

SEVERE FLOODING EMERGENCY PLAN



Chester County Department of Emergency Services
601 Westtown Road, Suite 012
West Chester, PA 19380-0990

Certification of Annual Review

The Chester County Department of Emergency Services has reviewed this Severe Flooding Emergency Plan. The Director of Chester County Emergency Services hereby certifies the review.

Date	Signature

Plan Approval

THIS PLAN IS APPROVED AS THE CHESTER COUNTY SEVERE FLOODING EMERGENCY PLAN. THIS PLAN IS DESIGNED TO COMPLY WITH ALL APPLICABLE COMMONWEALTH AND COUNTY REGULATIONS AND PROVIDES THE POLICIES AND PROCEDURES TO BE FOLLOWED IN DEALING WITH EMERGENCY EVENTS.

THIS PLAN SUPERSEDES ALL PREVIOUS SEVERE FLOODING EMERGENCY PLANS.

SIGNED THIS _____ DAY OF _____, 2010

Edward J. Atkins, Director
Chester County
Department of Emergency Services

TABLE OF CONTENTS

I. Executive Summary.....	1
II. Overview.....	1
III. Planning Considerations.....	2
IV. Applicability and Scope.....	3
V. Authority and References.....	3
VI. Update and Maintenance.....	3
VII. Future Development Actions.....	4
VIII. Training and Exercises.....	4
IX. Concept of Operations - DES Operations.....	4
A. Public Information.....	4
B. Planning.....	5
C. Operations.....	5
D. Logistics.....	5
E. Finance/Administration.....	6
X. Concept of Operations – ESF Operations.....	7
A. Health and Medical.....	7
B. Human Services.....	7
C. Private Sector Coordination.....	7
D. Public Safety and Security.....	8
E. Regional Coordination.....	8
F. Transportation.....	8
G. Infrastructure and Utilities.....	9

ANNEXES

ANNEX A-National Weather Service Products
and Categories Associated With Flooding.....10

ANNEX B-Acronyms.....13

I. EXECUTIVE SUMMARY

The Chester County Department of Emergency Services (DES) has prepared this *Severe Flooding Emergency Plan* to coordinate a county-wide capability to provide coordinated activities; during times of an emergency or a disaster.

II. OVERVIEW

Description

Floods can occur as a result of many conditions. Causes include runoff from sustained rainfall or rapid snow melting exceeding the capacity of a river's channel, flash floods from convective precipitation such as intense thunderstorms, or no-notice events such as a dam breakage or a water main break.

A major flood in Chester County has the potential of affecting large sections of the County and the people that live and work there. Due to the urban nature of portions of the county, in particular the dense populations and high percentage of impervious surfaces, the affects of such floods can be amplified.

At-risk Populations

People and businesses most at risk during flood emergencies include those located in the 100-year floodplains. Individuals in transit may also be at risk during flash flooding or larger flood events. As with other emergencies, individuals who do not speak English, those with limited access to private vehicles, and individuals with mobility impairments may have difficulty taking recommended action due to language barriers and limited mobility.

Critical Facilities

The Federal Emergency Management Agency (FEMA) defines critical facilities as structures critical to the operation of a community. Some examples of critical facilities located in the 100-year floodplains in Chester County include schools, health care facilities, and public safety offices.

Health and Safety

Personnel responding to the scene of a flood emergency must ascertain the hazards to life and safety that exist and are responsible for keeping a safe distance from those hazards. Personnel must wear appropriate personal protective equipment based upon the duties being performed and the hazards present. Operations and staffing schedules must be arranged to allow time for personnel to get needed breaks and adequate nourishment.

Flood emergencies involve one or more of the following hazardous conditions:

1. Moving Water
2. Washed-out Roads
3. Damage to utility systems
4. Damage to structures

Moving Water

Moving water is a hazard to pedestrians and vehicles. Six inches of moving water can sweep people off their feet and can reach the bottom of passenger cars causing loss of control and stalling. A foot of water can float most vehicles. Two feet of rushing water can carry away most vehicles, including vehicles as large as sport utility vehicles and pick-up trucks.

Washed-out Roads

Roads can weaken where flood waters have receded and can collapse under the weight of a car.

Damage to Utility Systems

Damage to electrical systems may occur after a flood. Downed power lines or power lines resting in water should be avoided. On-line generators can become fire hazards when electrical service is restored. In addition, the improper connection of a generator to a home's electrical circuits may endanger line workers who are restoring power in an area. All electrical equipment and appliances must be completely dry before returning them to service.

Natural gas lines can be damaged by flood waters causing risks of explosion or carbon monoxide poisoning. If a home or business suffers structural damage to a natural gas line, the premises should be immediately evacuated. Although danger is limited because most gas lines coming into a home are buried underground, special precautions may be necessary in the event of a disaster.

Damage to Structures

Following a flood, buildings can have structural damage as a result of fast-moving water and long periods of standing water, especially to the roof and/or foundation, and will require inspection by an engineer or architect. Damaged structures can range from homes and businesses, to equipment storage buildings. The amount and type of damage will depend on the structure's type, age, and condition.

III. PLANNING CONSIDERATIONS

1. A flood event can occur with little or no advance warning from the National Weather Service.
2. Certain locations are historically prone to flooding.
3. Flood response activities will prioritize issues of life safety followed by property and infrastructure protection.
4. A flood event in Chester County may lead to significant traffic disruptions.
5. During a flooding event, areas evacuated in Chester County will have individuals seeking shelter, depending on the geographical areas.

IV. APPLICABILITY AND SCOPE

The Chester County Department of Emergency Services has prepared this Severe Flooding Emergency Plan to coordinate activities associated to flood events and the hazardous conditions that may occur during and following a flood, such as risk to personal life and safety and damage to public and private property.

The plan outlines roles and responsibilities, and gives senior-level managers, emergency management liaisons, and private and non-profit partners, guidance in making the many complex decisions that may be necessary before, during, and after a flood emergency. The plan is designed to complement the Chester County Emergency Operations Plan.

V. AUTHORITIES AND REFERENCES

Authorities

The Severe Flooding Emergency Plan complies with the following federal and state regulations and Executive Order(s):

- PA Code 4 § 6.53
- Executive Order 2006-1, January 10, 2006
- Robert T. Stafford Disaster Relief and Emergency Relief Act, PL 93-288, as amended Code of Federal Regulations, Title 44 Code of Federal Regulations

References

- Chester County Emergency Operations Plan

VI. UPDATE AND MAINTENANCE

The Chester County Severe Flooding Emergency Plan will be reviewed each December. DES will be the lead agency for reviewing and updating the plan and will coordinate with other response partners as necessary.

In addition, the plan will be updated as appropriate when an emergency flood event occurs that significantly affects the County. The update will be completed within 2 months following the date of an emergency.

- *After Action Report (AAR)*: At the completion of emergency flood event operations, DES will develop an AAR that outlines the activities that occurred. Within the AAR, steps needed to improve operations will be identified. The complete AAR and action items for each agency will be distributed to all participants.

VII. FUTURE DEVELOPMENT ACTIONS

At the completion of severe flooding operations, DES will develop an After Action Report (AAR) that outlines the activities that occurred. Within the AAR, steps needed to improve operations will be identified. The complete AAR and action items for each agency will be distributed to all participants.

Future Planning Developments

1. Coordinate with non-profit agencies in fully understanding and capturing their roles and responsibilities pertaining to severe flooding operations.

VIII. TRAINING AND EXERCISES

Training

Severe flooding emergency training and exercises will be conducted on an ongoing basis with major emphasis placed on the operational strategies defined in this plan.

Exercises

DES will develop appropriate Homeland Security Exercise Evaluation Program (HSEEP) compliant exercises to this plan, or components of it, as deemed necessary.

IX. CONCEPT OF OPERATIONS – DES OPERATIONS

DES manages the interagency coordination of response efforts for an emergency flood event. DES liaises with local, state, federal, non-profit and private entities as needed to ensure the appropriate resources (e.g. human and material) are available and utilized efficiently.

A. PUBLIC INFORMATION

During an emergency flood event, the DES Public Information Officer (PIO) coordinates the following tasks in cooperation with the County Commissioner's PIO, and other participating agencies:

1. Establishment of a Joint Information Center (JIC).
 - a. Development of a unified message from participating agencies regarding:
 - i. Progress regarding debris removal.
 - ii. Flood-related information and tips through established health and medical networks.
 - iii. Other important information as deemed necessary.
2. Provide the County Commissioners with periodic updates on emergency flood operations.
 - a. Ensure agencies are using DES-coordinated public information messages.

- b. Assist with the distribution of official press releases and frequent weather updates on:
 - i. County website
 - ii. Television, radio, print media, and social networking sites.
- c. Conduct daily press conference calls with PIOs from other agencies.

B. PLANNING

The Planning Section is assigned primary responsibility for information management and incident documentation.

C. OPERATIONS

DES works to ensure effective and efficient information gathering, decision making, and resource allocation. DES gathers and disseminates accurate information regarding inclement weather and response efforts.

DES is responsible for the development of Emergency Operations Center (EOC) Situation Reports. EOC Situation Reports are a compilation of agency updates provided by agency representatives regarding their activities during each operational period as designated by DES. EOC Situation Reports are distributed to each participating agency.

DES coordinates closely with participating agencies to identify issues, resource needs (e.g. human and material); and identifies and obtains additional resources and support, as deemed necessary.

When the EOC is activated, all operations will be coordinated through the EOC agency representatives.

D. LOGISTICS

When the EOC is activated, logistics support and resource requests are assigned to the DES, EOC Logistics Section. The duties of the Logistics Section are:

1. Monitor and coordinate all logistics issues related to the emergency floods.
2. Determine methods to fulfill requests for supplies or equipment.
3. Determine methods to fulfill requests for human resources.
4. Determine available supply of items such as:
 - a. Fuel
 - b. Four wheel-drive vehicles
 - c. Dump trucks
5. Assist in executing emergency procurement for agencies in cooperation with the County Procurement Department.

E. FINANCE/ADMINISTRATION

During an emergency flood event, agency representatives track expenditures for human and material resources utilized. DES determines the need for the establishment of a Finance/Administration Section.

Agencies must:

1. Maintain accurate records regarding straight and overtime expenditures.
2. Monitor and maintain accurate records regarding the use of existing contractual services.
3. Maintain accurate records regarding any other expenditure related to the emergency flood response.
4. Maintain accurate records and written justification regarding any emergency procurement.

X. CONCEPT OF OPERATIONS – EMERGENCY SUPPORT FUNCTION OPERATIONS

A. HEALTH AND MEDICAL

During an emergency flood event, agency representatives assigned to the EOC are responsible for monitoring and assessing the impact of the emergency flood event on health and medical agencies/organizations. Responsibilities of the agency representatives assigned to the EOC include, but are not limited to:

1. Ensure the EOC Manager is aware of issues related to health and medical activities throughout the County.
2. Monitor and assess the operational readiness and capacities of health and medical agencies and organizations.
3. Coordinate with the DES PIO and agencies in the JIC to develop and disseminate flood-related health tips for the public.
4. Compile information from healthcare facilities (e.g. hospitals, nursing homes, and dialysis centers) to include: operating status, any issue regarding staffing, utility interruptions, supplies, access, and any unmet needs. It is suggested that this be collected via Knowledge Center.
5. Coordinate with the DES PIO and agencies in the JIC to develop and disseminate flood-related health tips for the public.
6. Submit detailed Situation Reports in a timely manner.
7. Engage in the development of Incident Action Plans (IAP).
8. Engage in the development of an exit strategy.

B. HUMAN SERVICES

During an emergency flood event, agency representatives assigned to the EOC are responsible for monitoring and assessing the impact of the emergency flooding on human services agencies/organizations. Responsibilities of the agency representatives assigned to the EOC include, but are not limited to:

1. Ensure the EOC Manager is aware of issues related to human services activities throughout the County.
2. Monitor and assess the operational readiness of human services agencies.
3. Coordinate the distribution of flood-related safety tips in coordination with social services agencies/organizations.
4. Monitor and coordinate the response to any disruptions in the provision of social services.
5. Submit detailed Situation Reports in a timely manner.
6. Engage in the development of Incident Action Plans (IAP).
7. Engage in the development of an exit strategy.

C. PRIVATE SECTOR COORDINATION

The determination to include private sector agencies in the EOC will be made by DES, based on potential impacts to the private sector and business corridors.

D. PUBLIC SAFETY AND SECURITY

During an emergency flood event, agency representatives assigned to the EOC are responsible for monitoring and assessing the impact of the emergency flood event on public safety and security agencies/organizations. Responsibilities of the agency representatives assigned to the EOC include, but are not limited to:

1. Ensure the EOC Manager is aware of issues related to public safety and security operations throughout the County.
2. Monitor and assess the operational readiness of public safety and security agencies.
3. Monitor and coordinate the response to any disruptions in public safety and security operations.
4. Monitor and assess situations related to stranded motorists, vulnerable populations, and people in need of rescue.
5. Monitor and assess scheduled outdoor events.
6. Monitor and assess the impact of utility outages and/or service disruptions.
7. Submit detailed Situation Reports in a timely manner.
8. Engage in the development of Incident Action Plans (IAP).
9. Engage in the development of an exit strategy.

E. REGIONAL COORDINATION

During an emergency flood event, agency representatives assigned to the EOC are responsible for monitoring and assessing the impact of the emergency flood event on regional agencies/organizations. Responsibilities of the agency representatives assigned to the EOC include, but are not limited to:

1. Ensure the EOC Manager is aware of issues affecting regional partners.
2. Ensure regional partners are aware of the activation of the EOC.
3. Maintain communication with regional partners.
4. Monitor and assess the impact of Chester County operations on the operations of regional partners.
5. Monitor and assess any disruptions of operations of regional partners.
6. Compile situational updates from regional partners regarding their operations and the impact of emergency flooding on their operations.

F. TRANSPORTATION

During an emergency flood event, agency representatives assigned to the EOC are responsible for monitoring and assessing the impact of the emergency flood event on transportation agencies/organizations. Responsibilities of the agency representatives assigned to the EOC include, but are not limited to:

1. Ensure the EOC Manager is aware of issues related to transportation activities throughout the County.
2. Ensure transportation agencies are providing a coordinated interagency public message at facilities and on Variable Message Signs (VMS).
3. Assess weather forecasts and prepare for rush hour issues.

4. Monitor and assess the operational readiness of transportation agencies.
5. Monitor and coordinate the response to any disruptions in transportation operations.
6. Compile, monitor and assess delays as reported by transportation agencies.
7. Monitor and assess scheduled outdoor events.
8. Compile situational updates from transportation agencies not present in the EOC regarding the effect of the emergency flood event on their operations.
9. Submit detailed Situation Reports in a timely manner.
10. Engage in the development of Incident Action Plans (IAP).
11. Engage in the development of an exit strategy.

G. INFRASTRUCTURE AND UTILITIES

During an emergency flood event, agency representatives assigned to the EOC are responsible for monitoring and assessing the impact of the emergency flood event on infrastructure and utilities agencies/organizations. Responsibilities of the agency representatives assigned to the EOC include, but are not limited to:

1. Ensure the EOC Manager is aware of issues related to infrastructure and utilities activities throughout the County.
2. Monitor and assess the operational readiness of infrastructure and utilities agencies.
3. Compile and assess operational reports from infrastructure and utilities agencies to ensure communication systems are operational.
4. Coordinate with the DES PIO and agencies in the JIC to develop and disseminate flood-related information to the public and agency employees.
5. Coordinate the distribution of flood-related safety tips.
6. Monitor and coordinate the response to any disruptions in infrastructure and/or utilities services.
7. Compile situational updates from infrastructure and utilities not present in the EOC regarding the effect of the winter weather emergency on their operations.
8. Compile information, monitor and assess the impact of utility outages and/or service disruptions as reported by infrastructure and utilities agencies.
9. Submit detailed Situation Reports in a timely manner.
10. Engage in the development of Incident Action Plans (IAP).
11. Engage in the development of an exit strategy.

ANNEX A – NATIONAL WEATHER SERVICE PRODUCTS AND CATEGORIES ASSOCIATED WITH FLOODING

National Weather Service Flood Categories

Flooding potential can depend of several factors such as time of year, how much the ground can absorb, and rain intensity and coverage. Convective events are quick-hitting, heavy rainfall events that usually have a lifespan of an hour or two. Non-convective events are steady rain events that can take place over the course of several hours and last as long as 24 hours.

Due to all of the flood potential factors that must be taken into consideration, the following is more of a generalization rather than hard fact.

National Weather Service Flood Categories		
	Convective	Non-Convective
<p>Minor Flooding</p> <p>An Urban and/or Small Stream Flood Advisory would be issued for this event.</p>	<p><i>For Urbanized Areas:</i></p> <p>Rainfall rates of 0.5 inch per hour lasting more than one hour. Minimal or no property damage. Minimal risk to the public.</p> <p><i>For Rural Areas:</i></p> <p>Rainfall rates from .75 to 1.0 inch per hour lasting more than one hour. Minimal or no property damage. Minimal risk to the public.</p>	<p>There is less of a distinction between urbanized and rural areas in non-convective events.</p> <p>Rainfall rates from 0.25 to 0.5 per hour depending on duration of event.</p> <p>A 0.5 inch rainfall rate over six hours can have similar impacts compared to a 0.25 inch rainfall rate over 12 hours.</p> <p>Minimal or no property damage. Minimal risk to the public.</p>
<p>Moderate Flooding</p> <p>A Flood or Flash Flood Warning would be issued for this event.</p>	<p><i>For Urbanized Areas:</i></p> <p>Rainfall rates of at least 1.0 inches per hour lasting more than one hour.</p> <p>Impacts include inundation of structures, road closures, evacuations of people and/or the transfer of property to higher ground.</p> <p><i>For Rural Areas:</i></p> <p>Rainfall rates from 1.25 to 1.50 inches per hour lasting more than one hour.</p> <p>Impacts include inundation of</p>	<p>There is less of a distinction between urbanized and rural areas in non-convective events.</p> <p>Rainfall rates from 0.5 to .75 per hour depending on duration of event.</p> <p>A .75 inch rainfall rate over six hours can have similar impacts compared to a 0.5 inch rainfall rate over ten hours.</p> <p>Impacts include inundation of structures, road closures, evacuations of people and/or the transfer of property to higher ground.</p>

National Weather Service Flood Categories		
	Convective	Non-Convective
	structures, road closures, evacuations of people and/or the transfer of property to higher ground.	
<p>Major Flooding</p> <p>A Flood or Flash Flood Warning would be issued for this event.</p>	<p><i>For Urbanized Areas:</i></p> <p>Rainfall rates of at least 1.50 inches per hour lasting more than one hour. Impacts include extensive inundation of structures, road closures and a significant evacuation of people and/or transfer of property to higher ground.</p> <p><i>For Rural areas:</i></p> <p>Rainfall rates from 1.75 to 2.0 inches per hour lasting more than one hour.</p> <p>Impacts include extensive inundation of structures, road closures, and a significant evacuation of people and/or transfer of property to higher ground.</p>	<p>There is less of a distinction between urbanized and rural areas in non-convective events.</p> <p>Rainfall rates from 0.75 to 1.0 per hour depending on duration of event.</p> <p>A 1.0 inch rainfall rate over six hours can have similar impacts compared to a 0.75 inch rainfall rate over eight hours.</p> <p>Impacts include extensive inundation of structures, road closures, and a significant evacuation of people and/or the transfer of property to higher ground.</p>

National Weather Service Flood Products	
Products	Description
Urban and/or Small Stream Advisory (FLW, FLS)	Alerts the public to nuisance flooding which is generally non life-threatening. Issued when rain will cause flooding of streets and low-lying areas in both urban and rural settings. May be upgraded to a Flash Flood Warning if flooding worsens and poses a threat to life and property. Forecaster confidence is at least 80%.
Flash Flood Watch (FFA)	Usually associated with quick-hitting convective rain events. Indicates current or developing hydrologic conditions are favorable for flash flooding in and close to the watch area, but the occurrence is neither certain or imminent. Issued 24 to 48 hours before a potential event. Forecaster confidence is approximately 50%.
Flood Watch (FFA)	Usually associated with non-convective events. Indicates current or developing hydrologic conditions are favorable for flooding in and close to the watch area, but the occurrence is neither certain or imminent. Issued 24 to 48 hours before a potential event. Forecaster confidence is approximately 50%.
Flash Flood Warning (FFW, FFS)	Usually associated with quick-hitting convective rain events. Indicates that flooding is occurring or is determined to be imminent within about a six hour period from the start of the causative event. There is a serious risk to life and property. Can be issued several hours before flooding occurs. Forecaster confidence is at least 80%. Can also be issued for ice jams and dam breaks. If the flooding is expected to persist for more than several hours, the product may be converted to Flood Warning.
Flood Warning (FLW, FLS)	Usually associated with non-convective rain events. Indicates that flooding is occurring or is determined to be imminent and is expected to persist for more than a six hour period. There is a serious risk to life and property. Can be issued several hours before flooding occurs. Forecaster confidence is at least 80%.
River Flood Warning (FLW)	Caused from either a convective or non-convective event. Indicates that flooding is occurring or is determined to be imminent on a gauged and monitored stream. There is a serious risk to life and property. Can be issued several hours before flooding occurs. Forecaster confidence is at least 80%.
Special River Statement (RVS)	Issued for mainstream rivers when water levels are running high but are expected to remain within banks.
Hazardous Weather Outlook (HWO)	Identifies the potential for flooding three to seven days in advance. If there is a >50% chance that an advisory, watch, or warning will be needed in some capacity, the event is mentioned in the HWO.
Area Forecast Discussion (AFD)	Provides a discussion of the meteorological thinking which went into the preparation of the forecast. Typically will contain the predicted precipitation amounts for an upcoming event as well as a discussion of anticipated flooding conditions. The NWS issues an AFD approximately four times a day but can update it more frequently based on significant forecast changes.
Coastal Flood Advisory (CFS)	Issued for minor tidal flooding. Impacts include nuisance flooding across roads or low-lying areas. Isolated property damage. Generally non life-threatening.
Coastal Flood Warning (CFW)	Issued for moderate or severe tidal flooding. Impacts for moderate flooding range from flooded roads to property damage. Severe flooding impacts include widespread flooding with significant property damage. Both moderate and severe tidal flooding can be life-threatening.

ANNEX B – ACRONYMS

AAR	After Actions Review or After Action Report
DES	Department of Emergency Services
EOC	Emergency Operations Center
ESF	Emergency Support Function
FEMA	Federal Emergency Management Agency
HSEEP	Homeland Security Exercise Evaluation Program
IAP	Incident Action Plan
JIC	Joint Information Center
NWS	National Weather Service
PIO	Public Information Officer
VMS	Variable Message Signs