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# *San Angelo Damaging Wind Event*

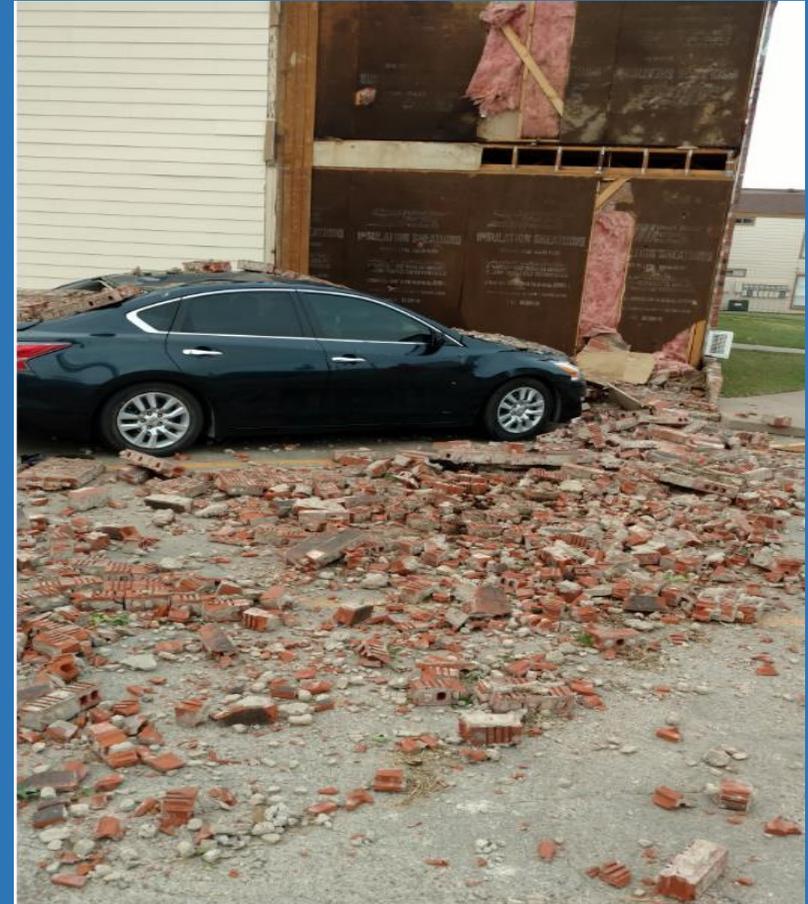
**June 23, 2017**

**By: San Angelo NWS**



# Event Overview

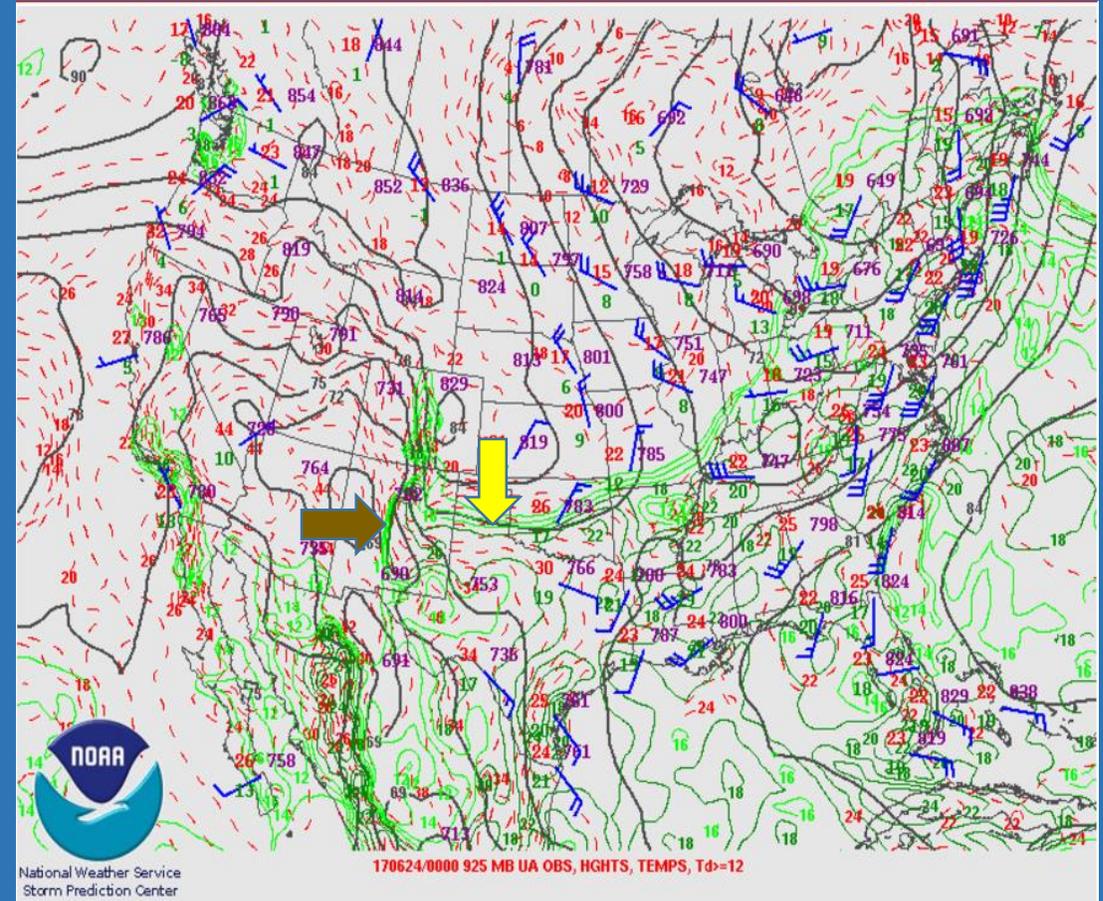
- During the evening of June 23, 2017, severe thunderstorms produced widespread wind damage across San Angelo.
- Thunderstorms moved in from the northwest and continued tracking southeast toward San Angelo.
- Numerous damage reports across the city; Shannon Hospital sustained roof damage.
- Heavy rainfall also produced some minor flash flooding across the city.





# Before the storm

- **Yellow arrow** shows the location of a cold front that was moving south. (Tightly packed green lines show the location of the cold front, also winds north the green lines are from the NE while winds to the south are out of the SE)
- **Brown arrow** shows the location of the dryline. (A boundary between dry air to the west and moist air to the east)
- Ahead of the cold front, temperatures ranged from 98-107 (Mathis Airfield hit 107).
- Being east of the dryline, dewpoints were in the low 60s over San Angelo.



# For thunderstorm development you need...

Lift

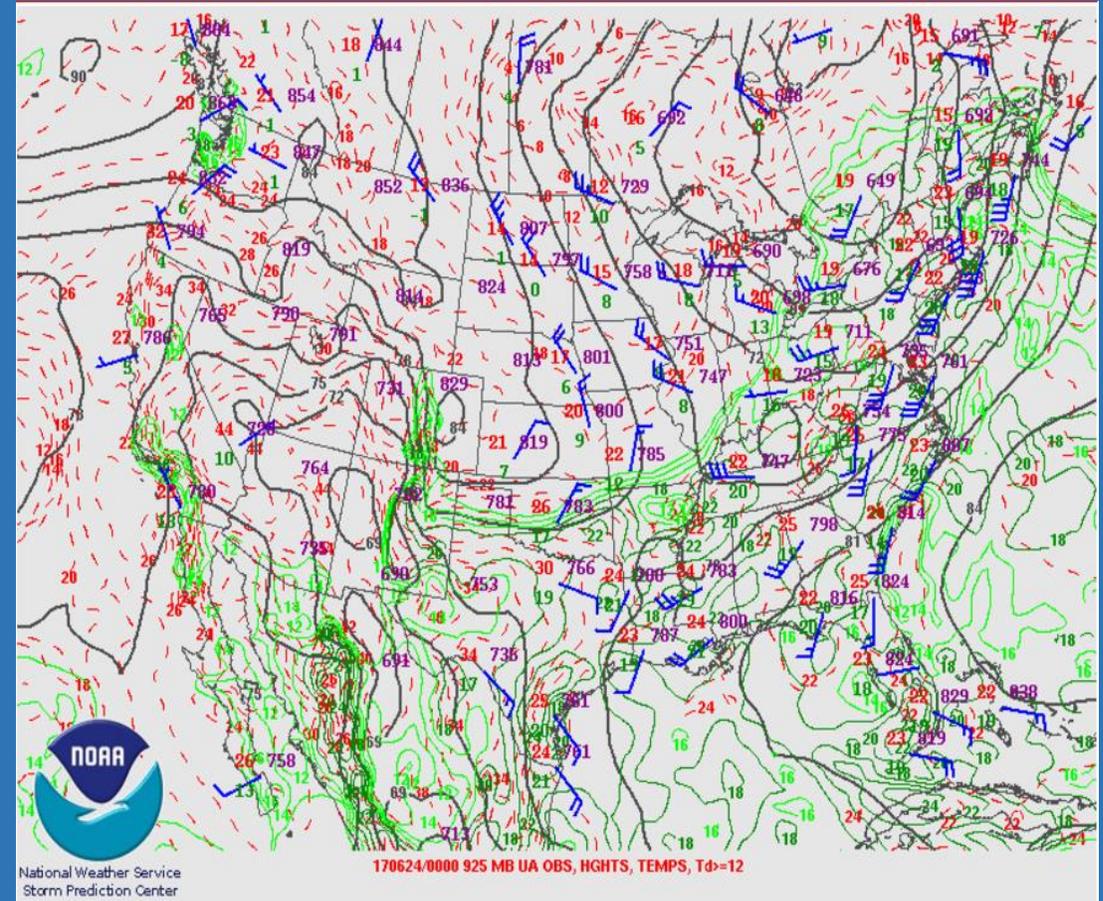
Moisture

Instability



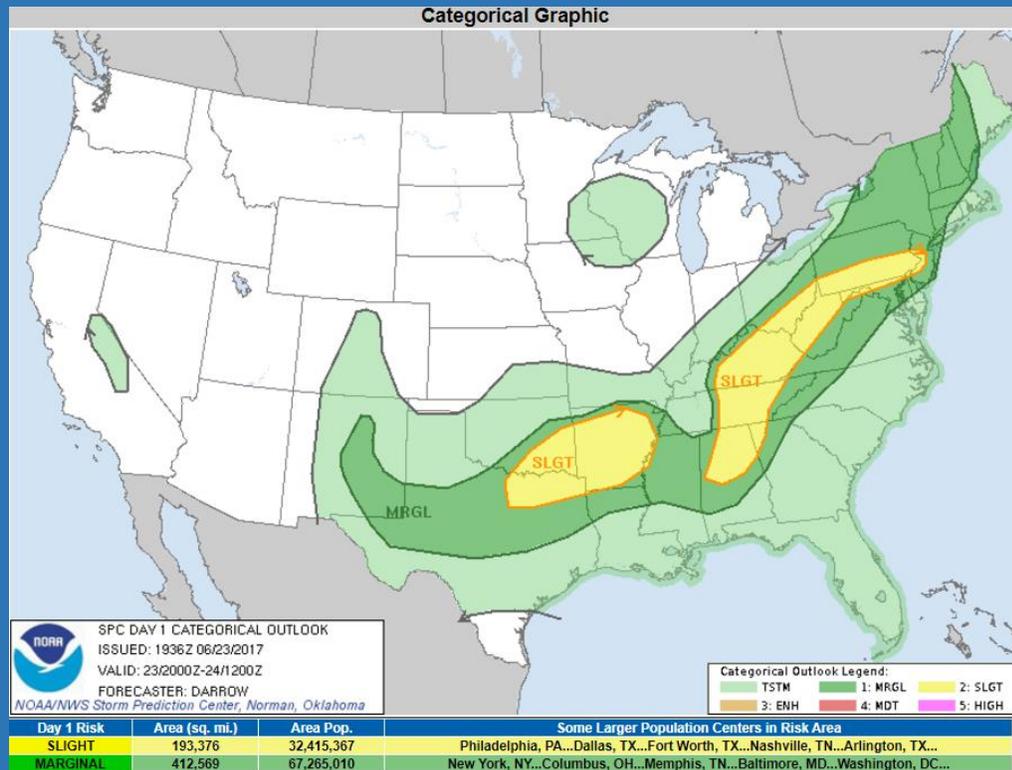
# Before the storm

- Lift- Cold front moving in from the north.
- Moisture- Dewpoint values in the 60s.
- Instability- Warm (in this case HOT) air at the surface and cooler air aloft.

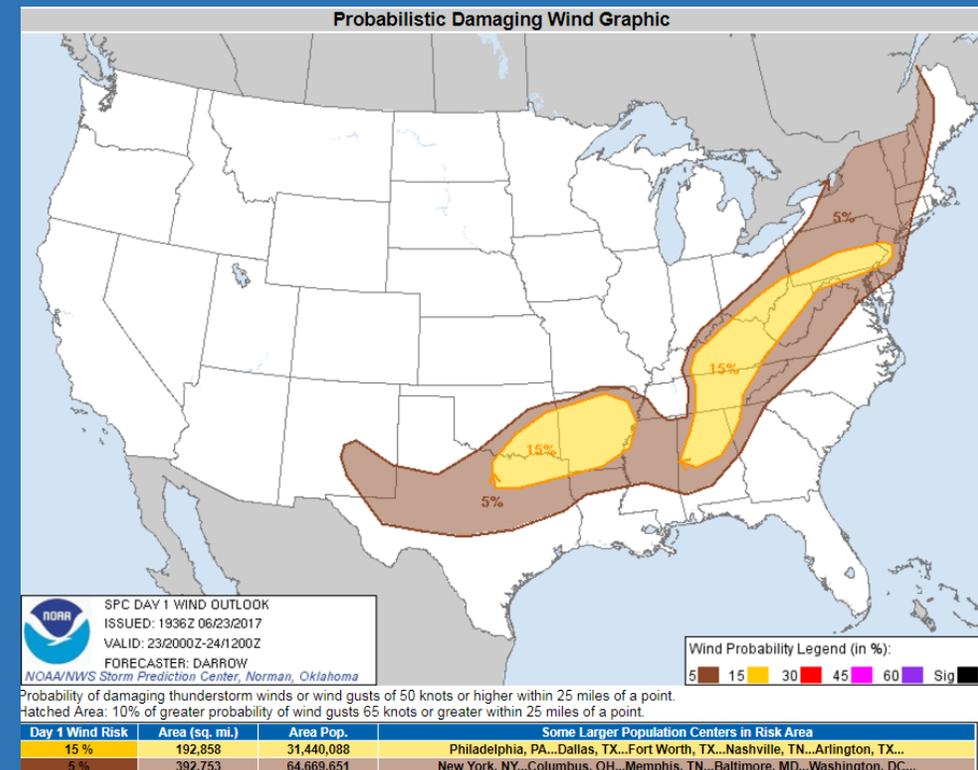


# The Forecast (Storm Prediction Center)

## Convective Categorical Outlook

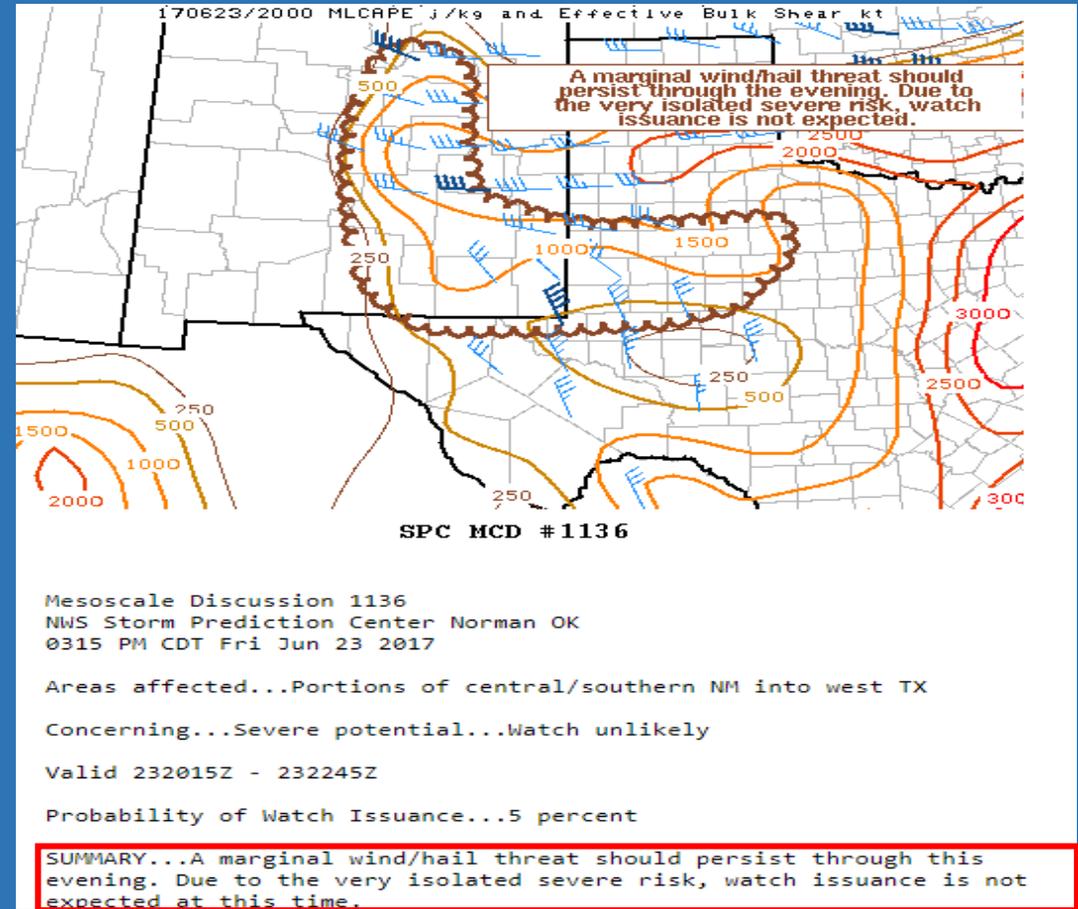


## Probabilistic Damaging Wind



# The Forecast (SPC)

- Parts of the area were under a marginal risk for severe weather; San Angelo was NOT in the outlined area.
- **Red box**, even though severe storms were possible, the isolated coverage of the storms did not warrant a watch to be issued.

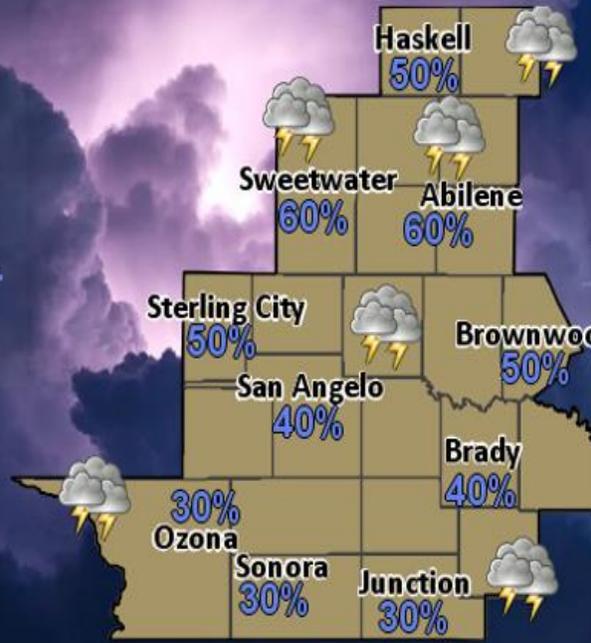


# The Forecast (NWS SJT)

## Showers and Storms Increase Tonight

Scattered showers and storms will develop along a cold front moving into West Central Texas tonight. Best chances will be along and north of I-20.

Small hail, gusty winds, and dangerous lightning will be likely with the stronger storms.



### Area Forecast Discussion

National Weather Service San Angelo TX  
345 PM CDT Fri Jun 23 2017

.SHORT TERM...  
(Today and Tonight)

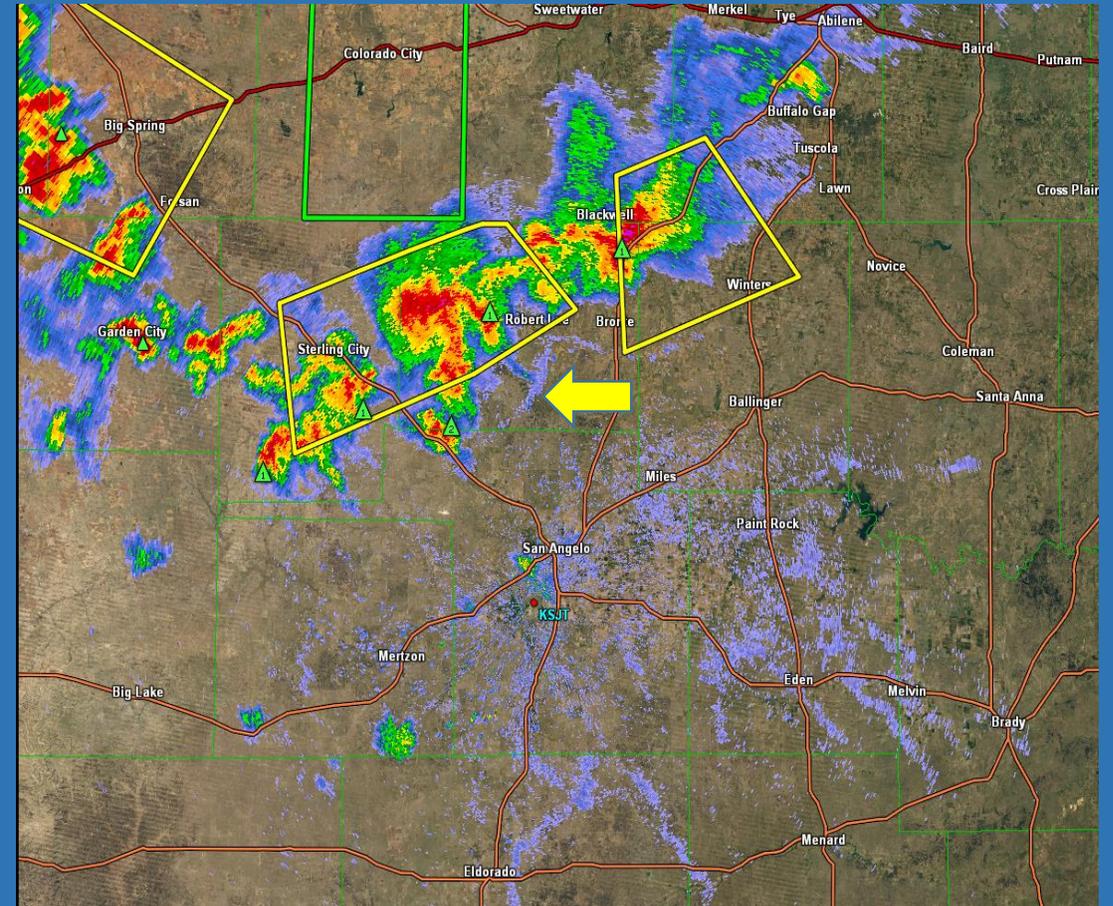
Another hot day across West Central Texas, with both the upper level ridge in place as well as the low level thermal ridge. Temperatures currently 103 to 109 across the southern 2/3 of West Central Texas, with San Angelo hitting 109 and breaking the previous record by 3 degrees. A Heat Advisory remains in effect across much of this area until 8 PM. Also, isolated storms have developed close to a cold front across the South Plains, just northwest of the Big Country.

Looks like best chance for scattered thunderstorms will be across the Big Country this evening, possibly as far south to along a San Angelo to Brownwood line, according to Hi-Res models. A few strong to marginal severe storms are possible, with the main hazards of wind gusts of 50 to 55 mph, small hail and dangerous lightning.

Going with the highest Pops across the Big Country(likely) and chance Pops further south. The cold front will move south across the area tonight, and be located just north of the I-10 corridor by Saturday morning. Lows will range from the mid to upper 60s across the Big Country to lower to mid 70s elsewhere.

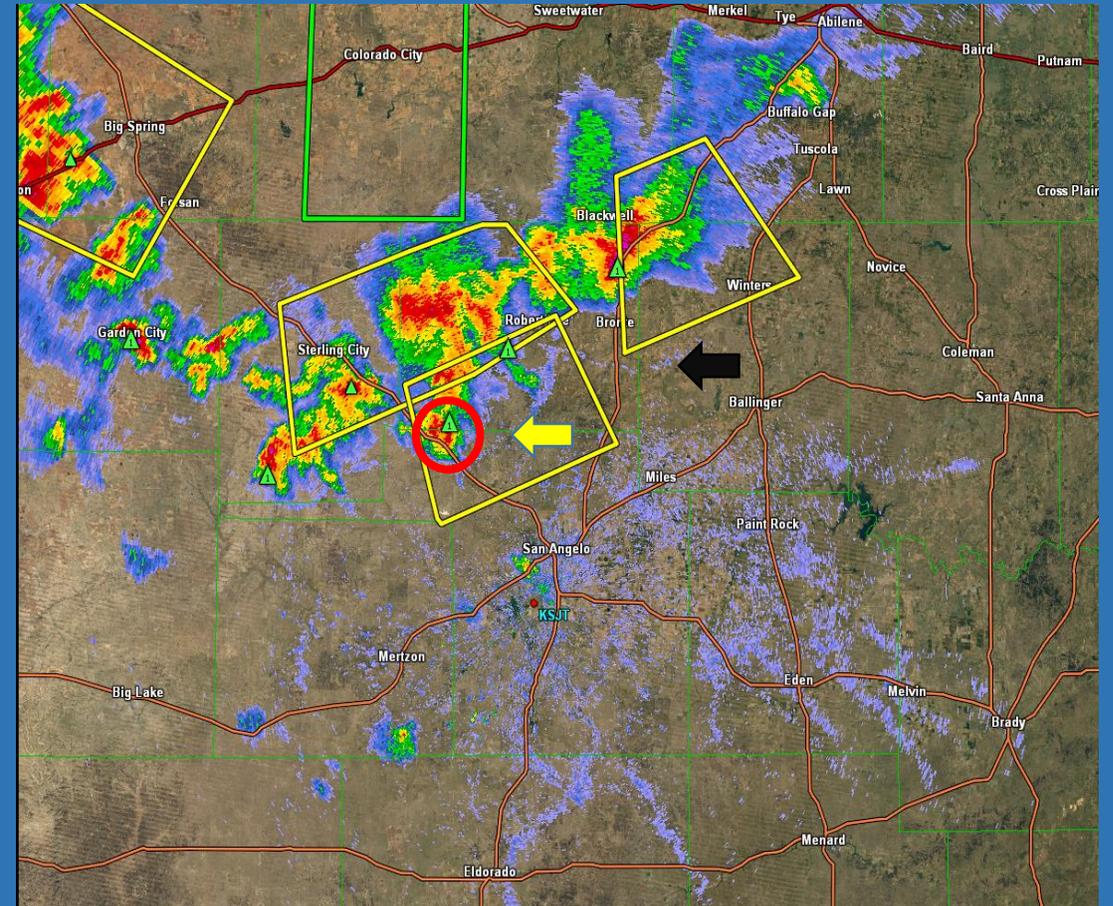
# The Event (7:01pm)

- Storms developed ahead of the cold front.
- **Yellow arrow** location of a gust front...(Leading edge of strong winds. This occurs when a thunderstorm begins to collapse, usually a sign that the parent storm is weakening. The boundary is a focal point for new thunderstorms development)
- Thunderstorm near Blackwell at this point is the stronger storm.
- Severe Thunderstorm warnings were issued for both storms.
- The storms were moving SSE.



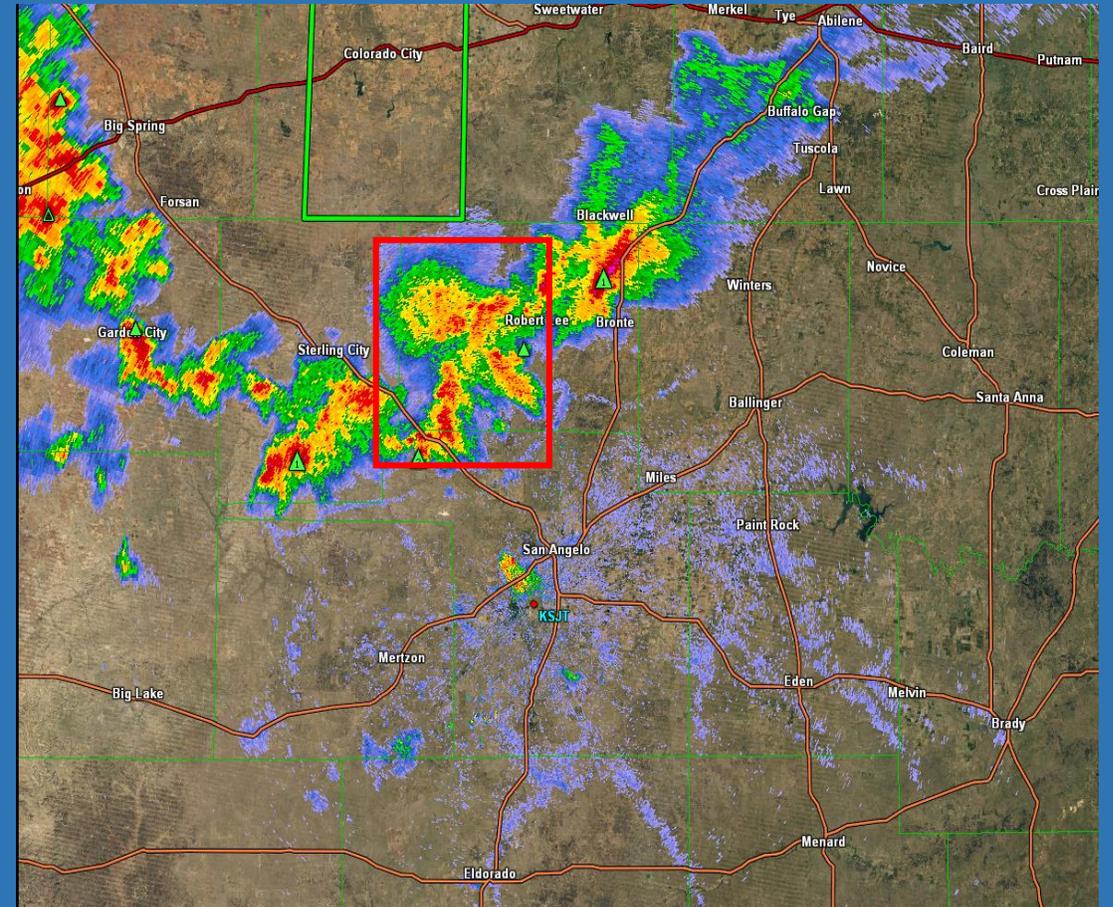
# The Event (7:04pm)

- **Red Circle** new storms form along the gust front.
- **Black arrow** gust from the storm near Blackwell begins to speed up and move south.
- Severe thunderstorm warning is issued for northwest Tom Green county at 7:02pm.
- Main hazard was for 70mph winds.



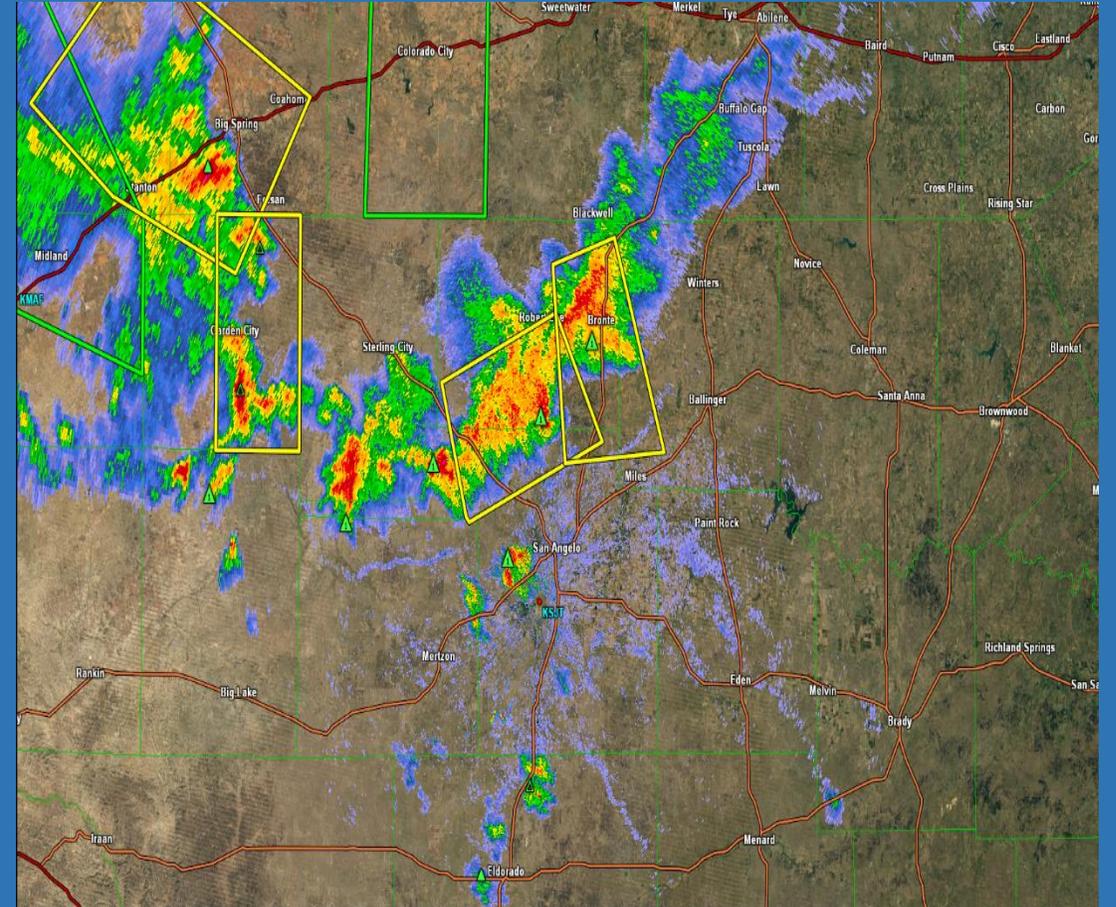
# The Event (7:15pm)

- **Red rectangle** storm is beginning to interact with other storms and has shown signs of weakening from previous scans.
- The storm south of Blackwell begins to merge with the middle storm.
- Gust front continues south.



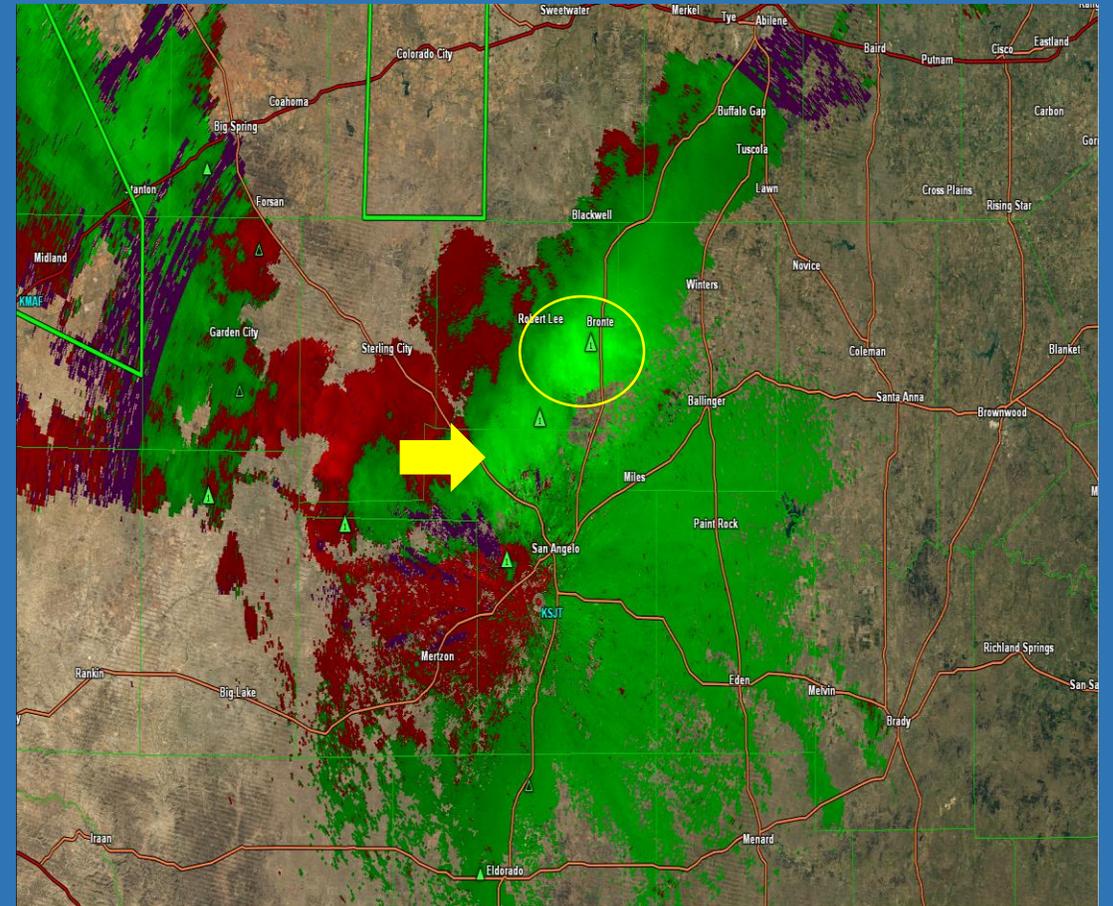
# The Event (7:28pm)

- Thunderstorms begin to merge and become a linear cluster.
- Severe thunderstorm warnings are still in effect for the stronger cores.
- This is the beginning of the thunderstorm development that produced the damaging winds in San Angelo.
- Velocity shows the story better...

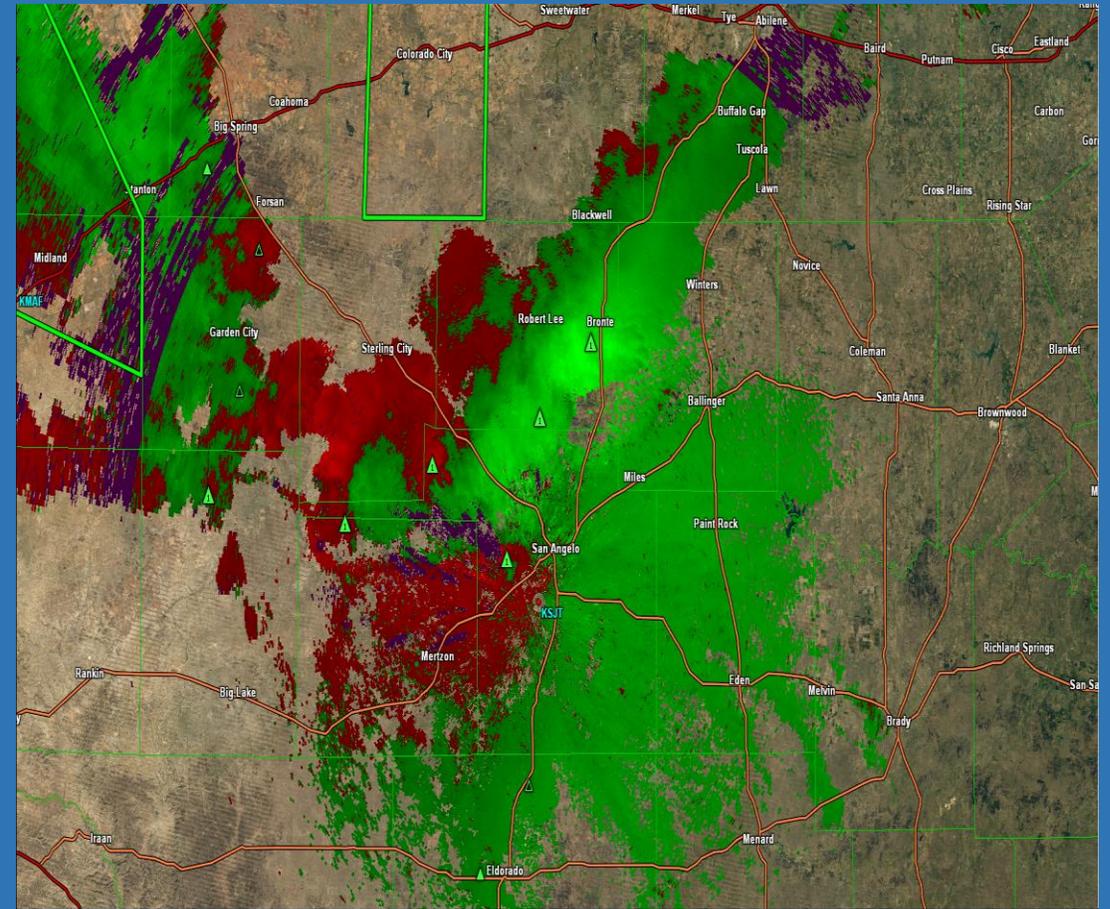
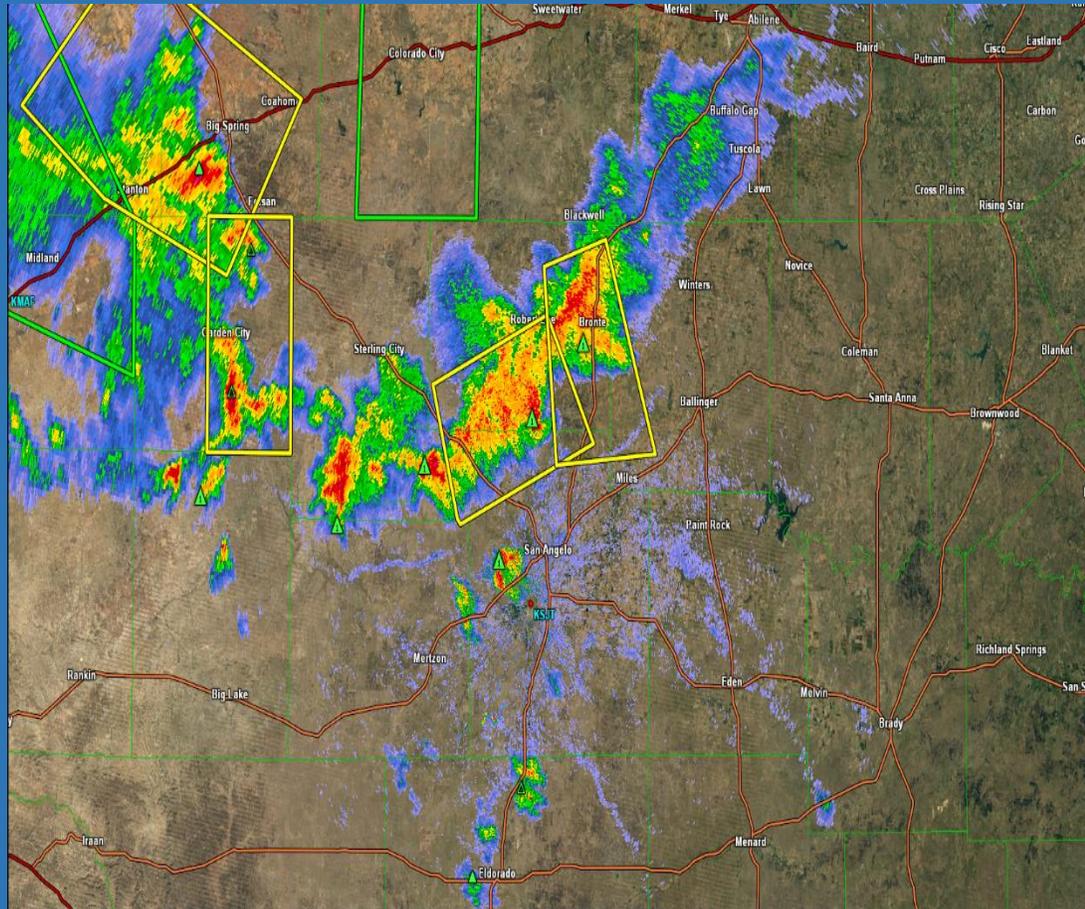


# The Event (7:28pm)

- Velocity is a radar product that measures the strength of the wind (velocity) thunderstorms.
- **Yellow circle** shows a wind core to the NNE of San Angelo.
- This core begins to merge with the weakening storm located to the NNW of San Angelo (**Yellow arrow**).

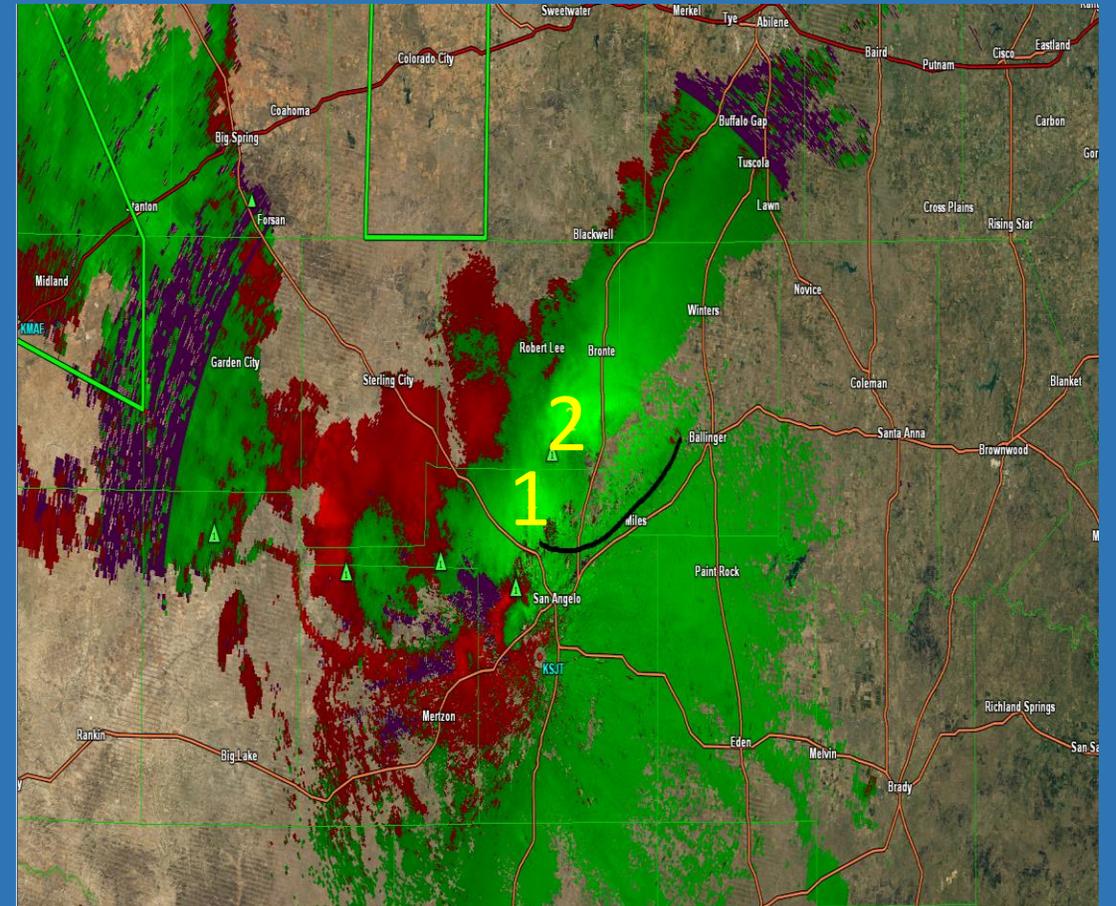


# Previous images side by side



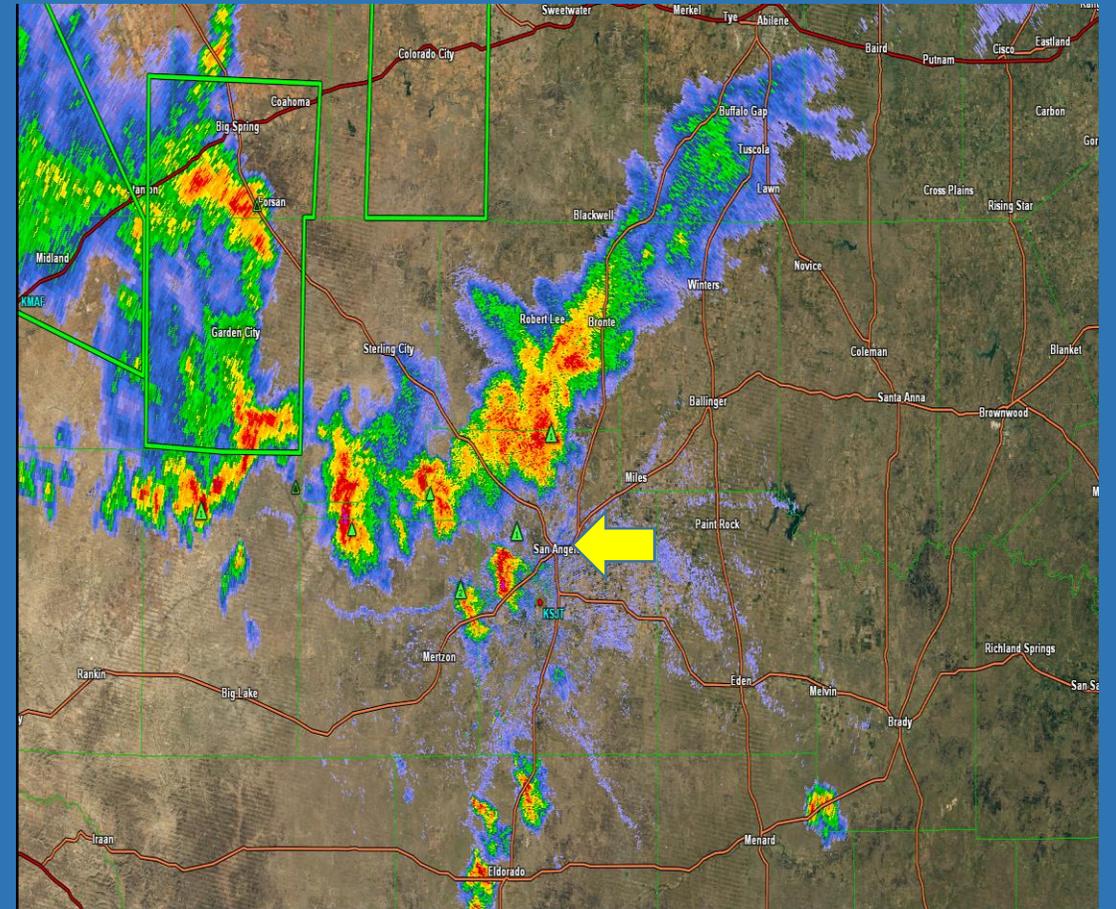
# The Event (7:33pm)

- Black line shows the location of the a gust front. This gust front provided some localized lift to storm 1 allowing it to regain a bit of strength.
- Storm 2's wind core continued to merge with the now strengthening storm 1.
- Peak wind velocities in storm 2 ranged from 67-75kts (77-86mph) ~1600ft above the ground.



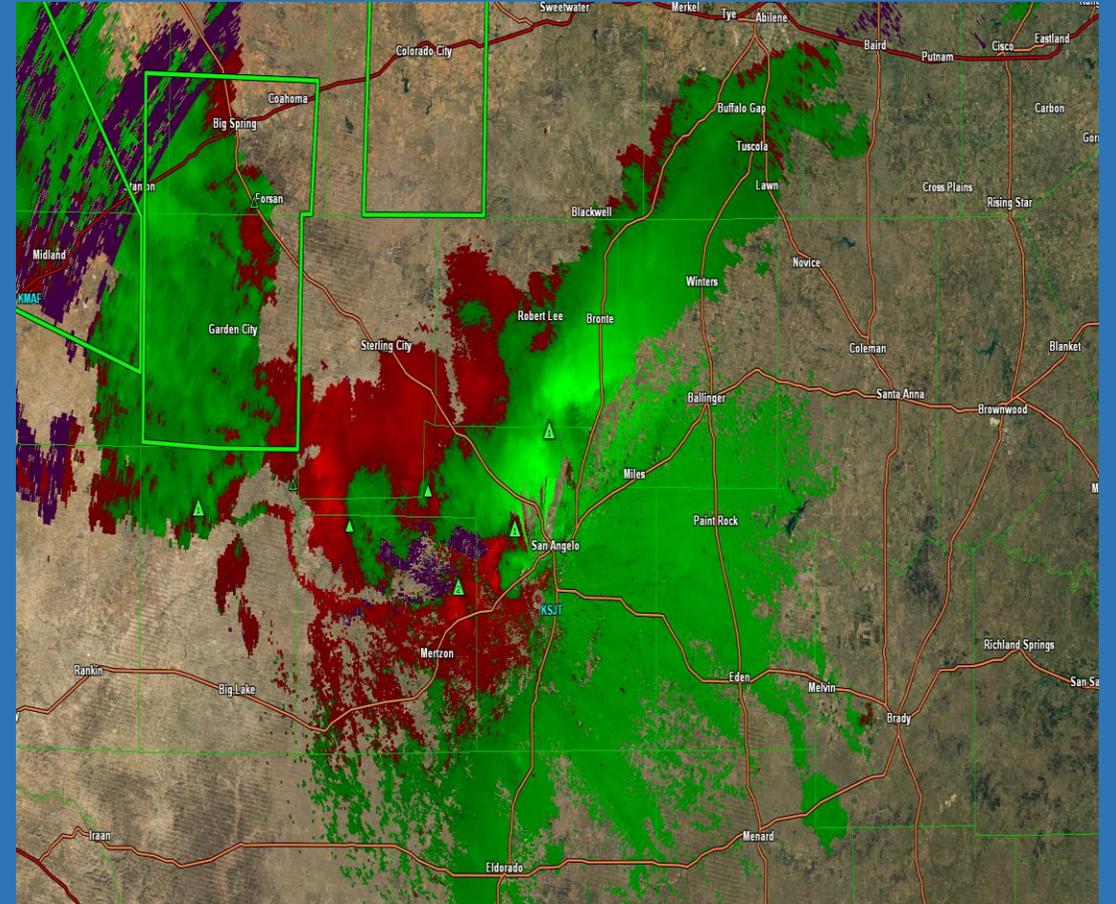
# The Event (7:41pm)

- Storm north of San Angelo becomes the dominant storm.
- Storm continues to move south.
- Gust front moves through San Angelo producing some gusty winds ahead of the pending storm.
- New storms formed on the gust front to the west of San Angelo.
- What did velocity show?



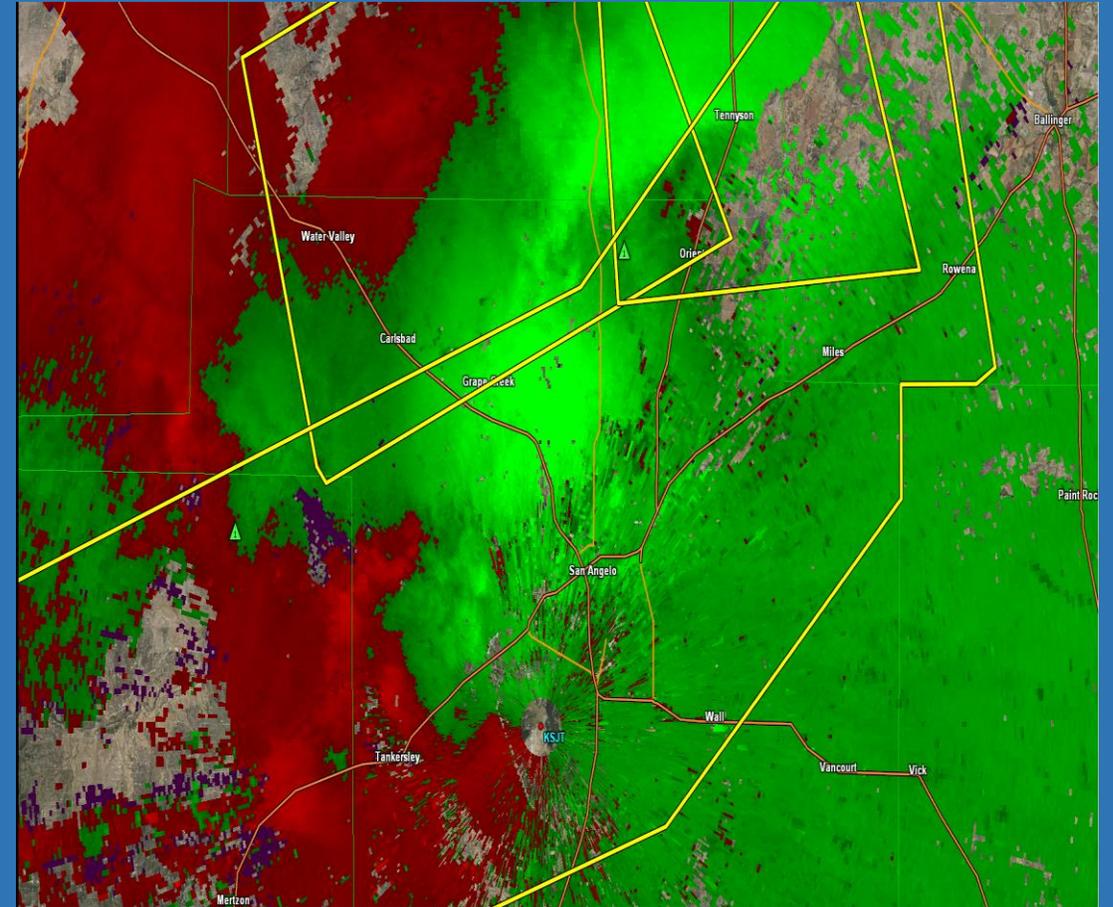
# The Event (7:41pm)

- Velocity product begins to show a surge in wind strength with the storm.
- Velocity was showing ~75kts (86mph) at ~890ft above the ground.



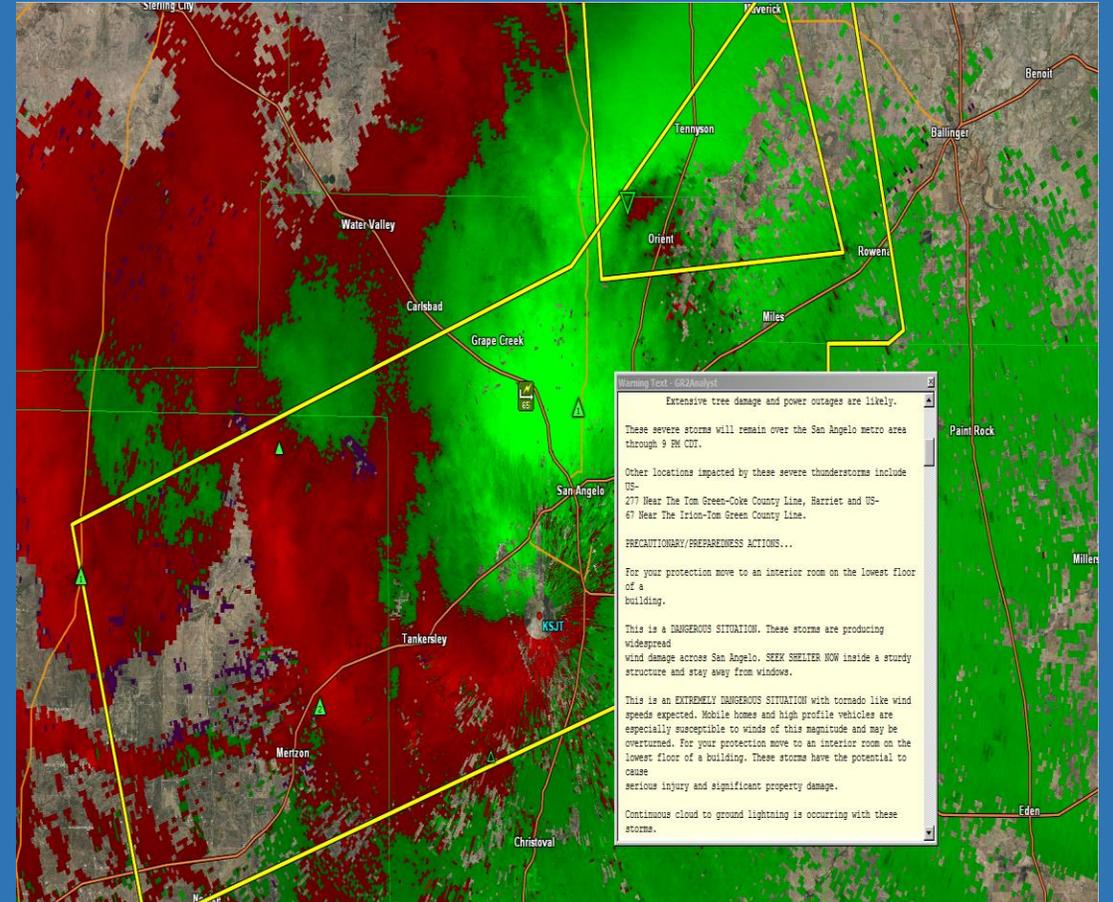
# The Event (7:44pm)

- Severe thunderstorm warning is issued for the San Angelo area at 7:44pm.
- Hazard was for 80mph winds.
- Velocity was showing a large area of 75-90kt (86-109mph) ~660ft above the ground.
- Radar showed isolated readings of 100-108kt (115-124mph) ~600ft above the ground to the SE of Grape Creek.



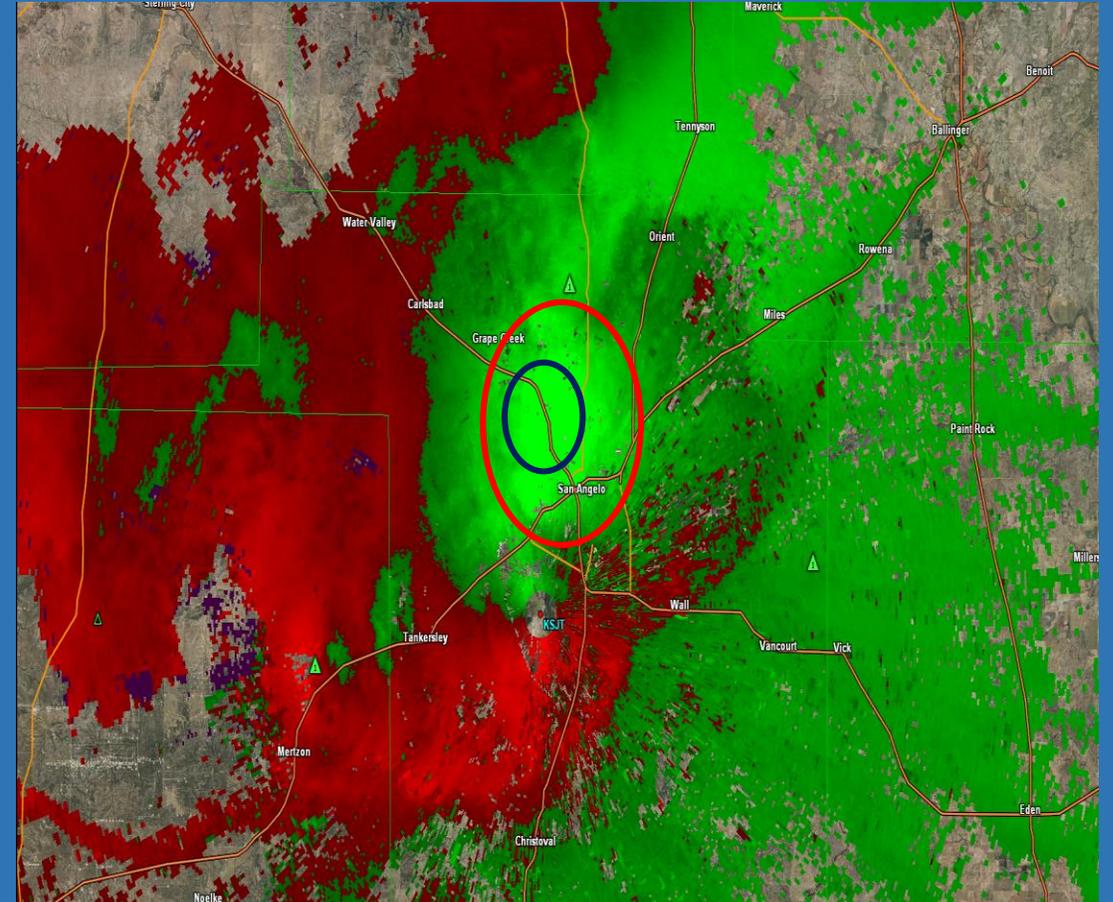
# The Event (7:49pm)

- Texas Tech Mesonet site 7NW of San Angelo recorded a 69mph gust.
- It was determined the site lost power but recorded an 84mph gust during post storm survey.
- Large area of strong winds beginning to move into San Angelo.
- **EXTREMELY DANGEROUS SITUATION** warned for tornado like winds approaching San Angelo.



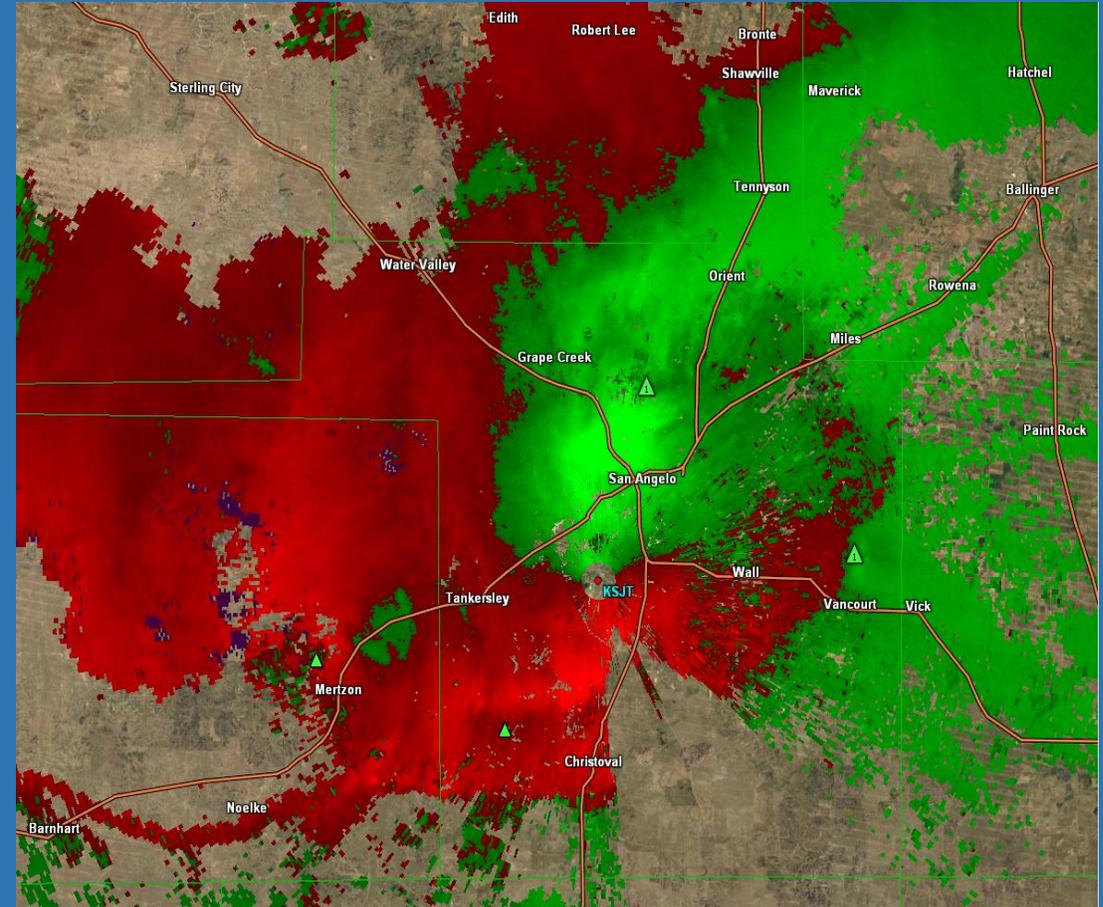
# The Event (7:54pm)

- Main wind core moves into the San Angelo area.
- **Red circle**- winds within the red circle were between 75-85kt.
- **Black circle**- winds within the black circle were 85kt+ with small areas of 95-100kt readings.
- Damage was starting to occur from Grape Creek south into San Angelo.



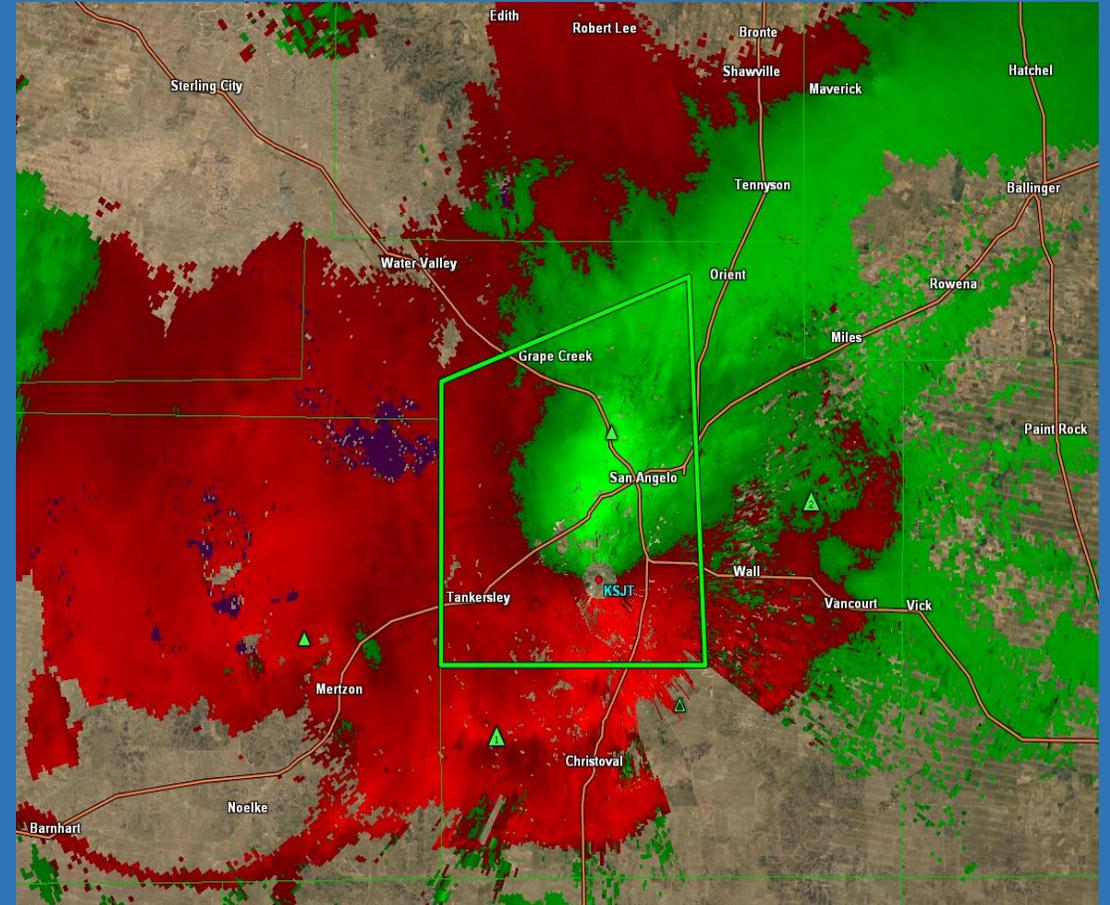
# The Event (8:02pm)

- Damaging winds are still impacting the north and west sides of San Angelo.
- Sustained winds of 55mph with gusts in the 65+mph were being reported across San Angelo.
- These high winds lasted for 20-30 minutes in some locations.



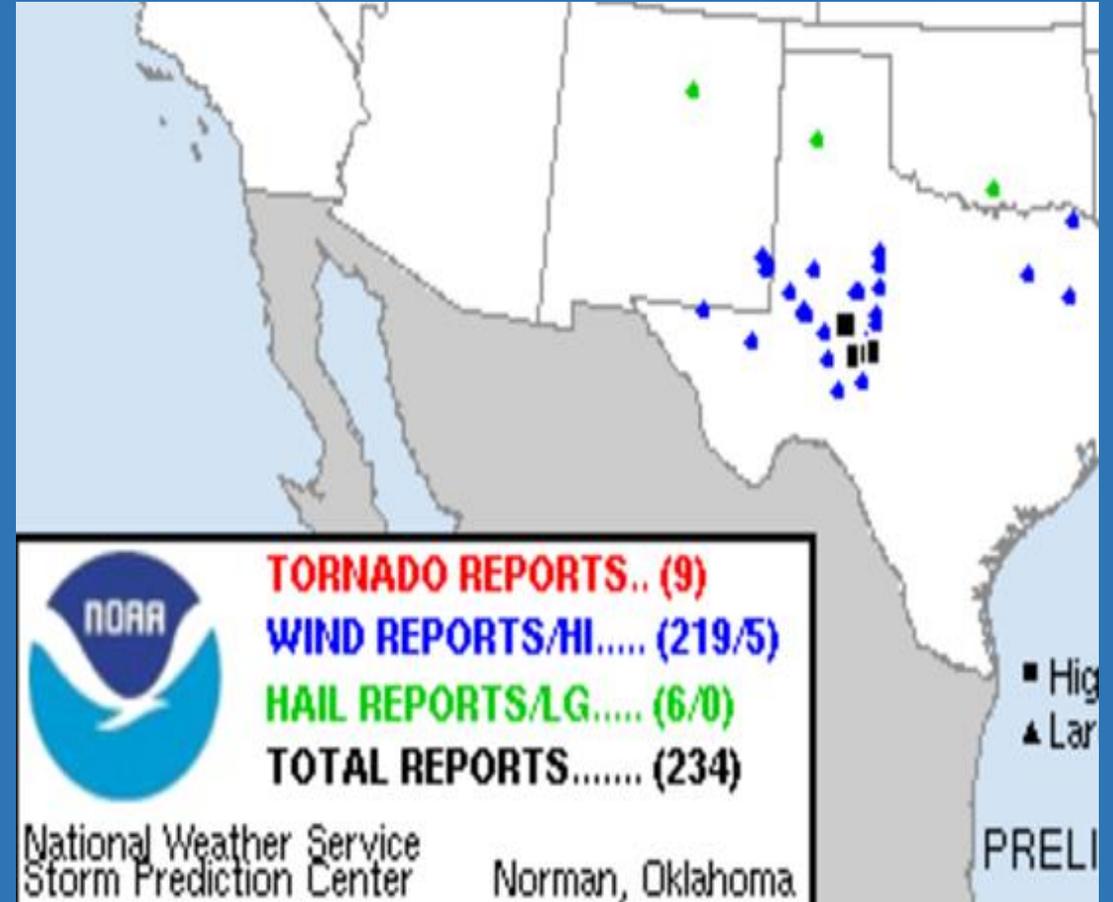
# The Event (8:15pm)

- The main wind core is impacting the southwest side of San Angelo.
- A Flash Flood Warning is issued for the San Angelo area.
- Heavy rain and winds were impacting the entire San Angelo area.

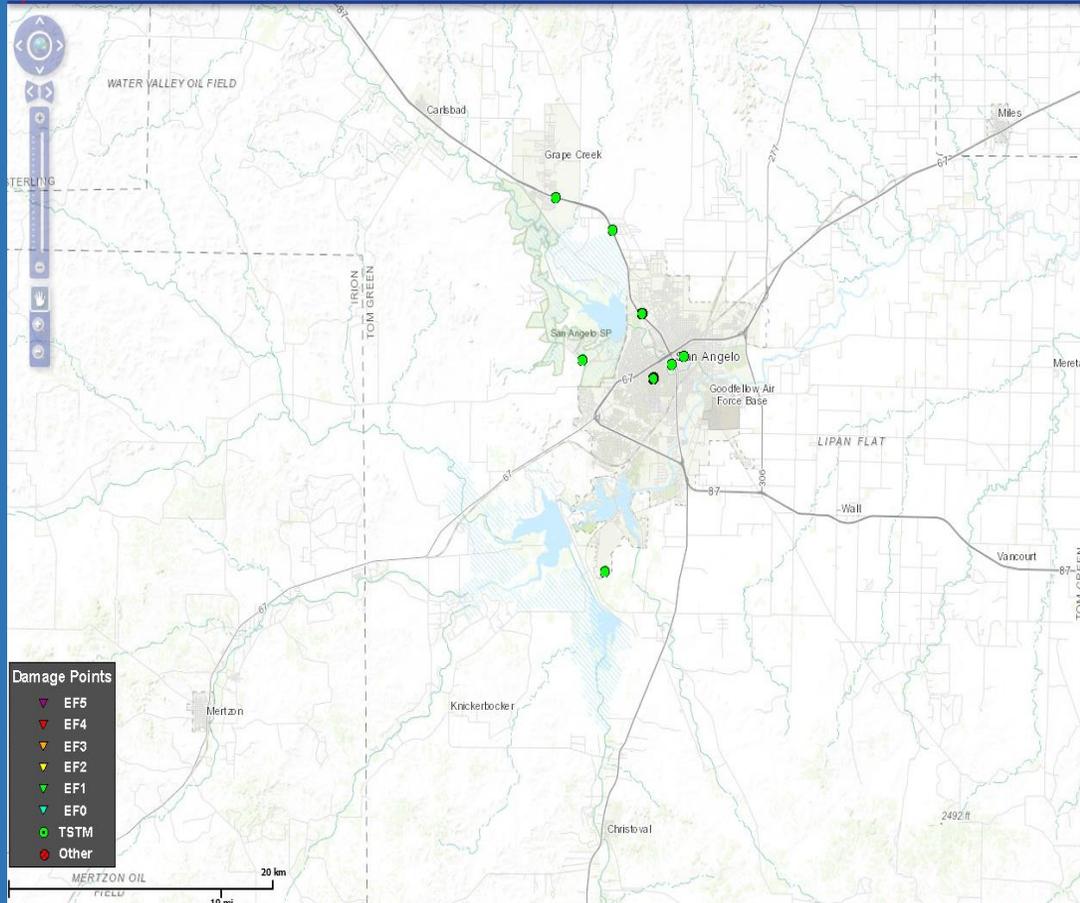


# Aftermath

- San Angelo WFO received 21 wind reports. 4 reports classified as significant wind reports. ( A significant wind report refers to a wind that is greater than 75mph)
- Texas Tech Mesonet sites across the area recorded the significant winds:
- 3NNE Mertzon-75mph @8pm
- 7NW San Angelo-84mph time estimated between 7:45-7:55pm
- 4WSW Sterling City-77mph @6:48pm
- 2E Wall-67mph @8:18pm
- Mathis Airfield ASOS- 78mph @7:56pm



# Aftermath



<http://apps.dat.noaa.gov/StormDamage/DamageViewer/>

- Link opens up a Map from the DAT software.

# Aftermath



# Aftermath



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# NWS San Angelo, TX

