

***SEVERE INCLEMENT WEATHER PLAN
FOR NORTH CAROLINA
PUBLIC TRANSPORTATION SYSTEMS
MODEL TEMPLATE***

Prepared for:

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Introduction

This template is designed to provide a model for a Severe Inclement Weather Plan for voluntary use by North Carolina public transportation systems. The template addresses a diverse audience, with differing needs and capabilities. The level of detail that is appropriate for a large urban transit system may be well beyond the needs of a single-county rural transit system.

In addition, North Carolina is a large state that encompasses many different geographic areas with a vast range of severe inclement weather events. Severe inclement weather conditions in coastal areas may differ from conditions in the Piedmont and mountains.

The template may need to be adapted, of course, to reflect local laws, plans, policies, employee agreements or procedures, as well as the likelihood of particular kinds of weather events in the local area (e.g. hurricanes on the coast vs. snow storms in the mountains). In some cases, alternative provisions are provided. As such, the template is intended to provide a menu of possible ideas and language. Each agency is free to pick and choose those provisions that are most appropriate for its own situation.

While inclement weather conditions such as rain, fog, wind, high/low temperatures will always exist, this plan focuses on inclement weather conditions that are sufficiently severe to affect transit operations. Depending on how widespread the severe weather conditions may be, some or all of a transit system's service area (as well as that of neighboring transit systems) may be affected. For the purposes of this document, "severe inclement weather" is defined as follows:

Weather conditions involving rain, snow, sleet, ice, and/or winds of sufficient severity to restrict or prevent normal transportation operations on highways, or threaten the safety of transit passengers and employees. Severe inclement weather conditions may result in flooding, icing, high wind conditions, or blockages of highways that disrupt or prevent normal transit operations. Examples of severe inclement weather include snow and ice storms, hurricanes, nor'easters, and tornadoes.

Although there will sometimes be some overlap, this template is not meant to cover what are usually referred to as "disasters" wherein a state of emergency may be declared or where emergency management plans and policies are put into effect.¹ However, many of

¹ The North Carolina Emergency Act (NC General Statutes, Chapter 166A) defines *disaster* as "An occurrence or imminent threat of widespread or severe damage, injury, or loss of life or property resulting from any natural or man-made accidental, military or paramilitary cause." It defines *emergency management* as "Those measures taken by the populace and governments at federal, State, and local levels to minimize the adverse effect of any type disaster, which includes the never-ending preparedness cycle of prevention, mitigation, warning, movement, shelter, emergency assistance, and recovery."

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the policies and procedures herein could also come into play even in the event of a disaster—whether or not it’s weather-related.

The template was developed using information from a variety of sources:

- A survey of NC public transportation systems conducted by ITRE and the inclement weather plans and policies that were collected as part of that effort.
- Plans and policies obtained from transit systems elsewhere in the country.
- Plans and policies obtained from various school systems and emergency management operations in NC and beyond.

In addition, three documents were particularly helpful:

- *Public Transportation Security, Volume 7: Public Transportation Emergency Mobilization and Emergency Operations Guide* (Transit Cooperative Research Program Report 86, 2005).
- *Transit Emergency Planning and Response Assessment Initiative*, Center for Urban Transportation Research, Tampa, Florida, September 2005.
- *North Carolina System Safety Program Plan Resource Manual*.

For additional resources, see the references at the end of this document.

Model Plan Components

Recommended information to include in a severe inclement weather plan:

- A brief description of the purpose of the plan
- The goals to be achieved through implementing the plan
- The applicability of the plan—to whom it will apply
- A definition of severe inclement weather events—what are the conditions that will trigger operating under the auspices of the plan
- Coordination with other agencies—local law enforcement/public safety, city/county departments, other transit systems, etc.
- Staff roles and responsibilities—who is to do what, once the plan is in effect
- Policies and procedures to take place once the plan is in effect
- Testing the plan—how often, types of training involved, etc.
- Updating the plan—the procedures to maintain the plan and ensure that it meets changing conditions

The following template language is organized as follows. Suggested plan language is in regular type and font. (*Informational or explanatory guidance is in parentheses and is italicized.*) [PLACES TO INSERT THE NAME OF YOUR AGENCY, ANOTHER AGENCY, A NAME/TITLE, APPROPRIATE TIME, ETC. ARE CAPITALIZED IN BRACKETS.]

Severe Inclement Weather Plan Template

Purpose

The purpose of this plan is to provide information, policies and procedures for transit system personnel to use in the event of severe inclement weather conditions to protect transit employees, passengers and property. It describes the underlying goals of the plan, the definition of a severe inclement weather event, the responsibilities of various transit system personnel, appropriate coordination activities with other agencies, and procedures for testing and updating the plan.

Goals

(An Inclement Weather Plan could have a number of different goals. Whatever goals are adopted by the agency should be made clear at the beginning of the plan.)

The goals of this Inclement Weather Plan are, in order of importance:

- To ensure the safety of riders and transit system employees
- To protect public transportation vehicles and facilities
- To continue service to the extent feasible and safe
- To provide information to the public

Applicability

These policies and procedures apply to all full-time, part-time and part-time temporary personnel.

Definition of Severe Inclement Weather Conditions/Events

For the purposes of this document, “severe inclement weather” is defined as follows:

Weather conditions involving rain, snow, sleet, ice, and/or winds of sufficient severity to restrict or prevent normal transportation operations on highways, or threaten the safety of transit passengers and employees. Severe inclement weather conditions may result in flooding, icing, high wind conditions, or blockages of highways that disrupt or prevent normal transit operations. Examples of severe inclement weather include snow and ice storms, hurricanes, nor’easters, and tornadoes.

Information on the most common types of severe inclement weather is contained in Appendix 1.

Interagency Responsibilities/Coordination with Other Agencies

(In this section, key responsibilities of and coordination procedures with various local agencies during a severe inclement weather event are to be spelled out. This might include local law enforcement, fire department/rescue squads, or emergency management agencies. These relationships can include the development of formal agreements such as Memorandums of Understanding (MOUs) or Mutual Aid Agreements between the agencies involved. See Appendix 2 for a list of items that could be included in a MOU.)

(Some examples of activities that may be addressed through formal or informal agreements are listed below.)

The primary responsibility for continuing transit service during inclement weather lies with [NAME/TITLE/AGENCY].

The [AGENCY/DEPARTMENT] is responsible for advising the Transportation Director/Administrator/Coordinator of storm warnings in as timely a manner as possible so that preparations can be made to ensure continued transit service.

The [AGENCY/DEPARTMENT—for example, City's/County's Emergency Communications Center] shall advise the Transportation Director/Administrator/Coordinator of storm warnings in as timely a manner as possible. If driving conditions decline to the extent that bus service must be altered, the Transportation Director/Administrator/Coordinator will advise the City/County [TITLE] of his/her recommendations for continued service.

The [AGENCY/DEPARTMENT] will be responsible for performing snow removal or control in accordance with the City's/County's Standard Procedure # ____.

The [AGENCY/DEPARTMENT] will be responsible for preparing press releases and contacting all media regarding bus services during inclement weather.

The [AGENCY/DEPARTMENT] will be responsible for placing sand and/or other de-icing materials on the pedestrian areas at the [NAME OF PLACE(S)] during normal transit operating hours. Normal transit operating hours are defined as [DAYS/TIMES].

The Transportation Director/Administrator/Coordinator is responsible for keeping the City/County [TITLE—for example, Manager] fully advised of the status of transit service during inclement weather.

The Transportation Director/Administrator/Coordinator is to continue monitoring transit routes and advise the City/County [TITLE] of any changes in conditions and recommendations for service changes. He/she shall submit a written report to the [NAME/TITLE] on service changes, disruptions, incidents, etc., following the period of inclement weather.

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Human service agencies whose services are affected by the decision to cancel or delay the start of service will be contacted no later than [TIME]. In turn, the agencies will notify scheduled private-pay passengers as necessary and practical.

For Rural Services:

Any agency with whom [TRANSIT AGENCY NAME] contracts for client transportation that opens late or closes early must contact the [TRANSIT AGENCY NAME] scheduling office [PHONE NUMBER] to reschedule transportation services for their clients who are transported by [TRANSIT AGENCY NAME]. [TRANSIT AGENCY NAME] will make every effort to accommodate the agency's request in view of previously scheduled services. Each agency should designate one person to call [TRANSIT AGENCY NAME] with their late openings/early closings. If such notification is not provided, any trips completed by [TRANSIT AGENCY NAME] will be billed to the agency as "no shows."

It is recommended that each agency provide [TRANSIT AGENCY NAME] with a written copy of their inclement weather policy, if available, and/or provide a phone number and contact person to place on file in the event of a severe inclement weather situation.

Internal Policies and Procedures

Policies

- Staff Reporting for Duty
- Continuation/Suspension of Service
- Route Changes
- Right to Cancel Service
- Compensation
- Testing the Plan
- Updating the Plan

1. Staff Reporting for Duty

(Expectations should be made clear to all employees, and, if mandatory, should be included in job descriptions. If voluntary, it is suggested that prior commitments be obtained in writing in order to ensure proper staffing during an inclement weather event. If transit services are operated by a management corporation, be sure to include a policy that ensures that adequate staff of that company will be available prior to, during, and following a severe weather event.)

All staff scheduled must report to work as soon as safely possible. Unless closed by [NAME/TITLE], [TRANSIT AGENCY NAME] should be considered to be open during normal operating hours and all staff are responsible for their regularly assigned duties. It is recognized that in some cases travel may be hazardous even though closing is not

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warranted. In those cases, everyone is advised to take all reasonable precautions in coming to work given his/her personal circumstances.

[NAME OF MANAGEMENT CORPORATION] will provide adequate staffing to answer additional transit information telephone calls that may occur during a severe inclement weather event.

Note: If government officials are making public statements about staying off the streets “unless there is an emergency,” essential transit system employees should still report to work unless informed to the contrary.

2. Continuation/Suspension of Service

Suggested policy for urban fixed-route systems that experience inclement winter weather:

Bus service will be continued to the degree possible, consistent with reasonable safety, during any inclement weather conditions. Rather than discontinuing service in total, service may be curtailed on minor streets or in areas that are impassable. Service will continue to operate along thoroughfare portions of normal routes that are normally kept open by plowing or salting.

It may be necessary to temporarily discontinue service in cases of heavy sleet or ice, when major thoroughfares are glazed and temperatures are such that glazing is not likely to disappear. Service may also need to be temporarily discontinued in the case of snowstorms, where the accumulation of unplowed snow on major thoroughfares has reached the point that buses cannot maneuver safely. Such discontinuation of service shall be as brief as possible and subject to the approval of the [TITLE OF POSITION/PERSON].

The establishment of transit service detours will be based upon a recommendation of the Transportation Director/Administrator/Coordinator to the City/County [NAME/TITLE].

Standard inclement weather detours, as listed in the Appendix (see Appendix 3 for an example), will be printed in brochures and made available to transit riders during the winter months. Service detours will be released to the media during any specific storm condition. These include “abbreviated routes” (where bus service has been curtailed in certain areas which have caused hazardous driving conditions), and “major thoroughfare routes” (when driving conditions have become so severe that buses can run only on the major roads).

Suggested policy for rural systems:

As a general rule, [TRANSIT AGENCY NAME] will generally follow the lead of the county school bus service. If school bus service is delayed in the morning, or is cancelled for the day, then [TRANSIT AGENCY NAME] service will also be delayed or cancelled. The [NAME/TITLE—Transportation Director/Administrator/Coordinator] will contact

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the county emergency management director no later than [TIME] for a recommendation on the safe transportation operation for the day.

Priority will be given to returning people home, and those who have serious medical needs (e.g. dialysis patients). Requests for urgent medical rides and life-sustaining medical trips should not be provided by private cars in inclement weather. Appropriate referrals should be made to other modes including ambulances. If the trip is not urgent or life sustaining (e.g. dialysis), riders should be encouraged to reschedule.

3. Inclement Weather Service Alternatives

(Particularly for fixed-route service, it may be appropriate to define alternative service levels or routes in the event of serious snow or ice conditions. For example:

Level 1. Snow and Ice Routes—Regular. All routes will be operated. However, side streets on which the bus must travel will be detoured and only the main streets on all the bus routes will be served. Passengers on side streets will have to walk out to these streets for service.

Level 2. Snow and Ice Routes—Limited. Only Saturday service will be operated. Side streets will be detoured until conditions improve. Passengers on side streets will have to walk out to the main streets for service.

Level 3. No service.

More specific information about streets on which service would be operated and streets which would be detoured can be spelled out in an appendix.)

4. Right to Cancel Service

[TRANSIT AGENCY NAME] will make every effort to ensure that service can be provided as requested; however, the safety of passengers and drivers will not be compromised. Therefore, [TRANSIT AGENCY NAME] reserves the right to contact any agency or passenger in order to revise, cancel or reschedule trips in the event of severe inclement weather conditions.

5. Compensation

(A good plan will include a policy on whether and how employees will be paid if service is delayed, curtailed or cancelled. Make sure that compensation policies don't penalize employees who respond to storm events, e.g. employees who work overtime because of a storm should be paid for it. Note: In some cases, compensation and related issues must become part of a collective bargaining agreement. Depending upon the specifics, it may be necessary for some of this to be negotiated by the Management Company and the bargaining unit.)

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For full-day closing:

Paid weather-related time due to closing will be limited to an amount equal to the hours that the employee was scheduled to work or would normally have worked on the day in question. If an employee has reported to work prior to the decision to close being made, weather-related time will only bring an employee up to the amount of their scheduled or normal working hours for that day.

For partial-day closing (delayed opening/early closing):

In the event that normal reporting time is delayed, employees working that day will receive paid time for the period between their scheduled or normal reporting time and the rescheduled reporting time. In the event of an early closing time, those employees working that day will receive paid time between the rescheduled closing time and their scheduled or normal closing time.

However, employees who are on leave, have called in sick, have made a decision to take annual leave, or in the case of non-leave earning employees, have called prior to a decision to alter operating hours to advise that they will not be reporting to work, would not be eligible for additional time. Weather-related time will not extend employees' time beyond eight hours on the rescheduled day, nor is it considered holiday time available to those who were not scheduled to work on the day in question.

Overtime compensation:

Employees who are required to work additional time past their scheduled shift will be compensated per the [TRANSIT AGENCY NAME] compensation policy. Employees who are designated as essential and required to respond during a severe inclement weather event will be compensated per the [TRANSIT AGENCY NAME] compensation policy.

6. Testing the Plan

[TRANSIT AGENCY NAME] will test the severe inclement weather plan at [TIME] intervals. All key personnel will be involved in the test. [NAME/TITLE] will be responsible for conducting tests of the plan, and notifying other agencies that are involved in coordinating severe weather actions with the transit system.

7. Updating the Plan

[TRANSIT AGENCY NAME] will update the severe inclement weather plan at least [TIME INTERVAL]. [NAME/TITLE] will be responsible for conducting the plan update. Copies of the updated plan will be distributed to other agencies that are involved in conducting coordinated severe weather activities with the transit system.

Procedures

- Staff Roles/Responsibilities.
- Essential Personnel
- Preparation for Severe Inclement Weather Events
- Communicating Within the Transit Agency
- Continuation/Suspension of Service (Demand-response services)
- Response to Specific Types of Severe Weather Events
- Announcements/Communicating With the Public
- Testing the Plan
- Debriefing Following a Severe Inclement Weather Event
- Updating the Plan

1. Staff Roles/Responsibilities

(In this section, spell out the specific responsibilities of key personnel during a severe inclement weather event. The number of such staff and their titles will vary from system to system; when developing your plan, include a description of roles and responsibilities for all key staff, providing redundancy in case some staff are unable to travel to their work location. Some examples follow.)

A decision to close for the day or alter operating hours (open late or close early) due to weather conditions will be made by the [TRANSIT AGENCY NAME]:

1. Transportation Director/Administrator/Coordinator, or, if unable to contact
2. Operations Manager, or, if unable to contact
3. Dispatcher on duty (in conjunction with supervisory staff available for contact)

Drivers must call the [TRANSIT AGENCY NAME] telephone answering system for instructions prior to their manifested trips. Drivers will exercise their discretion and good judgment in cases where isolated hazardous road conditions exist at any time, regardless of other procedures outlined herein.

All drivers and supervisors are to remain on standby and be ready to report to work if called. Each individual is expected to stay by his/her phone or contact [NAME/TITLE] to let them know if they will be away from the phone, for how long, and where they can be reached.

The AM dispatchers should report at least ½ hour earlier than normal when there is ice or snow. If unable to report, supervisors and dispatchers should call [NAME/TITLE] as soon as possible. They should also be ready for pickup by [TRANSIT AGENCY NAME] personnel.

Drivers may also be assigned to non-driving duties, such as answering information calls, clearing bus stops of snow or ice, etc. Any driver refusing to accept non-driving assignments may be sent home without pay.

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Drivers living within five miles of the bus garage and on a state, county or city maintained road may be added to the pickup list. Pickups will only be made if drivers are needed. If needed, a pickup time will be given.

Also, see Appendix 4 for examples of assigned tasks at transit systems.

2. Essential Personnel

(Essential personnel are those personnel that are needed to operate, maintain, and supervise transportation service and to provide necessary customer information. Each designated manager/supervisor must keep an updated copy of the contact phone numbers.)

The following personnel have been determined to be essential:

(The titles of essential personnel should be listed, e.g., Transportation Director, Operations Manager, Bus Operators and Supervisors, Maintenance Manager, Mechanics, Finance and Administration Manager, Communications Officer, etc.)

All other employees will report to their normal workstations as soon as possible and be prepared to assist other departments as necessary.

Adequate staffing will be provided to answer additional transit information telephone calls that may occur during the inclement weather.

3. Communicating Within the Transit Agency

(Transit agencies must be prepared for disruptions in their communication systems during and immediately following severe weather events. Wind damage to radio towers and cell phone towers may temporarily disrupt reliable reception for primary communication systems. Telephone systems may cease to function. Transit agencies should plan for redundancy and expect disruption, and should create hard copies of communications protocols, and back up electronic versions of passenger records and manifests used for paratransit scheduling and dispatching.

The most basic communications need is a list of contact information for all key personnel, in printed form as well as electronic files. Second, there needs to be an efficient method for notifying all transit system personnel of changes in operations in the event of severe inclement weather. A "phone tree" is an example of such a method. Finally, there needs to be multiple means of communicating among transit system staff in the event of a power outage or disruption to cellular phone or radio service.)

- *Contact Information.* [NAME/TITLE] will maintain a list of contact information for all staff, including: names, titles, telephone numbers (office, home, and cellular), email addresses, etc.

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- *Phone Tree.* [NAME/TITLE] will maintain and provide a copy to each staff member the list describing staff responsibilities for notifying all staff of changes to normal operations in the event of severe inclement weather.
- *Paratransit records/manifests.* [NAME/TITLE] will make a backup copy of all paratransit (demand-response) passenger records and manifests [TIME] prior to the onset of a severe weather event.

4. Preparations for Severe Inclement Weather Events

(In this section, describe all activities, both short- and long-term that should be undertaken and completed prior to the onset of a severe weather event.)

To be able to respond effectively to a severe weather event, [TRANSIT AGENCY NAME] personnel will, to the degree possible, prepare prior to the onset of a severe weather event. This will include both short- and long-term actions to increase the safety and sustainability of the transit system's facilities, vehicles, and equipment. Preparatory activities will include *(select from and add to the following, as appropriate)*:

- *Facility Protection.* Analyze transit facilities for any weaknesses that can be corrected, both in the short- and long-term. Install storm shutters where appropriate. [NAME/TITLE] is responsible for checking and securing items stored outdoors to minimize the possibility of them being blown around and damaging facilities, vehicles, or injuring staff. [NAME/TITLE] will be responsible for moving outdoor items that will be moved indoors.
- *Batteries and Electrical Generators.* [NAME/TITLE] is responsible for ensuring that spare batteries for portable radios and cell phones are purchased [TIME] prior to the onset of a severe storm. Spare batteries will be stored [LOCATION].

(If warranted, install a backup generator to maintain key electrical functions in the event of loss of electricity.)

- *Bus Parking and Deployment Strategies.* For weather events that involve high winds or flooding, [TRANSIT AGENCY NAME] will conduct the following strategies to protect its capital equipment: [NAME/TITLE] is responsible for overseeing that buses and/or vans are parked and secured to minimize the possibility of damage to vehicles.
 - a. Move buses out of flood-prone areas. [NAME/TITLE] will arrange for one or more off-site locations. [NAME/TITLE] will specify how much in advance of the onset of a severe weather event (such as a hurricane) vehicles are to be moved, and who is to drive the vehicles and what arrangements will be made to ferry drivers between locations.
 - b. Park buses “nose-to-nose” to minimize windshield damage from flying debris.

(Damage from flying debris can be minimized by installing perimeter fencing.)

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- c. Park the buses inside structurally safe facilities where possible.
- d. Securing engine compartment and front doors so they stay closed during high winds, thereby preventing damage by wind-driven rain.
- e. Avoiding parking near light poles, trees and similar potential hazards.
- *Fueling Fleet and Staff Vehicles Prior to a Storm Event.* [NAME/TITLE] will ensure vehicles are fueled [TIME] prior to the onset of a severe weather event. [NAME/TITLE] will ensure that sufficient fuel stock is delivered to the fueling facility.

5. Response to Specific Types of Severe Weather Events

Tornadoes. If a tornado warning is issued, all employees will be verbally informed immediately. Employees will be instructed to take shelter, when deemed appropriate, in [NAME OF BUILDING OR ROOM].

Hurricanes/High Winds/Flooding. Depending on the hazard, preparations may include: covering equipment with protective covers, storing and protecting critical documents, removing equipment/paper from areas known to flood, and sending employees home before the weather becomes too severe. [NAME/TITLE] will be responsible for overseeing that these precautions have been taken.

Winter Storms. Inclement weather brochures will be placed on buses and in all locations that display route and schedule information no later than [DATE] of each year. In the event weather forecasts suggest snow or sleet, the inclement weather brochures shall be displayed immediately.

High Winds. Vehicles will not be operated when wind speeds exceed either the manufacturers' (original and/or after-market) recommendations or ___ miles per hour.

(High winds may occur by themselves or in conjunction with another type of severe weather, such as a hurricane or a blizzard. The definition of what constitutes "high winds" could vary depending on the type of vehicle, type of terrain, etc. The North Carolina System Safety Program manual (CD) mentions ceasing all operations when wind speeds reach 60 mph. The CUTR document, p.52, mentions wind speeds reported from transit agencies ranging from 30 mph to 50 mph, with the most common being 40-45 mph sustained winds. Check with both the original and after-market manufacturers of your vehicles to determine their recommendations for the maximum safe wind speed for operation of their vehicles. Some vehicles, such as vans that have been modified with a raised roof by after-market manufacturers, should follow the recommendations, if any, of the after-market manufacturer.)

See Appendix 5 for a Winter or Foul Weather Readiness procedure.

See Appendix 6 for more detailed weather response instructions for operating personnel.

6. Announcements/Communicating With the Public

(Storms can disrupt regular communications capabilities. Anticipate such disruptions and create redundant systems where possible. Gear announcements of service changes/cancellations to the media that your customers are most likely to use.)

In the event of inclement weather, [NAME/TITLE] will telephone and/or fax the following media outlets so that both employees and the public will be informed of any service cancellations, delays, or detours (see Appendix 7 for an example).

Radio: *(list stations and contact info)*

Television: *(list stations and contact info)*

Information should also be posted on the [TRANSIT AGENCY NAME] website, and an appropriate message should be put on the telephone weather hotline.

7. Communication with Contracting Agencies (Demand-response Services)

If severe inclement weather occurs during the day, the following procedures will be in effect:

- Dispatch staff of [TRANSIT AGENCY NAME] will call contracting agencies to advise that [TRANSIT AGENCY NAME] will be picking up passengers [TIME] earlier than scheduled.
- Contracting agencies are responsible for calling family members to make sure that a family member will be at home when the passenger will be dropped off early due to severe inclement weather closings.
- Administrative staff will call any general public demand-response passengers that are scheduled after the early closing decision has been made to notify them that they will not be picked up as scheduled.

8. Debriefing Following a Severe Inclement Weather Event

(Post-event debriefing is a process that reviews the operations during the event and how procedures may be improved. A debriefing should include a systematic account of the event and a review and evaluation of the effectiveness of procedures. The process should include a review of the following:

- *Initial understanding of the event—was the information accurate? Complete? Were there misunderstandings/confusion?*
- *Initial actions—were the correct first steps taken? What else should have been done? What would better be done differently?*
- *Results of actions—were the intended results achieved? Were there any unintended consequences of the actions? Improvements?*
- *Obstacles encountered—what? Who? Why?*
- *What worked well and why—what went well? Do we know why?*

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- *Recommendations for improvement—what lessons were learned? What policies and/or procedures need to be amended? Is additional training needed? How well did communications work?)*

Staff should keep notes or logs of what happened during a severe weather event. As soon as possible after the event, [NAME/TITLE] will conduct a debriefing session with key personnel in order to discuss and document what went right, what went wrong, and what lessons were learned. This information will be used to revise the Severe Inclement Weather Plan where necessary.

9. Testing the Plan

(Agencies should conduct regular staff training, for both new and current employees, that provides a thorough explanation of the agency's inclement weather plan, details of the duties and responsibilities of each employee, and provides the employees with the necessary training to successfully implement the plan. In addition, mock training drills should be conducted periodically at the agency level, and, as appropriate, should involve other local and state agencies as well. This provides a means to assess whether or not transit agency employees understand the agency's inclement weather plan and the critical interrelationships with community partners and passengers, including people with disabilities, older adults, and individuals with limited English proficiency.)

[TRANSIT AGENCY NAME] will use the following procedures to test the severe inclement weather plan.

(The agency should list here the specific steps or actions that will be used to test its plan. For example, just prior to hurricane season a transit agency in a coastal area might conduct a test of its hurricane procedures. At the start of the winter season, a transit agency in a mountain area might perform a test of procedures to be used in the event of a heavy snowstorm.)

10. Updating the Plan

(A specific person should be designated as responsible for plan updates. In addition to reviewing and updating the plan as appropriate following an actual inclement weather event, it is recommended that the plan be reviewed and updated at least once each year. In particular, the contact information for key personnel should be updated on a regular basis.

Questions to consider when updating a severe weather plan include:

- *Are the goals and objectives still applicable?*
- *Are the problems the same? Are they different; and if so, in what way(s)?*
- *Is the plan appropriate for the available resources? Is staff time and the required funding available to implement the recommendations? Do additional sources of funding need to be identified?*

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- *Are there any changes to partners involved in inter-agency coordination? Are there any changes to inter-agency response procedures?*
- *Are there problems with implementation?*
- *Are the outputs/outcomes as expected? Have critical recommendations been implemented?)*

[TRANSIT AGENCY NAME] will use the following procedures to update the severe inclement weather plan.

(At the discretion of the transit system, a description of steps to take in updating the plan can be added here. This should include how often the plan is to be updated, and who [NAME/TITLE] is responsible for ensuring that it is done.)

(Note: It is suggested that each agency develop a severe weather checklist that will help key personnel ensure that appropriate actions are being taken. This can be developed by using the agency's specific Inclement Weather Plan elements as a basis for it. Appendix 8 provides some ideas for a severe weather "pre-event" checklist.)

Emergency/Disaster Management

In the event of an emergency or natural disaster, all scheduled transportation service will be discontinued. Every effort will be made to take those passengers who are in route or at appointments to their homes as quickly as possible. This agency will assist county (or municipal) emergency management services provide emergency transportation in the event of a disaster. The system vehicles will be used to transport disabled and/or elderly persons, and any other citizen needing such transportation, to safe shelters.

(Note: particularly in the event of severe weather that reaches emergency or disaster status, it can be important to have a Memorandum of Understanding/Mutual Aid Agreement with appropriate external agencies—see Appendix 2.)

Selected References/Resources

Adverse Weather Plan, Triangle Transit Authority.

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Appendices

- 1. Severe Weather Terms**
- 2. Items for Consideration in a Memorandum of Understanding**
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Appendix 1

Severe Weather Terms

Flooding—high water flow or an overflow of rivers or streams from their banks that inundates adjacent low-lying areas. Riverine flooding, the most common type of flooding is caused by large-scale weather systems that generate prolonged rainfall over wide areas. More localized weather systems with intense rainfall over small areas cause small rivers and streams to flood. Flash floods are characterized by a rapid rise in water level, high water velocity, and large amounts of waterborne debris.

Hurricane/Nor'easter—low pressure areas of closed circulation winds that originate over tropical waters. Tropical storms have sustained surface wind speed that ranges from 39 to <74 mph and hurricanes have a minimum sustained surface wind speed of at least 74 mph. Hurricanes/nor'easters pose threats from coastal and riverine flooding, high winds, and tornadoes.

Severe Thunderstorms/Windstorms—generated by atmospheric imbalance due to the combination of unstable warm air rising rapidly into the atmosphere, sufficient moisture to form clouds and rain, and an upward lift of air currents caused by colliding waterfronts, sea breezes, or mountains. Severe thunderstorms produce damaging winds or winds greater than 58 mph and/or hail $\frac{3}{4}$ inches or greater in diameter. High winds include sustained wind speeds of 40 mph or greater lasting for one hour or longer, or winds of 58 mph or greater for any duration. Thunderstorms/windstorms can pose threats from tornadoes, hail, intense downburst and microburst winds, lightning, and flash floods.

Tornado—a rapidly rotating vortex of air extending groundward from a cumulonimbus cloud. Wind speeds can reach in excess of 300 mph. Often, tornadoes are related to larger vortex formations, and often form in convective cells such as thunderstorms or in the right forward quadrant of a hurricane.

Winter Storms—cyclonic weather systems that can cause snowstorms, blizzards, and ice storms. Winter storms include ice storms, blizzards, and extreme cold, and can produce an accumulation of snow and ice on trees and utility lines resulting in loss of electricity and blocked transportation routes. Long term loss of utilities can render elderly and extremely young populations more vulnerable to the effects of extreme temperatures associated with these storms. Heavy snow may be defined as an accumulation of four inches or more in 12 hours or less, or an accumulation of six inches or more in 24 hours or less. A blizzard has winds greater than 35 mph and heavy falling and/or blowing snow that reduces visibility to less than $\frac{1}{4}$ mile. Winter storms pose threats from freezing/frozen precipitation that can build up on highways/walkways, winds that can blow vehicles and result in loss of visibility, hazards on highways from fallen tree limbs, utility poles and lines, and exposure to cold temperatures.

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Two terms associated with severe weather are *watch* and *warning*. They can be defined as follows:

Watch—a forecast issued well in advance of a severe weather event to alert the public of the possibility of a particular hazard, such as tornadoes, severe thunderstorms, flash and river floods, winter storms, or heavy snows.

Warning—a forecast issued when severe weather has developed, is already occurring and reported, or is detected on radar. Warnings state a particular hazard or imminent danger, such as tornadoes, severe thunderstorms, flash and river floods, winter storms, etc.

Appendix 2

Items for Consideration in a Memorandum of Understanding/Mutual Aid Agreement

Agreements between agencies should establish a chain of command and define roles and responsibilities as well as financial obligations. There should be a list of personnel involved along with telephone numbers, radio frequencies, and call codes.

The State of North Carolina authorizes the state and its political subdivisions to develop and enter into mutual aid agreements for reciprocal emergency aid in case of emergencies too extensive to be dealt with effectively unassisted.

Mutual Aid Agreements provide the mechanism that enhances and leverages existing capabilities.

A process for creating a Mutual Aid Agreement:

- Establish a working group. This group will review current local, state, and federal laws to clearly identify any limitations to how each party will provide assistance during emergencies;
- Write a draft agreement (unless the law says otherwise) including the terms of the agreement, the participating parties, period of assistance, definitions of disasters or emergencies, and designating an authorized representative who can execute the agreement;
- Identify in the agreement available services and resources, with some specific reference to the type of resources that can and cannot be used. Limitations will be spelled out also, to ensure the resources are not exhausted;
- Identify in the Agreement exactly how to request assistance, for instance, the "trigger" for a request - a local emergency or disaster declaration;
- Explain in the Agreement how the transit agency will request aid, and what the expected committed response would be;
- Identify in the Agreement who can make the request, and whether it should be written or oral. If possible, develop a form clearly explaining what is needed and for what length of time;
- Define in the Agreement operational procedures and explain who will maintain control of the resources provided and who will provide required maintenance for any equipment made available;

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- Make provisions in the Agreement for any food, housing, or communications support required for personnel who respond to an emergency or disaster; and
- Define in the Agreement reimbursable expenses, including personnel, material, and equipment costs and for replacing damaged or destroyed equipment.

Appendix 3

Inclement Weather Route Detours

(This appendix should provide details of where fixed route service will be detoured in the event of various types of inclement weather conditions.)

For example:

Route 1—Green Street. Delete portion of route on Prospect Ave. east of Crescent. Use Maple Street instead.

Route 2—Buncombe Blvd. No change.

Route 3—Mountain Meadow Road. Avoid intersection of Waterlog Way and Rushing River Road. Use Wheelhouse St. to Overton Bridge, then Clearwater Drive back to Mountain Meadow.

Route 4—Downtown Express. As street conditions allow.

Route 5—Brookshire Street. No change.

Etc., etc.

Appendix 4a

Assigned Responsibilities—Inclement Weather

From the Triangle Transit Authority's Adverse Weather Plan...

General Manager

1. Will review the severe weather conditions and forecast and determine the level of transit and paratransit service.
2. Will determine when personnel are to report for work.
3. Will advise the Director of Bus Operations.

Director of Bus Operations

1. Will contact the Maintenance Manager, Transit Manager, and Operations Manager and advise them of the level of service and personnel to report for work.
2. Will advise the Customer Service Supervisor of the revised bus operation hours and schedule changes.
3. Will advise the Systems Administrator to alter schedule on the web page and if assistance with the phone system is needed to reflect the severe weather schedule. Procedures will be maintained so that the phone system can be changed from home. Procedures to change the phone message will be maintained by the Customer Service Supervisor, the Systems Administrator and the Communications Officer.
4. Will advise the Communications Officer of the severe weather schedule.

Maintenance Manager

1. Will ensure that the Bus and Maintenance facility and the Bus Transfer Station are free of ice and snow and are fully operational for the weather condition. If required will arrange for a contractor to handle snow and debris removal. At present, arrangements have been made with Thompson Contracting (919) 779-0065.
2. Will determine the maintenance actions necessary to fuel and maintain buses in accordance with the severe weather schedule.
3. Will, prior to inclement weather season, insure a current inventory is maintained for necessary severe weather equipment, such as shovels, sand, salt, chain saws, etc.
4. Will insure that maintenance personnel verify the operational status of emergency generator and insure all necessary equipment is operational.
5. Other Authority employees, as needed, may be tasked to remove snow, ice and debris from sidewalks, driveways, and parking lots.

Operations and Transit Manager

1. Will work together to develop and maintain an alternative route schedule for severe weather.

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2. Will adjust bus operators and paratransit operators run schedule and routes as outlined by the severe weather schedule.

Customer Service Supervisor

1. Will advise the customer service representatives of the revised bus operation hours and schedule changes.
2. Will be responsible for ensuring that there are enough personnel available to answer customer service calls.
3. Will update and activate the “urgent message” section of the TTA phone menu.
4. Will send an email notice to all individuals registered to receive Severe Weather Email Alerts.

Vanpool Manager

1. Will be prepared to answer questions or to inform vanpools if questions arise as to the service requirements of their individual vanpool
2. Will ensure that the Vanpool Mechanic is available to assist vanpool drivers or bus dispatch as necessary.

Systems Administrator

1. Will be responsible for the operation of all computers, networks, and telecommunications.
2. Will ensure that the TTA web page will be changed to reflect the severe weather schedule.
3. Will provide technical assistance as needed to the Customer Service Supervisor (primary contact) and the Communications Officer (secondary contact) to insure the proper telephone message is recorded and operational.

Communications Officer

1. Will coordinate with the Director of Bus Operations to determine the severe weather schedule.
2. Will advise the following television and radio stations the severe weather schedule:
 - Channel 11, ABC News WRAL TV 5
 - WLFL Fox 22 WNCN 17 NBC
 - News 14 Carolina WUNC Radio/NPR (91.5 FM)
 - FOXY WPTF 680

Director of Finance and Administrative Services

1. Will insure that appropriate personnel are available to process emergency requests for equipment, services, or supplies.
2. Will assist other departments as needed.

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All Other Staff

All other staff will report to their normal workstations as soon as possible and be prepared to assist other departments as necessary.

Appendix 4b

Sample Assigned Duties Instructions

An example from Mountain Mobility, Buncombe County...

Assigned Duties:

- Mamie* Make early determination of system operation status with assistance from Asheville Transit System and dialysis centers.
- Geri* Call WLOS-TV and WWNC Radio and post Mountain Mobility service status.
- Cancel all scheduled subscription trips to closed agencies immediately. Throw trips as necessary to unscheduled route(s) and optimize by 9:30 AM in order to print new routes as needed for time and cost effectiveness.
- Assist with calling passengers and agencies to determine if trips are still to be made.
- Mac* Handle all cancellations as they come in.
 Speak with all drivers calling in regarding work schedules.
- Mickey* Assist drivers with assignment of vehicles and routes.
- Drivers
in office* Assist with answering phones on dispatch lines after being briefed on what to tell callers.
- Drivers
on road* Document properly; make sure and document vehicle # when changed on every page with initial.
- Dispatch* Print copy of school closings listed on www.wlos.com at 9:30 AM and attach same to dispatch log at the end of the day.
 Handle multi-tasks as usual including answering phones and making proper referrals to staff.
- Admin.
Staff* Answer telephones and make calls to passengers as directed by Transit Management to inform them of changes in schedules.

Appendix 5

Winter or Foul Weather Readiness

Advance planning for winter or foul weather conditions help to reduce the risk of being caught unprepared. The following are helpful hints for facility and vehicle preparation:

Facility Preparation

- Confirm all required contractor services and review agreement terms and conditions.
- Conduct contractor safety training.
- Inspect furnace operation and change all required filters.
- Assign employees to specific winter or foul weather maintenance tasks.
- Review all emergency contingency plans.
- Ensure all driveway markers and premise lighting are in good condition.
- Keep replacement “dry” rugs and runners beside door entrances.
- Verify all winter or foul weather equipment or provisions (shovels, maps, ice-melt, sand, etc.).

Vehicle Preparation

- Include winterization and foul weather protection as part of the vehicle preventive maintenance program. (Tires, cooling system, fluid levels, battery, block heaters, wiper blades, heaters/defrosters, etc.)
- Inspect and replenish all vehicle emergency equipment. (May include shovels, tire chains, sand, etc.)
- Provide for emergency communication for out-of-town travel. (Cell phone, two-way radio.)
- Fill all vehicles with fuel (full) prior to the expected bad weather.

Maintain a “Weather Watch”

- Check weather condition reports frequently.
- Advanced planning will reduce winter hazards and foul weather risk.

Adapted from NC *System Safety Program Plan Resource Manual* (CD).

Appendix 6

Response to Weather Emergencies—Operating Personnel

The following is adapted from the *Transportation Services Handbook* of the American Red Cross (Kansas Chapter) and *A Guide to Developing a Severe Weather Emergency Plan for Schools* by Barbara McNaught Watson with the National Weather Service, Baltimore-Washington Forecast Office. Additional adaptation may be appropriate to fit local conditions.

Thunderstorms

1. Dispatcher will notify vehicles with radios of any thunderstorm Watches or Warnings.
2. Keep your radio tuned to local news and weather for advisories and information.
3. Keep your eye on the sky. Look for darkening skies, lightning or increased wind. If you can hear thunder, you are close enough to the storm to be struck by lightning.
4. If a severe storm happens, find shelter in a building or vehicle. Keep vehicle windows closed. A building is much preferred if you can safely get to one.
5. After the storm passes, keep tuned to local radio stations and steer clear of any possible damaged areas.
6. Check in with dispatcher, if possible, for further instructions.

Flash Floods

If it has been raining hard for several hours, or steadily raining for several days, be alert to the possibility of a flood.

- A flood Watch means a flood is possible.
- A flood Warning means flooding has already started or will be occurring soon.

Follow these guidelines for a flood Watch or Warning:

1. If a flood Watch is issued, you will be notified by the dispatcher. Listen to local radio and if told to evacuate a certain area, do so as soon as possible, making every effort to protect yourself and any passengers you may have with you.
2. If a flood Warning is issued, the dispatcher will advise you to return to base immediately, if safe to do so.
3. If there is no time to return to base, move to higher ground away from rivers, streams, creeks and storm drains.
4. Do not drive around barricades because they have been placed there to keep you out of a hazardous area.
5. If your vehicle stalls because of high water, stay in the vehicle and radio for help, particularly if there are passengers with serious mobility impairments (e.g. in a wheelchair). However, if the vehicle is in danger of being swept away, abandon it immediately and assist passengers in reaching higher ground.

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6. Do not drive through floodwaters. They may look shallow, but looks can be deceptive. The swift current of even a few inches of water can sweep your vehicle away and turn it over on its side or top, trapping you and any passengers inside.

Tornadoes

1. When a tornado Watch is issued, stay tuned to local news and weather and keep in touch with the dispatcher.
2. Be alert to any changing weather conditions.
3. When a tornado Warning is issued:
 - a. Go to the lowest floor at the nearest inside shelter, if possible. If there is no basement, go to a center hallway, away from windows, or into a bathroom.
 - b. Never attempt to outrun a tornado.
 - c. Do NOT stay in your vehicle. During tornadoes, your vehicle is one of the worst places to be. If you can get to a well-constructed building (preferably in the basement or an interior room or hallway), do so as fast as possible. If there is no building available and you are outside, go to a low-lying area and lie flat. Or, seek shelter in a ditch or under a bridge. If others are in your vehicle, assist them first.
4. After the storm is over, watch out for fallen power lines and stay out of damaged areas.
5. Establish communication with base for further instructions.

Hurricanes

Hurricanes are essentially large complexes of thunderstorms. Therefore, they include all of the dangers that can come with thunderstorms: lightning, flash floods, downbursts, tornadoes. For coastal areas, there is the added threat of flooding from high tides and the storm surge. Weather forecasters now provide significant advance notice of a hurricane's projected path and location over time. Given the relatively long period of advance notice now typical, preparations for a hurricane should begin well in advance of the storm. If proper preparations have been conducted, transit vehicles will not be operating during a hurricane, nor will transit offices be staffed.

Winter Storms

1. Keep your radio tuned to local news and weather for advisories and information.
2. Be alert to changing weather conditions if you do drive.
3. Wear several layers of lightweight clothing, which will keep you warmer. Wear gloves or mittens and something on your head, which will prevent loss of body heat. Cover your mouth when it is cold to protect your lungs.
4. A winter storm Watch means a winter storm is possible in the area. Please let the Transportation Office know if you are uncomfortable driving with an issued storm Watch. If you do drive, keep your vehicle radio on for dispatcher's instructions, or a cell phone turned on. Keep your radio tuned to local and regional weather.
5. A winter storm Warning means a winter storm is on the way. If you are driving out of town, please check with the Transportation Office to see if your run is still

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scheduled. If you are driving people in town, stay tuned for changing conditions and possible cancellations of your pick-ups and deliveries.

- a. If you get stuck in your vehicle, stay with the vehicle and wait for help. Do NOT try to walk to safety unless you are in town and see an open business you can easily get to.
 - b. As wind increases, so does the possibility of hypothermia. Be sure and cover any exposed skin when out in cold weather.
 - c. Make sure your gas tank is full.
6. A blizzard Warning means strong winds, blinding wind-driven snow, and dangerous wind chills are expected. Keep in touch with the Transportation Office for information.

Appendix 7

Sample Media Notice

(This appendix should provide a template for the information to be provided to the media in the event of some kind of service disruption due to weather. It could even be set up as a standard form with blanks where relevant information can be inserted.)

It should include such information as:

- *Name of agency and contact information.*
- *The day/time of any service delays, curtailments or cancellations.*
- *Relevant information regarding any rerouting or detouring of routes.*
- *The expected time of service restoration (if known).*
- *The agency's telephone number for recorded weather messages, and/or its web address for service updates.*

Also, it could include any information that would be helpful for the public to know about, e.g.:

“Customers should not assume that regular bus or van service will resume just because their local road conditions have improved. Other areas in the county may still be experiencing dangerous road conditions making it unsafe for our drivers to reach customers.”)

Appendix 8

Sample Severe Weather Pre-Event Checklist

A recent study by the Center for Urban Transportation Research (CUTR) contains a number of recommended “best practices” (*Transit Emergency Planning and Response Assessment Initiative*, Center for Urban Transportation Research, Tampa, Florida, September 2005). Although the study was focused on more severe weather emergencies such as hurricanes requiring evacuation, many of the best practices are applicable to less severe weather events as well. Many of these were used as the basis for the following checklist of key actions to take prior to a severe weather event:

- Clarify Staff Expectations and Duties.* Make sure that expectations and duties are made clear to all employees, and, if mandatory, are included in job descriptions. (If voluntary, it is suggested that prior commitments be obtained in writing in order to ensure proper staffing during an inclement weather event.)
- Review Compensation Policies.* Make sure that compensation policies don’t penalize employees who respond to storm events, e.g. employees who work overtime because of a storm should be paid for it.
- Develop Memorandums of Understanding (MOUs) or Mutual Aid Agreements.* Such agreements may be appropriate with other key agencies in the area and in adjoining areas as well. These can formalize and authorize assistance during a storm event and facilitate financial reimbursement afterward.
- Update Contact Information for Key Personnel.* Review all contact information for essential personnel, phone trees, etc. to ensure that they are current. This should include contact information for relevant external agencies.
- Conduct Staff Training and Mock Training Drills.* Ongoing staff training should be conducted, for both new and current employees, to ensure that they know and can perform their roles and responsibilities during a weather event. In addition, mock drills should be held with agency staff, and as appropriate, with other agencies as well.
- Develop Bus Parking and Deployment Strategies.* For example, in weather events that are likely to involve high winds or flooding:
 - Move buses out of flood-prone areas.
 - Park the buses “nose-to-nose” to minimize windshield damage from flying debris.
 - Park the buses inside structurally safe facilities where possible.
 - Secure engine compartment and front doors so they stay closed during high winds, thereby preventing damage by wind-driven rain.
 - Avoid parking near light poles, trees and similar potential hazards.
- Fuel Fleet and Staff Vehicles.* If bad weather is approaching, make sure that adequate fuel is available and that all vehicles are fueled.
- Plan Communications Options.* Storms can disrupt regular communications capabilities. Anticipate such disruptions and create redundant systems where possible.

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- *Stock Spare Batteries and Electrical Generators.* In a storm, electricity may go out so have plenty of spare batteries for portable radios and cell phones, and, if possible, backup generators.
- *Protect Facilities.* Transit facilities are essential both during and after a storm. They should be designed to withstand storms. Current facilities should be analyzed for any weaknesses that can be corrected. Install storm shutters where appropriate.
- *Prepare for a Debriefing.* Staff should be encouraged to keep notes or logs of what happened during the event for use in a debriefing after the event.