

***WHEN THE WEATHER TURNS SEVERE:***  
***A GUIDE TO DEVELOPING A SEVERE***  
***WEATHER EMERGENCY PLAN***  
***FOR SCHOOLS***

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# THE MISSION STATEMENT



## National Weather Service

The National Weather Service (NWS), under the National Oceanic and Atmospheric Administration (NOAA) and the Department of Commerce (DOC), is responsible for providing weather services to the nation. It is charged with the responsibility of observing and reporting the weather and with issuing forecasts and warnings of weather and floods in the interest of national safety and our economy.

Briefly, the priorities for the weather service to the nation are:

1. Protection of life,
2. Protection of property, and
3. Promotion of the nation's welfare and economy.

A strong cooperative arrangement between the NWS and local school districts is *essential* to ensure that students and teachers are informed and prepared to take action when severe weather threatens. The information in this guide will assist you in using NWS products and resources to develop a severe weather emergency plan for your school.

## What to Expect From this Guide

The purpose of this guide is to provide assistance to school administrators and teachers in designing a severe weather emergency plan for their school. While not every possible situation is covered by this guide, it will provide enough information to serve as a starting point and a general outline of actions to take. The majority of material focuses on thunderstorms and the hazards these storms produce – damaging winds, lightning, hail, tornadoes, and flash floods. We have also included a section on the risks of winter weather. To ensure safety, actions must be taken quickly. This will become more apparent in Section 1, "Severe Weather: Understanding Your Risks and the Importance of a Plan".

Once you comprehend the scope of the problem, you can begin to address how to reduce the potential hazard. Sections 2 and 3 of this guide, "Designing Your Severe Weather Emergency Plan" and "Designing Your Winter Weather Emergency Plan", detail more specifically how to get weather information, how teachers and students

can be alerted to the emergency, and what actions under what circumstances should be taken to reduce the danger. Appendix A – Severe Weather Safety Plan Checklist offers a quick review of key points in this document. Safety is always the foremost concern. The ultimate goal is to quickly inform teachers and students anywhere on the school grounds of the threat of severe weather and to move them as quickly as possible to pre-designated shelters. These sections also discuss school bus driver actions in severe weather.

***For any plan to work efficiently, it must be practiced!!*** Schools should conduct semi-annual exercises and severe weather safety instruction should be a part of these exercises. It is important to understand why certain actions are being taken.

### **Choosing a Severe Weather Coordinator**

Before you begin, it is recommended that one person or group be designated as the "Severe Weather Coordinator(s)". This person(s) may be a teacher or administrator with an interest in weather, who is willing to attend local NWS spotter training programs (no fees). The coordinator will be responsible for developing the plan and working with the local school board, administrators, and teachers to implement the plan. To ensure a successful plan, it is imperative that the coordinator has the support and active involvement of both the school board and the school administration.

To find out more about NWS spotter training, contact Mr. Steve DiRienzo, Warning Coordination Meteorologist, National Weather Service, Albany NY.

Email: [Stephen.Dirienzo@noaa.gov](mailto:Stephen.Dirienzo@noaa.gov)

Phone: (518)435-9568

# SECTION 1: SEVERE WEATHER THREATS

## A. Hazardous Weather Outlook

Each day between 5 am and 7 am the National Weather Service in Albany issues a Hazardous Weather Outlook (HWO). This product discusses the potential for severe weather (flooding, severe thunderstorms, winter storms, etc.) over the next seven days. School administrators should review the Hazardous Weather Outlook daily. The Outlook can be heard on NOAA Weather Radio and viewed on the NWS Albany web site: [weather.gov/Albany](http://weather.gov/Albany) under Local Outlooks in the left hand index at the top.

## B. Lightning

Eastern New York and Western New England average about 25 to 30 thunderstorm days per year. By definition, a thunderstorm contains lightning. Lightning is a threat to anyone outdoors – the softball team on the field, the band practicing, fans in the stand, kids on the playground. The National Weather Service does not issue warnings for lightning alone. When thunderstorms are observed, keep these lightning safety tips in mind:

- **If you can hear thunder, you are close enough to the storm to be struck!** Thunderstorms extend 5 to 10 miles into the atmosphere. Winds aloft can blow the upper portion (anvil) of the storm many miles downstream. Lightning can come out of the side or anvil of the storm striking the ground 10 to 20 miles away from the rain portion of the cloud.
- **30-30 Rule** - Determine the threat of lightning in your area.
  - **30 Seconds:** Count the seconds between seeing lightning and hearing thunder. If this time is less than 30 seconds, lightning is still a potential threat. Seek shelter immediately.
  - **30 minutes:** After the last lightning flash, wait 30 minutes before leaving shelter. Half of all lightning deaths occur after the storm passes. Stay in a safe area until you are sure the threat has passed.

## C. Flash Floods

Flash flooding is the rapid rise – usually six hours or less – of water along a stream or low lying urban area. On average, about 30 flash flood events occur across Eastern New York and Western New England every year. These flash floods occur in every season. Eastern New York and Western New England's topography combined with winter ice jams, spring snow melt, summer thunderstorms, and autumn tropical systems make the region particularly susceptible to flash flooding.

When there is the possibility of flash flooding, the National Weather Service will issue a Flash Flood Watch. A Watch means conditions are favorable for flash flooding. You should continue with your daily routine, but know what to do if a Flash Flood Warning is issued. A Flash Flood Warning means the flooding is imminent or occurring. Take action now to protect your life and property!

Flooding is the number one weather-related killer, averaging 150 deaths per year nationally. Half of these deaths occur in automobiles. **NEVER ENTER FLOODED WATERS!** If caught in rising water, abandon your vehicle immediately and move to higher ground. **Turn Around, Don't Drown!**

#### **D. Severe Weather**

Severe thunderstorms are those storms which produce winds of 58 mph or greater and/or hail of 1 inch in diameter or larger. Tornadoes are violently rotating columns of air attached to the cloud base above and in contact with the ground below. On average, Eastern New York and Western New England can expect about 100-150 severe weather events per year, and three or four tornado events per year. Keep in mind, that although most common during the warm weather months, severe weather can strike during any season. In 2004, severe thunderstorms moved across Eastern New York and Western New England on Thanksgiving morning!

If conditions are favorable for severe weather, the National Weather Service will issue either a Severe Thunderstorm Watch or Tornado Watch. Again, a Watch means severe weather is possible. Continue with your daily routine but be alert for the issuance of a severe thunderstorm warning. A Severe Thunderstorm Warning or Tornado Warning means that severe thunderstorms or tornadoes respectively are imminent or occurring. Take cover now to protect life and property!

#### **E. Winter Weather**

Extreme winter weather takes a toll on lives and property throughout many portions of the United States. Heavy snow and freezing rain are responsible for numerous traffic fatalities each year. Moreover, hundreds of deaths and injuries from hypothermia, exposure, and frostbite are reported each year as bitter cold air masses plunge into the United States during the winter. Although the above weather conditions are often accepted as facts of life in Eastern New York and Western New England, many people are still injured or killed despite a long history of extreme winter weather activity in our region.

- **Heavy Snow Storms** - Remember the Valentine Day Storm of 2007? We all know that heavy snow can immobilize a region and paralyze a city, stranding commuters, stopping the flow of supplies, and disrupting emergency and medical services. Accumulations of snow can collapse buildings and knock down trees and power lines. When snow is accompanied by wind, travel becomes even more hazardous. School bus routes may be blocked by

drifting snow and travel may be hindered by near whiteout conditions. Often times, bus service is delayed or unavailable.

- **Lake Effect Snow** - Lake effect snow is one particular type of winter storm common to the snow belt regions of New York. Lake effect snow occurs when cold air rushes across the warm waters of the Great Lakes, initiating snow showers and squalls. In the primary snow belt, seasonal accumulations are often well over 100 inches.
- **Ice Storms** - Heavy accumulations of ice can bring down trees, utility lines, and communication towers. Roadways become a glaze of ice and nearly impassable. Again, school buses may be delayed or unavailable. Of all winter deaths related to ice and snow, 70 percent occur in motor vehicle accidents and 25 percent are people caught out in the storm.
- **Extreme Cold** - Extremely cold temperatures often accompany a winter storm or are left in its wake. Prolonged exposure can cause frostbite or hypothermia and can become life threatening. This is a problem especially for children waiting at bus stops or at outdoor recess. When extremely cold temperatures are accompanied by wind, an especially dangerous situation exists. The Wind Chill is based on the rate of heat loss from exposed skin caused by the combined effects of wind and cold. As the wind increases, heat is carried away from the body at an accelerated rate, driving down the body temperature, leading to frostbite.

## F. Conclusion

The goal of this publication is to ensure that every student's safety is adequately accounted for when the weather turns severe. It has been well documented that severe thunderstorms and dangerous winter weather occur in Eastern New York and Western New England. If your school has never experienced severe weather, **do not** conclude that severe weather will never place your school in danger. A delay in developing a severe weather emergency plan could be a painful lesson. Only through preparedness **before** the storm, can the safety of all school children and personnel be assured. Please get prepared now and use this guide to help you develop a severe weather emergency plan for your school. If you need any assistance or have questions, please contact Mr. Steve DiRienzo, Warning Coordination Meteorologist, National Weather Service, Albany, NY.

## **SECTION 2: DESIGNING YOUR SEVERE WEATHER EMERGENCY PLAN**

### **A. How to Get Emergency Weather Information**

Because severe weather can occur with little, if any, warning, minutes and even seconds can mean lives saved. In just five minutes, a tornado may travel two to four miles on the ground. From the time the National Weather Service (NWS) issues a warning, to the time you receive that warning via radio or television, ten minutes may have elapsed. Also, you must be listening at the critical moment that the warning is announced or an even greater amount of time will pass!

#### **NOAA Weather Radio**

The fastest, most accurate and reliable means of receiving critical weather information at your school is through a NOAA Weather Radio with a **"tone alert"** feature. Make sure your NOAA Weather Radio has a battery back-up. NOAA Weather Radio is operated directly from NWS offices and is part of our country's National Warning System. When the NWS issues a warning, a Specific Area Message Encoder (SAME) unit triggers a **"tone alert"** (1050 Hertz). This alert is immediately followed by warning information.

The NOAA Weather Radio **"tone alert"** feature is used for the issuance of all short-fused weather information such as severe thunderstorm, flash flood, and tornado watches and warnings. NOAA Weather Radio broadcasts 24 hours a day, seven days a week with the latest weather information, from daily forecasts to special weather statements about sudden shifts in the weather patterns or the development of potentially hazardous weather.

If your school is not in a reliable NOAA Weather Radio listening area (due to interference from mountains or other sources), then below are some suggested alternatives:

#### **- The Weather Channel**

If you have cable television access, The Weather Channel uses NWS products and broadcasts warnings and statements immediately upon receipt from the NWS via a satellite link. They also display local radar pictures throughout the day.

#### **- Primary Emergency Alert System (EAS) Station**

Monitor your primary (EAS) radio station. EAS operates on a cooperative agreement between broadcasters and federal, state, and local government agencies.



## - Local or Cable Television

Monitor your local or cable television stations. Many television stations have access to NWS products and will immediately post (i.e., scroll) a watch or warning when it is issued.

## -New York Alert

As wireless technology continues to expand, New York State is offering a free service to receive text alerts. NY-Alert is free to join as you can receive warnings and emergency information via the web, your cell phone, email and other technologies.

## -iNWS

InteractiveNWS (iNWS) is the home of new mobile and desktop innovations of the National Weather Service. This application suite allows NWS partners to receive National Weather Service products in new and innovative ways, such as text messaging and mobile-enabled webpages. iNWS strives to fulfill our mission of protecting life and property by using new technology to reach out to our customers.

Phone call-down systems **are not advised** for receipt of warning information due to: 1) time elapsed in relaying information; 2) chance of incorrect or incomplete information being passed; 3) lack of reliability of phone systems during storms; and, 4) the NWS advises people not to use corded telephones during an electrical storm due to the lightning hazard.

Your radio or television should be located in the main office or near the person(s) responsible for enacting the plan. Keep in mind that the main office may not be the best place for a NOAA Weather Radio during evening and weekend cultural and sporting events. Here the best place is usually at the event site – the football field or auditorium. If using a NOAA Weather Radio, the radio should be set at all times in "**Alert**" mode. Some radios will automatically turn on when an alert sounds, while others must be manually turned on. It is better to have the type that automatically turns on in case you are out of the room when the tone is activated. If using NOAA Weather Radio, the information cycles every few minutes, so if you don't hear all the information you need the first time through, it will repeat shortly. You can also review warnings at the NWS Albany internet site – [weather.gov/Albany](http://weather.gov/Albany) .

Listen for the type of watch or warning and where it is in effect. The person(s) monitoring must know what action they should take based on this information. Have a map nearby for easy reference to counties and towns to locate storms and their movement in reference to your school. There is no need to take emergency action if the warning is not for your location. It should, however, heighten your awareness to

the potential for severe weather in your school district, especially if the warning is for a county next to you and the storms are moving in your direction!

## **B. Getting the Message Out to Students and Staff**

Most schools utilize a public address (PA) system to talk directly to students and teachers. In some cases, electricity may be lost during a storm before you have activated your plan. Therefore, it is critical to have a back-up alerting device such as a megaphone.

If your school has mobile classrooms or detached gymnasiums that are not part of a PA or intercom system, then special arrangements should be made to notify students and staff in these areas. Sending "runners" outside to mobile classrooms is **not advisable** due to the danger posed by lightning and the approaching storm. Wireless communication devices are an effective means for such communication. "**Walkie-talkies**" may be the least expensive.

Persons with disabilities may require special attention. You may want to assign a staff member to each person requiring special attention to see that the student moves to the appropriate place of safety. Students or staff that may not hear the warning must be taken into account. To ensure appropriate action and understanding of your "**call to action**," you must exercise your plan.

## **C. Determining Severe Weather Safety Zones in Your School**

This may be the most time consuming and complex phase of designing your plan. Schools are sufficiently complex and diverse in design that it is impossible to describe an exact plan here that will apply to every school. **Due to this complexity, it is recommended that this phase of the plan be accomplished with the help of an engineer or architect familiar with the school's design.** There are, however, general guidelines and basic concepts that can be discussed.

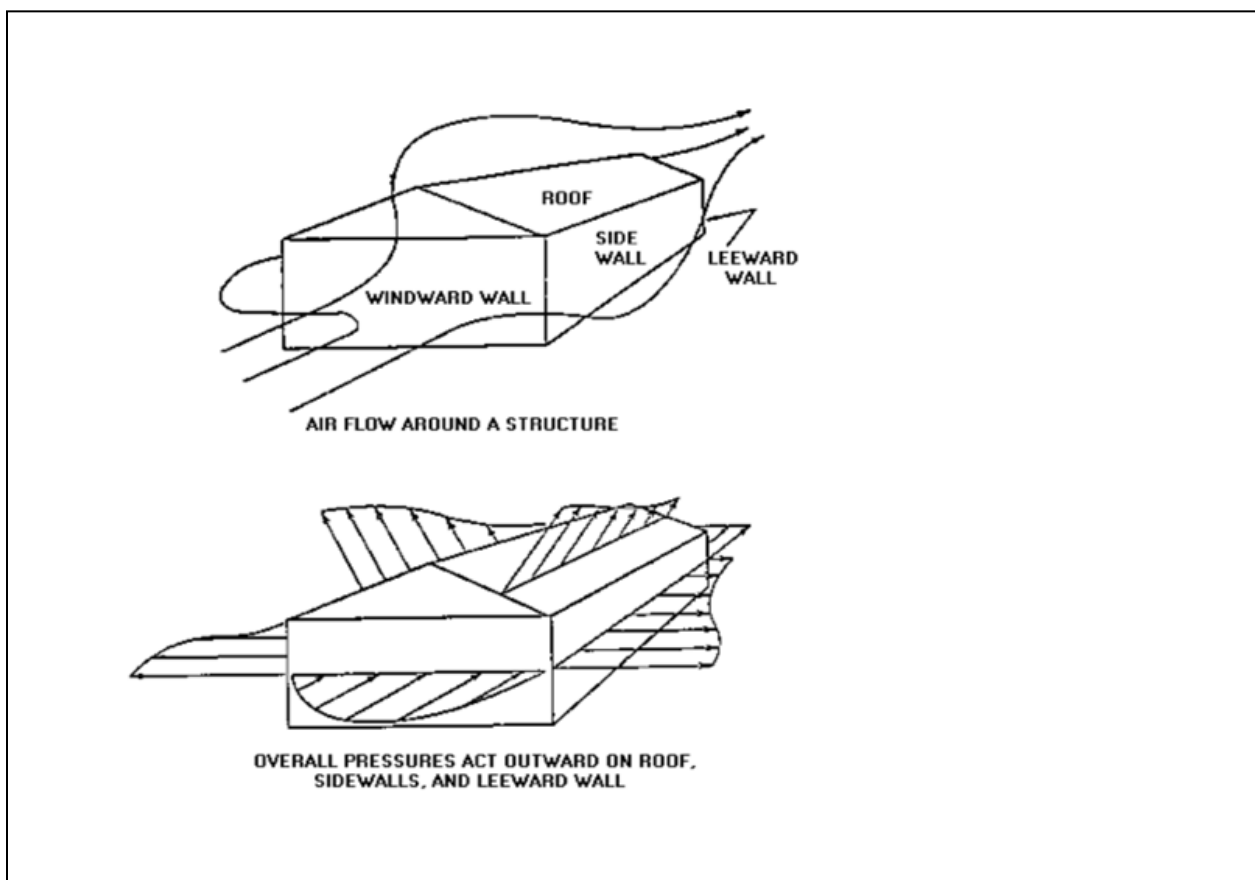
The greatest dangers from high winds (e.g., tornado, thunderstorm downburst, etc.) are:

- 1) roof failure;
- 2) breaking glass; and,
- 3) flying debris (airborne missiles).

The **most dangerous locations** are generally large rooms with big expansive roofs such as cafeterias, gymnasiums, and auditoriums. The collapse of the room's load-bearing walls may lead to the failure of the entire roof. Roofs tend to rely on gravity to keep them attached. When strong winds act on a structure, pressure differences are created, causing outward pressure forces, acting to lift the roof (see Diagram 1 on next page). Rooms with large windows that may shatter from being struck by airborne missiles or from pressure stresses are extremely dangerous. While windows on the side of the school facing the storm are **most** susceptible, any

window could potentially shatter as the storm passes. Once winds enter a building, additional damage can create a domino effect. This is one of the reasons that ***“IT IS NO LONGER ADVISED THAT WINDOWS BE OPENED!!! Greater damage may occur from this action and valuable time that should be used getting to safety is often lost.”***

Small interior rooms, bathrooms, and windowless, interior hallways that are away from exterior doors offer the best protection. Interior load-bearing walls (with short roof spans) provide better protection than temporary or non-load-bearing walls and structures. If your school has more than one story, evacuate the upper level of your school. **The lowest level is always the safest.**



*Diagram 1: Top diagram - Airflow around a structure.*

*Bottom diagram - Airflow induces pressure on building components. Lengths of arrows are proportional to the magnitude of the force in the direction indicated.*

Schools designed for the ***“open classroom”*** concept often lack safe areas due to a lack of interior load-bearing walls, large spanning roofs, and the abundant use of glass. You may not be able to find enough ***“ideal”*** space to protect your students

and staff. It may be a matter of determining the lesser of evils. Below is a list beginning with the **lowest** probability of failure:

- 1) Interior, lower level, load-bearing walls (i.e., interior bathrooms or closets);
- 2) Interior walls of upper level - exterior walls of lower level;
- 3) Exterior walls of upper level - roof;
- 4) Rooms with large roof spans - mobile classrooms; and,
- 5) Windows on exterior walls.

Fortunately, the majority of tornadoes will not destroy well-constructed buildings and damage in about 70% of cases should not go beyond #2 listed above. With these considerations, you may want to rank areas according to safety. Then begin by filling the safest areas first with students and continue until you have found space for everyone.

***AGAIN, IT IS BEST TO HAVE AN ENGINEER OR ARCHITECT ADVISE YOUR SCHOOL ON THE SAFEST AREAS SINCE SCHOOLS ARE BUILT WITH VARIED DESIGNS AND PURPOSES. THE PRIORITIES LISTED ABOVE ARE BASED ON BROAD GENERALITIES.***

#### **D. When to Activate Your Plan and When to Return to Normal Activities**

When activating a plan, you need as much information as possible about the type of storms, expected impact, and time of impact on your school district to assess the risk. A plan may work best with phases of activation. For instance, outdoor activities will be the most susceptible to weather hazards, with lightning being the greatest threat. ***As soon as thunder is heard***, not when the rain begins, outdoor activities should be stopped (*When Thunder Roars, Go Indoors!*). Outdoor activities should not be resumed until the storm has passed. It is important not to resume activities simply because the rain has stopped or you no longer hear thunder. Since lightning can strike far from the parent cloud, do not resume outdoor activities until 30 minutes after thunder is last heard.

#### **Tornado or Severe Thunderstorm Watch**

In a tornado or severe thunderstorm watch, outdoor activities may need to be postponed. As a storm approaches, you may want to move students from the most susceptible areas such as mobile classrooms and gymnasiums as a precaution, even though a warning has yet to be issued. You may want to post a school official trained in spotting severe weather to watch the storm as it approaches. This person can then advise when to take special actions. For severe weather spotter training, contact the NWS Albany Warning Coordination Meteorologist, Mr. Steve DiRienzo.

#### **Severe Thunderstorm Warning**

If a severe thunderstorm warning is issued and your school is in the path of the storm, all of the above actions are warranted. It is important to note that even though severe thunderstorm warnings are issued for a county, at times only a small part of a county is affected. That is why the NWS provides a storm path in the text of the warning (see example below). Action is only recommended if your school is in

the path of the storm. In addition to strong damaging winds, severe thunderstorms may contain large hail and students should be moved out of areas with skylights. If you have areas where large exterior windows may be exposed to the storm's winds, keep students out of these areas until the storm has passed. Below is an example of a severe thunderstorm warning from the NWS in Albany. Note the projected storm path in the example below:

WUUS51 KALY 011858  
SVRALY  
NYC035-011945-  
/O.NEW.KALY.SV.W.0102.101201T1858Z-101201T1945Z/

BULLETIN - EAS ACTIVATION REQUESTED  
SEVERE THUNDERSTORM WARNING  
NATIONAL WEATHER SERVICE ALBANY NY  
158 PM EST WED DEC 1 2010

THE NATIONAL WEATHER SERVICE IN ALBANY HAS ISSUED A

\* SEVERE THUNDERSTORM WARNING FOR...  
EASTERN FULTON COUNTY IN EASTERN NEW YORK...

\* UNTIL 245 PM EST

\* AT 155 PM EST...NATIONAL WEATHER SERVICE DOPPLER RADAR INDICATED A SEVERE THUNDERSTORM CAPABLE OF PRODUCING DAMAGING WINDS IN EXCESS OF 60 MPH. THIS STORM WAS LOCATED NEAR CAROGA LAKE PUBLIC CAMPGROUND...OR 7 MILES NORTHWEST OF GLOVERSVILLE...AND MOVING EAST AT 20 MPH.

\* **THE SEVERE THUNDERSTORM WILL BE NEAR...**  
**GLOVERSVILLE AND 7 MILES NORTH OF JOHNSTOWN BY 210 PM EST...**  
**MAYFIELD BY 220 PM EST...**  
**CRANBERRY CREEK BY 225 PM EST...**  
**BROADALBIN AND CRANBERRY CREEK BY 230 PM EST...**  
**6 MILES SOUTH OF NORTHAMPTON BEACH PUBLIC CAMPGROUND BY 235 PM EST...**

PLEASE REPORT HAIL SIZE...DAMAGING WINDS AND REPORTS OF TREES DOWN TO THE NATIONAL WEATHER SERVICE BY EMAIL AT ALB.STORMREPORT@NOAA.GOV.

LAT...LON 4322 7457 4322 7432 4321 7432 4322 7428  
4322 7415 4300 7412 4300 7458  
TIME...MOT...LOC 1858Z 273DEG 19KT 4311 7444

## Tornado Warning

When a tornado warning is issued for your county and you have determined that your school is in the path of this storm, an **“immediate and complete call to action”** is needed (see Tornado Warning example below). If the storm has not yet reached your school, begin moving students and staff from unsafe areas and post a trained teacher or school employee to keep an eye on the storm’s approach. From your exercises, you should know approximately how long it will take to move students into **“tornado safe areas”**. To be on the safe side, it should take no more than two or three minutes to move students from upper floors to lower floors. Plan for the worst-case scenario – a tornado is sighted nearby with little or no warning. During the storm, ensure all students and staff are in designated areas – and in the tornado safety position (see photo). If winds begin to pick-up outside the school (or if a roar is heard or large hail is falling), have students and teachers drop immediately into the “tornado safe” position (see diagram). Winds may increase at the onset of the storm and may or may not drop off prior to the tornado. Rain may or may not be occurring. Large hail is a signal that you are near the part of the storm in which the tornado would most likely occur. Once the storm has passed, students may return to classrooms. Stay alert for the potential for additional storms.

One special consideration would be the complication of activating a full emergency plan during class changes, when the halls are crowded and students may not know where to go. It may be best to hold classes beyond regular dismissal time until the severe weather threat has passed. Likewise, at the end of the school day, students may need to be held from boarding buses until the danger has passed.

You should have at least a couple of people who know how to shut off the main power (electricity) and gas (if applicable). After a tornado or severe thunderstorm, it may be necessary to shut off the gas and electric supply to the building.

## Tornado Safety Position



**Below is an example of a tornado warning issued by NWS Albany:**

WFUS51 KALY 211939  
TORALY  
CTC005-212030-  
/O.NEW.KALY.TO.W.0003.100721T1939Z-100721T2030Z/

BULLETIN - EAS ACTIVATION REQUESTED  
TORNADO WARNING  
NATIONAL WEATHER SERVICE ALBANY NY  
339 PM EDT WED JUL 21 2010

THE NATIONAL WEATHER SERVICE IN ALBANY HAS ISSUED A

- \* TORNADO WARNING FOR...  
SOUTHERN LITCHFIELD COUNTY IN NORTHERN CONNECTICUT...
- \* UNTIL 430 PM EDT
- \* AT 334 PM EDT...NATIONAL WEATHER SERVICE DOPPLER RADAR INDICATED A SEVERE THUNDERSTORM CAPABLE OF PRODUCING A TORNADO NEAR LITCHFIELD...OR 9 MILES SOUTHWEST OF TORRINGTON...MOVING SOUTHEAST AT 30 MPH.
- \* THE TORNADO WILL BE NEAR...  
LITCHFIELD AND LITCHFIELD GREEN BY 345 PM EDT...  
THOMASTON BY 355 PM EDT...  
TERRYVILLE AND 7 MILES NORTHEAST OF OAKVILLE BY 400 PM EDT...

PRECAUTIONARY/PREPAREDNESS ACTIONS...

WHEN A TORNADO WARNING IS ISSUED BASED ON DOPPLER RADAR...IT MEANS THAT STRONG ROTATION HAS BEEN DETECTED IN THE STORM. A TORNADO MAY ALREADY BE ON THE GROUND...OR IS EXPECTED TO DEVELOP SHORTLY. IF YOU ARE IN THE PATH OF THIS DANGEROUS STORM...MOVE INDOORS AND TO THE LOWEST LEVEL OF THE BUILDING. STAY AWAY FROM WINDOWS. IF DRIVING...DO NOT SEEK SHELTER UNDER A HIGHWAY OVERPASS.

PLEASE REPORT HAIL SIZE... DAMAGING WINDS AND REPORTS OF TREES DOWN TO THE NATIONAL WEATHER SERVICE BY EMAIL AT ALB.STORMREPORT@NOAA.GOV.

A SEVERE THUNDERSTORM WATCH REMAINS IN EFFECT UNTIL 800 PM EDT WEDNESDAY EVENING FOR NORTHERN CONNECTICUT AND WESTERN MASSACHUSETTS AND EASTERN NEW YORK AND SOUTHERN VERMONT.

&&

LAT...LON 4171 7339 4187 7329 4179 7301 4164 7297  
4163 7299 4163 7302 4162 7302 4159 7305  
4158 7309  
TIME...MOT...LOC 1939Z 295DEG 28KT 4175 7322

## **E. Determining When to Delay Departure of Students**

You should consider holding the departure of students to buses whenever watches or warnings are in effect. There are two primary considerations:

- 1) Upon departure, determine the amount of time it will take students to get safely home. Include time for the students to walk from their bus stop to their home; and,
- 2) How much time do you have before the storms are expected to impact your district? Severe thunderstorm and tornado watches are often issued several hours in advance of thunderstorm development. Watches are generally issued for large areas, so it may be a couple of hours before the storms reach you. On the other hand, it may be a rapidly developing situation with less than an hour before the storms impact.

If there is a possibility that students will be traveling during the storm, delay their departure until after the storm has passed. Buses **“do not provide protection”** from severe storms, so you should provide adequate time for students to get home.

***It is not advisable for parents to go to the school to pick up their children in severe weather. Children are far safer at the school with the severe weather plan in place than on the road when a storm strikes.***

## **F. School Bus Driver Actions**

All school bus drivers should be trained on how to handle severe weather situations. Two primary concerns are flash floods and tornadoes. Additional thought should be given to high wind situations (thunderstorm or other), unexpected heavy snow or ice, and extreme heat or cold. Heavy snow and extreme cold are covered in Section 3. In most situations, these events are forecast in advance, but there are times when they may catch you by surprise.

### **1) TORNADOES - NEVER ATTEMPT TO OUTFRAN A TORNADO!**

If a bus driver has reason to believe a tornado is approaching, the following steps should be taken:

1. If you have the time to get the students to a well-constructed building, then certainly do so as fast as possible. Move them into the interior or basement of the building away from windows and doors.
2. If no well-constructed building is available for shelter, then look for a ditch or low lying area (preferably without water). Stop the bus downwind from the location you have selected. You do not want the wind to roll the bus toward where the students will be. Unload the students and move them to the ditch or low-lying area and have them get in the protective position with their hands over the head.



## 2) FLOODING - **NEVER ATTEMPT TO DRIVE THROUGH FLOOD WATERS!**

If your bus route takes you across small streams and creeks or along a river, you need to have either an alternate route to travel or a contingency plan to return to the school, should flood-waters be encountered. Major river flooding generally is well forecast with warnings issued early enough that school officials can plan their strategy prior to placing the students on the bus. **Flash flooding** (a sudden and dramatic rise in water levels leading to flood conditions) does not lend much warning time (by definition). **Drivers need to understand what to do and what not to do.**

A shallow ponding of water on the roadway is usually not a problem, but as soon as the depth of the water comes into question, particularly in cases where the road may have been undermined, drivers should not enter. Do not enter underpasses that are filling with water. If the water appears to be flowing (moving across the road), do not enter the water.

Water levels can rise rapidly, and the force of that water against an automobile, even a bus, can be amazingly powerful. If the driver is caught in an unavoidable situation, seek higher ground immediately. **If the bus stalls, and water is rising, abandon the bus and seek higher ground before the situation worsens.**

## 3) EXPOSURE TO EXCESSIVE HEAT

While most heat waves hit when school is not in session, temperatures can occasionally soar into the 90s in May, June, and September. Like wind to cold, humidity adds to the effects of heat. A **"heat index"** is used to combine these effects. The National Weather Service will issue a heat advisory when the **"heat index"** is expected to reach 105F and an excessive heat warning when it is expected to reach or exceed 115F. At temperatures of 105F and greater, heat disorders such as cramps, heat exhaustion, and heatstroke are possible. Students should be kept out of the sun and strenuous activities should be eliminated. Encourage students to drink plenty of water and wear light-colored, lightweight clothing. School staff should familiarize themselves with the symptoms of heat disorders and first aid procedures.

On hot, humid days, some children may have difficulty handling the heat. They may be boarding the bus from an athletic event or coming from a hot classroom. Also special attention should be given to outdoor practices and athletic events during the heat. This is especially true for football, which requires children to practice in pads during the heat of late summer. This could become deadly if the children aren't properly supervised and attended to. A child may be dehydrated and starting to show signs of heat exhaustion. Drivers, coaches and monitors should be taught to recognize symptoms of heat stress. Additional information can be obtained from the National Weather Service Office of Climate, Water, and Weather Services at <http://www.weather.gov/om/heat/index.shtml> .

### **G. Need for Periodic Exercises and Severe Weather Safety Instruction**

In order to have an effective severe weather emergency plan, you must have periodic severe weather exercises and severe weather safety training. Exercises not only teach students and school personnel the actions they need to take, they allow you to evaluate your plan's effectiveness. Did everyone hear the message? Did they understand what to do? Were they able to get to the designated areas of safety in a reasonable amount of time? It is suggested that you conduct such exercises in conjunction with a severe weather education and awareness program, so that students and teachers understand the dangers of severe weather and better comprehend the actions that they are asked to take.

The New York State Office of Emergency Management and the NWS, hold statewide “**Severe Weather Awareness Week**” campaigns respectively each May. These campaigns educate the public about tornado and flood safety. State and county emergency management offices, the NWS, and the news media participate in both campaigns. This may be an opportune time for your school to conduct an exercise. Contact Mr. Steve DiRienzo at NWS Albany if you would like more information on these awareness campaigns and how your school can participate in a severe weather safety drill. In addition, we also can arrange to have a severe weather safety presentation at your school. These presentations are an excellent way to educate students and staff alike on the dangers of severe weather and are a *free* public service offered by the NWS.

It is also suggested that your school conduct an exercise each September. This will instruct new students on procedures and act as a refresher for returning students. While severe thunderstorms and tornadoes are often perceived as a uniquely “*springtime*” event, outbreaks of severe thunderstorms and tornadoes in October and November are not uncommon. For example, a confirmed tornado occurred during the early morning hours in Columbia County on November 17, 2010.

## **SECTION 3: DESIGNING YOUR WINTER WEATHER EMERGENCY PLAN**

Winter weather claims nearly 100 lives annually, more than lightning, hurricanes, or tornadoes. Winter storms are considered to be deceptive killers because most deaths are indirectly related to the storm. People die in traffic accidents on snow or ice covered roads, from hypothermia due to prolonged exposure to cold, and from heart attacks due to overexertion. About 70% of the deaths occur in motor vehicles accidents, and nearly 25% are from exposure to snow and cold. These statistics indicate the need for a winter weather preparedness plan for schools. This section provides the framework for organizing such a plan.

### **A. How to Get Winter Weather Information**

Unlike severe thunderstorms, winter storms are generally slow in developing, often taking one to three days to mature. This does not in any way diminish their importance, nor their potential for causing loss of life and destruction. What it does mean is that the NWS is often able to provide advance notice of winter storms, in some cases, lead times of one to two days.

As with severe weather information, the fastest, most accurate and reliable means of receiving critical weather information at your school is through a NOAA Weather Radio with a "**tone alert**" feature.

The internet is also an excellent way to receive longer fused winter weather watches, warnings, advisories and outlooks. The following are some important recommended web sites:

<http://weather.gov> National Weather Service nationwide web site.

<http://weather.gov/albany> National Weather Service Albany, NY

In winter weather situations, listen or look for the following:

#### **1) HAZARDOUS WEATHER OUTLOOK**

Discussed in Section 1.A.

#### **2) WINTER STORM WATCH**

This means that hazardous winter weather due to various elements such as heavy snow, sleet, or ice accumulation from freezing rain are a possibility, NOT a certainty. In our region, heavy snow means an average of 7 inches or more of accumulation in 12 hours or less (or 9 inches in 24 hours). A "WATCH" is a long range prediction and is typically issued 24 to 72 hours before the hazardous winter weather is expected to begin. If the storm becomes imminent, the watch will be upgraded to a "WARNING".

### **3) WINTER STORM WARNING for heavy snow**

An average of seven inches or more of snow is expected to fall within a 12 hour period (or 9 inches in 24 hours).

### **4) WINTER STORM WARNING and/or ICE STORM WARNING for severe icing**

Heavy accumulation of ice due to freezing rain will down trees and power lines. Electricity or telephone communications may be out for a long period of time. Roads may become impassable for most vehicles.

### **5) WINTER STORM WARNING**

This is issued when a dangerous combination of heavy snow, mixed with sleet and/or freezing rain, is expected to occur. In addition, winter storm warnings are issued for a combination of heavy snow, dangerously cold wind chills and/or considerable blowing and drifting snow.

### **6) BLIZZARD WATCH**

This means that hazardous winter weather due to a combination of snow and wind are a possibility, NOT a certainty. A "WATCH" is a long range prediction and is typically issued 24 to 72 hours before the hazardous winter weather is expected to begin. If the storm becomes imminent, the watch will be upgraded to a "WARNING".

### **7) BLIZZARD WARNING**

This is issued for a combination of strong winds averaging or frequently gusting to, or above, 35 miles an hour and very low visibility due to blowing or falling snow. These are the most dangerous winter storms and can be especially severe when combined with temperatures below 10 degrees.

### **8) HIGH WIND WARNING**

This means the expected winds will average 40 miles an hour or more for at least 1 hour or wind gusts will be greater than 58 miles an hour. Trees and power lines can be blown down. A High Wind Warning may be preceded by a HIGH WIND WATCH if the strong winds are only a possibility and at least 12 hours away.

### **9) WIND CHILL WARNING**

This means life-threatening cold with wind chill temperatures computed to be at least -25 degrees or less for at least 3 hours. Exposure to this combination of strong winds and low temperatures without protective clothing will quickly lead to frostbite, hypothermia and even death.

### **10) WIND CHILL ADVISORY**

This is issued for cold temperatures and winds, with wind chill temperatures computed to be at least -15 degrees or less for at least 3 hours. Exposure to

this combination of strong winds and low temperatures without protective clothing can lead to frostbite, hypothermia, or even death.

**11) WINTER WEATHER ADVISORY for snow**

An average of 4 to 7 inches of snow will fall within a 12 hour period.

**12) WINTER WEATHER ADVISORY and/or FREEZING RAIN ADVISORY for freezing rain/freezing drizzle**

Small accumulations of ice due to freezing rain and freezing drizzle will cause roads to become slippery creating significant inconveniences. All it takes is a small amount of ice to make roads hazardous.

**13) WINTER WEATHER ADVISORY**

This is issued for a combination of snow, sleet and/or freezing rain. Winter weather advisories are also issued for a hazardous combination of falling snow and/or blowing and drifting snow.

**14) WIND ADVISORY**

This is issued for average wind speeds between 31 and 39 miles an hour, or for frequent wind gusts between 46 and 57 miles an hour.

**THERE ARE OTHER WINTER WEATHER HAZARDS UNIQUE TO SPECIFIC PORTIONS OF OUR REGION:**

**15) LAKE EFFECT SNOW WARNING**

This is issued when snow squalls/snow showers originating from the Great Lakes are expected to accumulate an average of 7 inches or more in a 12 hour period. This is similar to a Winter Storm Warning for Heavy Snow, except Great Lakes induced squalls/showers occur in narrow bands and over limited areas. Lake effect snow squalls/showers can occur quite suddenly and cause blizzard-like conditions. A LAKE EFFECT SNOW WATCH may precede a lake effect snow warning when the possibility of heavy lake effect snow exists and is more than 12 hours away.

**16) LAKE EFFECT SNOW ADVISORY**

A Lake Effect Snow Advisory is issued for Great Lakes' induced snowfall in New York averaging 4 to 7 inches in a 12 hour period. Blowing and drifting snow is also common in relatively limited areas and in narrow bands.

**17) SPECIAL WEATHER STATEMENT**

A Special Weather Statement (SPS) is issued for short-fused hazardous winter weather situations. These could include times when snow is falling at intense rates (greater than 1 inch per hour), such as during lake effect snow storms.

The National Weather Service issues Short-Term Forecasts (NOW) that keeps you abreast of the latest information on winter storms. The Short Term Forecast provides detailed up-to-the-minute information on snow and ice storms as well as lake effect snow squalls. When conditions are changing rapidly, the Short Term Forecast will have the most up-to-date weather forecast information. *Currently, the National Weather Service is experimenting with Enhanced Short Term Forecasts which provides routine updates more frequently. This would replace the Short Term Forecast product for most situations.* The NOAA Weather Radio "**tone alert**" feature will always be used for blizzard warnings, but may or may not be used for the other warnings listed above, so do not forget to periodically monitor the NOAA Weather Radio broadcast for winter weather information which may not be tone alerted.

If your school is not in a reliable NOAA Weather Radio listening area (due to interference from mountains or other sources), reference Section 2.A for some suggested alternatives.

### **B. Alerting Students and Staff to Take Action**

For information on alerting students and staff to take action, reference Section 2.B.

### **C. Determining When to Activate Your Plan**

When deciding to activate a plan, you must use as much information as possible about the type of winter storm, the expected impact, and the time of impact on your school district.

For most winter storms, the primary decision will be whether to cancel, delay, or hold classes as usual. In **watch** situations, immediate action will usually not be required. When a **warning or advisory** is issued, however, NWS products and weather conditions should be monitored closely.

When a warning or advisory is issued, the current weather situation must be assessed. The forecast in effect, current weather conditions, and road conditions all need to be considered. One way to gauge road conditions is to find out if a snow emergency has been declared by the county Emergency Management office.

Current and forecast weather, as discussed above, can be received via NOAA Weather Radio, local television and radio stations, cable television and wireless devices. Road condition information can be obtained from local law enforcement officials, city transportation officials, and the State Department of Transportation offices. Additionally, some school districts will send out "**drivers**" or have "**security teams**" to check road conditions.

### **D. Determining When to Cancel or Delay Classes**

You will want to consider canceling or delaying classes whenever a warning or advisory has been issued. There are two primary considerations:

1) How much time do you have before the storm impacts the area? Not only must students be transported to school safely, but also back home. If, for example, a major ice storm will hit around noon, then is it worthwhile to hold classes as scheduled, only to have to dismiss early? In such a case, not only would the buses have to run on icy roads, but some children would have to be picked up by car or walk to their home; and,

2) What kind of an impact will the storm make? A major ice storm or blizzard could make roads nearly impassable, while a snow of just a couple of inches might have only a minimal effect on transportation of students to and from school, likely causing only small delays.

In all cases, it is the **safety** of the students that is of paramount importance. All decisions must be based on protecting each student.

## **E. School Bus Actions**

All school bus drivers should be trained on how to handle winter weather conditions. Most winter storms are forecast well in advance, but there will be times when travel will be required during severe winter storms.

### **Heavy Snow**

Heavy snow can leave roads nearly impassable, especially when combined with strong winds (i.e., blizzard conditions).

#### School bus drivers should:

- Be familiar with alternate routes.
- Stay up to date on the latest forecast.
- Maintain communication with proper school officials.

### **Ice Storms**

Freezing rain can make travel nearly impossible. In addition, heavy accumulations of ice can bring down trees and utility lines, creating additional hazards.

#### School bus drivers should:

- Remain alert for downed trees, utility lines, and other road hazards.
- Be familiar with alternate routes.
- Stay up to date on the latest forecast.
- Maintain communication with proper school officials

### **Extreme Cold**

Like humidity to heat, extreme cold temperatures in our area can reach -40 degrees without wind. However, increased winds only enhances to the effects of cold. The National Weather Service will issue a wind chill advisory (potentially dangerous if proper precautions are not observed) for “**wind chills**” of -15F to -24F. A wind chill

warning (unusual and significant danger) will be issued for “**wind chills**” of –25F and below. The wind chill is meant as a precautionary guide as to how warmly you need to dress when going outside. The goal of this precaution is to prevent frostbite and hypothermia. Wearing proper layered clothing including hats, boots, and mittens can reduce the risk substantially even at very cold wind chills. During cold wind chill days, it is not advisable to wait for the Advisory and Warning levels before employing safety precautions such as opting to keep children indoors during the school day. If children are taken outdoors, even for short periods, they should be closely monitored by adults trained to recognize early signs of frostnip, frostbite, or hypothermia. If children develop symptoms, they should be properly treated and all children brought indoors immediately. Additional information on wind chill can be found at: <http://www.nws.noaa.gov/om/windchill/index.shtml>

Children awaiting the school bus in the morning, standing exposed to the cold and wind at recess or during an outdoor athletic event or practice may develop hypothermia if not properly clothed. ***School bus drivers, coaches and monitors as well as teachers should be taught to recognize symptoms of hypothermia and frostbite.***

#### **F. Need for Winter Weather Safety Instruction**

In order to have an effective winter weather emergency plan, you must have winter weather safety training. Both school staff and students need to be educated. This education will help students and staffs understand the dangers of winter weather and better comprehend the actions that should be taken. Winter weather presentations are available from NWS Albany. Please Contact Mr. Steve DiRienzo.



## **APPENDIX A. Severe Weather Safety Plan Checklist**

Use the following checklist for the evaluation or design of a severe weather safety plan for your school. The plan should be designed so that teachers and students anywhere on the school grounds can be quickly alerted and follow a preset plan of action to maximize safety.

**1) Who is responsible for activating the plan? Is there a back-up?**

**2) What is/are the primary means of receiving severe weather information? NOAA Weather Radio with an alert feature and battery backup is recommended (found in electronic stores costing approximately \$30-80).**

**3) What method do you employ to alert teachers and students? Is there a back-up that does not require electricity? (Electricity may be lost as the storm approaches).**

**4) Subscribe to NY-Alert or iNWS for text alerts.**

**5) Make provisions for the following problem areas:**

a) Students that are in mobile classrooms that may be far from the main building and that may be disconnected from an intercom system.

b) Students that may be in the cafeteria or gymnasium during the storm.

c) Learning-disabled students, or any other students who may be in a position to not hear the warning or alert or be able to respond on their own accord. Assign a teacher to each student with special needs, ensuring that the student arrives at a place of safety.

d) Students who are outside, including after-school activities. Remember, if you are close enough to hear thunder, then you are close enough to be struck by lightning. Also, students who are outside are at risk from the dangers of large hail and severe thunderstorm winds.

e) Before and after school events.

**6) Four main problems for schools in a tornado and strong winds:**

a) Forces caused by winds and the airflow around the building.

b) Forces caused by other objects (debris) impacting school walls.

- c) Gas leaks and electrical hazards after the storm. Have someone knowledgeable in turning off gas and electricity at the school during school hours if appropriate.
- d) "Wind Tunnel Effect" - When blown by tornado-strength winds, debris (such as fragments of glass, wood, and metal) can cause serious injury when accelerated by relatively narrow hallways in schools.

**7) Safest places to be in a school: (assuming no underground shelter)**

- a) Interior hallway on the lowest level.
- b) Away from windows.
- c) In a small room, such as a bathroom, surrounded by load-bearing walls.
- d) In a room without small objects that can serve as projectiles (such as tableware).

**8) Some other aspects of designing a plan:**

- a) Practice your plan. Have drills semi-annually (Fall and Spring).
- b) Include severe weather safety instruction as part of the drill period.
- c) Encourage your staff to develop a plan for their families at home. The American Red Cross has brochures on developing a "Family Protection Plan."
- d) Encourage administrators and faculty to attend severe weather spotter classes at no additional cost.
- e) It is recommended that an engineer and the local school board should participate in the design of an emergency plan. The emergency plan should respond to increasing severity of weather, beginning with the Hazardous Weather Outlook.
- f) Encourage administrators to contact the nearest National Weather Service Office or Local Emergency Services Coordinator for assistance in answering ANY questions that may arise.

**APPENDIX B. Web Sites of Interest**

Lightning Safety	<a href="http://www.lightningsafety.noaa.gov/">http://www.lightningsafety.noaa.gov/</a>
Turn Around - Don't Drown	<a href="http://tadd.weather.gov/">http://tadd.weather.gov/</a>
NY-Alert	<a href="http://www.nyalert.gov/">http://www.nyalert.gov/</a>
Interactive NWS (iNWS)	<a href="http://inws.wrh.noaa.gov/">http://inws.wrh.noaa.gov/</a>
NOAA Education	<a href="http://www.education.noaa.gov/">http://www.education.noaa.gov/</a>
NWS Jetstream Education	<a href="http://www.srh.noaa.gov/jetstream/">http://www.srh.noaa.gov/jetstream/</a>
National NOAA Weather Radio	<a href="http://www.weather.gov/nwr/">http://www.weather.gov/nwr/</a>
Regional NOAA Weather Radio	<a href="http://www.erh.noaa.gov/nwr/ny/">http://www.erh.noaa.gov/nwr/ny/</a>