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TREE REPORT

Resistograph & aerial Survey of 2 Beech and a Horse Chestnut Tree's at Beech Grove Residential Home, Clitheroe, BB7 2LS.

ABSTRACT

Report highlighting the silvicultural issues with 2 Beech Trees and a Horse Chestnut Tree at Beech Grove Residential Home, St Pauls Street, Clitheroe, Lancs, BB7 2LS. With recommendations for the removal of the 2 Beech's and crown reduction of the Horse Chestnut.

Anthony Bethell

Chartered Arboriculturist, BSc (hons) For., MICFor, PGC Urban Forestry

1) **Introduction**

a) **Terms of Instruction**

i) This report has been commissioned by Bowland Tree Consultancy Ltd of Preston, Lancs, on behalf of Beech Grove Residential Home to undertake an aerial and ground Resistograph survey of the 2 copper beech trees to the rear of Beech Grove Residential Home, St Paul's Street, Clitheroe, Lancs, BB7 2LS.

ii) This instruction was confirmed by Phil Harris MD of Bowland Tree Consultancy.

b) **Report Limitations**

i) This report is for the sole use of the client and its reproduction or use by anyone else is forbidden unless written consent is even by the author.

ii) This is an arboricultural report and as such no reliance should be given to comments relating to buildings, engineering or soil.

iii) This is a preliminary arboricultural health and safety survey of trees identified to detect structural or physiological defects.

iv) The inspection/drilling was undertaken from ground level and aerial.

v) Trees are growing dynamic structures. Whilst reasonable effort has been made to identify defects within the trees inspected, no guarantee can be given as to the absolute safety or otherwise of any individual tree. No tree is ever absolutely safe due to the unpredictable laws and forces of nature. Because of this, natural failure of intact trees will occur; extreme climatic conditions can cause damage to even apparently healthy trees.

vi) Trees are living organisms whose health, condition and structure can change quickly and without warning. Therefore, the contents of this report are valid for a period of one year from the date of this survey. As such, it would be prudent for the trees discussed in this report to be re-inspected by a competent person where the frequency of inspection has been entered in the tree schedule found in the Appendix.

vii) Only the 2 copper beech trees at the rear and the Horse Chestnut at the front of Beech Grove have been assessed. Therefore, this report only provides a snap shot of the condition of these tree.

viii) On undertaking the recommended works, the arborist/tree surgeon must without delay report any defects that become apparent while climbing or working on the tree/s in question. Those defects must be reported immediately to the relevant project manager, landowner and /or author of this report to enable the appropriate remedial action. This is principally relevant to work on the Horse Chestnut Tree.

c) **Documents provided.** As background information an earlier VTA (Visual Tree Assessment) report by Bowlands Tree Consultancy (13th July 2017) was issued to the author prior to the Resistograph work. An updated version of this report can be found in the appendix of this report. This includes the summary of the Resistograph work and findings.

d) **Author and Qualifications:** The author of this report is Anthony Bethell BSc(Hons) Forestry, PGC Arboriculture & Urban Forestry, M.I.C.For. Chartered Arboriculturist (Full curriculum vitae is available on request).

2) Data Collection

a) Site Visit

i) Anthony Bethell visited the site on the following date 10th November 2017. The tree was inspected visually from the ground as well as an aerial presence survey in the lower trunk sections (Note this was not a full crown aerial presence survey as the principal concern was with issues with the trunk and hence a full aerial survey would be superfluous should initial concerns with the trunk be substantiated). The weather at the time of the inspection varied between sunshine and cloud with occasional showers. Visibility was sufficient for the inspection of the trees, but rain showers meant that the drilling had to take place in the dry spells.

b) Site Description

i) Beech Grove Residential Home is situated adjacent to St Pauls Road, just of Edisford Road on the West side of Clitheroe in Lancashire. It is situated to the North West of St Pauls Church. Clitheroe is a town and civil parish in the Borough of Ribble Valley, approximately 34 miles northwest of Manchester, England. It is near the Forest of Bowland, and is often used as a base for tourists visiting the area.

ii) The 2 copper beech trees are in the rear garden situated on the South side of the building. The horse chestnut is sited at the front of the building adjacent to the road entrance off St Pauls Street.

iii) The beech trees at the rear are growing in a garden setting but some residential development has taken place to the South of these trees. The horse chestnut at the front of the building has a mixed rooting structure development layer with its root protection zone area spanning into driveways/carparks and road/pedestrian surface layers. Location of the trees is shown in the google maps image in the appendix.

Iv) The amount of footfall and exact usage within the garden and carpark area/ pedestrian footpath is unknown to the author. However, as Beech Grove is open though as a residential house with both staff and visitors coming and going on a daily basis it is thought it would be quite high with perhaps 50 plus journeys a day, 7 days a week all year around.

c) Method of data Collection

i) The trees had previously been assessed according to the Visual Tree Assessment (VTA) method (Lonsdale 1999) and QTRA methodology by Rowland Tree Consultancy with a record made of any hazard that require remedial action or further inspection from the ground. This previous report had highlighted the need for further investigation into decay

pathogens on the main trunks of the beech trees and the fact that the horse chestnut tree had shed a limb recently in 2017.

ii) Trees are identified by their common name and botanical name. All heights and crown spreads given are estimated in metres (these figures are shown in the Bowland Tree Survey of July 2017)

iii) Approximate tree age is reported as age class whilst the physiological condition (Vitality on Bowland Tree Consultancy-BTC- report) of the tree is given as a classification of either good, fair or poor. A key for these is present on the front page of the BTC report.

iv) The BTC tree schedule found in the Appendix also outlines brief comments made on the overall health and condition of the trees in question. Prioritized recommendations are given for the trees in the Management Suggestions Column. Any pruning or felling works considered are viewed as being appropriate to the risk the defects pose and their associated targets.

v) The Resistograph drilling work was undertaken using a IML FSX500 which has a drilling depth of 500mm. The drillings were interpreted using the IML F-Tools software.

vi) Resistograph work was undertaken at both ground level and at height. The pdf drilling readings in the appendix state the time, date, tree ID number, direction of drilling and the height the drilling was taken at.

vii) No Resistograph drillings were undertaken on the horse chestnut due to an internal breakage on the Resistograph from the last drilling of copper beech T2. Aerial inspection with probe and mallet was undertaken to assess items highlighted in the initial BTC report.

3) Tree Protection: Legal Status

a) Tree Preservation Order and Conservation Areas.

i) The trees in question are subject to a Tree Preservation Order (TPO). The tree Officer for the area was aware of the on-site inspections due to a phone call from BTC.

ii) A TPO is an order made by a local planning authority (LPA) to protect individual, groups, areas of trees and woodlands. The legislation on TPO's is in Part VIII of the Town & Country Planning Act 1990 and subsequent amendments.

iii) LPA's have the power to designate Conservation Area (CA). Trees located within a CA are subject to similar protective provisions as that of the TPO's so that a tree owner must issue their LPA with a Section 211 notification to inform them of any impending works on said trees.

iv) Written consent from the LPA must be obtained before any work can take place on either TPO or CA protected trees. Failure to acquire written consent from the LPA may result in prosecution. In some cases a dead, dying and dangerous exemption will apply; the landowner should contact their LPA or the author for more details.

b) Felling Licences

i) Tree felling is also restricted under the Forestry Act 1967. Under this act, there is an exemption from the need for a felling licence where "Felling necessary for the prevention of danger or the prevention or abatement of a nuisance (e.g. which may involve threat of danger to a third party)."

ii) The remedial work recommendations highlighted in this report fall under this exemption.

iii) When felling is likely to generate over 5 cubic metres of wood per quarter or 20 cubic metres per annum and the trees are not subject to the above exemption then a felling licence is required.

4) Tree Appraisal: Common Defects

a) Deadwood

i) Deadwood is a defect found on all trees inspected. Its significance depends on the nature of the target below (e.g. a busy road compared to a field corner), the size of the deadwood and the type of tree it is attached to.

ii) Deadwood can be produced by healthy trees that no longer require the use of certain branches (such as those that are shaded out) and are discarded. However, deadwood is also produced by trees that are in decline or are exhibiting low vigour.

iii) The size of deadwood is recorded as small diameter (up to 4cm), medium diameter (up to 8cm) and large diameter (greater than 8cm). Obviously, trees holding larger diameter deadwood are more significant than those holding smaller diameter deadwood.

iv) Tree type is an important consideration. For example, ash is more brittle than oak when it decays hence the priority for removal of ash deadwood is higher.

v) In some instances, the size of the deadwood and associated decline in certain trees require removal of the crown and pollarding to remove the hazard.

b) Internal Tree Decay

i) Wood decay in trees can lead to the failure of main stems and limbs. Decay commonly occurs in many tree species and can weaken the structural characteristics of the wood. In many instances the presence of decay will not signify immediate failure of the tree and is only cause for concern when significant amounts of woody tissue are affected. However, it is important to note where on the tree and to what level the decay has taken hold.

ii) Stem and/or branch failure can at times be predicted by identifying the location of the decay on the tree and the extent of the decay in the tree. The significance of the decay being found at a certain point on the tree indicates a failure around that area may be likely (although possibly not imminent). Generally, the closer to the ground the decay is found the larger the tree part that could fail.

iii) The cause of wood decay in trees is fungi. There are many different species of fungi some of which only degrade certain tree species. Additionally, some fungi decay wood at a faster rate than others or leave wood in such a condition that it has a very high likelihood of sudden failure. Therefore, identifying the particular fungi can be very important and provide clues to

how far the tree has deteriorated.

iv) Where decay is evident it must be measured. If there is an open cavity a visual inspection can be carried out. At other times a probe is used ion small cracks to measure internal cavities and a hammer is used to sound for "hollowness".

v) The point at which a tree is considered "dangerous" and is liable to fail is where significant amounts of decay are found in relation to a safe level of live woody tissue. Arboriculturists use engineering based formula to assist in identifying this failure point, however, additional factors are also taken into account (see below) when detailing tree work recommendations.

vi) This pragmatic approach includes considering the level of decay, the tree species (indicating the initial strength of the wood), the age and condition of the tree, its form e.g. if it is heavily weighted in one direction or has suffered past storm damage, the location of the decay on the tree and very importantly the potential target. In this way, a management recommendation can be established, from the extremes of purely monitoring the progress of the decay to the felling of individual trees.

5) Tree Appraisal: General

a) Introduction

i) All 3 trees inspected have been assessed by Bowland Tree Consultancy with comments being made about their general appraisal along with suggested management recommendations. This report was updated in November 2017 following this site visit that month. These details can be found in the report attached in this reports appendix.

ii) It was noted however that on this site visit some work had been undertaken to the 2 copper beech trees in the rear of the care home. The work that had been undertaken was not to BS3998 standard. It had also become apparent that climbers had accessed the trees using climbing irons as marked were left in the cambium of the main trunks of bot trees. It is thought that this work was instigated by building contractors who undertook the new residential build to the South of the rear garden.

b) Further investigation-aerial presence survey

i) Following the initial ground inspection by BTC this site visit was undertaken to perform Resistograph drillings and aerial inspections of points highlight in the July 2017 report. The findings of these drillings are shown in the attached Appendix of this report.

ii) The aerial inspection of tree T1 (Horse Chestnut) found that no significant decay pockets were occurring in the forked inclusions and this has been documented in the updated BTC report as thus "Union at point of bifurcation probed to a depth of 100mm and evidently solid. All other main primary unions to secondary branch architecture inspected and deemed solid. Tree is projected to successfully maintain structural and physiological condition after a crown reduction to reduce its sail area and relieve tensile and compressive forces exerted on its significantly long branches."

iii) The aerial inspection of tree T2 (copper beech) highlighted extensive decay pockets occurring within the main stem forked inclusions. The updated BTC report highlights the findings as such; "Aerial inspection of stem bifurcation, substantial included union with cavity in junction probed to 400mm. Aerial inspection of south primary branch junction, substantial included union with cavity in junction probed to 200mm." A large Ganaderma bracket was also found in an un-occluded wound at 5 metres as highlighted in the initial BTC July 2017 report (see photo in appendix).

iv) The ground and aerial Resistograph work on tree T3 (copper beech) highlighted a number of possible areas of decay occurring within the main stem of the tree. Four drillings were undertaken at 1 metre from ground level. 2 were from the North, 1 from the South and 1 from the East. The drilling from the East showed a possible cavity occurring after 32cm of drilling. The drillings from the North showed signs of suspect wood (that which its integral strength and load bearing capacity maybe being compromised i.e. the early signs of fungal attack). This is highlighted as the resistance of the drilling did not increase as the depth of the drilling increased as would be expected until very late in the drilling depth. The last minute increase in resistance would be most likely from the drill entering reaction or healthy wood tissue; hence an increase in basal strength properties. The drilling from the South highlights suspect wood from around 21cm until the end of the drilling at 50cm. Another four drillings were then undertaken at 1.5metres above ground level from the North, East, South and West. The drilling from the North gave a solid reading of healthy wood until a depth of 50cm. The East drilling highlighted from 10cm-25cm dense reaction wood followed then by a possible decay pocket from 32cm onwards (concurring with the drilling at 1metre). The drilling from the South shows reaction wood from around 19-36cm with a cavity occurring from 36-50+cm. The drilling from the West shows also a cavity occurring from 32cm onwards. Lastly 3 drillings were undertaken at approximately 4 metres above ground level. These were undertaken from the North, the North East and South East. The North drilling highlighted the lower point of a lower bark included union. The drillings from the North East and South East both highlighted 20cm+ of suspect wood with the south East drilling also showing a cavity from 37cm onwards. The inspection of the fork inclusions also revealed most had decay inclusions forming.

c) Results Summary

i) The BTC updated VTA sheets for the tree basic tree details can be found in the Appendix along with the Resistograpgh pdf's and site photographs.

ii) Despite a recent limb failure on tree T1 (Horse Chestnut) the initial concern is for the two large copper beech trees (T2 & T3). Both trees have forked inclusions with decay pockets forming in primary weight bearing structures. Both trees have visible fungi brackets. Both trees have decay cavities within the main trunk. Both trees have internal structural issues

related to their historical grafting.

iii) The aerial inspection of Tree T1 revealed that fork unions are presentable sound and stable. However, the tree does have a "complex" environment of carparks and footpaths/roads for root growth which may in the long term exert compaction issues on root development.

6) Recommendations

a) Tree work

i) The arboricultural recommendations within this Tree Report as listed below provide remedial tree works to reduce or minimise hazards on a tree posing risk. These tree work recommendations are in the authors professional opinion considered "reasonable" and pragmatic so they are neither too prescriptive nor inadequate to address the landowners duty of care. The recommended tree work is viewed as both elimination control for risk assessment (i.e. the removal of deadwood or dangerous branches) and to a lesser extent the reduction of likelihood of failure when undertaking operations such as end weight reduction, bracing and remedial pruning.

ii) Trees T2 & T2 should be removed to ground level. The Resistograph drillings of tree T3 highlight a very distinct area of reduced resistance and hence most likely a decay cavity radiating from the eastern aspect of the tree from at least 1 metre above ground level to around at least 4 metres. This would concur with the onsite presence of various bracket fungi occurring on the Eastern side of the tree (see appendix photographs). The readings also indicate that with Tree T3 the decay/suspect wood is also extending into the South and Western regions of the main stem. In most cases on the lower West, South and East sides there is only approximately 300mm of structurally sound timber at best. Given the diameter of the trunk is 1360mm this is suggesting that decay levels maybe around the 70% within the main trunk. It is at this point that many field studies have shown that the failure rate of trees increases rapidly (C. Mattheck – "Updated Field Guide for Visual Tree Assessment" 2007). The option of managed decline or a large crown reduction was considered for both but as beech trees do not respond well crown reductions greater than 15% and the economic management input required would be extensive without either option addressing the primary concern of catastrophic failure they were dismissed as being non-affective to the hazard presented.

iii) It is proposed that Tree T1 (Horse Chestnut) should have a crown reduction by 25-30% targeting end weight to relieve tensile forces on branches, forks and unions. This would affectively lock the tree into an ongoing maintenance regime of crown thinning at least then once every 5 years to start a process of reduced crown habit formation but with a long term view of encouraging more leaf mass within the internal crown (ie a denser leaf

area). Thus, reducing crown spread but not leaf mass in the long term. This would hopefully reduce weight stress whilst trying to keep photosynthetic area at suitable levels for tree health.

b) **Engineering/construction**

i) No engineering or construction methodologies are suggested for the trees inspected within this report due to boundary and third-party ownership constraints.

c) **Summary**

i) It is recommended that an application is made to the local tree officer to remove trees T2 & T3, along with a recommendation to crown reduce tree T1.

ii) To mitigate the loss of trees T2 and T3 it would be required that new tree planting within the grounds would be required. Beech does not coppice very easily and therefore the option of coppicing of the main stems is unlikely. The requirement of the new plantings can be sort from the local tree officer. Often trees maybe heavy to extra heavy standards (container grown trees around 3-4 metres in height).

7) **Other Considerations**

a) **Re-inspection Requirements**

i) It is recommended that the tree(s) are re-inspected by a "competent person" at a regular interval reflecting the different levels of risk. For this cedar tree annual inspections are recommended. Inspections should also occur when fungal fruiting is most likely such as in the autumn months.

ii) A "competent person" with regard to tree inspections can be someone who is trained to a professional level or who has attended the Lantra "Tree Inspection" courses.

b) **Trees and Wildlife**

i) Trees play host to nesting birds, many of which are protected by law. All British bat species are also protected and can be found in trees. Great care needs to be taken to avoid disturbance and consideration should be given to the timing of tree works to avoid disturbance. Where the presence of such species is suspected, a qualified ecologist should be contacted for advice.

c) **Implementation of Tree Works**

i) The remedial works will require a specialist arboricultural contractor using tree climbers or MEWPs (mobile elevated work platforms) to work in the crowns, wood chippers to minimise brash and traffic control on the roads according to Traffic Signs Manual, Chapter 8; Traffic Safety Measures and Signs for Road Works and Temporary Situations. All tree works should be carried out to BS3998 or any updated Best Practice Guidelines.

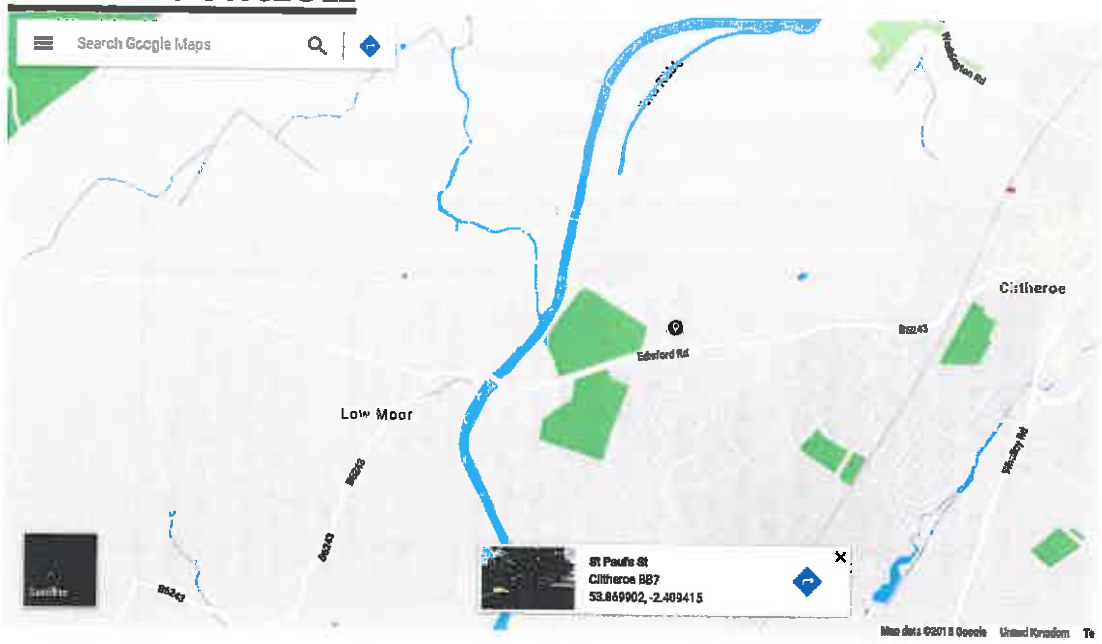
8) **References**

a) British Standard 3998:2010 Recommendations for Tree Work

b) Lonsdale, D (1999) Principle of Tree Hazard Assessment & Management

Appendix

Site Location



Close up of tree locations (satellite)

Site:	Beech Grove Residential Home, St Pauls Street, Clitheroe, Lancashire, BB7 2LS
Client:	Roseberry Care Centres
Brief:	Carry out an 'Individual Tree Survey' of trees within identified site and make risk management recommendations where appropriate

Surveyor:	Ryan Gledhill FdSc MArborA
Survey Date:	13 July 2017 (Aerial and Resistograph inspection 10 November 2017)
Viewing Conditions:	Scattered clouds and no discernible wind
Job Reference:	BTC1388

No.	Species	Age	Height (m)	Diam. (mm)	Crown Spread (m)	Vitality	Comments	Management Suggestions	Target	Size	P.O.F	Reduced Mass %	Risk Index	Review (months)
T1	Horse Chestnut	M	21	1130	16	G	▪ Located in north-eastern corner of car park. ▪ Growing in small raised landscape area with subsequently highly restricted rooting capacity. ▪ Landscaped area covers only approximately 30-40% the area of the expected root spread, with the remaining area being tarmac car park and the public highway. ▪ Slight stem lean south, with little basal flare on north side of stem in comparison to substantial basal flaring on south side. ▪ Frequent occluded cavities to stem to a height of 4m, evidently from remedial pruning to lift crown. ▪ Stem bifurcates at a height of 3m into primary branches of approximately 550mm diameter. ▪ The point of bifurcation at a height of 3m is a compression fork, with the ribs of the bonding area starting at a height of approximately 1.75m exhibiting a substantial included union. ▪ Torn branch peg, of approximately 350mm diameter, at a height of approximately 5m from failed branch. ▪ At the time of the survey the failed branch was still present in the carpark, and was seen to exhibit a lateral rib and rapid adaptive growth around a hazard beam fracture. ▪ Several long and heavily weighted branches in crown, to approximately 350mm diameter, with little diametric tapering and minimal positive geotropic adaptation, which increases the risk of another hazard beam fracture (note: Horse Chestnut trees of this age would characteristically adapt by developing weeping branches). ▪ Several branch forks identified as transformed compression forks with characteristic bowl like pockets on the upper side; evidently holding water.	▪ Prune to reduce canopy spread by up to 2.5m in order to relieve tensile forces on branches. ▪ Prune to clean up torn peg at 5m from previously failed branch by cutting back to branch bark collar in accordance with best practice arboricultural pruning techniques. ▪ Climbing arboriculturist to carry out aerial inspection of stem bifurcation to assess for incipient splitting and inspection of water holding pockets above transformed compression forks to inspect for signs of decay. ▪ Re-inspect upper canopy during dormant period (i.e. when tree has no foliage). ▪ **After in depth re-inspection 10 Nov '17:* ▪ *Union at point of bifurcation probed to a depth of 100mm and evidently solid.* ▪ *All other main primary unions to secondary branch architecture inspected and deemed solid.* ▪ *Tree is projected to successfully maintain structural and physiological condition after a crown reduction to reduce its sail area and relieve tensile and compressive forces exerted on its significantly long branches.*	3	2	2	N/A	10K	N/A

HEADINGS & ABBREVIATIONS

NO. TREE/GROUP REFERENCE NUMBER. REFER TO PLAN OR NUMBERED TAGS WHERE APPLICABLE
SPECIES: COMMON NAME
AGE: Y = YOUNG, SM = SEMI MATURE, EM = EARLY MATURE, M = MATURE, PM = POST MATURE
HEIGHT: APPROXIMATELY 80% OF TREES ARE MEASURED USING AN ELECTRONIC CLINOMETER AND THE REMAINDER ESTIMATED AGAINST THE MEASURED TREES
CROWN SPREAD: MEASURED OR ESTIMATED DIAMETER OF CROWN(S) AT THE WIDEST POINT
DIAMETER: STEM DIAMETER MEASURED OR ESTIMATED AT A HEIGHT OF APPROXIMATELY 1.3 METRES
VITALITY: A MEASURE OF PHYSIOLOGICAL CONDITION WHEREBY D = DEAD, MD = MORIBUND, P = POOR, M = MODERATE, G = GOOD
TARGET RANGE: HIGHEST VALUE TARGET THAT THE MOST SIGNIFICANT PART LIKELY TO FAIL COULD STRIKE. RANGES 1-6. 1 = HIGH, 6 = LOW VALUE/OCCUPANCY
SIZE RANGE: SIZE CATEGORY OF MOST SIGNIFICANT PART CONSIDERED LIKELY TO FAIL - RANGES 1-4 WHEREBY 1 = LARGE, 4 = SMALL, P = PROPERTY
P.O.F: PROBABILITY OF FAILURE WITHIN 12 MONTHS. RANGES 1-7. 1 = HIGH, 7 = LOW
REDUCED MASS %: WHERE THE MASS OF A TREE OR BRANCH IS REDUCED BY DEGRADATION THE RISK INDEX IS MULTIPLIED TO REFLECT THE PERCENTAGE OF MASS REDUCTION
RISK INDEX: E.G. RISK INDEX 20 = RISK OF SIGNIFICANT HARM 1 IN 20,000. AN ADDITIONAL FIGURE, IN BRACKETS, MAY BE SUFFIXED 'T' REPRESENTING THE RATE OF MULTIPLE OCCUPATION OVER THE YEAR, E.G. 10(10T) REPRESENTS A RISK OF HARM 1/10,000 TO 10 OCCUPANTS OR AN EQUIVALENT MONETARY VALUE. SEE QTRA PRACTICE NOTE FOR MORE INFORMATION REGARDING COLOURS USED TO SIGNIFY RISK INDEX
MANAGEMENT: SUFFIXES: (M) = FOR GENERAL ARBORICULTURAL OR SILVICULTURAL MANAGEMENT; (S) TO REMOVE OR REDUCE THE RISK OF DIRECT DAMAGE TO A FIXED STRUCTURE BY MEANS OF CIRCUMFERENTIAL GROWTH
REVIEW: PERIOD TO NEXT INSPECTION (IN MONTHS). WHERE TREES ARE RECOMMENDED FOR REMOVAL THEN THEY ARE MARKED NOT APPLICABLE
ITALIC TEXT: TEXT CHANGES MADE TO RE-SURVEYED TREES IN RESPECT OF CURRENT YEAR'S INSPECTION

Site:	Beech Grove Residential Home, St Pauls Street, Clitheroe, Lancashire, BB7 2LS
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Brief:	Carry out an 'Individual Tree Survey' of trees within identified site and make risk management recommendations where appropriate

Surveyor:	Ryan Gledhill Fd3o MArobertA
Survey Date:	13 July 2017 (Aerial and Resistograph inspection 10 November 2017)
Viewing Conditions:	Scattered clouds and no discernible wind
Job Reference:	BTC1388

No.	Species	Dir	Height (m)	Diam. (mm)	Crown Spread (m)	Vitality	Comments	Management Suggestions	Target	Size	P.O.F	Reduced Mass %	Risk Index	Review (months)
T2	Copper Beech	M	25	1280	22	G	▪ Stem approximately 12m from building. ▪ Extensive basal flaring with raised and exposed primary roots, which is often indicative of infection by *Meripilus giganteus* white rot decay causing fungi; no visible signs of fruiting bodies forming at time of survey. ▪ Partially occluded cavity, of approximately 400mm diameter, to stem at a height of 2m, with adaptive ribbing around cavity, evident partial hollowing and aerial rooting present. Significant stem swelling at this height, evidently in compensation for hollowing. Sounding with nylon mallet indicated presence of decay extending radially from cavity, and down stem below cavity for at least 1m. ▪ Unoccluded cavity of approximately 450mm diameter at a height of approximately 5m, evidently resultant of failed torn out branch. Cavity evidently site of a previously included branch union. Decayed wood present in cavity, and *Ganaderma adspersum/ applanatum* (localised white rot causing fungi) fungal fruiting body present in wound. ▪ Frequent included branch unions to approximately 350mm diameter. ▪ Frequent occluded cavities to approximately 150mm diameter. ▪ Stem bifurcates at a height of 8m. Excessive bark cracking evident down centre of fork, with evidently rapid adaptive growth and significant ribbing each side, which are indicative of a transformed compression fork. ▪ Moderate instances of deadwood to approximately 50mm diameter.	▪ Re-inspect in August to October to check for *Meripilus* fungal fruiting bodies. ▪ Prune to reduce canopy spread by up to 2.5m in order to relieve tensile forces on branches. ▪ Climbing arboriculturist, under guidance from consulting arboriculturist, to carry aerial inspection of included unions and bifurcation at a height of 8m in order to assess issues, such as rot from water holding fork pockets, and to map extent of decay. Testing should, as a minimum, consist of sounding with a nylon mallet and, if possible, a sonic tomography assessment. ▪ *After in depth re-inspection 10 Nov '17:* ▪ *Evidently had poor pruning works undertaken on tree since time of previous survey in July. Bark damage from climbing spikes up stem and along primary branches, and pruning pegs up to 3ft in length and to diameters of 100mm.* ▪ *Aerial inspection of stem bifurcation, substantial included union with cavity in junction probed to 400mm.* ▪ *Aerial inspection of south primary branch junction, substantial included union with cavity in junction probed to 200mm.* ▪ *With the trees previous incidents of large branch failures and evident signs of current weak unions it is projected the tree will succumb to another substantial failure. It is recommended that the tree is removed, as pruning works required to mitigate the risk would be of decline management due to the trees species and age, and incur substantial costs and resources.*	3	2	2	N/A	10K	N/A

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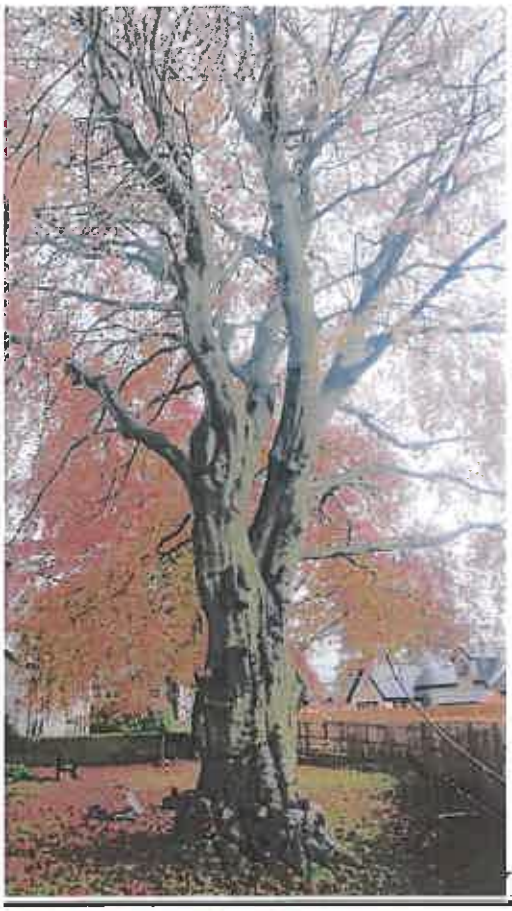
Job Reference:	BTC1388

No.	Species	Age	Height (m)	Diam. (mm)	Crown Spread (m)	Vitality	Comments	Management Suggestions	Target	Size	P.O.F	Reduced Mass %	Risk Index	Review (months)
T3	Copper Beech	M	24	1360	19	G	▪ Evidently grafted at stem base. ▪ Signs of graft incompatibility evident in excessive cambial folding around graft line and stem swelling above, indicating possible compaction fracture. ▪ In comparison to the previous survey (BTC482), undertaken by Phill Harris in May 2013, the rapid adaptive growth and cambial folds protruding from the graft line have evidently increased in size suggesting an internal structural issue may be developing further. ▪ Although tree is exhibiting healthy foliage and good vigour, graft failure can show no symptoms and, in turn, grafts of this type can succumb to sudden failure. ▪ Large 500mm diameter occluded cavity bulge out of south stem side at a height of 2.5m, with adjacent cambial folding seam into stem. Stem widens at this point. ▪ Sounding with nylon mallet around lower stem to a height of 2m indicates presence of decay around 500mm occluded cavity, and some hollowing around west side of lower stem side at a height of 0.5m. ▪ Stem bifurcates into primary branches of approximately 500mm diameter at a height of 5m, with an included bark union and associated compression fork. ▪ Numerous occluded pruning wounds on north side of stem to a height of 10m, evidently resultant of works to reduce lateral spread towards building. ▪ Moderately frequent instances of *Ganaderma adspersum/ applanatum* (localised white rot causing fungi) fungal fruiting bodies present, whose annual growth increments are indicative of a lack of the presence of residual internal wood. ▪ Partially occluded cavity exhibiting partial hollowing at a height of 14m; possible bat roost. ▪ Numerous acute compressive branch forks to approximately 400mm diameter.	▪ Re-inspect in August to October to check for *Meripilus* fungal fruiting bodies. ▪ Carry out detailed inspection of lower stem around graft line in order to assess structural integrity and severity of possible decay around the union. Testing should consist of a resistograph test or a sonic tomography assessment. ▪ Climbing arboriculturist, under guidance from consulting arboriculturist, to carry out aerial inspection of included unions and bifurcation at a height of 8m in order to map extent of decay. Testing should, as a minimum, consist of sounding with a nylon mallet and, if possible, a sonic tomography assessment. ▪ *After in depth re-inspection 10 Nov '17:* ▪ *Resistograph test results exhibit that internal wood has a substantial spiral of decay present throughout stem.* ▪ *Care home manager informed us of a previous neighbouring tree that had failed. On inspection of the remaining stem it is evident it was also a copper beech and had succumbed to full stem failure at the graft line due to decay progression indicative of the resistograph findings on T3.* ▪ *Recommend removal.*	3	1	2	N/A	4K	N/A



Tree T3 (note lower grafting collar)

Tree T2; note tears at 2 and 5 metres

Tree T3; illustrating cambrial growth stress from the historical grafted root stock

Tree T3 Eastern main stem, fungal presence.

Tree T3; Eastern main stem, fungal presence.

Tree T3; Eastern Main stem, fungal presence 4metres above ground.

Tree T2; Silky saw in forked inclusion cavity in central weight bearing limbs.

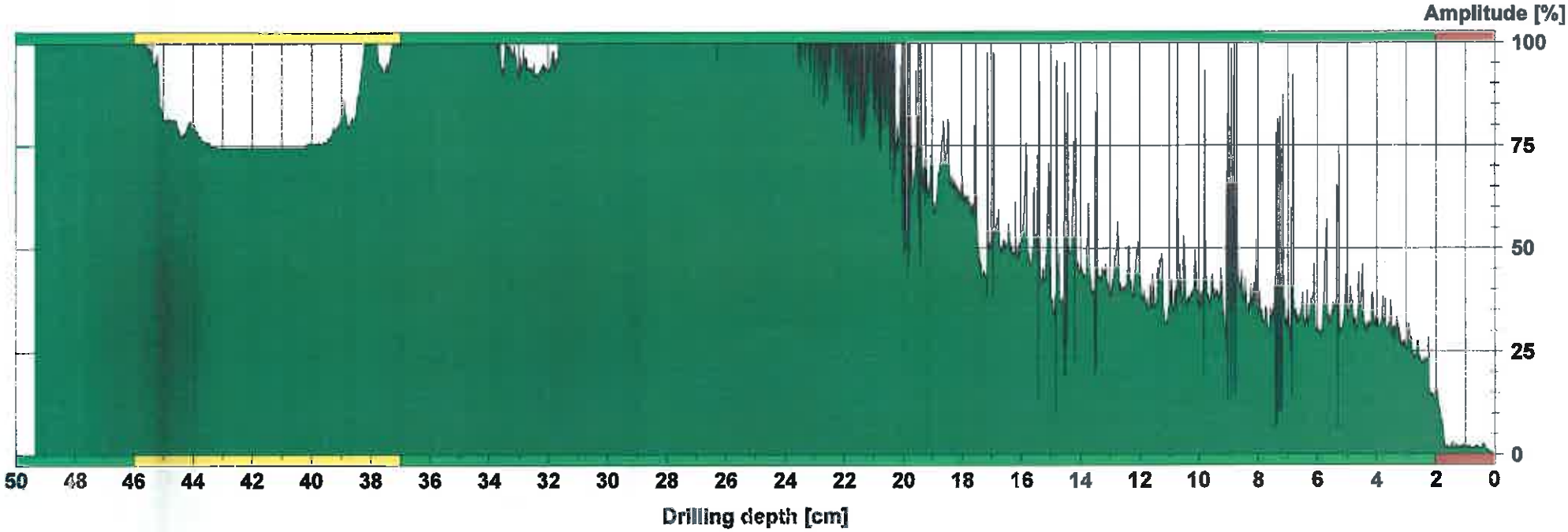
Tree T2; Silky saw in forked inclusion cavity in another primary weight bearing union.

Tree T2; Insertion of depth probe in included decay pocket.

Tree T2; Ganaderma at 5metres in old limb failure tear, note full depth gauge insertion in bottom left corner.

Measuring / object data

Measurement no.	: 35	**Tilt**	: 90° (1°)	**Name** :	Testing high Cavity
Drilling depth	: 49,35 cm	**Avg. curve**	: off		
Wood species	: Hard (2)	**Diameter**	:		
ID number	: BEECH GROVE T2 W6	**Level**	: 600,0 cm		
Date	: 10.11.2017	**Direction**	: West		
Time	: 15:14:16	**Object species**	: Copper Beech		
Advance	: 48 cm/min	**Location**	: Beech Grove Home		



Assessment

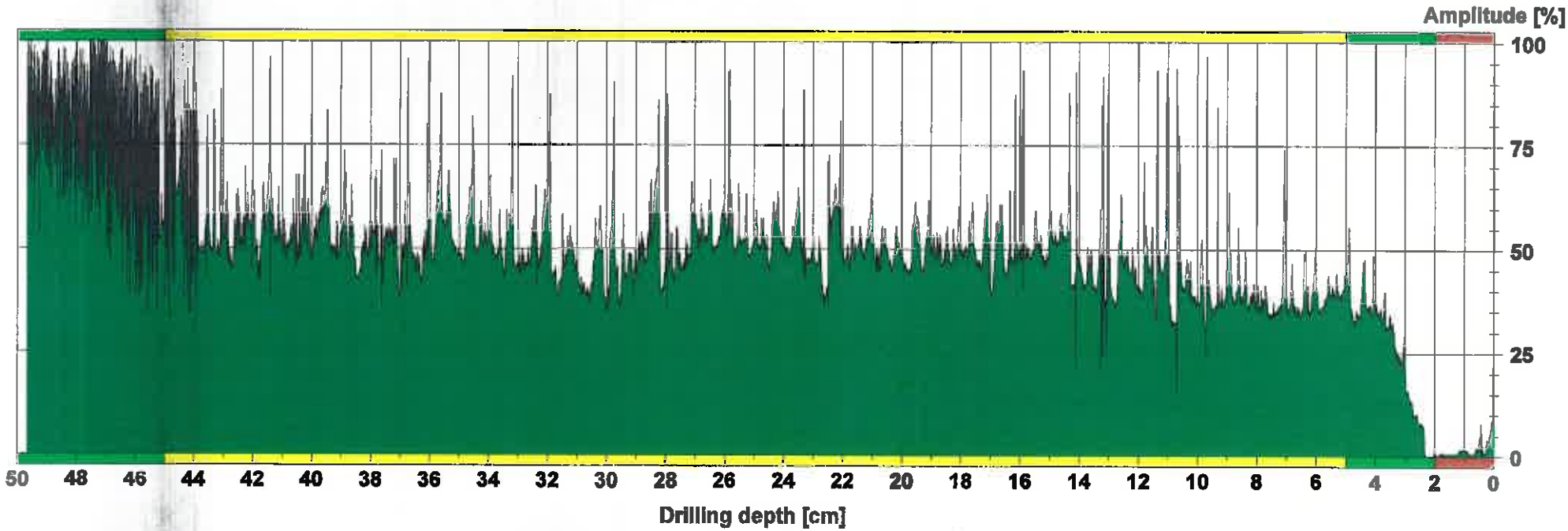
From	0,0 cm	to	2,0 cm	:	Bark
From	2,0 cm	to	37,0 cm	:	Sound Wood
From	37,0 cm	to	46,0 cm	:	Suspect Wood
From	46,0 cm	to	50,0 cm	:	Sound Wood
From	0,0 cm	to	0,0 cm	:	
From	0,0 cm	to	0,0 cm	:	

Comment

Beech Grove residential Home; T2 Copper Beech. Tree Diameter 1280mm. Tree Height 25m, crown spread 22m. Drilling at 6 metres from the West.

Measuring / object data

Measurement no.	: 20	**Tilt**	: 75° (1°)	**Name** : T3
Drilling depth	: 49,68 cm	**Avg. curve**	: off	
Wood species	: Hard (2)	**Diameter**	:	
ID number	: BEECH GROVE T3 N1	**Level**	: 100,0 cm	
Date	: 10.11.2017	**Direction**	: North	
Time	: 12:54:41	**Object species**	: Copper Beech	
Advance	: 44 cm/min	**Location**	: beech Grove Home	



Assessment

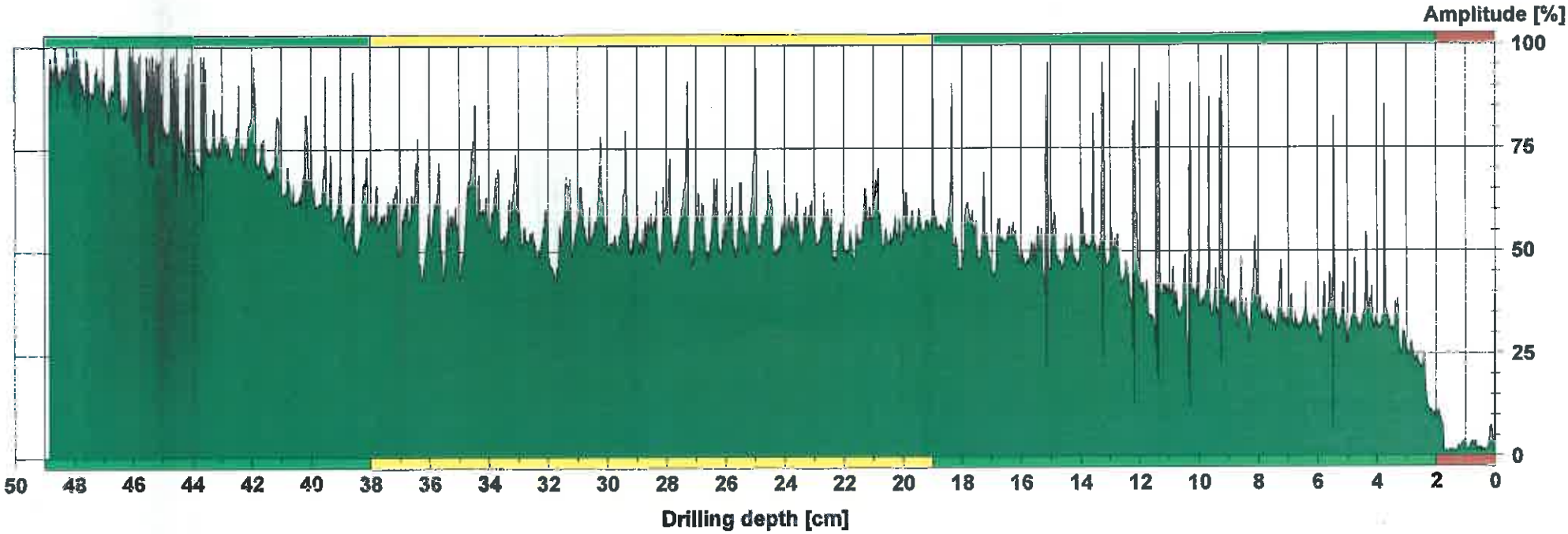
From	0,0 cm	to	2,0 cm	: Bark
From	2,0 cm	to	5,0 cm	: Sound Wood
From	5,0 cm	to	45,0 cm	: Suspect Wood
From	45,0 cm	to	50,0 cm	: Sound Wood
From	0,0 cm	to	0,0 cm	:
From	0,0 cm	to	0,0 cm	:

Comment

Beech Grove Residential Home; Tree T3 drilling from the North at 1 metre. Copper Beech with tree diameter of 1360mm, tree height 24 metres and crown spread of 19 metres.

Measuring object data

Measurement no.	: 22	**Tilt**	: 74° (1°)	**Name**	: T3
Drilling depth	: 48,84 cm	**Avg. curve**	: off		
Wood species	: Hard (2)	**Diameter**	:		
ID number	: BEECH GROVE T3 N1B	**Level**	: 100,0 cm		
Date	: 10.11.2017	**Direction**	: North		
Time	: 13:06:52	**Object species**	: Copper Beech		
Advance	: 46 cm/min	**Location**	: beech Grove Home		



Assessment

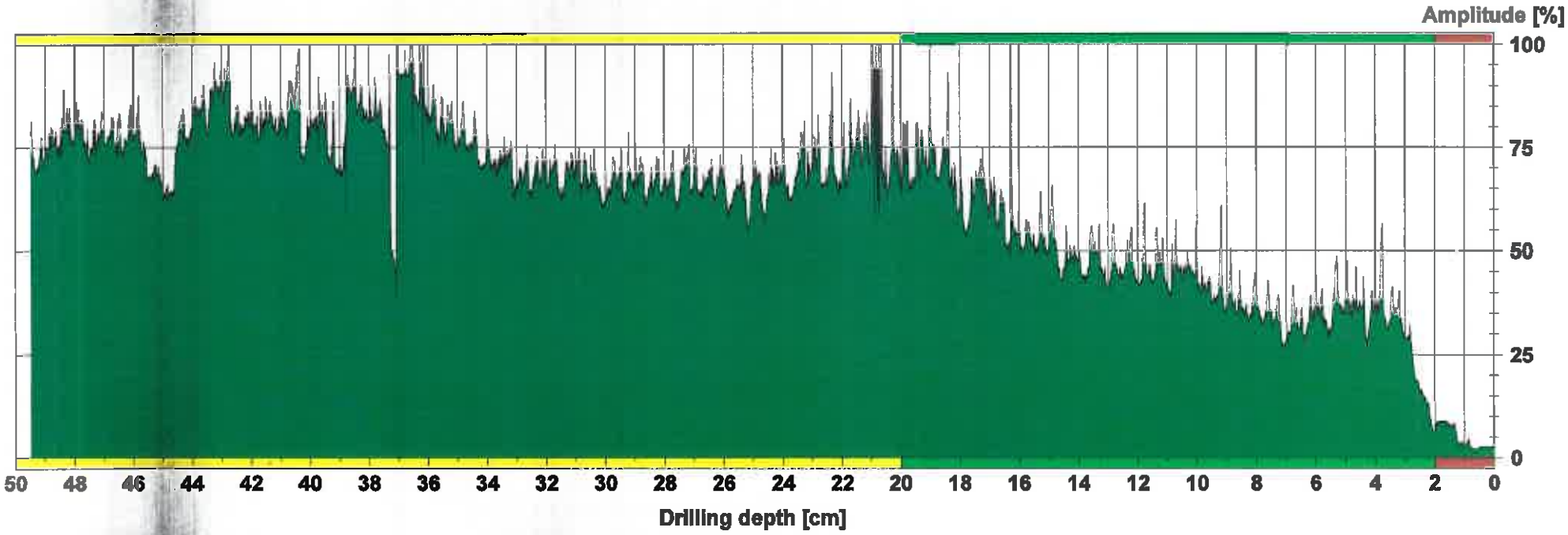
From	0,0 cm	to	2,0 cm	: Bark
From	2,0 cm	to	19,0 cm	: Sound Wood
From	19,0 cm	to	38,0 cm	: Suspect Wood
From	38,0 cm	to	49,0 cm	: Sound Wood
From	0,0 cm	to	0,0 cm	:
From	0,0 cm	to	0,0 cm	:

Comment

Beech Grove Residential Home; Tree T3 second drilling from the North at 1 metre. Tree girth 1360mm, tree height 24, crown spread 19 metres.

Measuring / object data

Measurement no.	: 25	**Tilt**	: 74° (1°)	**Name** : T3	
Drilling depth	: 49,48 cm	**Avg. curve**	: off		
Wood species	: Hard (2)	**Diameter**	:		
ID number	: BEECH GROVE T3 S1	**Level**	: 100,0 cm		
Date	: 10.11.2017	**Direction**	: South		
Time	: 13:24:06	**Object species**	: Copper beech		
Advance	: 46 cm/min	**Location**	: Beech Grove Home		



Assessment

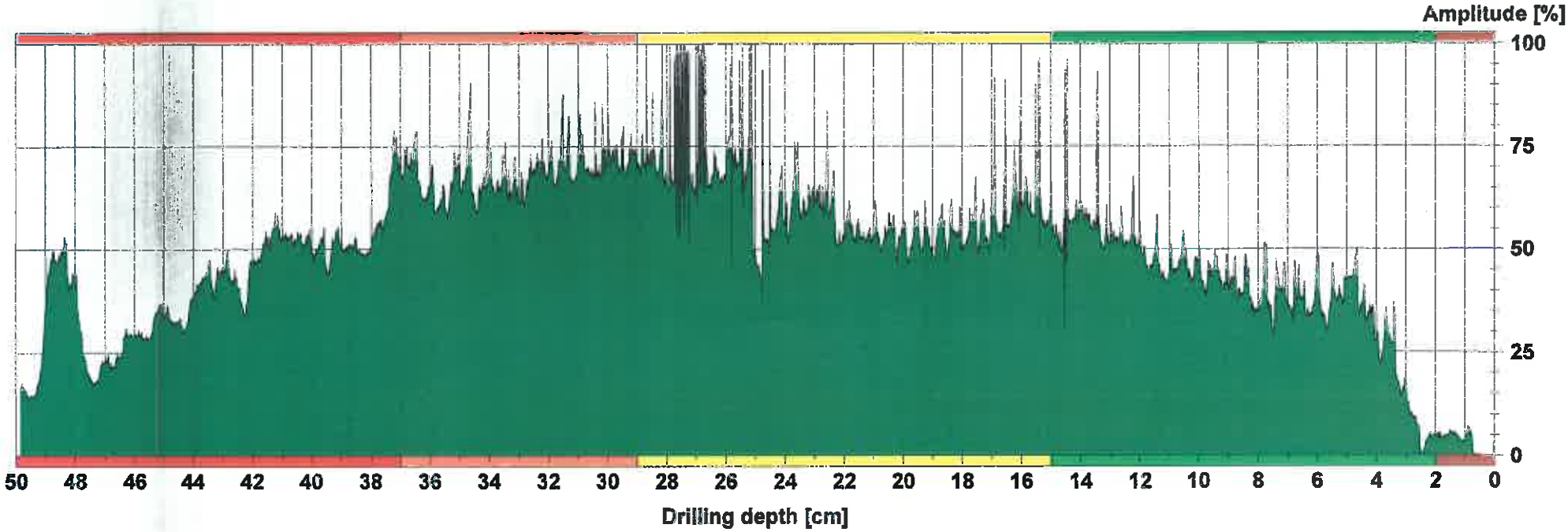
From	0,0 cm	to	2,0 cm	: Bark
From	2,0 cm	to	20,0 cm	: Sound Wood
From	20,0 cm	to	50,0 cm	: Suspect Wood
From	0,0 cm	to	0,0 cm	:
From	0,0 cm	to	0,0 cm	:
From	0,0 cm	to	0,0 cm	:

Comment

Beech Grove Residential Home; Tree T3 Copper beech. Tree dbh 1360, tree height 24 metres and crown spread 19 metres. Drilling at 1 metre from the South.

Measuring / object data

Measurement no.	: 23	**Tilt**	: 85° (1°)	**Name** :	T3
Drilling depth	: 49,85 cm	**Avg. curve**	: off		
Wood species	: Hard (2)	**Diameter**	:		
ID number	: BEECH GROVE T3 E1	**Level**	: 100,0 cm		
Date	: 10.11.2017	**Direction**	: East		
Time	: 13:09:49	**Object species**	: Copper Beech		
Advance	: 46 cm/min	**Location**	: Beech Grove Home		



Assessment

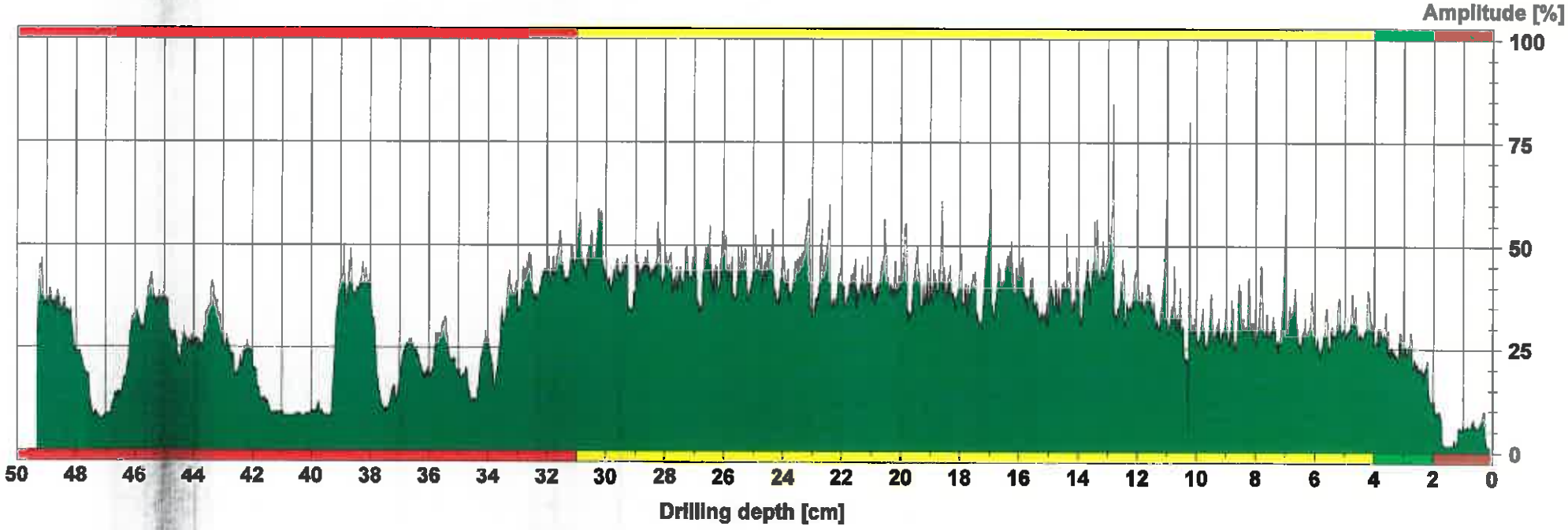
From	0,0 cm	**to**	2,0 cm	: Bark
From	2,0 cm	**to**	15,0 cm	: Sound Wood
From	15,0 cm	**to**	29,0 cm	: Suspect Wood
From	29,0 cm	**to**	37,0 cm	: Decay
From	37,0 cm	**to**	50,0 cm	: Cavity
From	0,0 cm	**to**	0,0 cm	:

Comment

Tree T3 rear garden of Beech Grove Residential home. Tree diameter 1360, tree height 24 metres, crown spread 19 metres. Drilling at 1 metre from the East.

Measuring / object data

Measurement no.	: 31	**Tilt**	: 86° (1°)	**Name**	: T3
Drilling depth	: 49,33 cm	**Avg. curve**	: off		
Wood species	: Hard (2)	**Diameter**	:		
ID number	: BEECH GROVE T3 W1.5	**Level**	: 150,0 cm		
Date	: 10.11.2017	**Direction**	: West		
Time	: 14:05:09	**Object species**	: Copper Beech		
Advance	: 49 cm/min	**Location**	: Beech Grove Home		



Assessment

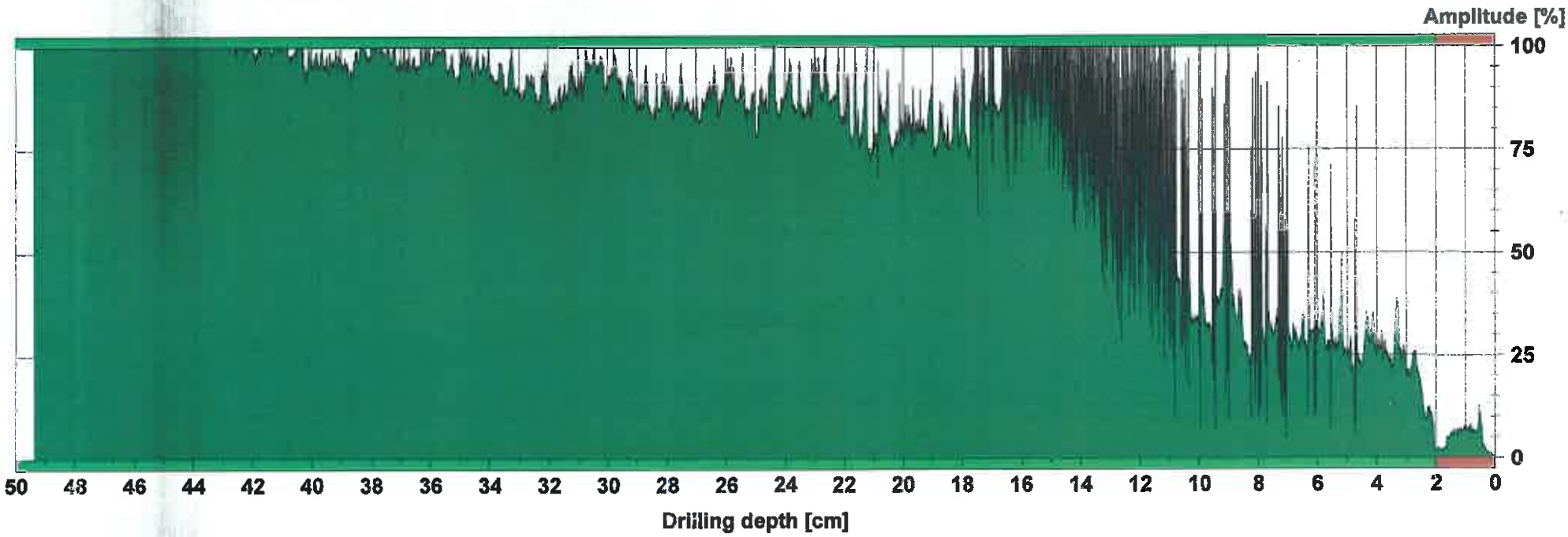
From	0,0 cm	to	2,0 cm	:	Bark
From	2,0 cm	to	4,0 cm	:	Sound Wood
From	4,0 cm	to	31,0 cm	:	Suspect Wood
From	31,0 cm	to	50,0 cm	:	Cavity
From	0,0 cm	to	0,0 cm	:	
From	0,0 cm	to	0,0 cm	:	

Comment

Beech Grove Residential Home,; copper beech T3. Tree dbh 1360mm, tree height 24 metres, crown spread 19 metres. Drilling from West at 1.5 metres.

Measuring / object data

Measurement no.	: 27	**Tilt**	: 86° (1°)	**Name**	: T3
Drilling depth	: 49,38 cm	**Avg. curve**	: off		
Wood species	: Hard (2)	**Diameter**	:		
ID number	: BEECH GROVE T3 N1.5B	**Level**	: 150,0 cm		
Date	: 10.11.2017	**Direction**	: North		
Time	: 13:34:01	**Object species**	: Copper Beech		
Advance	: 45 cm/min	**Location**	: Beech Grove Home		



Assessment

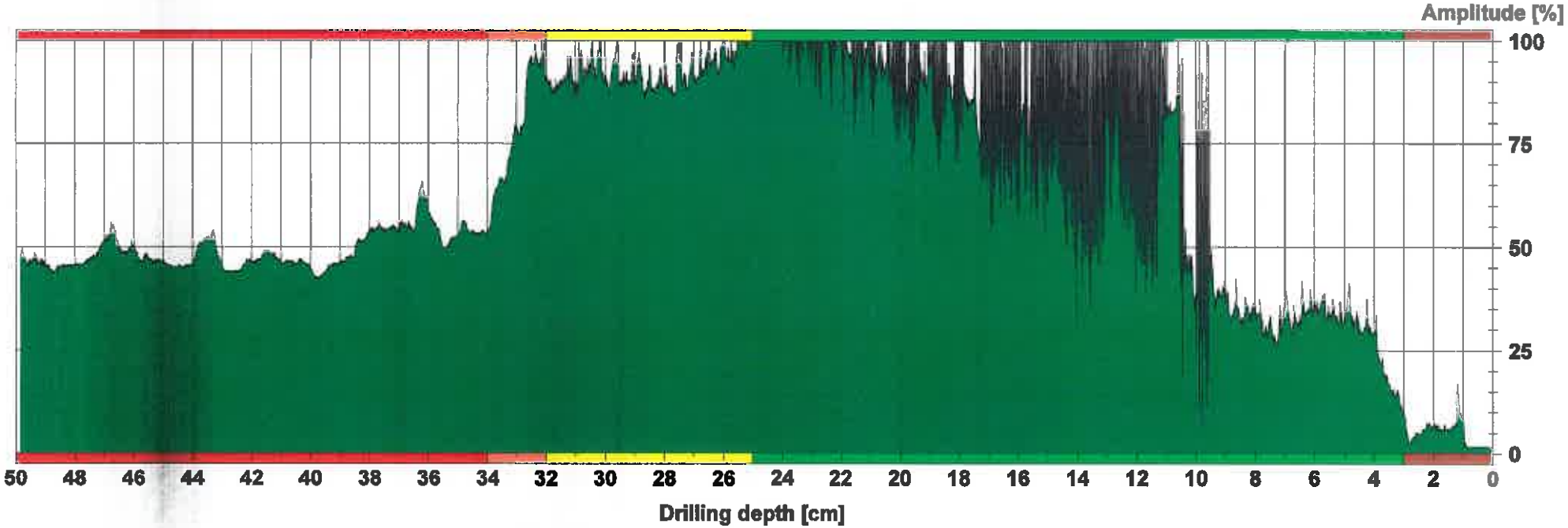
From	0,0 cm	to	2,0 cm	: Bark
From	2,0 cm	to	50,0 cm	: Sound Wood
From	0,0 cm	to	0,0 cm	:
From	0,0 cm	to	0,0 cm	:
From	0,0 cm	to	0,0 cm	:
From	0,0 cm	to	0,0 cm	:

Comment

Beech Grove Residential Home; T3 Copper beech. Tree diameter 1360, tree height 24 metres, and crown spread 19 metres. Drilling at 1.5 metres from the North.

Measuring / object data

Measurement no.	: 28	**Tilt**	: 88° (1°)	**Name** : T3	
Drilling depth	: 49,85 cm	**Avg. curve**	: off		
Wood species	: Hard (2)	**Diameter**	:		
ID number	: BEECH GROVE T3 E1.5	**Level**	: 150,0 cm		
Date	: 10.11.2017	**Direction**	: East		
Time	: 13:40:00	**Object species**	: Copper Beech		
Advance	: 50 cm/min	**Location**	: Beech Grove Home		



Assessment

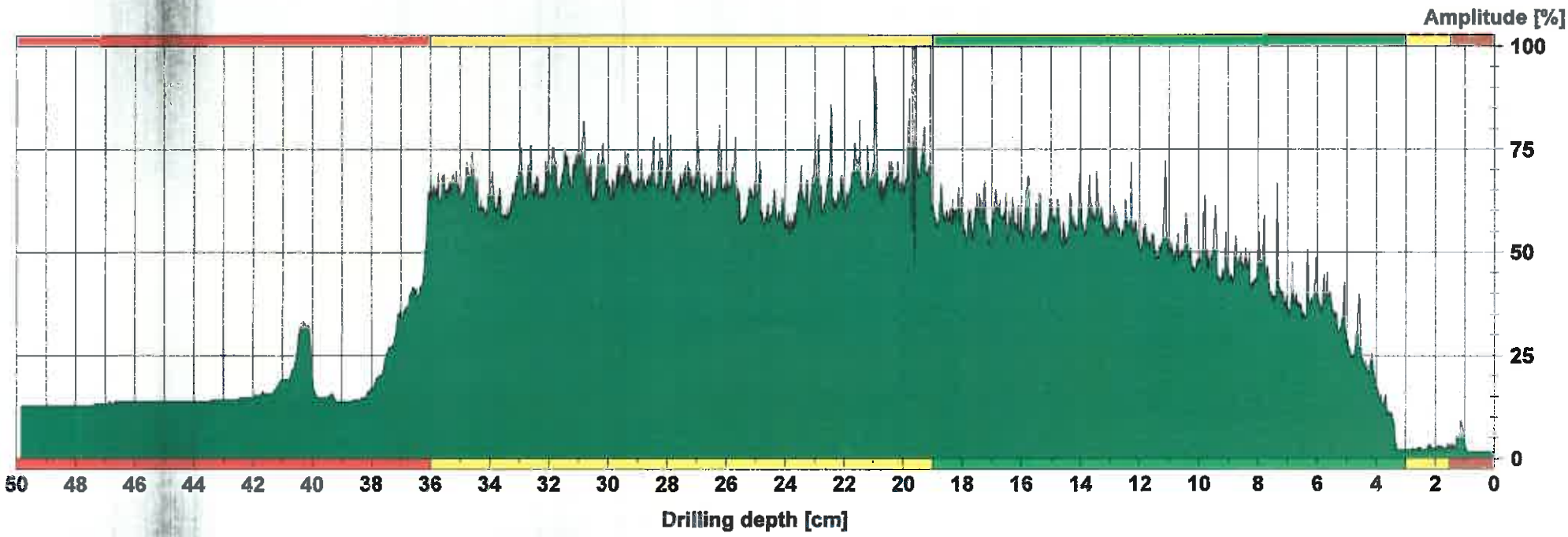
From	0,0 cm	to	3,0 cm	: Bark
From	3,0 cm	to	25,0 cm	: Sound Wood
From	25,0 cm	to	32,0 cm	: Suspect Wood
From	32,0 cm	to	34,0 cm	: Decay
From	34,0 cm	to	50,0 cm	: Cavity
From	0,0 cm	to	0,0 cm	:

Comment

Beech Grove Residential Home; Tree T3 Drilling from the East at 1.5metres Tree diameter 1360, height 24 metres. Crown spread 19 metres.

Measuring / object data

Measurement no.	: 30	**Tilt**	: 89° (1°)	**Name** : T3	
Drilling depth	: 49,85 cm	**Avg. curve**	: off		
Wood species	: Hard (2)	**Diameter**	:		
ID number	: BEECH GROVE T3 S1.5	**Level**	: 150,0 cm		
Date	: 10.11.2017	**Direction**	: South		
Time	: 14:02:05	**Object species**	: Copper Beech		
Advance	: 50 cm/min	**Location**	: Beech Grove Home		



Assessment

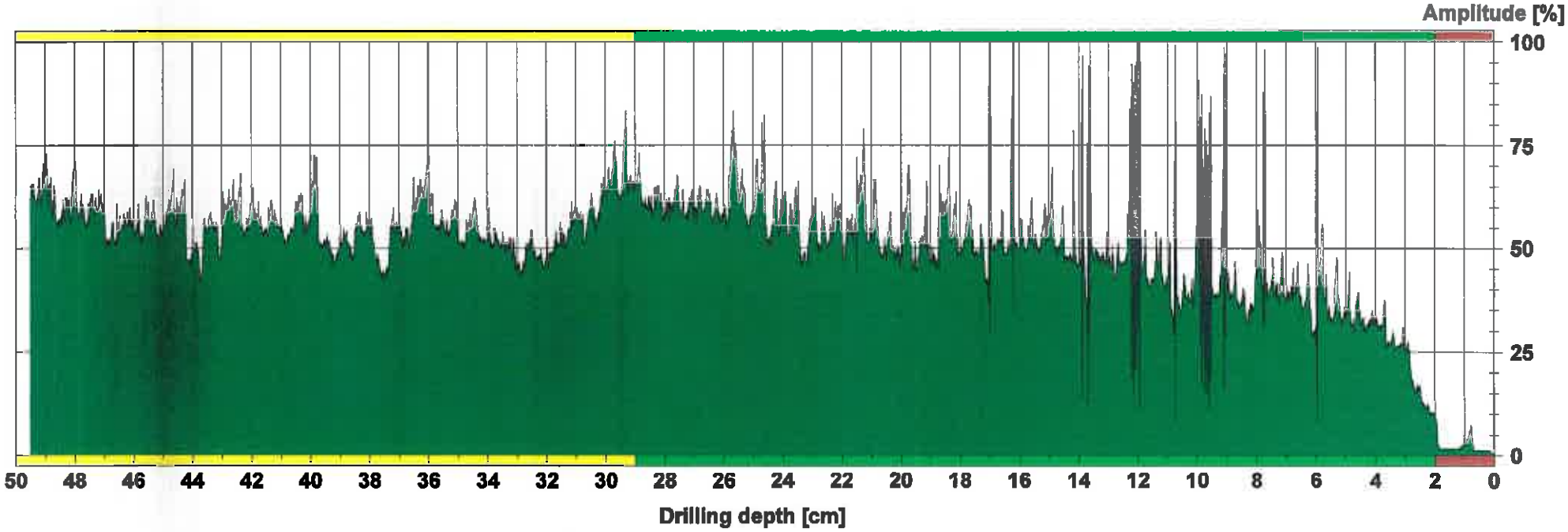
From	0,0 cm	to	1,5 cm	: Bark
From	1,5 cm	to	3,0 cm	: Suspect Wood
From	3,0 cm	to	19,0 cm	: Sound Wood
From	19,0 cm	to	36,0 cm	: Suspect Wood
From	36,0 cm	to	50,0 cm	: Cavity
From	0,0 cm	to	0,0 cm	:

Comment

Beech Grove Residential Home; Copper beech T3 drilling from the South at 1.5 metres. Tree dbh 1360, tree height 24 metres, crown spread 19 metres.

Measuring / object data

Measurement no.	: 33	**Tilt**	: 85° (1°)	**Name** : T3	
Drilling depth	: 49,52 cm	**Avg. curve**	: off		
Wood species	: Hard (2)	**Diameter**	:		
ID number	: BEECH GROVE T3 NE4	**Level**	: 400,0 cm		
Date	: 10.11.2017	**Direction**	: North East		
Time	: 14:34:13	**Object species**	: Copper beech		
Advance	: 50 cm/min	**Location**	: Beech Grove Home		



Assessment

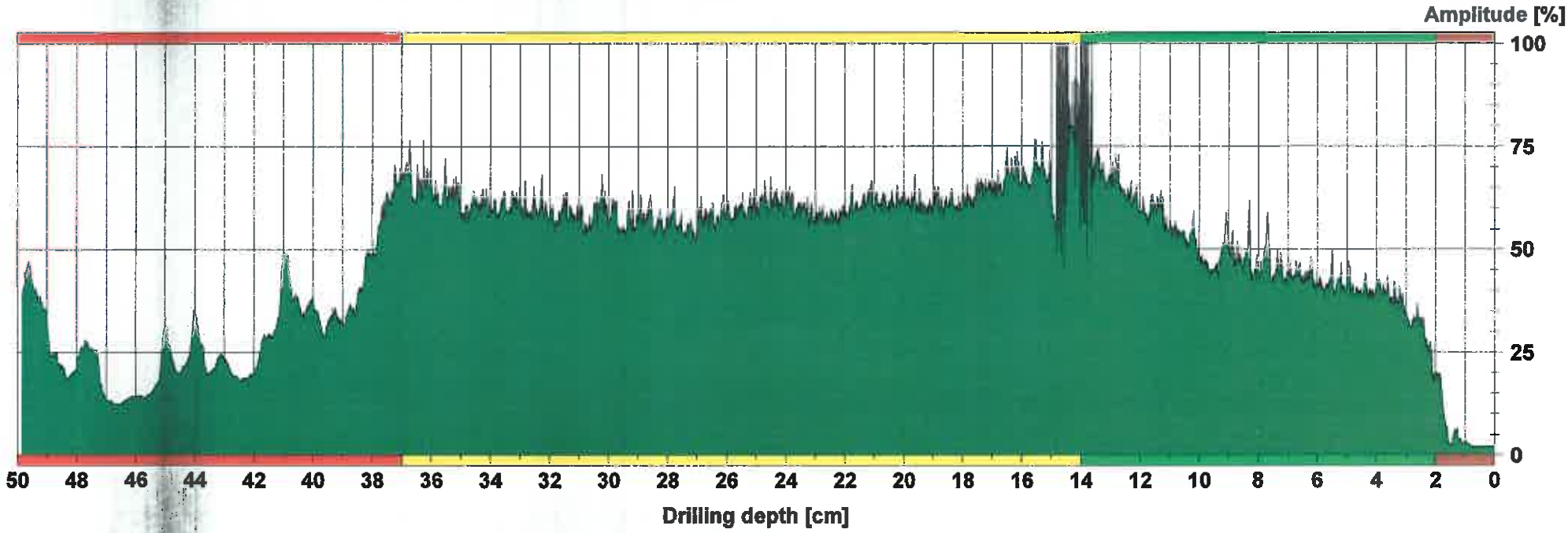
From	0,0 cm	to	2,0 cm	: Bark
From	2,0 cm	to	29,0 cm	: Sound Wood
From	29,0 cm	to	50,0 cm	: Suspect Wood
From	0,0 cm	to	0,0 cm	:
From	0,0 cm	to	0,0 cm	:
From	0,0 cm	to	0,0 cm	:

Comment

Beech Grove Residential Home; Copper Beech T3 drilling at 4 metres from the North East. Tree dbh 1360, tree height 24 metres, crown spread 19 metres.

Measuring / object data

Measurement no.	: 32	**Tilt**	: 85° (1°)	**Name** : T3	
Drilling depth	: 49,85 cm	**Avg. curve**	: off		
Wood species	: Hard (2)	**Diameter**	:		
ID number	: BEECH GROVE T3 SE4	**Level**	: 400,0 cm		
Date	: 10.11.2017	**Direction**	: South East		
Time	: 14:28:46	**Object species**	: Copper beech		
Advance	: 48 cm/min	**Location**	: Beech Grove Home		



Assessment

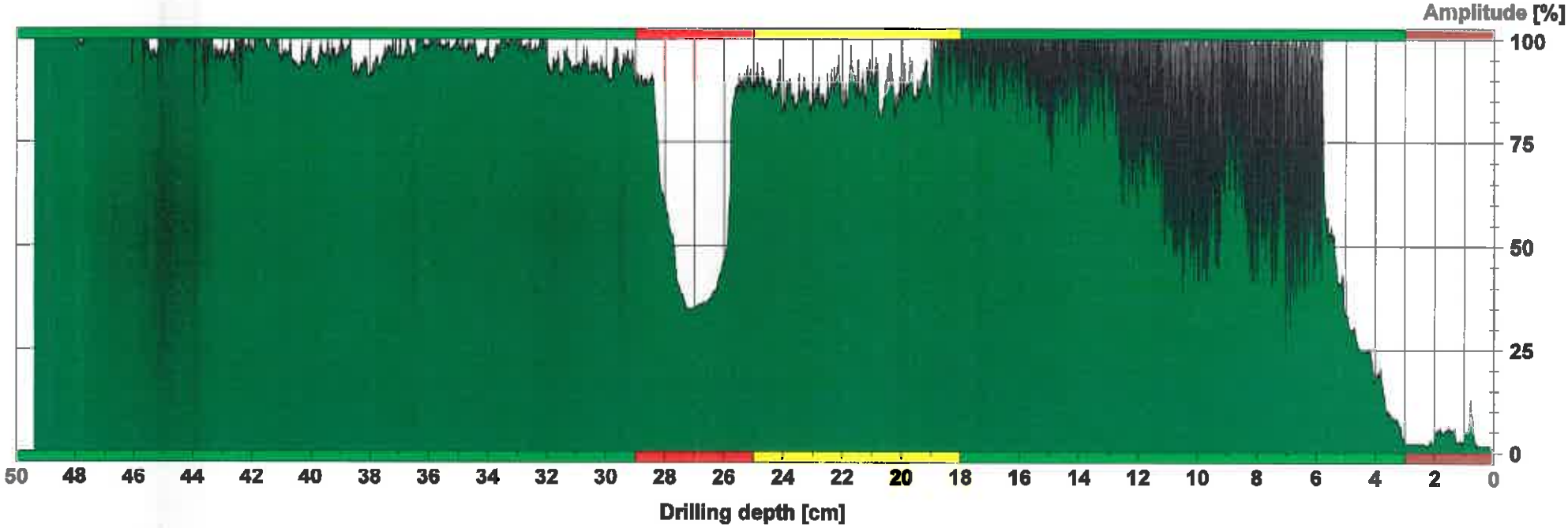
From	0,0 cm	to	2,0 cm	: Bark
From	2,0 cm	to	14,0 cm	: Sound Wood
From	14,0 cm	to	37,0 cm	: Suspect Wood
From	37,0 cm	to	50,0 cm	: Cavity
From	0,0 cm	to	0,0 cm	:
From	0,0 cm	to	0,0 cm	:

Comment

Beech Grove Residential Home; Tree T3 copper beech. Tree dbh 1360, tree height 24 metres, crown spread 19 metres. Drilling at 4 metres from the South East

Measuring / object data

Measurement no.	: 34	**Tilt**	: 84° (1°)	**Name** : T3
Drilling depth	: 49,39 cm	**Avg. curve**	: off	
Wood species	: Hard (2)	**Diameter**	:	
ID number	: BEECH GROVE T3 N4	**Level**	: 400,0 cm	
Date	: 10.11.2017	**Direction**	: North	
Time	: 14:42:12	**Object species**	: Copper Beech	
Advance	: 49 cm/min	**Location**	: Beech Grove Home	



Assessment

From	0,0 cm	**to**	3,0 cm	: Bark
From	3,0 cm	**to**	18,0 cm	: Sound Wood
From	18,0 cm	**to**	25,0 cm	: Suspect Wood
From	25,0 cm	**to**	29,0 cm	: Cavity
From	29,0 cm	**to**	50,0 cm	: Sound Wood
From	0,0 cm	**to**	0,0 cm	:

Comment

Beech Grove Residential Home; Copper Beech T3, drilling at 4metres above ground from the North. Tree diameteer 1360, tree height 24 metres, crown spread 19 metres.