

WEATHER RESEARCH

National Oceanic and Atmospheric Administration (NOAA) Storm Prediction Center (SPC) data was reviewed for records of reported severe weather near the December 9, 2023 loss date. The SPC compiles reports of hail 1 inch or greater in diameter, thunderstorm winds of 58 miles per hour (mph) or greater, and tornadoes. Table 1 lists all such events within 10 miles of the subject property over the period from November 25, 2023 to December 23, 2023.

Date	Location	County	Type	Qty.	Unit	Dist. (miles)	Dir. from Site
12/9/2023	3 WNW Hendersonville	Sumner	Tornado	---	---	2.6	WSW
12/9/2023	1 NNE Madison	Davidson	Tornado	---	---	6.5	WSW
12/9/2023	1 W Madison	Davidson	Tornado	---	---	8.0	WSW
12/9/2023	1 SE Gallatin	Sumner	Tornado	---	---	9.8	ENE

Table 1. NOAA SPC Events Within 10 Miles

The National Centers for Environmental Information (NCEI) Storm Events Database (SED) is the official U.S. record of severe weather and includes damage estimates and event narratives not found in real-time storm reports. The only event type recorded was tornado. Table 2 lists all SED events within 10 miles of the subject property over the period from November 25, 2023 to December 23, 2023.

Date	Event Type	County	State	Magnitude	Damage	Dist. (miles)	Dir. from Site
12/9/2023	Tornado	Sumner	TN	---	10.00M	3.0	WSW

Table 2. NCEI Storm Events Within 10 Miles

National Weather Service (NWS) Automated Surface Observing System and Automated Weather Observing System (ASOS/AWOS) airport wind observations, obtained through the Iowa Environmental Mesonet, were reviewed for the December 9, 2023 loss date $\pm$ 24 hours. Reported values are the highest recorded across all sub-hourly observations at each station. The nearest station, Sumner (11.8 miles ENE of the subject property), recorded a peak wind gust of 67 mph from the W and a maximum sustained wind of 20 mph. Table 3 lists the daily airport wind data from stations within 40 miles of the subject property.

Date	Location	High (°F)	Low (°F)	Sust. Wind (mph)	Peak Wind (mph)	Peak Dir.	Dist. (miles)	Dir. from Site
12/8/2023	Sumner	64	41	16	23	S	11.8	ENE
12/9/2023	Sumner	66	50	20	67	W	11.8	ENE
12/10/2023	Sumner	50	30	14	23	NNW	11.8	ENE
12/8/2023	Nashville Metro	64	42	17	24	S	14.0	SSW
12/9/2023	Nashville Metro	68	51	22	36	S	14.0	SSW
12/10/2023	Nashville Metro	51	32	16	35	W	14.0	SSW
12/8/2023	John C Tune	64	41	16	25	S	18.0	WSW

12/9/2023	John C Tune	66	50	18	22	S	18.0	WSW
12/10/2023	John C Tune	50	28	14	20	NNW	18.0	WSW
12/8/2023	Lebanon	64	45	21	28	S	18.1	ESE
12/9/2023	Lebanon	66	50	22	31	S	18.1	ESE
12/10/2023	Lebanon	50	32	16	21	NNW	18.1	ESE
12/8/2023	Portland	63	43	20	26	S	20.8	NNE
12/9/2023	Portland	64	48	21	26	S	20.8	NNE
12/10/2023	Portland	48	30	16	22	NNW	20.8	NNE
12/8/2023	Smyrna	64	40	16	28	SSW	21.3	SSE
12/9/2023	Smyrna	69	50	22	28	W	21.3	SSE
12/10/2023	Smyrna	50	29	18	21	n/v	21.3	SSE
12/8/2023	Springfield	63	45	14	21	S	23.4	NW
12/9/2023	Springfield	68	48	18	29	S	23.4	NW
12/10/2023	Springfield	48	27	14	18	N	23.4	NW
12/8/2023	Murfreesboro	63	41	17	24	SSW	32.5	SSE
12/9/2023	Murfreesboro	68	50	17	29	WSW	32.5	SSE
12/10/2023	Murfreesboro	50	30	16	25	N	32.5	SSE

Table 3. NWS ASOS/AWOS Daily Airport Wind Observations Within 40 Miles

Wind table notation: --- = no observation reported; n/g = observations exist, but no gust at or above the day's sustained wind was reported; n/v = a reported value failed validation and is withheld, with the raw value retained in the run record.

The NCEI Global Historical Climatology Network (GHCND) was reviewed for documentation of precipitation data in the area. The GHCND includes NWS cooperative and community gauges and private stations documented by the Community Collaborative Rain, Hail and Snow Network (CoCoRaHS). The nearest gauge, Hendersonville 1.4 SW, located 2.2 miles SSW of the subject property, recorded a maximum of 0.30 inches on December 10, 2023. Table 4 lists the 10 nearest GHCND gauges with data within 10 miles of the subject property.

Date	Location	Precip. (in.)	Snowfall (in.)	Snow Depth (in.)	Dist. (miles)	Dir. from Site
12/8/2023	Hendersonville 1.4 SW	0.00	0.0	---	2.2	SSW
12/9/2023	Hendersonville 1.4 SW	0.02	---	---	2.2	SSW
12/10/2023	Hendersonville 1.4 SW	0.30	---	---	2.2	SSW
12/8/2023	Hendersonville 2.9 NE	0.00	0.0	---	2.5	ENE
12/9/2023	Hendersonville 2.9 NE	0.01	---	---	2.5	ENE
12/10/2023	Hendersonville 2.9 NE	0.65	---	---	2.5	ENE
12/8/2023	Old Hickory Dam	0.00	---	---	3.0	WSW
12/9/2023	Old Hickory Dam	0.03	---	---	3.0	WSW
12/8/2023	Hendersonville 4.7 N	0.00	0.0	---	3.6	N
12/9/2023	Hendersonville 4.7 N	0.07	---	---	3.6	N
12/10/2023	Hendersonville 4.7 N	1.00	---	---	3.6	N
12/8/2023	Green Hill 3.1 NNE	0.00	0.0	---	4.0	SE

12/9/2023	Green Hill 3.1 NNE	0.00	0.0	---	4.0	SE
12/10/2023	Green Hill 3.1 NNE	0.61	---	---	4.0	SE
12/8/2023	Goodlettsville 1.7 ESE	0.00	0.0	---	4.0	WNW
12/9/2023	Goodlettsville 1.7 ESE	0.05	---	---	4.0	WNW
12/10/2023	Goodlettsville 1.7 ESE	0.98	---	---	4.0	WNW
12/10/2023	Hendersonville 4.9 NNE	1.19	---	---	4.0	NE
12/8/2023	Green Hill 1.7 NNE	0.00	0.0	---	4.5	SE
12/9/2023	Green Hill 1.7 NNE	0.03	---	---	4.5	SE
12/10/2023	Green Hill 1.7 NNE	0.56	---	---	4.5	SE
12/8/2023	Old Hickory Wfo	0.00	0.0	0.0	5.0	SSE
12/9/2023	Old Hickory Wfo	0.04	0.0	0.0	5.0	SSE
12/10/2023	Old Hickory Wfo	0.55	0.0	0.0	5.0	SSE
12/8/2023	Green Hill 0.3 N	0.00	0.0	0.0	5.3	SSE
12/9/2023	Green Hill 0.3 N	0.02	0.0	0.0	5.3	SSE
12/10/2023	Green Hill 0.3 N	0.55	0.0	0.0	5.3	SSE

Table 4. NCEI Daily Precipitation Reports Within 10 Miles

Radar rainfall data from the NOAA National Centers for Environmental Prediction (NCEP) was reviewed for the period surrounding the loss date. The heaviest one-hour rainfall in the searched period, 0.55 inches, fell on the December 9, 2023 loss date. Rainfall of this amount over one hour is common at this location and would be expected in most years. Radar records were searched from December 6, 2023 through December 12, 2023. Table 5 lists the heaviest rainfall over one, six, twenty-four, and seventy-two hours, when each fell, and how often rainfall of that amount is expected at this location. These figures come from national weather radar, corrected against ground rain gauges, for the roughly 4-kilometer area containing the subject property — not from a gauge at the subject property itself.

Duration	Rainfall (in.)	When It Fell	How Often Expected
1 hour	0.55	Dec 09, 6:00-7:00 PM	Most years
6 hours	0.75	Dec 09, 5:00-11:00 PM	Most years
24 hours	0.84	Dec 09 12:00 AM - Dec 10 12:00 AM	Most years
72 hours	0.84	Dec 07 12:00 AM - Dec 10 12:00 AM	Most years

Table 5. NOAA/NCEP Stage IV Radar-Derived Peak Precipitation at the Subject Property

For context in evaluating drainage capacity, Table 6 presents short-duration design rainfall depths published by NOAA Atlas 14 for this location. These are design values describing the expected frequency of short-duration rainfall; they are not measurements, and no measured sub-hourly depth exists for this event. NOAA Atlas 14 derives its sub-hourly estimates by scaling from the directly analyzed sixty-minute value.

Duration	1-in-2 year	1-in-10 year	1-in-25 year	1-in-50 year	1-in-100 year
15-min	0.89	1.14	1.27	1.37	1.46
30-min	1.23	1.66	1.89	2.06	2.24
60-min	1.55	2.16	2.51	2.80	3.08

Table 6. NOAA Atlas 14 Short-Duration DESIGN Rainfall Depths (Not Measured Values)

For the December 9, 2023 loss date, the following were searched: NOAA SPC severe reports within 10 miles over the period from November 25, 2023 to December 23, 2023; NCEI Storm Events within 10 miles over the period from November 25, 2023 to December 23, 2023; airport wind (NWS ASOS/AWOS) within 40 miles over the loss date $\pm$ 24 hours; GHCND precipitation within 10 miles over the loss date $\pm$ 24 hours.

All searches used the standing default radii and station limits.

These sources report event times on differing bases (the NOAA Storm Prediction Center uses a 12Z-12Z convective day, the NCEI Storm Events Database uses local standard time, and surface stations report in local time). So that an event recorded just across a midnight boundary is not missed, single-day station searches were widened by 1 day before and after the loss date.

This document is a compilation of publicly published government and volunteer-network records for the stated address and date, retrieved on the timestamps recorded in the accompanying provenance file. It is not a meteorological opinion, a site observation, or an engineering conclusion. Observations recorded at a reporting station may differ from the conditions at the address. The sources searched, their published revisions, and any gaps in their coverage are listed in the provenance file. Interpretation of these records is the responsibility of the reader.