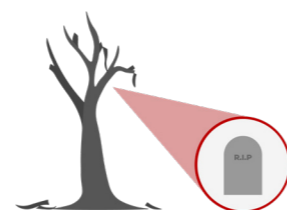
## POOR HEALTH

Unbalanced crown, with leaves showing clear signs of abiotic stressors. Usually disformed and of poor colour and consistency. Foliage is very sparse and covers very little of the canopy. Tree also likely includes >30% deadwood branches.



## DECEASED

The tree has expired. The deadwood now poses a risk to both people and property alike. Falling branches and limbs can injure those beneath them while also damaging property. Meanwhile the trunk could potentially become the host to termites while the roots will prevent the growth of anything new. It will need to be removed.



# Pathogens & Remediation.

## PATHOLOGY TESTING

Pathogens such as fungi, bacteria, and viruses can severely damage plants when left undiagnosed and untreated. Our comprehensive external lab specializes in identifying and managing plant diseases through a combination of laboratory testing and field analysis.

We collect plant samples for microscopic examinations, running external laboratory cultures and using molecular techniques to pinpoint the specific pathogens responsible for any present diseases found.

Pathology tests help us identify the cause of ailing trees, which in turn helps our team of specialists hand tailor customised treatments to combat the pathogen while also preventing it from spreading to other plants.

## REMEDICATION PLANNING

For landscapes facing complex health challenges such as soil contamination, pest infestations, or disease outbreaks, our Remediation Plans provide a strategic road map to recovery. The goal of these plans is to restore the health and vitality of your landscape through sustainable, long-term solutions hand-tailored to your specific needs.

Many failed street side tree plantings and trees found to be in decline area usually the direct result of the impact of sustained abiotic and biotic stressors not being correctly managed. One of the stressors that impact the growth and health of trees is soil compaction, which restricts the flow of air and water through the soil which slowly starves and suffocates a tree and hinders its growth. Compacted soil can often be decompacted with professional tools that help aerate it. This ends up promoting the flow of water and air, as well as root growth.

We use a variety of different organic materials and fertilizers based on the analysis of our soil tests. Custom blends are mixed and applied specifically for the needs of each site to promote healthy plant growth and reduce the risks from pests and diseases.



Preparations for the retrieval of soil samples along with a visual inspection of the soil layers.



Fruiting bodies of a wood decay fungi. These fungi usually appear on the lower stems of trees or at points of damage where the tree is weak.



A mature fig tree in decline showing clear symptoms of wood decay in its buttress.

## The Fungi Did It.

Fungi are often times the most common culprit of tree die-back. The most common diseases that affect trees are often fungal and usually attack their hosts through wounds on their surface or weakened areas of the trees, causing rot in some specific cases.



Plant Health Care crew performing soil treatment as part of a greater remediation plan.

# Protection Orders & TPZ's.

## VEGETATION PROTECTION ORDER (VPO)

Vegetation Protection Orders (VPOs) are used by authorities to apply legal protection to individual or groups of trees from being removed, damaged or otherwise altered without first receiving strict approval from council. These are usually issued to help preserve trees that possess significant value to their environment due to their health, size, species, ecological contribution, historical importance or aesthetic value. VPO's can be applied for through the Brisbane City Council website, which protects them from being removed or harmed by law. In Queensland, vegetation protected under the Natural Assets Local Law 2003 (NALL) fall into one of four (4) categories:

**[DARK ORANGE] Council Vegetation:** Vegetation on land that is owned, controlled or otherwise occupied by Council is protected.

**[BLUE] Waterway & Wetland Vegetation:** Waterways and wetlands can be either naturally formed or man-made and may be both freshwater or saltwater.

**[LIGHT ORANGE] Significant Urban Vegetation:** Native and Exotic vegetation on private property that is mature and/or prominent in the landscape may fall under the protection of NALL.

**[GREEN] Significant Native Vegetation:** This includes native vegetation ranging from small ground covers and native grasses to large trees.



A map that showcases registered tree protection zones within the city of Brisbane.

## TREE PROTECTION ZONE (TPZ)

Trees are a vital aspect of our natural environments and play integral roles in the aesthetic appeal of our parks and greenspaces which is why we have a responsibility to ensure that no harm befalls them when urban development and construction is undertaken nearby. Tree Protection Zones (TPZs) are designated areas that surround trees, protecting them from disturbances and damage during construction, development or otherwise any kind of planned activities that pose a risk to the tree in question. The TPZ acts as a buffer to shield the tree from receiving damage to its roots, trunk or canopy and can vary wildly depending on both the size, type and shape of the tree.

### HOW IS THE TPZ CALCULATED?

Typically, the TPZ for a specific tree is calculated using either the tree's drip line, which is the outer edge of its canopy, or a formula based on the diameter of the tree's trunk at breast height (DBH). The common standard of practice is to create a buffer zone that extends 1.5 times the DBH or the drip line, whichever is greater, which will then become the TPZ for that specific tree.

### WHAT IS THE STRUCTURAL ROOT ZONE (SRZ)?

The Structural Root Zone (SRZ) is a fundamental part of a TPZ and is the area of roots around the trees that are considered vital for the tree's ongoing structural integrity. While a much larger area is required to maintain a viable tree, the structural root zone is considered critically important for the structure of the tree to remain upright and sturdy.



Fencing set up to protect the TPZ around this tree from ongoing development.



A short rail set up to protect the tree while it undergoes remediation treatment.

# Sonic Tomography.

## SONIC TOMOGRAPHY

Sonic Tomograph Testing is a non-invasive diagnostic test that is frequently used to assess the internal structure, condition and integrity of trees. This method allows arborists to detect potentially dangerous weaknesses in the core of the tree without having to damage its bark or structure. It is particularly useful for identifying rot or decay and the severity of it to determine whether a tree is in danger of failure.

### HOW SONIC TOMOGRAPHY WORKS

The principle behind sonic tomography is based on how sound waves travel at different speeds through materials depending on their density and structure. In healthy trees the sound waves should travel throughout the structure of the trunk at a steady speed, while those that are experiencing decay, have cavities or internal damage will have the sound waves slow down or scatter entirely.

Arborists will place multiple sensors around the trunk of the tree or in the area of interest, such as the limb of the tree or it's branches. They will then send several sound pulses throughout the tree, which are picked up by each of the sensors. The time it takes for each sound pulse to reach each sensor is then measured and processed by a program that generates a tomographic image of the tree's internal structure. This image is what helps arborists identify flaws or weaknesses in the core of the tree.

Sonic Tomography works best on trees with relatively homogenous structures. Those with highly irregular growth patterns or dense, knotty wood are far more difficult to assess with this method.

## SONIC TOMOGRAPHY

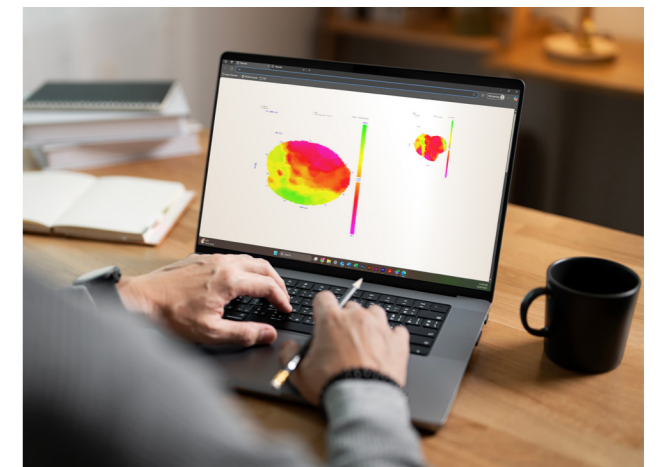
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### The Advantages

- » A limited-invasive procedure, causing little-to-no long-term damage to the tree's structure or health.
- » Capable of detecting structural flaws deep within the tree such as cavities.
- » Can accurately pinpoint points of failure or damage with extreme precision, ensuring that any treatment or remediation plans are focused on the right area.
- » The mapping of the most likely points of failure can help protect people and property around the tree from sudden structural failure.



A sonic tomography setup and test as seen from the outside of the tree.



The digital rendering of a tomographic map of the above tree. The colours indicate the density of the wood and therefore whether it has any cavities within.



An arborist fixes the tomograph nodes in place, preparing to make an assessment on whether the tree has any cavities of structural weakness' inside.



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