



EMERGENCY ACTION PLAN UPDATE OF LAKE GENEVA DAM ID #617

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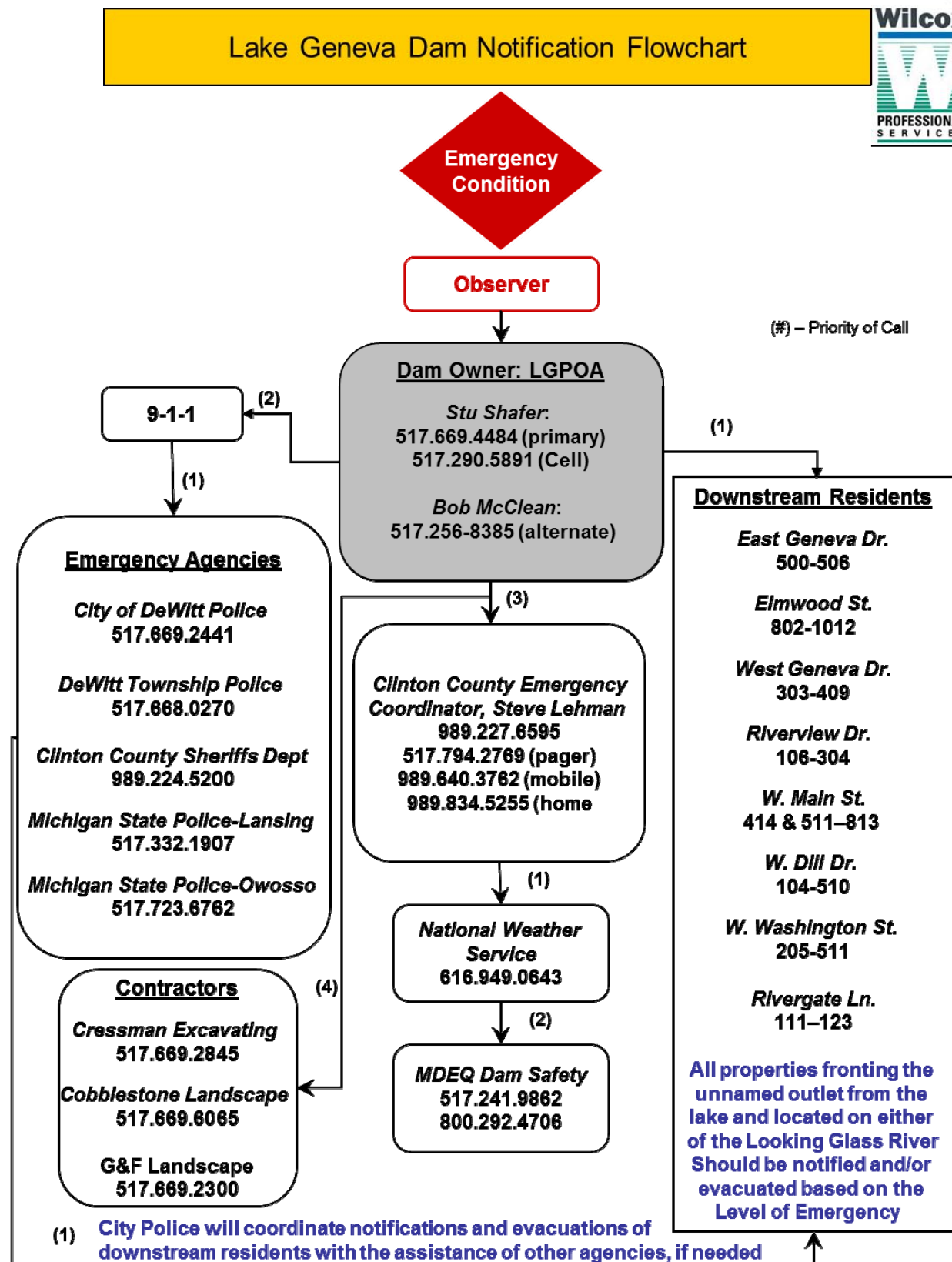
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NOTE: Wilcox's update of this Emergency Plan was limited to the verification of contacts and emergency phone numbers and to elements associated with the accuracy of information related to physical features only. No hydraulic evaluation or analysis was performed to verify the accuracy of the information presented by Advantage Civil Engineering, Inc.





SECTION 1

INTRODUCTION

PURPOSE

The purpose of this Emergency Action Plan (EAP) is to safeguard lives and reduce damage to the property of the citizens of Clinton County, who live along the Looking Glass River, in the event of failure of Lake Geneva Dam or flooding caused by large flow releases from the dam. This EAP was developed by Advantage Civil Engineering, Inc. in 1999 and was updated by Wilcox Professional Services, LLC in 2003, 2007 and 2011.

DESCRIPTION OF DAM

Lake Geneva Dam is located in Section 8, City of DeWitt, Clinton County, Michigan. The dam impounds approximately 60 acres and discharges to an unnamed tributary of the Looking Glass River. The structure is designated as significant hazard. It is believed that the dam was constructed in the early 1960's as a recreational amenity for residential development.

The dam consists of an outlet control structure and approximately 125 feet of earthen embankment. Level is controlled by a vertical 36" corrugated metal pipe that is encased in concrete. The concrete encasement forms a 4' x4' square structure. The outlet pipe is a 21 inch corrugated metal pipe. The 21 inch pipe discharges to the unnamed tributary. The structural height of the dam as measured from the top of the embankment to the invert of the receiving stream is roughly 16 feet. The normal head is about 12 to 13 feet and the height of the dam as defined by the Dam Safety Act is 14.4 feet.

HAZARD AREA

The flood inundation map, developed by Advantage Civil Engineering, Inc., that illustrates the area of potential flooding during a "wet weather" failure is contained in appendix A. A "sunny day" failure would most likely be less severe once it reached the Looking Glass River. This inundation map was based upon limited calculations and analyses by Advantage and should be used as a guideline and not as a definitive boundary for potential flooding. The height of the flood wave near the unnamed tributary to the Looking Glass River was based upon the 4/9 rule which approximates the flood wave to be 4/9 of the structural height of the dam. The flood wave for Lake Geneva was estimated to be about 8 feet. The peak discharge from a dam break is



estimated to be 700 cubic feet per second (cfs). For comparison purposes, the 100-year discharge of the Looking Glass River in the vicinity of Lake Geneva is 2,865 cfs.

In general, a failure of the dam could have a significant impact on the Looking Glass river floodplain, both upstream and downstream. Lake Geneva is located within the City of DeWitt and could impact residents of the City as well as DeWitt Township. If a dam break occurred during the 100-year peak flow in the Looking Glass River, the additional flow would essentially equate to a 500-year flood event.

It should be pointed out that tributary drainage area for Lake Geneva is 0.6 square miles while the tributary drainage area for the Looking Glass River in the vicinity of Lake Geneva is 234 square miles. It is not likely that a failure of the Lake Geneva Dam would occur at the same time as a large flood event on the Looking Glass River. Also, the flows from a dam failure would have a tendency to attenuate once it reached the Looking Glass River. Therefore, the flood inundation area illustrated on the included map is similar to a 100-year floodplain.



SECTION 2

RESPONSIBILITIES

The Lake Geneva Association (the Association) is responsible for all operation and maintenance activities associated with the dam. In addition, the Association is responsible for implementing this emergency plan as well as keeping the plan updated and current.

Coordination

Emergency action is a coordinated effort between the Lake Geneva Association and the appropriate state, county and local agencies. In the event that an emergency situation develops, the Association will contact the Clinton County Central Dispatch Center by dialing 911. The initial emergency coordination will be handled by the 911 dispatcher. When identifying an emergency situation, the Association should follow the following format:

Alert:	Failure and/or flooding is not imminent, but a more serious condition could develop
Warning:	Failure and/or flooding is imminent.

The Association will be responsible for coordination and management of on-site activities, such as preventative actions discussed later in this plan.

Evacuation

The City of DeWitt Police Department will be responsible for coordinating evacuation.

Records

The Association is responsible for keeping a data base of available records concerning the dam. The records should include, but are not limited to: design drawings; past inspection reports; and updated copies of the emergency action plan.



SECTION 3

EMERGENCY CONDITIONS

Emergency conditions can develop at a dam at anytime and usually when you least expect it. In general, dam failure can be classified as either “wet weather” or “sunny day” failures. Following is a brief description of these types of failure mechanisms.

Wet Weather Failure

Wet weather failures normally occur during a large flood event. A large flood event can develop due to excessive runoff caused by large precipitation events, snow melt and/or the combination of rain and snow melt. Recent evaluations of the Lake Geneva Dam indicate that it has adequate spillway capacity to pass the 0.5% chance (200-year) flood event, however, if the spillway or discharge pipe were to become clogged during a large flood event, it is possible that the embankment could be overtopped which may lead to catastrophic failure of the dam. Furthermore, heavy precipitation or snow melt can cause a rapid rise in reservoir level which causes an increase in internal pressures in the embankment. This can lead to internal erosion (piping) of the embankment or sudden shifting or settlement of the embankment.

Sunny Day Failure

Sunny Day failures occur during a period of little or no precipitation or snow melt. Sunny day failures can be caused by internal piping of the embankment, earthquakes, vandalism or plugging of the outlet with debris. Wave action from wind or boats as well as burrowing animals can have an effect on the structural stability of the embankment.

Either “wet weather” or “sunny day” failures can lead to slow or rapid failures. Association members should make periodic inspections of the dam, especially during and after large flood events to check for potential problems.



SECTION 4

EMERGENCY ACTIONS

Once an emergency situation has been identified, the Lake Geneva Association should begin the notification process immediately as indicated on the Emergency Action Telephone List contained within this document.

NOTIFICATION

The notification process should begin with calling 911 and alerting the dispatcher to the current status of the emergency. After 911 contact, the Association should evaluate the seriousness of the emergency. If the situation warrants, a contractor should be contacted to assist in stopping or mitigating the failure. MDEQ Dam Safety personnel should be contacted and consulted with in making the determinations of the emergency.

PREVENTATIVE ACTIONS

Depending on the type of failure and the degree to which it has progressed, it may be possible to perform preventative measures to stop or slow the progress of the failure. This normally requires the assistance of a contractor that has sufficient equipment and access to materials. The association should keep an updated list of several different contractors that could be available during an emergency situation.

Possible preventative actions include:

- Placing sandbags to temporarily increase freeboard
- Installing additional culverts to provide additional hydraulic capacity
- Installing steel sheet piling to serve as a temporary cut-off wall
- Placing additional fill where needed
- A controlled breach of the embankment section

EVACUATION

As indicated above, the City of DeWitt Police Department is responsible for coordinating evacuation efforts as necessary. An inundation map that illustrates the area of potential flooding should be used as a general guideline for performing the evacuations.



SECTION 5

EMERGENCY TERMINATION

EMERGENCY CONDITIONS

The Lake Geneva Association is responsible for determining the end of an emergency situation. However, the Association is encouraged to consult with MDEQ and the Clinton County Emergency Coordinator before terminating the emergency.

DISASTER RESPONSE

The City of DeWitt Police Department, in consultation with the Clinton County Emergency Management Coordinator, will evaluate a proper timetable for the termination of both the evacuation and the disaster response activities.

CRITIQUE AND AFTER ACTION REPORT

Should an emergency situation occur, a critique should be conducted including all participants and interested parties, with the results being used to revise and improve the emergency plan.



APPENDIX A

Lake Geneva & Surroundings

