



Geosynthetics

Tree Vitality Observations

Cellweb[®]TRP

2nd Edition



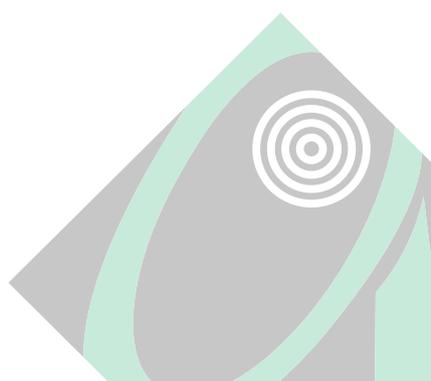
Tree Vitality Assessment of historic Cellweb® TRP projects

Geosynthetics Cellweb®TRP is the UK's leading three dimensional cellular confinement tree root protection system. Since 1998 it has been installed as a no dig solution for the construction of new hard surfaces within root protection areas (RPA's) and remains the only tree root protection system to have undergone independent testing. The system is specifically designed to prevent soil compaction within RPA's and is completely permeable. This enables continued water permeation and gaseous exchange between the rooting environment and the atmosphere, ultimately ensuring the long term health of the tree.

After many successful years of supplying the Cellweb®TRP system, in 2015 Geosynthetics Limited began a project to investigate the long term effects of Cellweb®TRP on the vitality of trees subject to historic installations. The aim is to run a programme of tree vitality assessments prior to installation and with ongoing annual assessments thereafter. This will provide a body of observational data and photographic evidence that Cellweb®TRP maintains the physiological and biological wellbeing of the trees subject to the construction of new hard surfaces within their RPA's.

Photographs were taken at the time of installation which are used to give an indication of tree vitality and can be compared with our most recent assessments. These historic installations will be revisited, assessed and photographed every 2 years by our LANTRA qualified arboriculturalist.

The first edition of our tree vitality assessments was completed and made available in autumn 2015. This represented the beginning of an ongoing programme whereby the trees featured in the first edition would be revisited and reassessed every two years. This edition details our assessments made in 2017 and provides photos which can be compared with those taken at the time of installation, and in 2015. We have also included a number of additional trees which will now form part of our ongoing programme.



Methodology

Tree vitality assessments were carried out by Geosynthetics Limited's in-house LANTRA qualified professional tree inspectors. When assessing tree vitality, Visual Tree Assessment (VTA) techniques were used to assess tree condition. Observations were recorded and photos were taken. The key indicators of tree condition observed are below, changes in these key indicators can indicate that a tree is under stress conditions and is experiencing physiological changes.

Leaf / needle / bud coverage

A lower than normal leaf, needle or bud density for the species in question can indicate that the tree is under stress. This can occur in drought conditions caused by soil compaction or the introduction of new hard surfaces in the rooting area. Particular attention will be paid to coverage in the crown above the Cellweb® installation and compared with the remaining crown.

Leaf / needle size, shape and colour

Smaller than normal leaves for the species can be caused by decreased cell expansion which is common under drought conditions. Discolouration and curling of leaves and needles may also indicate drought conditions or possible nutrient deficiencies. These can be caused by soil compaction and root death.

Presence of dead wood

The presence of a larger than normal quantity of dead wood in the crown would indicate die back. This is the trees natural response when it is unable to access the water and nutrients required to maintain its biological processes throughout the tree. Particular attention will be paid to the presence of dead wood in the crown above the Cellweb® installation as this could indicate soil compaction or root death.

Evidence of bacterial or fungal colonisation

Trees which are stressed by drought conditions, nutrient deficiencies or physical damage, over time can become more prone to bacterial and fungal colonisation. Attention will be paid to the presence of both.



Lakeside Development

Tree species:	Atlas Cedar <i>Cedrus atlantica</i>
Project details:	This project involved the construction of a holiday park on the banks of lake Windemere. The site comprises numerous luxury chalets set amongst mature trees. Cellweb® TRP was used for the construction of the access roads around the new parks and was surfaced with a permeable asphalt. The photos show the tree at the time of installation and at the time of the 2015 and 2017 inspections.
Installation date:	18 th March 2011
Assessment date:	18th August 2015 and 17th July 2017
Leaf, needle and bud coverage:	Dense and even needle coverage was observed
Leaf and needle size shape and colour:	Needle shape and colour were normal for species.
Dead wood content:	Minor deadwood was observed in the inner crown. This can be considered normal for the species.
Bacterial or fungal colonisation:	No evidence of bacterial or fungal colonisation was observed.
Other observations and comments:	The tree is currently exhibiting no signs of ill health or reduced vitality.
Next assessment date:	Summer 2019



Installation - Year 2011



Assessment 1- Year 2015



Assessment 2 - Year 2017

McDonalds

Tree species:	Common Lime <i>Tilia x europaea</i>
Project details:	In October 2016 McDonalds Cirencester embarked on a project to improve their parking facilities and drive through. This included the construction of a minimal dig Cellweb® footpath through the RPA's of two Lime trees. A full case study is available for this project.
Installation date:	October 2016
Assessment date:	20th June 2017
Leaf, needle and bud coverage:	Leaf coverage is good and even across the crowns.
Leaf and needle size shape and colour:	Leaf size is normal for species and colour is good.
Dead wood content:	A small amount of minor deadwood was observed throughout the crown. This could be considered normal for this species in this stage of its life cycle.
Bacterial or fungal colonisation:	No evidence of bacterial or fungal colonisation was observed on inspection.
Other observations and comments:	It can be observed that these trees have been subject to historic crown reduction. Some minor epicormic growth was observed on the main stems but this can be considered normal for species. The trees appear to have good vitality and although the inspection was carried out only eight months after installation, they will be monitored in the future.
Next assessment date:	Summer 2019



Installation - Year 2016



Assessment - Year 2017

Shelton Road

Tree species:	Common Lime <i>Tilia x europaea</i>
Project details:	In order to construct a driveway and create a garage the drive needed to pass through the RPA of a mature Lime. The photos above show the tree at the time of installation, in February 2016 and in July 2017. This has enabled us to view the tree in winter and in leaf.
Installation date:	5th December 2008
Assessment date:	3rd February 2016 and 5th July 2017
Leaf, needle and bud coverage:	The good bud coverage observed in December 2016 has provided good even leaf coverage in summer 2017.
Leaf and needle size shape and colour:	The leaf size, shape and colour is good and is normal for species.
Dead wood content:	Minor deadwood was observed throughout the crown which is common to the species at this stage in the life cycle.
Bacterial or fungal colonisation:	No fungal fruiting bodies or exudates were observed.
Other observations and comments:	In 2017 almost nine years after installation, this tree continues to exhibit signs of good vitality.
Next assessment date:	Summer 2019



Installation - Year 2008



Assessment 1- Year 2016



Assessment 2 - Year 2017

Parkside School

Tree species:	London Plane <i>Platanus x hispanica</i> and Sycamore <i>Acer pseudoplatanus</i>
Project details:	In December 2014 Parkside school embarked on the construction of a new carpark to increase capacity for staff and visitor parking. The 200mm Cellweb® was used to construct the minimal dig carpark and access road. The access road and carpark encroaches significantly into the RPA's of the trees photographed above. A full case study is available for this project.
Installation date:	December 2014
Assessment date:	20th June 2017
Leaf, needle and bud coverage:	Leaf size and coverage was good on both trees.
Leaf and needle size shape and colour:	Leaf size, shape and colour is good.
Dead wood content:	No deadwood was observed.
Bacterial or fungal colonisation:	No evidence of fungal or bacterial colonisation was observed.
Other observations and comments:	Two and a half years after the installation of the carpark these trees appear to be in good health with good vitality.
Next assessment date:	Summer 2019



Installation - Year 2014



Assessment - Year 2017

Calke Abbey

Tree species: **English Oak *Quercus robur***

Project details: This 1200 year old oak at the national trusts Calke Abbey had been retrenching on one side due to soil compaction caused by long term foot traffic on one side of the crown. A Cellweb® footpath was created to replace the existing footpath and a layer of mulch was placed below the Cellweb® system to encourage the loosening and aeration of the compacted soil by decomposers and earth worms. The above pictures show the tree at the time of installation and on the dates of assessment in both 2015 and 2017.

Installation date: 18th July 2014

Assessment date: 23rd August 2015 and 5th July 2017

Leaf, needle and bud coverage: Leaf coverage and crown density continues to improve. This can be attributed to improved soil conditions but also the removal of several surrounding trees at the time of installation.

Leaf and needle size shape and colour: Leaf size colour and shape was typical for species.

Dead wood content: As would be expected of a tree of this age and species there were significant quantities of major dead wood, most of which can be found on the footpath side of the crown. Although the tree is retaining its dead wood well, no additional deadwood was found suggesting a possible slowing in the trees retrenching through an improvement in soil conditions, increased light levels and reduced competition for water and nutrients.

Bacterial or fungal colonisation: No fruiting bodies or exudates were observed.

Other observations and comments: This tree continues to display an improvement in its vitality through improved soil conditions and reduced competition for light, water and nutrients.

Next assessment date: Summer 2019



Installation - Year 2014



Assessment 1 - Year 2015



Assessment 2 - Year 2017



Installation - Year 2015



Assessment - Year 2017

Weybridge Cricket Club

Tree species: **English Oak *Quercus robur***

Project details: In March 2015 Elmbridge Borough Council began construction on a new car park at Weybridge cricket club. The carpark was constructed using a Cellweb® no dig subbase and was surfaced using the Geosynthetics Golpla® gravel retention system. The new carpark was constructed over a large proportion of the RPA's of the two oaks photographed.

Installation date: March 2015

Assessment date: 20th June 2017

Leaf, needle and bud coverage: The combined crowns have good even leaf coverage.

Leaf and needle size shape and colour: The leaf size and shape and colour is good.

Dead wood content: Only minor quantities of deadwood were observed, although it is standard practice to remove deadwood in such high target areas.

Bacterial or fungal colonisation: No evidence of bacterial or fungal colonisation was observed.

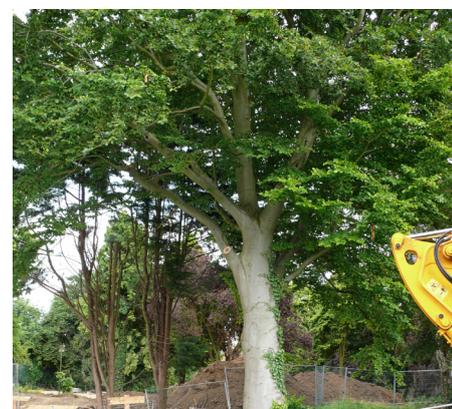
Other observations and comments: Two years on from the installation these trees appear to be in good health and exhibit good vitality.

Next assessment date: Summer 2019



Keats Way

Tree species:	Common Beech <i>Fagus sylvatica</i>
Project details:	This project involved the construction of a new access road through the RPA of a Beech tree to access a new development site in Rushden, Northamptonshire. The project was unique at the time in that it required the stacking of the Cellweb® system to overcome changes in levels within the RPA in excess of 2M. This brought about a significant increase in levels within the RPA. The photos above show the tree at the time of installation and at the time of the 2015 and 2017 inspections.
Installation date:	26th June 2014
Assessment date:	14th August 2015 and 13th June 2017
Leaf, needle and bud coverage:	Leaf coverage was good and even throughout the crown.
Leaf and needle size shape and colour:	Leaf size, shape and colour was normal for species.
Dead wood content:	No major dead wood was observed however low levels of minor deadwood were observed throughout the crown.
Bacterial or fungal colonisation:	No fruiting bodies or exudates were observed on inspection.
Other observations and comments:	It can be seen in 2017 that this tree continues to exhibit no signs of reduced vitality or ill health caused by this installation.
Next assessment date:	Summer 2019



Installation - Year 2014



Assessment 1 - Year 2015



Assessment 2 - Year 2017



Installation - Year 2016



Assessment - Year 2017

69 Church Lane

Tree species:	English Yew <i>Taxus baccata</i>
Project details:	In summer 2016 a new driveway was constructed within the RPA of an English yew. Much of the RPA was located in a natural depression which was in excess of 1m below the road level and the proposed drive beyond. The construction required a build up of five layers of Cellweb® 200mm to infill the depression and meet the existing road level. A full Case study is available for this project.
Installation date:	June 2016
Assessment date:	6th July 2017
Leaf, needle and bud coverage:	This tree has good needle coverage. As would be expected needle coverage is more sparse on the trees shade side.
Leaf and needle size shape and colour:	Needle size and colour is normal for the species.
Dead wood content:	No significant deadwood was observed, although this may have been removed at the time of the crown raising operation.
Bacterial or fungal colonisation:	No exudates or fruiting bodies were observed.
Other observations and comments:	The tree has been crown raised during the construction of the visual splays onto Church Lane. One year on from the installation this tree appears to be in good health with good vitality.
Next assessment date:	Summer 2019

Castle Gardens

Tree species:	London Plane <i>Platanus x hispanica</i>
Project details:	In spring 2015 Leicester City Council constructed a new footpath linking St Nicholas Circle with the Castle Gardens. Due to natural changes in levels this required a multiple layer build up, utilising different depths of Cellweb®. The footpath passes through the RPA of the above photographed London Plane. A full case study is available for this project.
Installation date:	April 2015
Assessment date:	13th June 2017
Leaf, needle and bud coverage:	The tree has good even leaf coverage.
Leaf and needle size shape and colour:	Leaf size, shape and colour is normal for species
Dead wood content:	Minor deadwood was observed in the inner crown but this can be considered normal for the species.
Bacterial or fungal colonisation:	No bacterial cankers, exudates or fungal fruiting bodies were observed.
Other observations and comments:	The tree exhibits no significant defects and displays good vitality.
Next assessment date:	Summer 2019



Installation - Year 2015



Assessment - Year 2017

Montacute School

Tree species:	Scots Pine <i>Pinus sylvestris</i>
Project details:	As part of an overall redevelopment, Montacute school constructed additional parking for visitors and staff. The carpark is constructed using Cellweb® in order to protect the RPA's of trees which were retained around the peripheries of the carpark. The above Scots Pine is one of those trees with its RPA partially covered by the new carpark.
Installation date:	August 2015
Assessment date:	5th July 2017
Leaf, needle and bud coverage:	The tree has good even needle coverage in the upper canopy. Needle coverage is more sparse in the lower canopy which is likely to be caused by shading.
Leaf and needle size shape and colour:	The needle size shape and colour is normal for the species.
Dead wood content:	Very little deadwood was observed and it is likely that deadwood was removed before construction during the tree work operations.
Bacterial or fungal colonisation:	No evidence of bacterial or fungal colonisation was observed.
Other observations and comments:	Although the carpark was only installed very recently we can see that the installation has had no immediate adverse effects on tree vitality.
Next assessment date	Summer 2019



Installation - Year 2015



Assessment - Year 2017



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