TORRO SITE INVESTIGATION

SUMMARY REPORT

Hampshire, Southern England

26 September 2024

Report number: SI20240926_Hants

Site Investigator: Sarah Horton

Site Investigator: Simon Collins

Authors **Site Investigator:** Sarah Horton sarah.horton@torro.org

Site Investigator: Simon Collins

Author: David Smart david.smrt@gmail.com

Date: 8 November 2024

Document status: Draft

Document history:

Author	Version	Type	Date	Comments
David Smart	0.1	Initial draft	08/11/2024	Initial draft from SH's template and previous write-ups.
Sarah Horton	0.2	Draft	9/11/2024	Added in context map and reviewed.
Sarah Horton	0.3	Draft	17/11/2024	Added in general comment 3.
Sarah Horton	1.0	Final	18/11/2024	Re-added table for Hartley Wintney Reviewed and approved by David Smart

Keywords: tornado, mesolow, Hants, SLW, thunderstorm

How to cite: Horton, Sarah (2024). TORRO site investigation summary report: Hampshire 26 September 2024

URL: https://www.torro.org.uk/pdf/SI/SI20240926_Hants.pdf

DOCUMENT OR CONTENT NOT TO BE REPRODUCED WITHOUT EXPRESS PERMISSION

Site Investigation summary

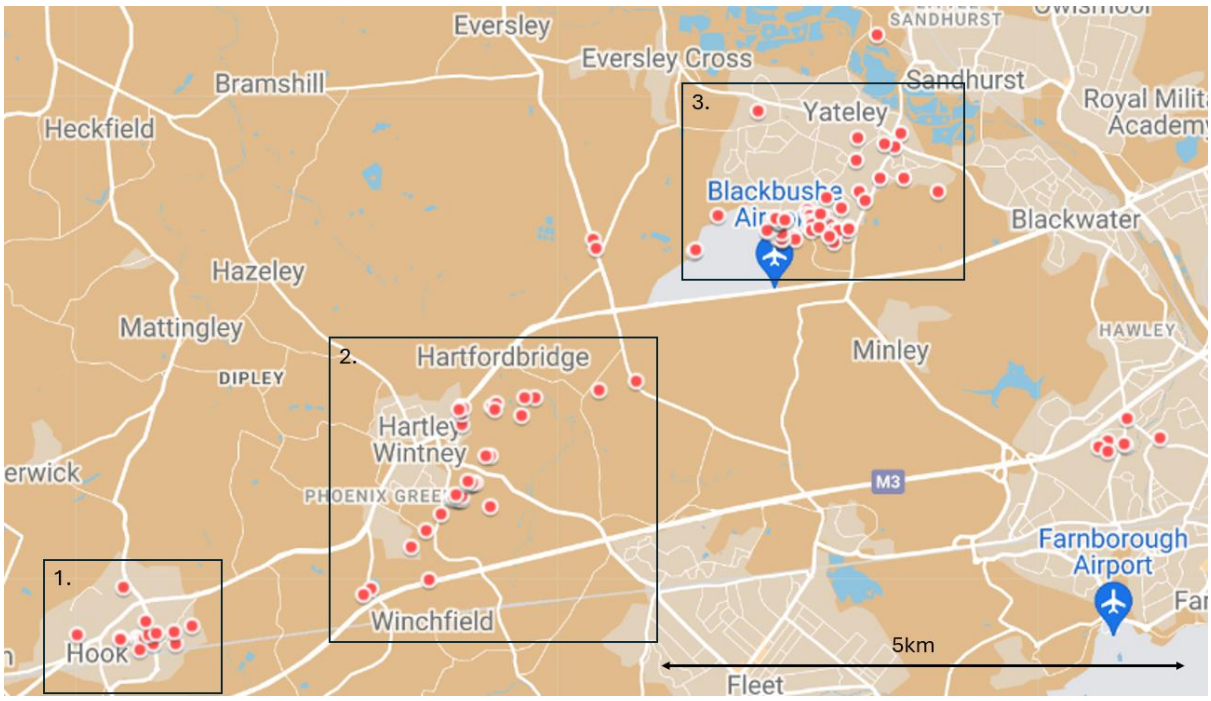

Figure 1: Context map showing locations of damage in Hook (1), Hartley Wintney (2) and Yateley (3). Damage reported in Farnborough was not investigated (2024) Map data ©2024 Google

Hook, Hants.

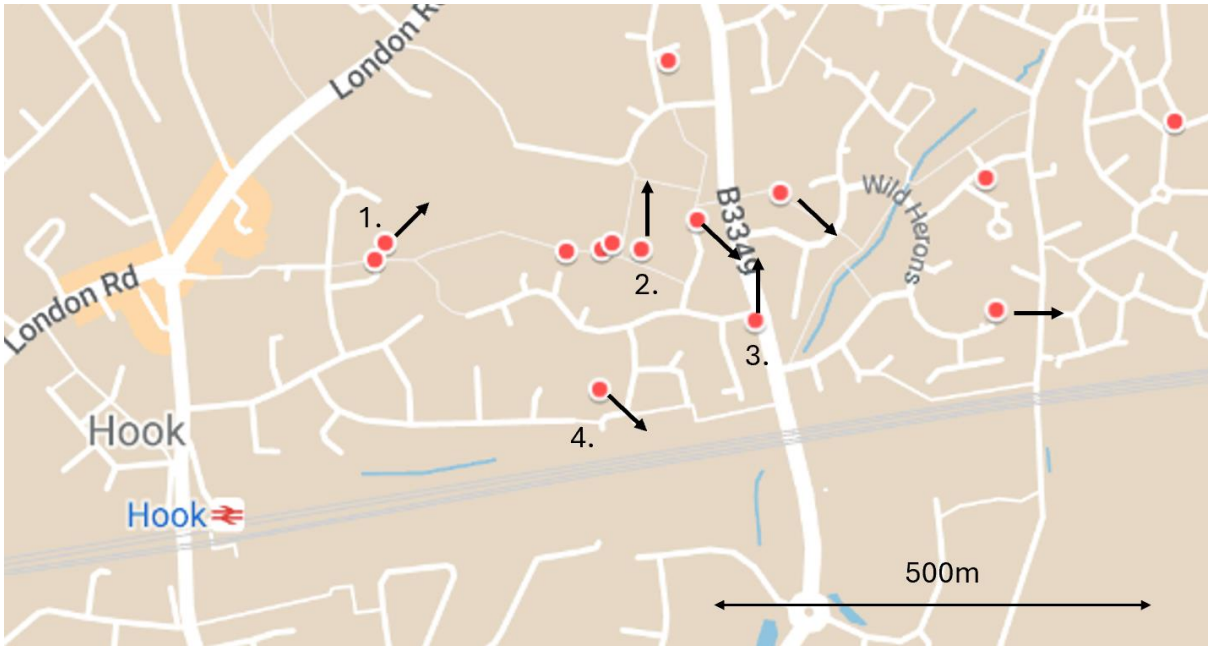

Figure 2: Damage track of the Hook tornado (2024). Map data ©2024 Google

Cause of damage:	Tornado
Strength:	T2 (see Hook comment #1 below)
Track Length:	700m
Maximum Width:	140-160m
Time/ duration	Around 1400 UTC
Map Location/postcode	RG27 9HP/9SQ/9UX

Key damage indicators

1. Large treetop fell E into local school grounds (location: 51.2828, -0.9590) **Intensity rating: T2**
2. Large oak tree snapped at base and fell SE, grazing a house, causing some minor damage to gutters and conservatory (location: 51.2813, -0.9555) **Intensity rating: T2**
3. Various branches torn off and small trees felled along the track. **Intensity rating: T1**

<u>Hartley Wintney, Hants.</u>

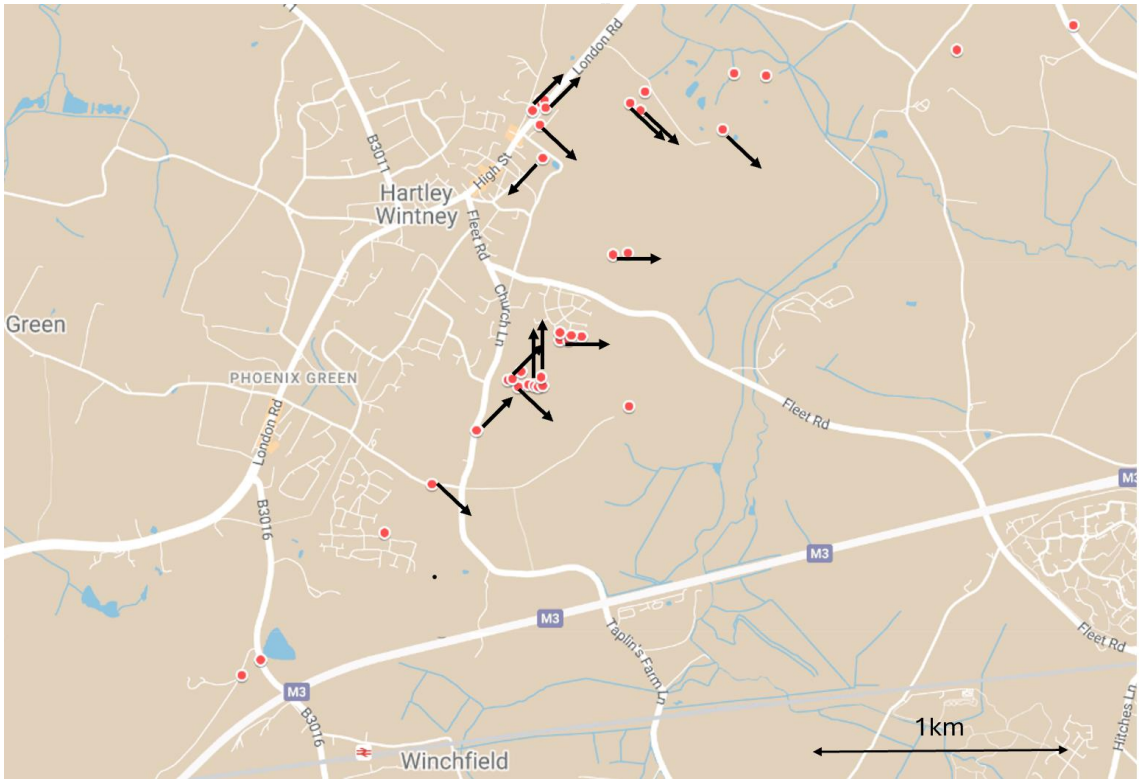

Figure 3: Damage track of the Hartley Wintney tornado (2024). Map data ©2024 Google

Cause of damage:	Tornado
Strength:	T2
Track Length:	3.4km
Maximum Width:	140m
Time/ duration	Around 1400 UTC
Map Location/postcode	RG27 8BT/8DY/8TW/8PS

Key damage indicators

1. A very narrow line of weak tree damage starting near the M3 motorway (see Hook comment #1 below) extended 1.4km to St Mary's church (location: 51.2969, -0.9005) **Intensity rating: T1 and T2**
2. A clear tree damage path (width 140m) across one garden bordered by trees on three sides was found NW of St Mary's church, including the top of one large mature oak tree which fell north (location: 51.2989, -0.8967). **Intensity rating: T2**
3. Several trees were damaged or fell at Hartley Wintney Golf Club (RG27 8PT) **Intensity rating: Unrated**
4. Very significant damage to a grove of mature oaks (estimated age 200 years old), including severe cracking of half the trunk of one oak. This tree was able to be saved by significant pollarding (location: 51.3090, -0.8968) . **Intensity rating: T2** See Hartley Wintney comment #2 below.

Yateley, Hants.

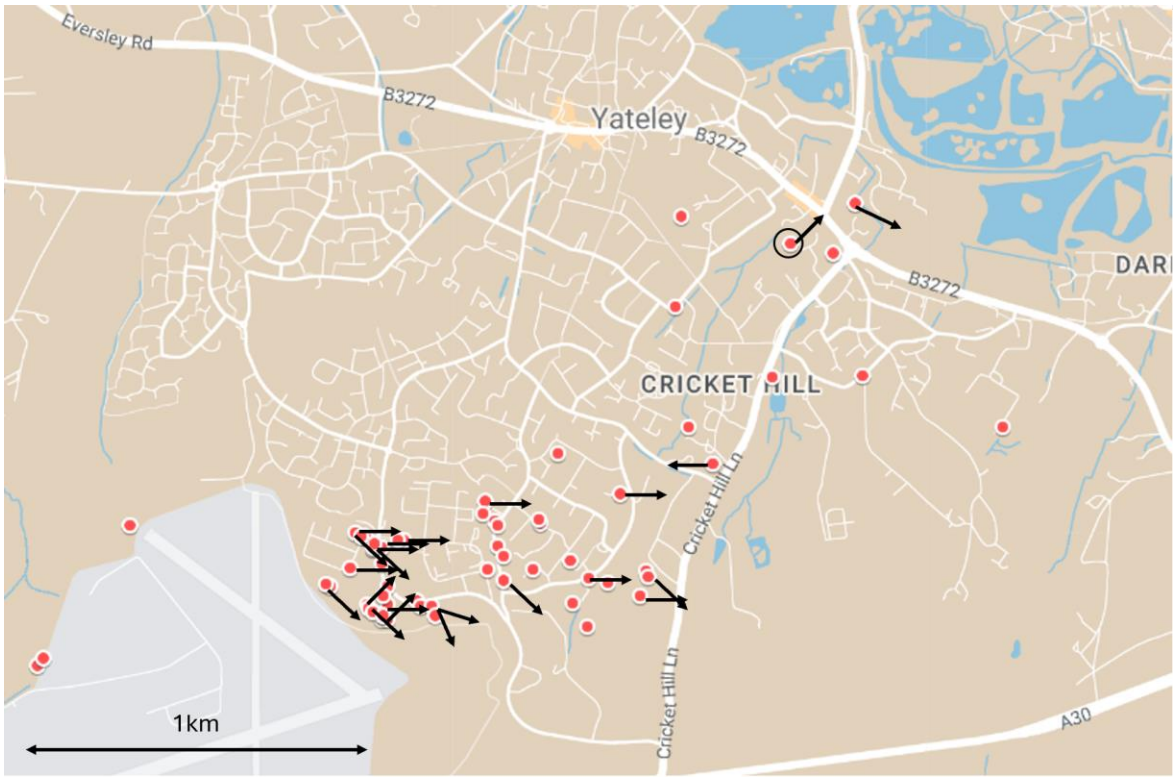

Figure 4: Map of damage in Yateley (2024). The grey area at bottom-left is Blackbushe airport. Map data ©2024 Google

Cause of damage:	downburst/straight line winds (SLW)
Strength:	NA
Track Length:	NA
Maximum Width:	NA
Time/ duration	Around 1400 UTC
Map Location/postcode	GU46 6ER/6EP/6JQ/6AU

Key damage indicators

1. Multiple trees snapped or fallen in woodland E, SE, NE. In particular, there was a 100m long stretch where multiple trees centred around 51.3283, -0.8387 had fallen or been badly damaged.

2. At 51.3302, -0.8388 two large mature oaks had snapped through the trunk around 8m up and one had toppled. These had fallen E. If this had been caused by a tornado, it would have been rated T3.
3. At 51.3305, -0.8393 an approximately 20m tall silver birch had fallen E to land on a house. The roof was damaged, with one branch penetrating through the roof into a bedroom. The tree had contained a bees nest in the base.
4. Trees around 51.3303, -0.8329 experienced less severe damage. If the damage had been tornadic it would have been rated T2.
5. Damage trees to the E and NE of this area was generally weak consisting mostly of fallen branches and small toppled trees.
6. A tree fell at Yateley Manor School (approximate location: 51.3398, -0.8244)
7. The most NE point of damage found was at 51.3402, -0.8163 where a large tree (girth around 90cm) fell ESE. In this location smaller trees were said to have bent NW then SE, perhaps indicating some damage due to vorticity here.

Meteorological summary

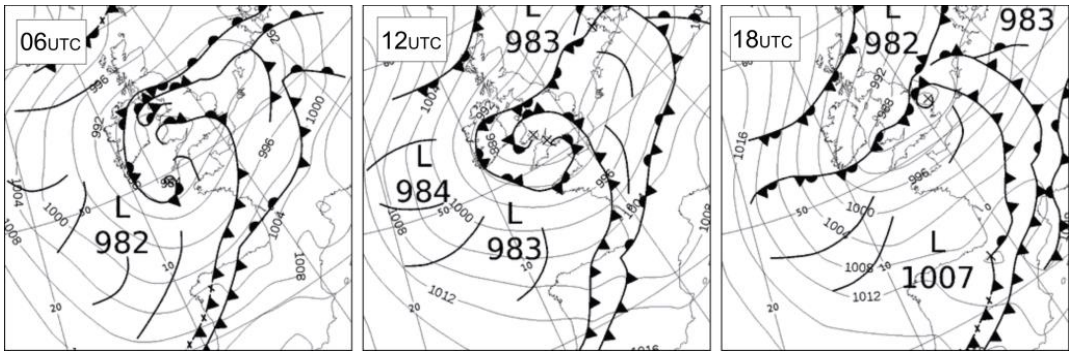

Figure 5: Sequence of snapshots from Met Office analyses on 26 September 2024 showing the passage of the mesolow as it crossed England. Originals: Met Office, Crown copyright.

These events all appear to be related to the passage of a *mesolow* and radar detected *hook* feature that moved north-eastwards across England during daylight hours*. Characteristically this resulted in a mixed, intermittent pattern of damage consisting of clear tornadic damage varying to damage swathes very likely due to straight-line winds (SLW).

This mesolow appears to have originated as a wave-like disturbance on a potential vorticity streamer to the west of the UK the previous day (seen in 6.3 micron WV imagery, not shown).

On the morning of the 26th a cluster of showers, co-located with this disturbance, formed off the south-west coast moving north-eastwards. As the cluster moved inland merger and development of a cold cloud shield accompanied by sferics indicate the convective nature of this mesolow. Over-shooting tops are also apparent in MRG satellite imagery.

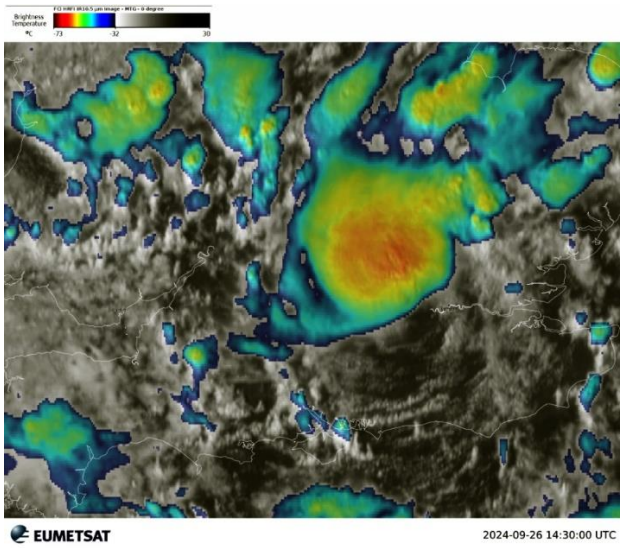

Figure 6: MTG IR+VIS sandwich product over southern England 1430 UTC. Note the quasi-circular cold cloud shield. Source: EUMETSAT (2024).

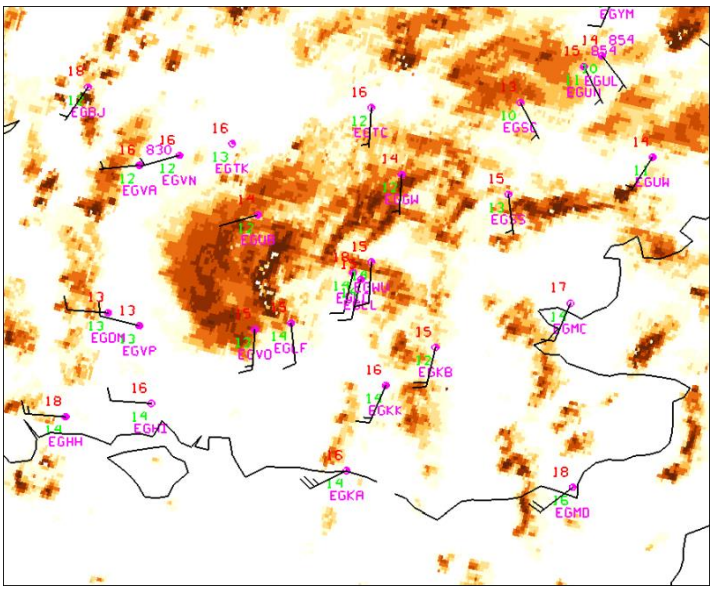

Figure 7: Met Office 1-km network radar product (via CEDA) with surface observations (metars, NOAA) valid 14 UTC.

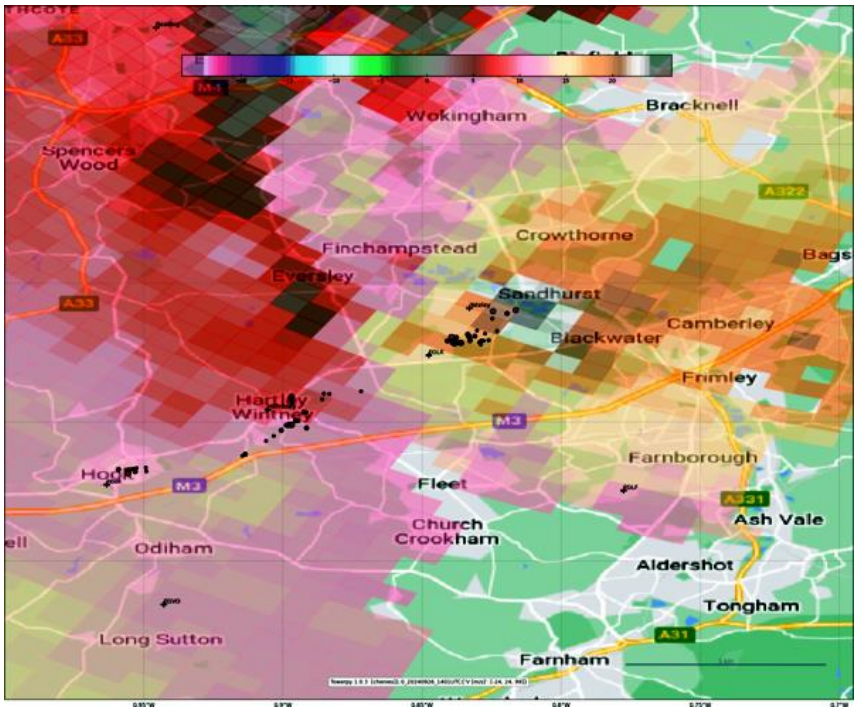

Figure 8: Reflectivity obtained from the Chenies radar (original data Met Office via CEDA) zoomed in on Hook-Hartney Wintney-Yateley valid 14 UTC. The black markers indicate damage points. Map data ©2024 Google.

Further imagery and data is available from David Smart david.smrt@gmail.com

*See Clark, M.R. (2024), Mesoscale cyclonic storms associated with tornadoes and localised wind damage in frontal rainbands. Weather, 79: 108-123. https://doi.org/10.1002/wea.4456)

Comments

Hook:

1. The tornado was estimated at T2 strength, despite the felling of a tree in one location meriting a T3 rating. This is due to the lack of house damage anywhere on the track, so it was felt that the tree may have had some inherent weakness.

Hartley Wintney:

1. A member of public sent in a report with regards to a severe wind event on the M3 motorway near to Hartley Wintney: "Driving in very heavy rain and gusty wind under a CB cell, southbound on M3 (approx 5 mins past Fleet services), a dark column surrounded by exceptionally heavy rain appeared ahead, perhaps a similar width or slightly wider than the whole motorway. Upon entering this area, debris including leaves, twigs and small branches filled the air, along with an exceptional amount of water/rain with airborne debris appearing to be in a large rotational movement. Visibility was reduced to virtually nothing, driving was nearly not possible with my pickup truck being shaken violently in erratic wind, and cars came to a stop or crawl, pulling to the left. Shortly before leaving this area a yacht fender fell from the sky in front of my vehicle, bounced on the motorway, and then passed underneath the vehicle. Emerging from the event airborne debris stopped, very heavy rain returned and this in turn quickly reduced. it looked and felt pretty much as tornadoes seen on television do. The phenomenon lasted at most 2 minutes with some forward movement of my vehicle, though it could have been a little less."

2. The cluster of severe damage to oak trees located at 51.3090, -0.8968 was 600m NW of the main damage track. This damage may be due to a downburst rather than related to the tornado.

Yateley:

1. Although there were some reports of rotation during the severe wind event, the pattern of damage found is more suggestive of a SLW downburst event with the tree damage pattern resembling a divergent 'cat's paw'. This is also consistent with radar findings.

2. An AWS record from Blackbushe Airport is available. Strong winds were reported by observers, but no vortex was observed.

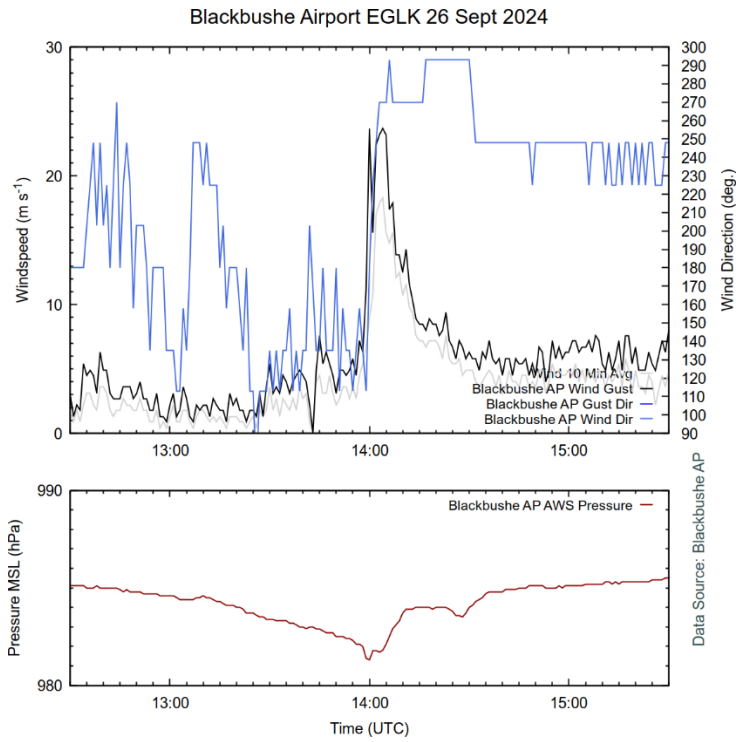

Figure 8: AWS record from Blackbushe Airport. For location see Figure 4. N.B. the strong wind veer coincident with the peak winds, pressure dip and rapid rise. Data courtesy Blackbushe AP plotted by DJS.

General comments:

1 A TORRO convective discussion had been issued: Convective Discussion. 08:26 BST Thu 26 Sep 2024 – 19:00 BST Thu 26 Sep 2024. Areas affected: Cent S England, SE England, E Anglia, SE Mids. Hazards: Isolated brief tornadoes, Hail, CG lightning, Gusty winds to 50mph. Discussion: A short wave trough will move NE through today. Showers and isolated thunderstorms are already present around parts of SW and S England, and these will tend to move NE through this morning, with other showers and a few thunderstorms developing inland via diurnal heating. Deep layer shear is favourable for small clusters or lines of

storms to form, and whilst low-level shear is reasonably modest, some backing of the flow ahead of the trough could assist in the development of low-level rotation, and perhaps a brief tornado or two. The most likely area of this to occur is across southern counties in the depicted area, but as models are keen to develop rather widespread showers through the day, the risk is drawn in a broader sense. Gusty winds and CG lightning will affect some places, along with hail. Last updated by RPK at 08:34 BST Thursday 26th September 2024

2 An ESTOFEX convective forecast had been issued: ESTOFEX ARCHIVE

3 Isolated tree damage was found in and around Moor Green Lakes, Horseshoe Lake (RG40 3TF) and Ambarrow Court (GU47 8JB) during a walk on 10/11/2024. Damage ranged from shallow rooted and/or weak trees falling to snapped branches. A social media comment on a local community page suggested that there may have been witnesses to a severe weather event over Horseshoe Lake: "Might be worth popping over to Horseshoe Lake Activity Center as they saw it travel over the water!" Enquiries were made with various landowners and managers. No fallen trees had been reported to them. One landowner had undertaken some tree work near one area of damage that was found at around the same period of time as the storm. As a result of the lack of definite evidence and the difficulty in ascertaining exactly which if any damage was due to the storm several weeks after the event, this area has not been detailed in the report. However, the radar detected *hook* feature did pass over this area and therefore it is possible that a very weak, narrow tornado was a cause of at least some of the damage.

DJS:

As the inside of the hook appears to develop a shear zone between 1401 and 1411 UTC then generation of a vortex to the north-west of Yateley appears plausible.

4 **Damage reports not investigated:** damage in Farnborough, Hampshire, fallen trees in Crowthorne, Berkshire, a tree on the train line in Ascot, Berkshire, fallen trees and minor roof damage in Egham, several large damaged trees in a park in Hounslow.

5 Relevant forum thread: TORRO Forum ACCESS RESTRICTED TO TORRO MEMBERS.