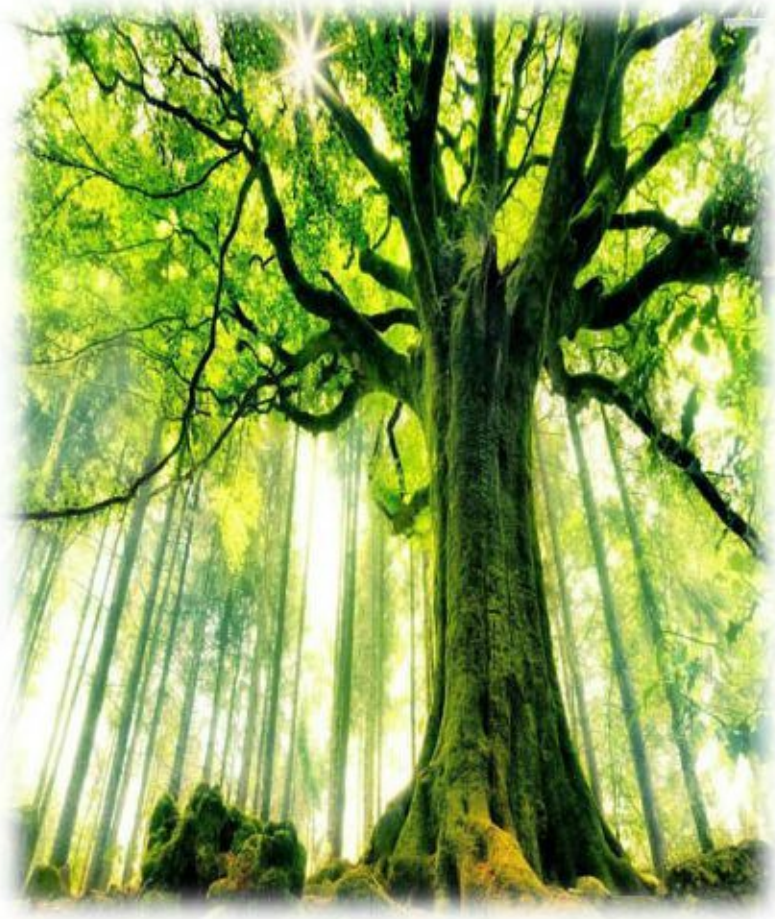

Tree Safety and Condition Survey

St John's Methodist Church

Bodmin Road

St. Austell

Cornwall

PL25 5AE

July 10th ,2021

Jason Bellenger Tree Surveys
Seven Stars Farm
Luxulyan
Cornwall
PL26 8RT

[redacted]

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Jason Bellenger Tree Surveys
Seven Stars Farm Luxulyan St.Austell Cornwall T.01726 858461 [redacted]

Tree Safety and Condition Survey at St.John's Methodist Church

1.0 Instructions

1.1 I have been instructed by John Hubbard Property Steward at St. John's Methodist Church to carry out an inspection of three principle trees located on the righthand side of the entrance drive and report on the following:

a) Condition and Safety of all the trees.

b) Make recommendations on the immediate and future management of the trees, based on my assessment and my personal experience as an Arboriculturalist.

c) Categorise trees in order of work priority (according to location and tree condition).

1.2 I confirm that I hold the Technicians Certificate in Arboriculture (Arbor. A), a Technical Member of the Arboricultural Association, RFS (Royal Forestry Society) Certified and have some 30 years of working within the industry.

2.0 Report Limitations

2.1 The inspection with the aid of binoculars (where necessary) has been carried out from ground level only using visual observation methods (VTA) and a sounding mallet. This is a preliminary report, should a more detailed inspection of an individual tree be required then this will be highlighted in the recommendations.

2.2 All trees assessed for safety and condition have undergone checks using the VTA (Visual Tree Assessment) system as popularised by eminent Arboriculturists such as Dr. David Lonsdale (ref. Principles of Tree hazard Management and Assessment 1999) and Mattheck & Breloer (ref. The Body Language of Trees 1999).

2.3 Trees are living organisms whose health and condition can change rapidly, the health, condition and safety of trees should be checked on a regular basis, preferably at least once a year. The conclusions and recommendations in this report are only valid for one year. This period of validity may be reduced in the case of any change in conditions to or in proximity to the trees.

2.4 The conclusions and recommendations contained in this report are based on the trees at the time of inspection. It should be noted that even sound, healthy trees, can fail given sufficient severe weather conditions. It should be also noted that trees are naturally shedding organisms. Leaves of some species can cause problems, particularly in autumn, by blocking gullies and gutters. Branches can shed and fall unpredictably even in average weather conditions. Fallen leaves and fruits can cause slippery patches and the accumulation of honeydew can be damaging to vehicles and surfaces.

2.5 Trees/tree roots can affect foundations, drains and other underground services. I have not been instructed to consider these factors in relation to this report and therefore should be considered as beyond the scope of this report.

Introduction

3.0 I visited the property on July 9th, 2021 and was given access by John Hubbard. The weather was bright with the occasional shower, reasonable conditions for a survey.

3.1 I was accompanied by John and a student from the Eden project throughout the tree inspection.

3.2 St Johns Church is located close to the centre of St. Austell at approximately 90 metres above sea level and relatively sheltered from the prevailing south-westerly salt laden winds.

3.3 The three trees inspected are mature (circa 150 years old) Holm Oaks located in an elevated position along eastern side the entrance drive and bounded by public carparking to the east.

3.4 There are no records of any previous inspections having been carried out however, there is evidence of historic tree surgery having been carried out to all three, which has limited the potential height and crown spread of the trees.

4.0 Findings

4.1 I attach tree location plan (Appendix 1) showing the location of the of all significant trees, built structures and frequented areas.

I attach a General Tree Assessment (Appendix 2), which presents the following information:

- Tree/Group number as shown on plan(s).
- Tag no. – If appropriate.
- Tree species (common and Latin)
- Height (estimated in metres or measured with clinometer if practical).
- DBH (Diameter of Stem at Breast Height – 1.2 meters)
- Crown spread (radius, estimated in metres).
- Maturity – **Young** – Less than ¼ life expectancy (new planting or establishing tree)
  Semi Mature – ⅓ to ⅔ life expectancy completed. Has not reached potential height or crown spread.
  Mature- ⅔ life expectancy completed with limited potential for any significant increase in size.
  Over Mature- ⅔ life expectancy completed and declining.
  Dead- Trees with little or no functioning networks of living cells, moribund.

- Condition - **Good**- Healthy, Full Crown, Long Life expectancy, No obvious signs of failure.
  Fair - Generally Healthy, Minor Defects.
  Poor- Low Vigour, Short Life expectancy,

Major Defects.

Dangerous- Likely to fail imminently.

- Observations – Root area/Stem condition/Branch Structure/Leaf and bud
- Survey comment – As appropriate to tree safety, physiological health structural condition and target.
- Work – remedial surgery (if needed) to improve tree safety and condition or abate a nuisance. To improve future potential of a tree or adjacent trees.
- Work priority – As appropriate to threat level/ risk management.
- Date of next inspection as recommended.

5.0 Conclusions

5.1 Each tree was inspected using VTA methodology. T2 & T3 were both found to be in good structural condition with the physiological condition of T2 slightly impaired (appendix 2 covers this in more detail), neither tree requiring any remedial works in their current condition.

5.2 Inspection of T1 revealed the fruiting body of *Ganoderma applanatum* at its base on its southwestern quarter and another at circa 2.1m on its southern quarter. Sounding with a nylon hammer indicated that decay/hollowing was evident at these levels. *Ganoderma applanatum* is a heartwood decay pathogen and frequently found on Holm Oak of this age class. Characteristically, the fungus produces a woody bracket forming a single bracket or overlapping in tiers, generally dark matt brown with a white underside. When the action of this fungus reaches an advanced stage an excessive amount of decay can result in the failure of the stem. However, the rate of decay can be slow and take many years to advance leaving the strength of the residual wall within acceptable tolerances for many years. In this case, it was difficult to assess the advancement of the decay using VTA methods therefore a further investigation using a Tomograph was carried out (see Appendix 4).

5.3 The results of the Tomograph Assessment indicated that although the tree is adapting to the changes in wood strength by laying down new wood, it has a moderate chance of stem failure (at 1500mm) in its current condition.

6.0 Recommendations

6.1 Given T1's location adjacent to the public car park ,church parking and the species ability to tolerate pruning, I recommend that the crown be reduced to alleviate loading on the decayed parts of the stem. This work will bring the risk of stem failure within acceptable levels. As a result of this reduction T2 is likely to suffer from a partial loss of companion shelter, therefore I have recommended a crown reduction to reduce the expected increased wind loading on T2.

6.2 The crown reductions should be carried out to British Standard 3998:2010 Recommendations for tree works and exactly as described in the Tree Survey Action Analysis (Appendix 3).

6.3 This work should avoid disturbing or destroying the nesting sites of wild birds or the roost sites of bats under the 'Wildlife & Countryside Act 1981', the 'Countryside and Rights of Way Act 2000' and the 'Conservation of Habitats & Species Regulations 2010' (as amended).

6.4 I recommend that a Tomograph Assessment of the stem (T1) should be carried out again in three years to assess the progression of the decay.

7.0 Sustainability Assessment

7.1 The trees within the site form an important ecological resource that provides shelter, shade, habitat and visual amenity. It is recommended that the client should commit to sustainability and recognise the impact of tree work practices on the environment and wherever possible minimising damage to the ecosystem by implementing the following mitigation measures:

- Use hand/battery operated saws where practical to limit emissions and noise.
- Use bio oils/fuel if chainsaws are used.

- Create habitat piles where possible to minimize impact on local flora and encourage wildlife diversity.
- Use felled/removed timber on site as firewood rather than removal.
- Use large logs as features i.e. Seats, Benches etc.
- If brash is chipped, use on site as mulch if possible.
- Communicate to and educate tree work operatives to work in a sustainable manner.

8.0 Wildlife Considerations

8.1 **Birds -** Any tree work should avoid disturbing or destroying the nesting sites of wild birds under the 'Wildlife & Countryside Act 1981', the 'Countryside and Rights of Way Act 2000' and the 'Conservation of Habitats & Species Regulations 2010' (as amended). Therefore, any tree works likely to disturb nesting birds should be avoided from late March to August.

8.2 **Bats-** In Britain all bat species and their roosts are legally protected, by both domestic and international legislation. Under current legislation (the 'Wildlife & Countryside Act 1981', the 'Countryside and Rights of Way Act 2000'),it is a criminal offence to deliberately take, injure or kill a wild bat Intentionally or recklessly disturb a bat in its roost or deliberately disturb a group of bats. Damage or destroy a place used by bats for breeding or resting (roosts) (even if bats are not occupying the roost at the time), Intentionally or recklessly obstruct access to a bat roost.

8.3 **Badgers -** The Protection of Badgers Act 1992 makes it an offence to kill or injure a badger (except under licence); cruelly ill-treat a badger; use certain prohibited firearms; dig for a badger; damage or destroy a badger sett or obstruct access to it, or disturb a badger in it; cause a dog to enter a badger sett; and tag or mark any badger (except under licence). The Act permits the granting of a licence to take or kill badgers, or to interfere with setts in certain circumstances - such as for the purpose of preventing serious damage to land, crops or other property. In England the licensing authority is Natural England and in Wales it is either the Natural Resources Wales (for development operations) or the Environment Department of the Welsh Assembly Government (for forestry operations)

This survey is for the sole use of the above-named client and refers to only those trees identified within, use by any other person(s) in attempting to apply its contents for any other purpose renders the report invalid for that purpose.

Signed [redacted]

Date. 10/07/2021

Jason Bellenger Tech. Cert. (Arbor. A.); RFS cert.

Arboricultural ASSOCIATION Technician Member

QTRA Registered User

The Consulting Arborist Society

The authority of this report ceases when any site conditions change or pruning or other works unspecified in the report are carried out to, or affecting, the subject tree(s). The statements made in this report do not take into account the effects of extremes of climate, vandalism or accident, whether physical, chemical or fire.

Jason Bellenger Tree Surveys cannot therefore accept any liability in connection with these factors, nor where prescribed work is not carried out in a correct and professional manor in accordance with good practice.

9.0 References

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St John's Methodist Church

Car parking

Car parking

PRIORY ROAD

T1

T2

T3

66.5m

20

19

13a

13

24

22

Jason Bellenger
TREE SURVEYS

Seven Stars Farm Luxulyan St.Austell Cornwall PL268RT

Tel :01726 858461 [redacted]

Tree Location Plan

SCALE : 1 : 500 @ A4

DATE : 21/07/2021

N

MAP FILENAME : Appendix 1

0 30m

St Johns Methodist Church
Bodmin Road
St.Austell
Cornwall
PL25 5AE

[redacted]

Jason Bellenger Tree Surveys
Seven Stars Farm
Luxuylan
St.Austell
Cornwall
PL268RT

[redacted]

General Tree Assessment (Detailed)

Tree Safety and Condition Survey 2021

Tree ID: T1 Holm Oak
Quercus ilex

Tag: No tag
TPO: No

Assessor: Jason Bellenger Tech. Cer
Date: 09-Jul-21

Survey Comment: Growing from raised bed 10m from church to North west , overhanging council car parking to East by 3m and overhanging church car park by 1m to west. Open grown crown form, biased towards car park .Good vigour with good extention growth noted. Historically topped at 12 m, cambium death below cuts and minor decay pockets associated but good attachment points remain. Major cavity (from historic tear out leaving heartwood exposed) on Northern quarter, 830mm in height by 350mm wide and 160mm , desiccated wood within but sufficiently compartmentalised, ribs/wound wood formed on all sides of wound. Fruiting body of Ganoderma applanatum identified @ base southwestern quarter, sounding reveals internal decay present. Fruiting body of Ganoderma applanatum noted @ 2.1m in old tear out southern quarter. Decay detection test carried out @ 300mm and 1500mm on main stem. Tree safety work : Reduce crown height by 3m (to leave 13m in height) and radial crown spread by 2.5m on all sides (N,S,E,W) 4.5m radial crown spread. No cuts greater than 50mm diameter to reduce wind sail and loading on stem.

Details

Height	Spread	Stems	Ø	Maturity	Bat	Con Area	Prev Insp	Next Due	Condition
16 m	7 m	1	780 mm	Mature	No	Yes	N/A	09-Jul-22	Fair

Observations

Root	Stem	Branch	Leaf/Bud
Increase in soil level	Fungus or decay Old pruning wounds Cavities Major cavities	Old pruning wounds Cavities Stubs	Normal

Work

Category	Action	Priority
Reduce crown(s)	Leaving - See Comment	3 Months

General Tree Assessment (Detailed)

Tree ID: T2 Holm Oak
Quercus ilex

Tag: No tag
TPO: No

Assessor: Jason Bellenger Tech. Cer
Date: 09-Jul-21

Survey Comment: Growing from raised bed, overhanging council car parking to East by 5m . Low vigour and limited extension growth noted. Historically pollarded/topped @ circa 8m, cambium death , minor cavities and decay pockets associated with all reduction points. Regrowth attachment points sufficient . Slight lean south away from T1. Sounding base reveals no noticeable internal defects/decay, areas of bark necrosis noted. Tree maintenance work : Reduce crown by 2m in height to leave 13m and radial crown spread by 2m to leave 4m radial crown spread on all sides to reduce sail area and loading as a result of partial loss of companion shelter following reduction of T1.

Details

Height	Spread	Stems	Ø	Maturity	Bat	Con Area	Prev Insp	Next Due	Condition
15 m	6 m	1	620 mm	Mature	No	Yes	N/A	09-Jul-22	Fair

Observations

Root	Stem	Branch	Leaf/Bud
Increase in soil level	Old pruning wounds Minor cavities	Old pruning wounds Epicormic growths Stubs Pollard	Normal

Work

Category	Action	Priority
Reduce crown(s)	Leaving - See Comment	3 Months

Tree ID: T3 Holm Oak
Quercus ilex

Tag: No tag
TPO: No

Assessor: Jason Bellenger Tech. Cer
Date: 09-Jul-21

Survey Comment: Growing from raised bed (behind stone/earth built retaining wall), in an elevated position above entrance drive, 4m from car parking to East overhanging by 2m. Open grown crown form, crown breaks @ circa 4m into 5 main scaffolds . Good vigour and extension growth. Historically crown topped /pollarded @ circa 8m . All pollard heads have minor decay pockets associated with limted cambium death noted, good attachment points. More recently crown lifted with good wound occlusion noted. Stones dislodged from retaining wall, structural roots exposed, minor damage to roots noted, insignificant. Sounding base reveals no noticeable internal defects.

Details

Height	Spread	Stems	Ø	Maturity	Bat	Con Area	Prev Insp	Next Due	Condition
15 m	6 m	1	640 mm	Mature	No	Yes	N/A	09-Jul-22	Good

Observations

Root	Stem	Branch	Leaf/Bud
Increase in soil level	Old pruning wounds	Minor dead wood Old pruning wounds Epicormic growths Pollard	Normal

Work

Category	Action	Priority
No action	No action	

General Tree Assessment (Detailed)

St Johns Methodist Church
Bodmin Road
St.Austell
Cornwall
PL25 5AE

[redacted]

Jason Bellenger Tree Surveys
Seven Stars Farm
Luxuylan
St.Austell
Cornwall
PL268RT

[redacted]

Tree Survey Action Analysis

Tree Safety and Condition Survey 2021

Tree: T1

TagNo: No tag

Holm Oak
Quercus ilex

Action Recommendations:		Priority
Reduce crown(s)	Leaving - See Comment	3 Months

Tree safety work : Reduce crown height by 3m (to leave 13m in height) and radial crown spread by 2.5m on all sides (N,S,E,W) 4.5m radial crown spread. No cuts greater than 50mm diameter to reduce wind sail and loading on stem.

Tree: T2

TagNo: No tag

Holm Oak
Quercus ilex

Action Recommendations:		Priority
Reduce crown(s)	Leaving - See Comment	3 Months

Tree maintenance work : Reduce crown by 2m in height to leave 13m and radial crown spread by 2m to leave 4m radial crown spread on all sides to reduce sail area and loading as a result of partial loss of companion shelter following reduction of T1.

Appendix 4 - ArborSonic 3D Measurements Report

St Johns Church 2021

09/07/2021 17:51

Tree species: *Quercus ilex* (Holly Oak or Holm Oak)

Tree location	St . Johns Church St.Austell
Measurement date	Friday, July 9, 2021 10:02 AM
Tree identifier	T1
Project identifier	St Johns Church Trees 2021
Trunk diameter at 4 feet	780mm
Status report	
Root status	Intact
Root collar status	Decayed
Trunk status	Decayed/hollowed
Crown collar status	Cavity
Crown status	Good vigour
Other state	Tree in good physiological condition. Tree in impaired structural condition- Fruiting bodies of *Ganoderma applanatum* at base south western quarter and at 2.1 m southern quarter.
Proposed treatment	
Root treatment	Not necessary
Root collar treatment	N/A
Trunk treatment	N/A
Crown collar treatment	N/A
Crown treatment	Crown reduction
Other treatment	Reduce crown height by 3m (to leave 13m in height) and radial crown spread by 2.5 m on all sides (to leave 5 m RCS) , no cuts greater than 50mm diameter to reduce wind sail/loading. Carry out as soon as can be arranged.

Biomechanics

Wind	
Wind model:	EN1991
Terrain:	Town
Base wind velocity:	26.0 m/s
Dry air temp.:	19 °C
Crown	
Crown model:	Drawn
Area:	192.81 m2
Top height:	15.88 m
Center height:	8.67 m
Bottom height:	2.24 m
Trunk	
Degree of lean:	0 °
Direction of lean:	0
Tree	
Wind load:	35621 N

Center height:	9.01 m
Drag factor:	0.25
Yield strength:	23.9 MPa

Layer name	Height	Decayed area	Safety factor	Risk rating
Layer #2	1800 mm	46 %	131 %	Moderate risk
Layer #1	300 mm	44 %	232 %	Low risk

Safety factor: 131 %

Layer #2

Sensor Geometry

Height	1800 mm
Scheme	Irregular
Sensor count	10 +10

Sensor position data

L1 - 1	17
2 - 1	29
L2 - 1	45
3 - 1	56
L3 - 1	63
4 - 1	71
L4 - 1	72
5 - 1	60
L5 - 1	59
6 - 1	60
L6 - 1	63
7 - 1	64
L7 - 1	63
8 - 1	61
L8 - 1	55
9 - 1	48
L9 - 1	37
10 - 1	30
L10 - 1	19
L1 - 6	50
2 - 6	40
L2 - 6	44
3 - 6	42
L3 - 6	37
4 - 6	34
L4 - 6	27
5 - 6	18
L5 - 6	8
L6 - 6	12
7 - 6	24
L7 - 6	33

8 - 6	40
L8 - 6	47
9 - 6	51
L9 - 6	54
10 - 6	61
L10 - 6	67
PD	3
BT	2

Time Data (μs)

	110±0	185±0	235±0	332±0	325±0	374±0	342±0	361±0	460±0	595±0	529±0	360±1	335±0	354±1	296±0	290±1	237±0	184±0	110±0
112±0		110±0	198±0	240±1	298±0	286±1	314±0	273±2	391±0	518±3	516±0	387±3	395±0	372±1	362±0	309±2	290±0	237±0	186±0
188±1	112±0		123±0	210±0	237±0	264±0	259±0	254±0	331±0	420±1	563±0	436±2	603±0	431±1	565±0	371±1	393±0	290±0	239±0
377±1	201±0	124±0		123±0	183±0	210±0	230±0	225±0	299±0	389±29	487±0	608±4	684±0	818±1	668±0	757±4	413±0	477±4	314±0
338±1	308±0	213±1	124±0		95±0	155±1	176±0	196±0	270±0	345±2	496±0	553±8	686±0	932±1	820±0	905±1	641±0	455±2	417±0
357±0	303±0	238±0	185±0	96±0		95±0	142±0	163±0	232±0	343±0	414±0	603±0	577±0	763±0	831±0	821±0	708±0	525±0	419±0
384±2	295±0	268±1	213±0	157±1	96±0		82±0	129±1	199±0	268±5	379±0	484±7	577±0	601±10	691±0	729±8	667±0	510±21	437±0
350±1	320±0	233±5	232±0	176±0	143±0	81±0		82±0	164±0	209±1	336±0	416±0	509±0	552±1	571±0	619±0	606±0	513±5	440±0

369±6	352±0	256±3	279±0	195±1	161±0	128±2	81±0		117±0	199±6	321±0	404±9	486±0	535±19	581±0	541±14	618±0	483±11	492±0
471±3	401±0	355±1	300±0	325±2	238±0	205±0	167±0	121±0		117±0	193±0	432±1	342±0	557±9	433±0	610±8	615±0	617±3	558±0
633±5	625±0	434±4	521±0	344±1	426±0	282±11	244±0	207±6	121±0		111±0	188±4	234±0	281±8	455±0	332±8	531±0	690±0	559±0
502±1	536±0	779±1	490±0	688±2	413±0	527±2	343±0	439±3	194±0	108±0		111±0	165±0	212±0	246±0	353±2	326±0	453±2	530±0
371±1	494±0	439±3	849±0	546±8	679±0	481±3	613±0	405±3	366±0	181±1	108±0		89±0	143±1	178±0	212±1	353±0	320±2	433±0
414±1	406±0	486±3	702±0	919±3	612±0	670±6	602±0	700±1	340±0	292±0	162±0	89±0		89±0	147±0	182±0	257±0	354±1	342±0
364±4	375±0	441±6	523±0	966±5	717±0	678±1	569±0	723±4	465±0	274±6	208±0	143±1	89±0		94±0	152±1	227±0	302±4	314±0
275±2	370±0	337±1	709±0	560±1	863±0	515±1	745±0	468±2	523±0	231±1	242±0	176±0	147±0	93±0		94±0	185±0	195±0	300±0
299±1	367±0	377±2	478±0	977±1	615±0	761±3	579±0	812±4	596±0	322±4	266±0	210±0	181±0	151±0	93±0		126±0	218±2	258±0
243±0	295±0	459±1	422±0	620±3	764±0	670±6	631±0	643±1	750±0	725±1	323±0	267±0	257±0	228±0	185±0	127±0		126±0	202±0

187±2	239±0	291±3	411±0	468±17	515±0	550±12	536±0	501±13	657±0	688±7	511±0	324±6	314±0	304±5	262±0	219±5	127±0		111±0
111±0	186±0	230±0	312±0	364±1	421±0	411±2	456±0	402±3	548±0	671±6	524±0	298±3	339±0	283±2	297±0	254±0	202±0	110±0	

Tomograms (m/s)

	2615	2146	1851	1954	2066	2021	2219	1719	1263	935	1196	1821	1796	1874	2261	1964	1984	2256	2969
2615		1953	2102	1846	1859	2208	2011	1615	1224	841	1018	1342	1563	1728	1731	1783	1834	2229	2607
2146	1953		2359	1783	1858	1966	2182	1542	1122	933	669	1197	1019	1359	1320	1574	1250	1960	2427
1851	2102	2359		1561	1652	2030	2080	1536	1482	1041	1138	847	966	1053	1045	1156	1668	1595	2314
1954	1846	1783	1561		2051	2032	2273	1817	1442	1418	946	1182	866	771	1110	800	1173	1696	2023
2066	1859	1858	1652	2051		2065	1948	1769	1644	1142	1308	967	1160	986	894	1069	1018	1541	1965
2021	2208	1966	2030	2032	2065		2329	2264	1929	1650	1189	1320	1117	1168	1310	1064	1179	1591	2078
2219	2011	2182	2080	2273	1948	2329		3476	2108	1854	1520	1171	1208	1290	1145	1283	1227	1556	1917
1719	1615	1542	1536	1817	1769	2264	3476		1358	1170	904	1127	876	910	1185	924	986	1386	1614
1263	1224	1122	1482	1442	1644	1929	2108	1358		1037	1346	904	1336	979	1155	932	821	971	1208
935	841	933	1041	1418	1142	1650	1854	1170	1037		1786	1734	1524	1702	1521	1688	850	861	1056
1196	1018	669	1138	946	1308	1189	1520	904	1346	1786		1872	1915	1871	1947	1651	1684	1256	1277
1821	1342	1197	847	1182	967	1320	1171	1127	904	1734	1872		2157	1953	2222	2182	1637	1884	1907
1796	1563	1019	966	866	1160	1117	1208	876	1336	1524	1915	2157		1839	1964	2101	1802	1688	2009
1874	1728	1359	1053	771	986	1168	1290	910	979	1702	1871	1953	1839		2243	1986	1797	1714	2222
2261	1731	1320	1045	1110	894	1310	1145	1185	1155	1521	1947	2222	1964	2243		1880	1624	1894	1943
1964	1783	1574	1156	800	1069	1064	1283	924	932	1688	1651	2182	2101	1986	1880		1556	1475	1933
1984	1834	1250	1668	1173	1018	1179	1227	986	821	850	1684	1637	1802	1797	1624	1556		1443	1793
2256	2229	1960	1595	1696	1541	1591	1556	1386	971	861	1256	1884	1688	1714	1894	1475	1443		2400

29 69	26 07	24 27	23 14	20 23	19 65	20 78	19 17	16 14	12 08	10 56	12 77	19 07	20 09	22 22	19 43	19 33	17 93	24 00	

Layer #1

Sensor Geometry

Height	300 mm
Scheme	Irregular
Sensor count	10 + 10

Sensor position data

L1 - 1	17
2 - 1	28
L2 - 1	38
3 - 1	49
L3 - 1	59
4 - 1	63
L4 - 1	78
5 - 1	88
L5 - 1	88
6 - 1	86
L6 - 1	78
7 - 1	73
L7 - 1	64
8 - 1	60
L8 - 1	48
9 - 1	45
L9 - 1	34
10 - 1	23
L10 - 1	10
L1 - 6	87
2 - 6	85
L2 - 6	76
3 - 6	65
L3 - 6	54
4 - 6	39
L4 - 6	33
5 - 6	26
L5 - 6	13
L6 - 6	14
7 - 6	28
L7 - 6	40
8 - 6	57
L8 - 6	72
9 - 6	77
L9 - 6	87
10 - 6	86
L10 - 6	83
PD	2

BT	1

Time Data (μs)

	135±0	234±0	282±0	330±0	424±0	696±2	769±0	752±21	920±0	599±1	568±0	366±0	416±0	318±0	373±0	258±0	309±0	182±0	109±0
137±0		135±0	225±0	273±0	384±0	423±2	745±0	818±5	816±0	845±6	554±0	473±1	401±0	396±0	361±0	366±1	307±0	311±1	210±0
239±1	137±0		126±0	216±1	327±0	438±2	600±0	794±5	835±0	880±3	761±0	510±3	478±0	436±0	416±0	403±1	377±0	355±1	299±0
288±0	226±0	124±0		126±0	244±0	398±0	502±0	776±4	716±0	852±3	872±0	678±2	511±0	482±1	449±0	436±1	415±0	388±0	342±0
329±2	271±0	214±1	124±0		154±0	272±1	482±0	567±3	702±0	639±11	800±0	863±7	679±0	511±14	510±0	463±4	469±0	427±3	386±0
385±1	378±0	320±0	241±0	152±0		154±0	256±0	567±5	419±0	628±3	495±0	749±5	753±0	680±2	667±0	539±2	629±0	502±3	559±0
691±0	550±0	426±0	348±0	269±0	152±0		137±0	239±0	255±0	271±0	464±0	350±0	594±0	642±0	665±0	822±0	730±0	795±0	743±0
983±3	780±0	714±5	495±0	506±6	255±0	138±0		137±0	213±0	229±0	293±0	300±1	398±0	438±3	657±0	649±4	838±0	922±23	833±0
870±0	970±0	869±1	663±0	565±4	403±0	241±1	138±0		111±0	187±1	251±0	316±1	394±0	447±4	529±0	671±7	710±0	855±1	906±0
889±2	875±0	956±1	755±0	611±3	421±0	259±0	213±0	111±0		111±0	200±0	353±1	332±0	488±1	462±0	620±2	711±0	770±6	849±0
843±4	842±0	879±3	921±0	641±2	493±0	277±1	231±0	186±0	111±0		124±0	213±1	281±0	349±1	475±0	477±2	549±0	751±3	635±0
501±2	672±0	795±11	750±0	885±4	499±0	374±1	295±0	250±0	199±0	124±0		124±0	210±0	278±0	341±0	462±1	413±0	477±1	559±0

368±0	479±0	501±4	683±0	621±5	653±0	357±1	365±0	314±0	263±0	213±1	124±0		121±0	206±1	269±0	333±1	391±0	349±1	411±0
346±3	400±0	457±1	502±0	572±17	636±0	421±1	402±0	356±0	333±0	263±0	210±0	121±0		121±0	214±0	299±1	298±0	321±1	334±0
320±1	388±0	433±2	477±0	502±2	656±0	651±2	505±0	447±2	422±0	351±2	304±0	206±1	121±0		128±0	221±1	242±0	263±1	310±0
300±2	364±0	431±1	456±0	497±1	673±0	741±7	667±0	589±4	469±0	488±2	343±0	346±1	215±0	231±1		128±0	187±0	208±0	263±0
263±1	329±0	408±4	433±0	479±6	662±0	845±9	715±0	684±8	601±0	492±9	414±0	334±1	294±0	224±1	129±0		94±0	153±1	208±0
196±2	305±0	358±2	415±0	435±1	644±0	827±4	769±0	689±10	705±0	613±7	420±0	340±2	299±0	243±2	187±0	93±0		94±0	167±0
182±0	266±0	348±0	391±0	422±0	577±0	810±0	911±0	694±0	675±0	726±0	524±0	348±0	360±0	263±0	275±0	150±0	93±0		109±0
109±0	208±0	335±0	339±0	424±1	559±0	719±5	781±0	994±7	646±0	662±3	546±0	435±0	333±0	380±0	261±0	307±0	166±0	109±0	

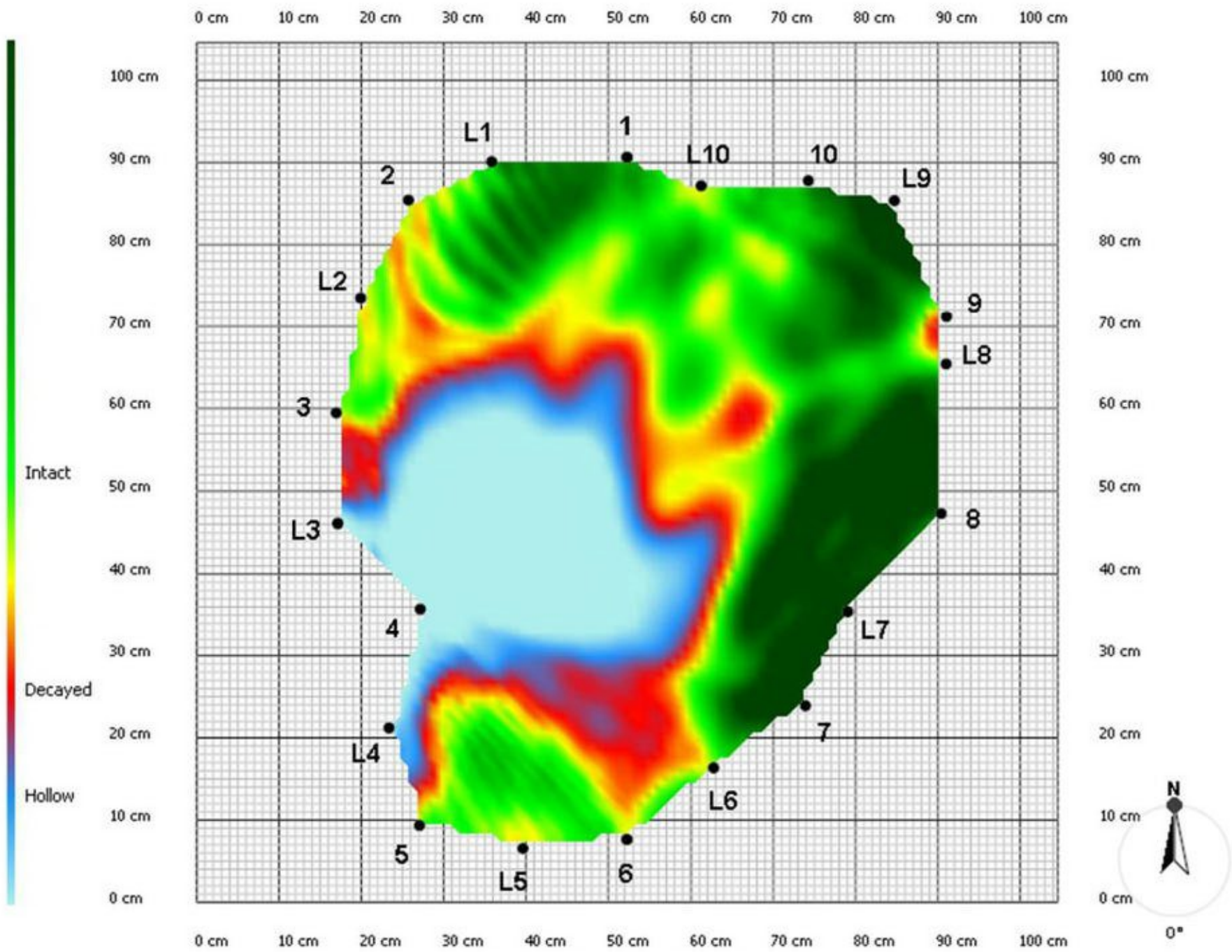
Tomograms (m/s)

	2044	1654	1750	1832	1683	963	920	1113	982	1210	1509	2160	1868	2240	1782	2273	1863	1917	1655
2044		1398	1497	1821	1590	1336	1029	988	1057	1049	1359	1737	1941	2047	2046	2099	2121	1827	1809
1654	1398		1857	1875	1654	1416	1144	1025	973	996	1063	1660	1701	1937	1889	1968	2011	1787	1515
1750	1497	1857		2007	1622	1336	1316	1053	1075	905	945	1142	1493	1710	1786	1879	1895	1777	1655
1832	1821	1875	2007		1423	1338	1060	1144	1044	1131	825	975	1136	1579	1609	1761	1827	1763	1569
1683	1590	1654	1622	1423		1537	1652	1099	1414	1132	1302	971	980	1163	1204	1386	1325	1453	1226
963	1336	1416	1336	1338	1537		1854	1612	1756	1886	1222	1680	1171	1079	1058	916	1024	924	912
920	1029	1144	1316	1060	1652	1854		1534	1535	2001	1821	1940	1723	1724	1306	1309	1155	953	998

11 13	98 8	10 25	10 53	11 44	10 99	16 12	15 34		21 45	20 73	20 51	20 52	19 20	19 17	16 65	14 10	14 41	12 38	93 3
98 2	10 57	97 3	10 75	10 44	14 14	17 56	15 35	21 45		21 08	18 93	16 94	19 01	17 05	19 03	14 88	13 67	12 90	11 71
12 10	10 49	99 6	90 5	11 31	11 32	18 86	20 01	20 73	21 08		19 32	18 80	19 44	19 82	16 77	17 62	15 91	12 01	13 08
15 09	13 59	10 63	94 5	82 5	13 02	12 22	18 21	20 51	18 93	19 32		19 04	17 64	19 05	20 53	16 78	20 08	16 10	13 89
21 60	17 37	16 60	11 42	97 5	97 1	16 80	19 40	20 52	16 94	18 80	19 04		18 54	20 69	19 14	19 30	20 74	21 87	17 31
18 68	19 41	17 01	14 93	11 36	98 0	11 71	17 23	19 20	19 01	19 44	17 64	18 54		24 03	21 75	17 19	21 90	19 24	19 78
22 40	20 47	19 37	17 10	15 79	11 63	10 79	17 24	19 17	17 05	19 82	19 05	20 69	24 03		15 66	15 82	22 31	22 47	18 06
17 82	20 46	18 89	17 86	16 09	12 04	10 58	13 06	16 65	19 03	16 77	20 53	19 14	21 75	15 66		78 1	17 22	16 66	19 45
22 73	20 99	19 68	18 79	17 61	13 86	91 6	13 09	14 10	14 88	17 62	16 78	19 30	17 19	15 82	78 1		33 62	25 25	18 42
18 63	21 21	20 11	18 95	18 27	13 25	10 24	11 55	14 41	13 67	15 91	20 08	20 74	21 90	22 31	17 22	33 62		23 36	22 29
19 17	18 27	17 87	17 77	17 63	14 53	92 4	95 3	12 38	12 90	12 01	16 10	21 87	19 24	22 47	16 66	25 25	23 36		22 35
16 55	18 09	15 15	16 55	15 69	12 26	91 2	99 8	93 3	11 71	13 08	13 89	17 31	19 78	18 06	19 45	18 42	22 29	22 35	

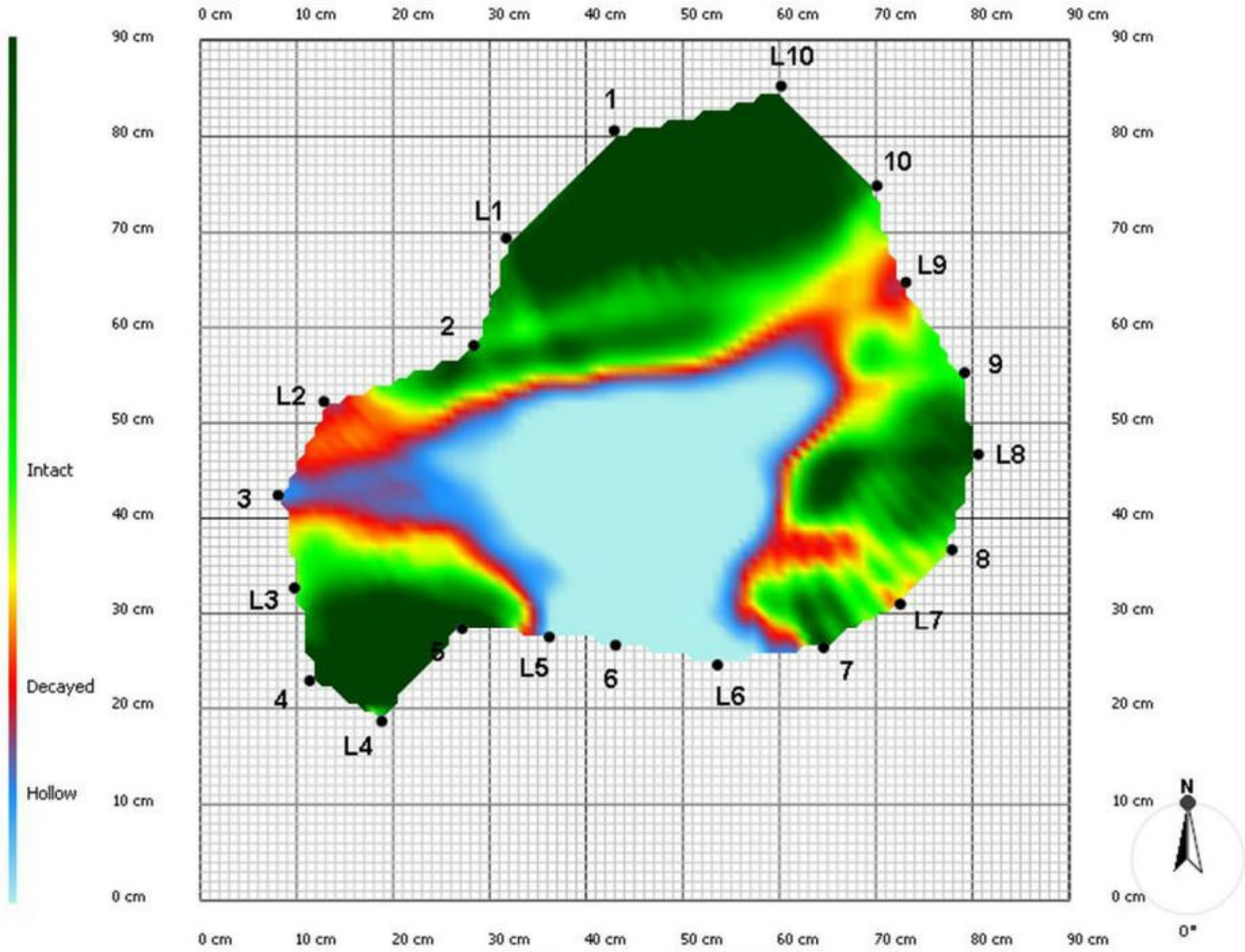
Arborsonic set up looking South (sensors @300mm)

Holm Oak viewed from council car park



Layer #1 - 2d map @ 300mm

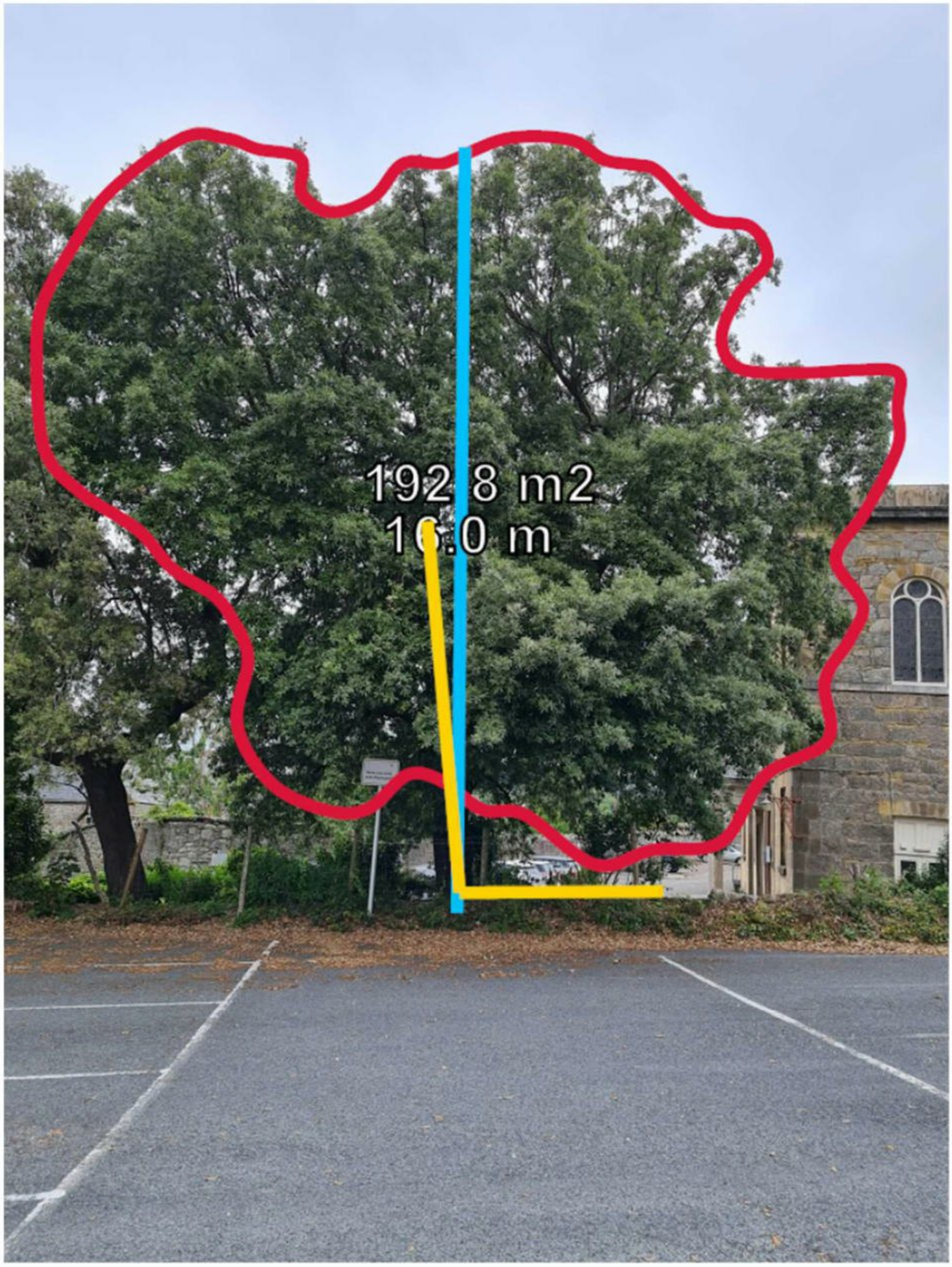
Ganoderma applanatum fruiting body identified at base



Layer #2 - 2d map@1800mm

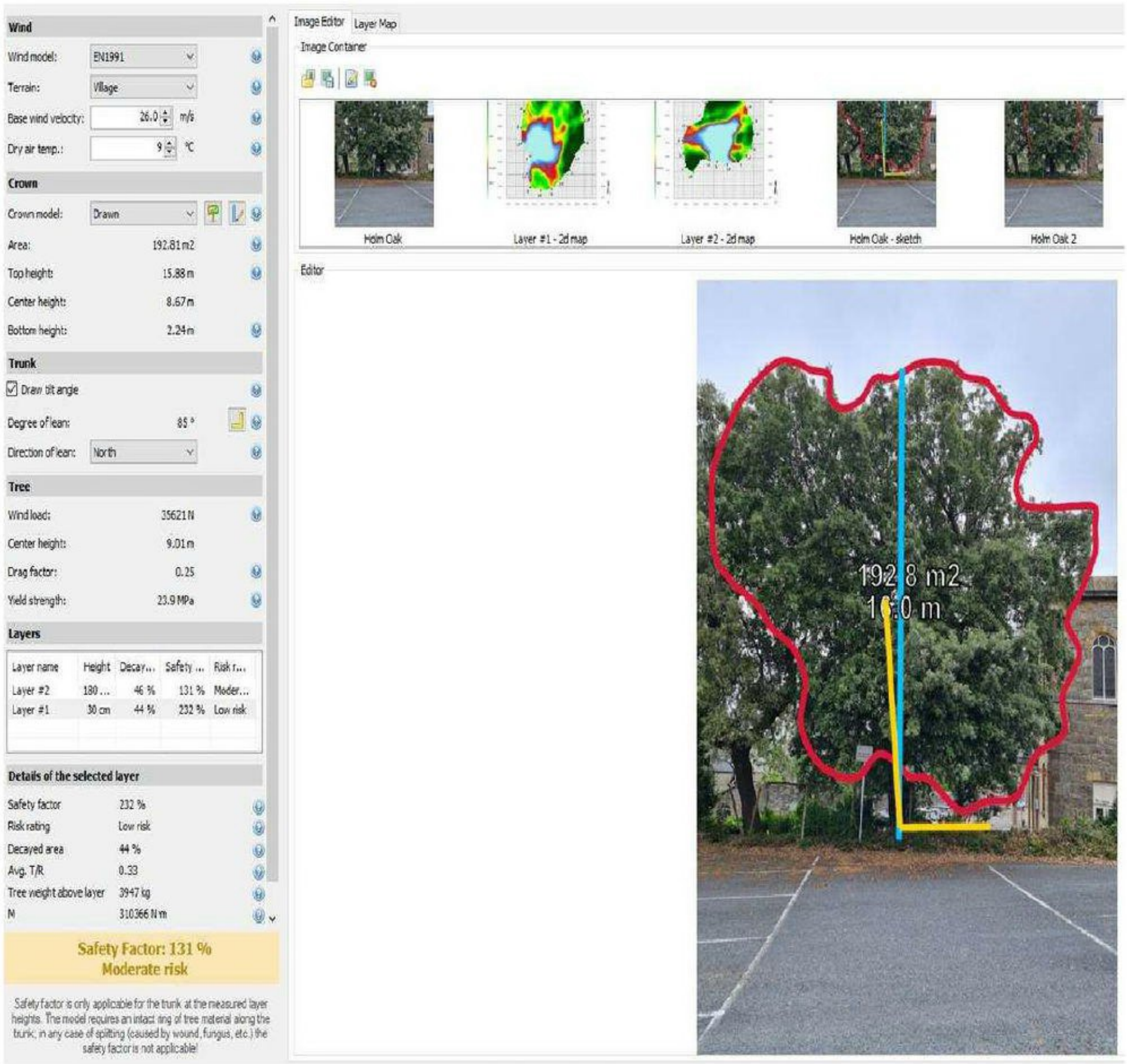
Ganoderma fruiting bodies

Arborsonic set up looking North (Sensors @ 1800mm)



Holm Oak – Crown area calculator

Holm Oak – Crown reduction indication



Safety Factor Calculation

Conclusions - Based upon this assessment the tree has a basic safety factor of 131% which is just below the minimal requirement of 150%, as such the tree is assumed to offer a moderate risk of stem failure at 1.8m assuming an upper wind speed of 33m/s (118.8 km/h or 73.8 mph or Beaufort Force 12) are likely to be experienced on site in the next year.

A crown reduction as indicated, will bring this risk of failure in to acceptable levels (low risk of stem failure).

I would therefore recommend that this crown reduction is carried out as soon as can be arranged and the car parking area remains fenced off until this work is carried out, as a precaution.

Glossary of Terms.

Sonic Tomography (SOT): Sonic tomographs detect defects (e.g., hollows or wood rot) in a non-invasive way by generating a two-dimensional map of the sound velocity transmitted across a tree's section, mirroring the integrity of the inspected wood. It works on the principle that sound waves passing through decay move more slowly than sound waves traversing solid wood. The system sends sound waves from a number of points around a tree trunk to the same number of receiving points, the relative speed of the sound can be calculated, and a two-dimensional image is generated. Using the differences in the transit times between sensors, the analysis software constructs a two-dimensional picture, which show zones of differing sound transmission properties within the stem. The software uses pre-set colours, for example, areas with high "sonic speed" in green whereas low sonic values are shown in magenta. Other colours of yellow & red represent various levels of rotting zones based on sonic speed measurements in the respective areas. Sonic Tomography gives valuable density information about the trees. The density strongly correlates with the soundness of the wood. This is very useful to access the stability of the tree. In some situations, the sonic investigation is interfered with by the internal structure of the wood.

t/R ratio in hollow tree stems, the ratio of the thickness of sound wood to the radius. A criterion helpful in evaluating tree risk developed by Mattheck & Breloer (1994).

Safety Factor. Safety factor is the ratio of the wood strength from the species database as shown at "Strength" and this computed maximal stress, multiplied by a correction factor of 70%. The formula is: (SF=0.7 $Strength$ / $MaxStress$). The rationale behind this approach is that given all the parameters above the software tries to estimate the stress in the wood and if this exceeds the maximum limit the material can resist, then the trunk would break. This is based upon several key elements including:

Safety Factor	below 50%	50% - 100%	100% - 150%	above 150%
Risk Rating	Extreme Risk	High Risk	Moderate Risk	Low Risk

- Expected wind speed will not breach 33m/s or 72 mph.
- Drag factor is the drag coefficient of the crown, taken from the tree species database.

- Strength is the yield strength of the trunk wood, also taken from the species database.
- Wind force is the calculated force acting on the crown centre at the given wind speed and crown size.
- Tree weight above layer is the estimated total weight of tree that is above the selected layer.
- The torque resulting from the wind and gravity forces.
- Max stress is the maximal stress resulting from the torque and mass of the tree, taking into consideration the tomogram. The Layer Details section shows the details for the selected layer. Decayed area is the percentage of the decayed region on the selected layer compared to the total layer area.