**LEVELS OF EMERGENCY RESPONSE FOR FLOOD PROTECTION PROJECTS**

**FREQUENTLY ASKED QUESTIONS**

*The purpose of this FAQ is to explain the roles and responsibilities for operation and maintenance of a flood protection project. The information in this guidance is solely advisory and does not represent a legal interpretation by the Department. Nothing in this summary shall affect any statutory requirements.*

1. **How is a Flood Protection Project Emergency Action plan implemented and how many levels are typically included?**

The Levels of Emergency Response for Operation of Flood Protection Projects reflect a general approach to implementing the project’s emergency action plan. There are **six** response levels to guide sponsors through appropriate actions for smaller, more frequently occurring storms, as well as “storm of the century” type storms. Each level is explained in this document. Rarely are all six levels experienced, but it is important to recognize the signs of each level and initiate the proper responses to each. The following is a general outline for emergency response. Project Sponsors should follow the detailed Emergency Action Plan (EAP) developed specific to the Project.

1. **What is the first level of Emergency Response and what actions are included in the first level?**

The Emergency Response Level 1 is Flood Watch and specifically when high water is possible in the near future. A potential flood can be anticipated when any of the following conditions are predicted:

* Unusually hard rain for several hours or substantial rain over several days;
* Rains in conjunction with a snow melt;
* A hurricane or tropical system is affecting the area.

The following actions should be taken during a level 1 emergency response:

* Begin checking current weather predictions and flood forecasts;
* Continually monitor anticipated rainfall intensities and amounts; and
* Notify key officials and monitoring teams of the developing potential flood situation.

1. **What is the second level of Emergency Response and what actions should be taken?**

The Level 2 Emergency response is Flood Warning. This is warranted when high water is highly likely to occur. Continue to monitor predicted rainfall intensities, rainfall amounts and flood forecasts to determine the degree of response that will be required. A major flood event will require a greater level of monitoring and response effort than a moderate flood event. During a moderate flood event; the water level may reach half of the project height; the capacity of interior stormwater collection systems may be exceeded; some flooding of streets and intersections may occur; drainage outlet structures may be submerged; and operation of a single pump in a pumping station may be required.

During a major flood event, flows may reach the capacity of the system; power outages and some interior flooding are very likely; roads leading to the community may be under water; closure systems at levees and floodwalls may have to be installed; and some damage to the flood protection system may occur. Most flood events will be associated with mild to moderate flooding, but it is extremely important to determine early which storms have the potential to produce major flood events.

The following actions should be taken during a Level 2 Emergency:

* Begin monitoring rainfall, stream levels and rate of rise; and
* When it becomes apparent that the threat of high water exists, conduct an inspection of conditions over the entire project. The inspection should include the following:
* The condition of all drainage structures, including operation of all gates. Gated outlets may be submerged with only a moderate rise in stream/river stage, so it is imperative that the gates be inspected, and necessary servicing be performed before any rise in the stream/river occurs. Flap gates and sluice gates should be inspected to ensure that they are operational and can be securely closed. Objects and debris that might prevent closure of the gate should be removed.
* Any trash racks and remove floatable debris, if necessary. This must be done before a rise in the stream/river occurs.

1. **What additional actions should be taken if a major flood is predicted?**

If a major flood event is predicted, the following actions should be added:

* Inspect condition of levees and floodwalls, including any recent repairs. Fill any holes, animal burrows or washes found in the levee with compacted material. Repair gaps where road crossings have worn down the levee crown or other locations where the levee is below grade;
* Locate any right-of-way encroachment that could impede access and efficient operation and determine any action required;
* Locate transportation resources, including available trucks and equipment;
* Obtain necessary tools and materials (sacks, sandbags, brush, lumber, lights, etc.) and distribute at points where maintenance is anticipated;
* Secure emergency communications equipment, telephones, police and radio systems;
* Verify location of relief agencies; and
* Notify local officials responsible for warning dissemination and emergency response actions.

1. **What is the third level of Emergency Response and what actions should be taken?**

The Level 3 Emergency Response is when the high water event is occurring. The following actions should be taken during a Level 3 Emergency Response:

* Continue to monitor rainfall, river/stream levels, and rate of rise.
* If a major flood event is predicted or occurring, notify the County Emergency Management Center (EMC) to initiate emergency operations, mobilize emergency personnel for public safety and protection of vital services, and make initial contacts regarding levee road/railroad closures.
* Begin flood monitoring with flood protection monitoring teams. Emergency patrols should be established and maintained. Data collection and observations of the following should be noted:
* Record incremental and cumulative rainfall amounts;
* Record water levels in streams, rivers, ponding areas, pumping stations; and
* Record rate of rise/fall in streams/rivers and ponding areas at regular intervals.

The following inspections should also be included during the level 3 emergency:

* Inspect all project features for conditions that may indicate that the project is not operating properly, the structural integrity of the project is in jeopardy or that the capacity of the project may be exceeded. Recognize that additional action may be required; and
* Inspect drainage structures for reverse flow, ponding or water flowing out of catch basins; and
* Inspect pumping stations and note the number of pumps in operation, accumulation of debris on trash racks (remove if safe to do so), excess noise, cycling of pumps, and ability of pumps to keep pace with inflow.

If a major flood event is predicted or occurring, the following actions should be added:

* Inspect levees for possible sand boils; seepage or unusual wetness of the land side of the levee; slides or sloughs; wave washing or scouring; low reaches of the levee; or leakage through/at drainage gates or piping penetrations;
* Inspect concrete channels and floodwalls for leakage at construction joints, seepage at points of transition between levees and channels or floodwalls, or seepage beneath floodwalls; saturation or seepage behind the wall; low reaches of the floodwall; or unusual vertical or horizontal movement of channel or floodwall; and
* Inspect ponding areas/debris dams for unusual vertical or horizontal movement of embank­ment/emergency spillway or low reaches that may be overtopped.
* During high water operations, place the various features of the project in service and adjust the assumed rate of rise of the water levels used in developing the plan to actual conditions. All preliminary inspections and notifications of impending closures must be completed sufficiently in advance to permit the actual closure to be completed, including sealing before water reaches the sill.
* During Emergency Operations, respond to a project emergency, such as seepages or boils, slides and sloughs, wave washing or scouring, unusual vertical or horizontal movement of the levee or floodwall and any condition or encroachment that might endanger project features.

1. **What is the fourth level of Emergency Response and what actions should be taken?**

The Level 4 Emergency Response is triggered when overtopping of the levee, floodwall, channel wall of debris dam embankment is imminent or is predicted to occur.The following actions should be taken during a level 4 emergency response:

* Notify the County Emergency Management Center (EMC).
* Continue monitoring rainfall, river/stream levels and rate of rise.
* Determine where overtopping is likely to occur, and evacuate area likely to be inundated by floodwaters immediately;
* If time permits, relocate vehicles and other mobile property;
* Perform search and rescue operations if necessary; and
* Continue flood-fighting efforts if it is safe.

**7. What is the fifth level of emergency response and what actions should be taken?**

The Level 5 Emergency is when overtopping of the project is occurring. The following actions should be taken during a level 5 emergency response:

* If safe to do so, continue monitoring rainfall, river/stream levels and rate of rise.
* Continue evacuation and search and rescue operations; and
* Establish emergency medical services, shelters and security measures.

**8. What is the sixth level of emergency response and what actions should be taken?**

The Level 6 Emergency Response is for when the high water is receding. The following actions should be taken during a Level 6 Emergency Response:

* Continue monitoring rainfall, river/stream levels and rate of fall.
* Initiate post-flood recovery measures if rain has ended and water levels are expected to recede;
* Inform monitors what damage to record;
* Record total rainfall and locate high water marks;
* Call DEP or U.S. Army Corps of Engineers for damage inspections and technical assistance;
* Continue monitoring of project;
* Check for project damage and ponded water;
* Remove debris throughout the project; and
* Perform maintenance and make necessary repairs in expectation of another high water event.

**9. Where can I find more detailed information on Emergency Action Plan Development?**

*For more information on how to develop a project specific Emergency Action, see the Plan* Guidelines for Developing an EMERGENCY ACTION PLAN for Flood Protection Projects

For more information on the Flood Protection Program or technical assistance regarding specific projects, visit [Flood Protection](https://www.dep.pa.gov/Business/Water/Waterways/Flood-Protection/Pages/default.aspx) or [www.dep.pa.gov](http://www.dep.pa.gov) (select “Businesses,” then “Water,” then “Waterways Engineering and Wetlands,” then “Flood Protection”), or contact:

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Bureau of Waterways Engineering and Wetlands

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