



BURLEIGH WOOD TORNADO 2021

Report by the Tornado and Storm Research Organisation (TORRO) SI20211031_Burleigh Wood

On 31st October 2021, a tornado went through the Burleigh Wood. This report covers the findings from a site investigation conducted by Sarah Horton (TORRO) over two days following the event

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Introduction

On 31st October 2021 a swathe of damage occurred across England, from the south coast, up through the Midlands and into Lincolnshire. It was associated with a small low pressure - a mesolow. Much of the damage across the country was straight-line winds, but some areas were hit by brief embedded tornadoes. This site investigation looks at the damage in a woodland called Burleigh Wood in Oxfordshire.

TORRO was alerted to the damage at Burleigh Wood during a nearby site investigation at a tornadic event in Cassington. Damage was clearly evident from the road. Blenheim Estate kindly granted access to the site. Subsequently a damage path was found from Church Hanborough through to north east of Thrupp.

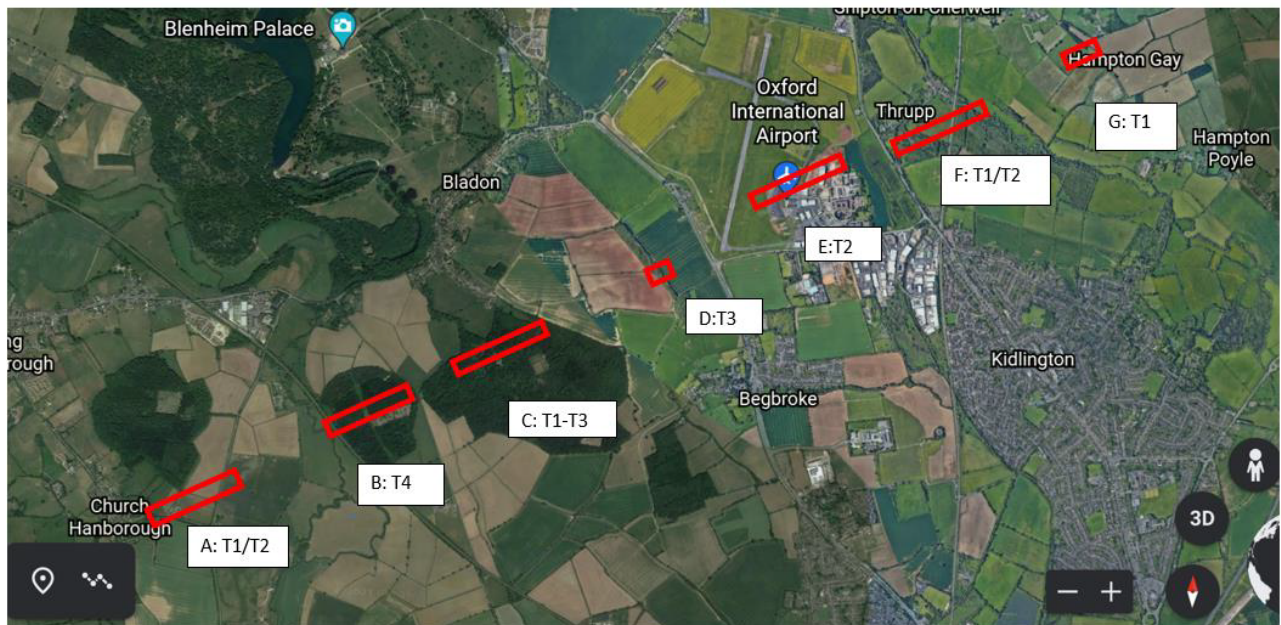
The site investigation took place on multiple days.

Detailed Site Investigation

The detailed site investigation is discussed from south to north (the approximate direction of travel of the tornado), rather than in order of investigation.

Where tornado strength is mentioned (T numbers) a description of the TORRO tornado Scale is given in Appendix A.

Areas mentioned in the report are labelled on the map.



A: Church Hanborough/ Edge of Pinsley Wood. Mostly T1. Estimated T2 through binoculars of Pinsley Wood. B: Burleigh Wood T4, some evidence of weakening as it exited. C: Bladon Heath. Mostly weak, T1, sporadic but restrengthened to poss T3 on exit. D: Provisional T3 Report from Blenheim head forester. Half a dozen mature ash trees pulled out of the ground. E: Mostly T1, but some T2 evident in woodland. F: Some evidence of T1.

T scale:





Church Hanborough and Pinsley Wood (Area A)

Damage was not found further south than Church Hanborough. This was weak and consisted of snapped branches off trees. A road sign was found suspended in trees.

Pinsley Wood was not explored, but through binoculars, damage could be seen – fallen trees and broken branches were evident. Estimated strength: T1/T2

Burleigh Wood Area B

On the south western edge of Burleigh Wood lies some cottages. Some substantial tree damage was found on these grounds with one having been blown into the River Evenlode. A teak table had been destroyed. Pieces were scattered to the north west and some a substantial distance to the SE.



Across the river lies a railway line. A line of damaged trees 100m wide bounded the track on the south western side. On the north eastern side the same pattern was evident. Some trees had fallen. Large branches had been thrown approximately 30m away in a clearing.

On the edge of Burleigh Wood itself a 130m margin of fallen and damaged trees lined the clearing. Some of the trees had fallen SW.



Inside the woodland this oak had lost some large branches. The branch in the picture had been thrown in a north westerly direction. Other trees were also badly damaged.

It became apparent that damage to the woodland was extremely substantial. A swath approximately 100-130m appeared to have largely been felled. These trees mostly consisted of larch.

it was difficult to see in which direction precisely these trees had been snapped off in as they lay in an impenetrable tangle. The predominant direction though was NNE-NE



Credit Pete Seaward.

The drone photograph taken by Pete Seaward two weeks after the event gives a clearer picture. The drone is positioned above a central track and faces south west. The railway line can be seen in the background. A clear path can be seen through the woodland. Trees have clearly been thrown to the left of the track. Sporadic tree damage can be seen to both the left and right of the track and corresponds with the western edge of the damage at the nearby cottages.





Credit Pete Seward.

Access was easier to the more northern part of damage in the woodland. Trees had landed in multiple directions, ranging from northerly to easterly. Even within small areas, trees ended up in different directions.



Credit Pete Seaward.

One noticeable aspect was that many trees had snapped more than once along their trunk, with trunks lying in separate directions from the main body of the tree.



Credit Pete Seaward.

Looking at the drone photograph taken looking at the north eastern side of the woodland provides a deceptive picture. It looked like the tornado had ended abruptly. However, this photograph is deceptive.







Underneath the apparently intact tree canopy, there was still substantial damage. The tornado appeared to weaken here. This apparent weakening may appear to be exaggerated as the eastern boundary of the woodland became more of a deciduous mix. These trees appeared to be generally more resilient, although Blenheim Estate say that young oak trees were snapped and mature Oak and chestnut trees had their tops taken out.



By the Cassington road oaks, chestnuts and other trees had been badly damaged or felled. The damage within Burleigh Wood was consistent with an intensity of T4.

Bladon Heath Area C.



Drone photographs were taken from the north of Bladon Heath. Little damage could be seen. However, on foot, more extensive damage was found. On the western edges was consistent with T1/T2. There were some peculiarities, such as this tree in the background caught and suspended by another tree.





However, on the north eastern edge of the woodland, tree damage became more severe and consistent

with some elements of T3 levels of damage.



Area D need to find out.

Half a dozen ash trees blah blah.

Conclusions

A severe tornado passed through Burleigh Woods. It caused devastating damage to hundreds of trees commensurate with a T4 tornado, indicating wind speeds of up to 52 - 61 m s⁻¹

(115 - 136 mi h⁻¹). It looks to have started in Church Hanborough and provisionally the path is being measured as ending at Hampton Gay. It had a width of around 120m and a provisional length of 7.4km.

Tornado Classification	
Tornado strength	T4
Track length	7.4km L5
Track Width	120m W6
Track Area	A5



Acknowledgments

TORRO would like to thank Blenheim estate for allowing access and supplying information. They would like to thank Pete Seaward for donating both his time and drone photographs, which enabled a much clearer picture of the damage in Burleigh Wood. We would also like to thank Oxford airport for their help with the investigation and the information and maps provided.



Appendix A The International Tornado Intensity Scale

Tornado Intensity	Description Of Tornado & Windspeeds	Description Of Damage (for guidance only)
T0	Light Tornado 17 - 24 m s ⁻¹ (39 - 54 mi h ⁻¹)	<ul style="list-style-type: none"> • Loose light litter raised from ground level in spirals. • Tents, marquees, awnings seriously disturbed. • Some exposed tiles, slates on roofs dislodged. Twigs snapped; trail visible through crops. • Wheelie bins tipped and rolled. • Garden furniture & pots disturbed.
T1	Mild Tornado 25 - 32 m s ⁻¹ (55 - 72 mi h ⁻¹)	<ul style="list-style-type: none"> • Deck chairs, small plants, heavy litter becomes airborne. • Minor damage to sheds. • More serious dislodging of tiles, slates. • Chimney pots dislodged. Wooden fences flattened. • Slight damage to hedges and trees. • Some windows already ajar blown open breaking latches.
T2	Moderate Tornado 33 - 41 m s ⁻¹ (73 - 92 mi h ⁻¹)	<ul style="list-style-type: none"> • Heavy mobile homes displaced. Light caravans blown over. • Garden sheds destroyed. Garage roofs torn away and doors imploded. • Much damage to tiled roofs and chimneys. Ridge tiles missing. • General damage to trees, some big branches twisted or snapped off, small trees uprooted. • Bonnets blown open on cars. • Weak or old brick walls toppled. • Windows blown open or glazing sucked out of frames.
T3	Strong Tornado 42 - 51 m s ⁻¹ (93 - 114 mi h ⁻¹)	<ul style="list-style-type: none"> • Mobile homes overturned / badly damaged. Light caravans destroyed. Garages and weak outbuildings destroyed. • House roof timbers considerably exposed. Some of the bigger trees snapped or uprooted. • Some heavier debris becomes airborne causing secondary damage breaking windows and impaling softer objects. • Debris carried considerable distances. Garden walls blown over. • Eyewitness reports of buildings physically shaking. • Mud sprayed up the side of buildings
T4	Severe Tornado 52 - 61 m s ⁻¹ (115 - 136 mi h ⁻¹)	<ul style="list-style-type: none"> • Motorcars levitated. Mobile homes airborne / destroyed. • Sheds airborne for considerable distances. Entire roofs removed from some houses. • Roof timbers of stronger brick or stone houses completely exposed. Gable ends torn away. • Numerous trees uprooted or snapped. Traffic Signs folded or twisted. • Some large trees uprooted and carried several yards.



Tornado Intensity	Description Of Tornado & Windspeeds	Description Of Damage (for guidance only)
		<ul style="list-style-type: none"> Debris carried up to 2km leaving an obvious trail.
T5	Intense Tornado 62 - 72 m s ⁻¹ (137 - 160 mi h ⁻¹)	<ul style="list-style-type: none"> Heavier motor vehicles (4x4, 4 Tonne Trucks) levitated. Wall plates, entire roofs and several rows of bricks on top floors removed. Items sucked out from inside house including partition walls and furniture. Older, weaker buildings collapse completely. Utility poles snapped.
T6	Moderately-Devastating Tornado 73 - 83 m s ⁻¹ (161 - 186 mi h ⁻¹)	<ul style="list-style-type: none"> Strongly built houses suffer major damage or are demolished completely. Bricks and blocks etc. become dangerous airborne debris. National grid pylons are damaged or twisted. Exceptional or unusual damage found, e.g. objects embedded in walls or small structures elevated and landed with no obvious damage.
T7	Strongly-Devastating Tornado 84 - 95 m s ⁻¹ (187 - 212 mi h ⁻¹)	<ul style="list-style-type: none"> Brick and Wooden-frame houses wholly demolished. Steel-framed warehouse-type constructions destroyed or seriously damaged. Locomotives thrown over. Noticeable de-barking of trees by flying debris.
T8	Severely-Devastating Tornado 96 - 107 m s ⁻¹ (213 - 240 mi h ⁻¹)	<ul style="list-style-type: none"> Motorcars carried great distances. Some steel framed factory units severely damaged or destroyed. Steel and other heavy debris strewn over a great distances. A high level of damage within the periphery of the damage path.
T9	Intensely-Devastating Tornado 108 - 120 m s ⁻¹ (241 - 269 mi h ⁻¹)	<ul style="list-style-type: none"> Many steel-framed buildings demolished Locomotives or trains hurled some distances. Complete debarking of any standing tree-trunks. Inhabitants survival reliant on shelter below ground level.
T10	Super Tornado 121 - 134 m s ⁻¹ (270 - 299 mi h ⁻¹)	<ul style="list-style-type: none"> Entire frame houses and similar buildings lifted bodily from foundations and carried some distances. Destruction of a severe nature, rendering a broad linear track largely devoid of vegetation, trees and man made structures.



Site	Estimated Strength	Path Width	Track Length
<u>Cokethorpe School to Richworth Linear Fisheries</u>	T4	200m	1.6km
<u>South Leigh</u>	T1	50m (Est.)	0.5km (Est.)
<u>Eynsham</u>	T2	70m	1.0km
<u>Yarnton</u>	T1	50m	<0.5km (Est.)
<u>Kidlington</u>	T2	70m	1.2km

