



CITY OF FRANKENMUTH

Flood Response and Implementation Plan



Updated: October 2021

INTRODUCTION AND PURPOSE

The purpose of this Flood Response and Implementation Plan (FRIP) is to detail actions and assignments for the planning, preparedness and prevention, response and recovery from flooding and flood-related incidents within the City of Frankenmuth.

As such, the scope of the Plan includes:

- Identifying the flood risk to the City of Frankenmuth;
- Supporting the implementation of measures to minimize the causes and impacts of flood incidents within the City of Frankenmuth;
- Detailing assignments including preparedness, coordination, implementation of flood reducing measures, and recovery.

The City of Frankenmuth FRIP also provides the following items.

- Establishes the responsible parties to respond to a flood emergency in the City of Frankenmuth.
- Identifies policies, responsibilities, and procedures required to protect the health and safety of City of Frankenmuth residents and businesses from the effects of flood-related emergencies.
- Establishes operational concepts and procedures associated with field response to flooding emergencies and the recovery process.
- Identifies policies for post-flooding analyses and follow-up activities.

GENERAL APPROACH/FLOOD DEFINITION

The City of Frankenmuth is responsible for levee/flood wall segments, drainage facilities, and flood control structures as shown on Table 1.

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Table 1. Summary of Frankenmuth Flood Control Facilities

Facility Name	Watercourse	Location
Frankenmuth Flood Control System – earthen levee and concrete flood walls	Cass River	Earthen levee and concrete flood wall system and related flood protection facilities around the City’s downtown district for approximately 3,600 feet along the north bank of the Cass River in the City of Frankenmuth, Saginaw County, Michigan.
Frankenmuth Stormwater Pump Station	Cass River	Stormwater pump station for interior drainage on east side of Gunzenhausen Street north of the Lager Mill.

Flood response levels for the City of Frankenmuth will be based on river stage data on the Cass River at Frankenmuth monitored at USGS Stream Gauge Station 04151500. This stream gauge is located approximately 2,200 river-feet downstream of the Main Street (M-83) bridge crossing. Approximately 81 years of river stage and flow rate data are available for this USGS stream gauge.

Not all flooding in the jurisdiction may be based on river stage. Therefore, for some portions of the downtown district and upstream areas in Frankenmuth, additional flood prone areas will be based on specific criteria developed for those areas.

PERTINENT FLOOD DATA

The following is a summary of flood data pertinent to the Cass River flood control system in Frankenmuth, Michigan.

Watercourse:	Cass River
Municipality:	City of Frankenmuth, Saginaw County, Michigan
Site Town/Range/Section:	T11N/R6E/SEC27
Site Lat./Long.:	43.331140N/-83.739870W
FIRM Panel Nos.:	26145C0205D (10/16/1997) 26145C0210D (10/16/1997)
Drainage Area:	839.5 square miles (USGS Stream Gauge 04151500)
Original Levee Construction:	Earthen levee constructed in 1954 by local interests Flood wall constructed in 1966/1967 by USACE contracts Levee and flood wall improvements constructed by City contracts in 2020/2021
Total Length of Existing Levee:	3,600 feet (approximate)
Levee/Flood Wall Material Type:	USACE flood wall: 9-foot-tall by 30-foot-long by about 7.5-inch-thick reinforced concrete flood wall panels and earthen levee. Levee Improvements: 15-inch-thick to 26-inch-thick pile-supported reinforced concrete flood wall, capped USACE

flood wall with reinforced concrete capping, concrete high curb with cut-off wall, installation of multi-use riverine concrete pathway along the levee embankment and excavation and backfill with compacted, clean levee fill (clay).

General Overview

Figure 1 shows a site location map of the majority of downtown Frankenmuth and the Cass River that flows through the City of Frankenmuth.

The downtown region of the City primarily consists of commercial development with some sporadic municipal green spaces. Most of the residential areas within the City consists of single-family residences and is generally located north of downtown and outside of the Cass River floodplain.

Sections of the Cass River are lined with trees that have light to medium vegetation. The levee/flood wall is predominantly covered on the river side with manicured short grass and some medium to large trees east of the Main Street (M-83) bridge crossing. The City's Water Resource Recovery Facility (WRRF) is located on the south bank of the Cass River, west of the Main Street bridge crossing, and across the river from a restored mill located on the levee wall. A public golf course (The Fortress Golf Course) is located south of the river directly downstream (west) of the City's WRRF that is sparsely wooded.

The levee was originally designed and constructed by City interests in 1954 and modified (raised) with concrete flood wall panels by the U.S. Army Corps of Engineers (USACE) in 1966/1967. The levee was subsequently turned over to the City to perform periodic inspection and maintenance activities, responsibilities that the City has taken seriously and continues to meet. The levee has withstood several extreme flooding events, most notably the flood of September 1986, which exceeded the 1% annual chance (aka "100-year" return period) flood. FEMA previously re-examined the criteria for accredited levees and has deemed the existing Frankenmuth levee as a non-accredited levee system, mostly due to freeboard deficiencies throughout and structural deficiencies along some sections of the levee/flood wall.

To obtain levee accreditation with FEMA per 44CFR65.10, the City of Frankenmuth recently completed construction of the Frankenmuth Levee Improvements Project for the levee/flood wall project. The construction contract was awarded to Rohde Bros. Excavating, Inc. (Rohde) of Saginaw, Michigan. Rohde's contract work began on September 9, 2019 and ended on May 14, 2021. Engineering and construction administration services during construction were performed via City contract with Matteo Engineering & Consulting, LLC (MEC) of Washington Township, Michigan. MEC was the Design Engineer for the levee improvements project.

Levee improvements construction generally included:

- Replacement of deficient USACE flood wall with pile-supported flood wall;

- Placement of concrete capping on existing USACE flood wall;
- Installation of high curb wall with cut-off;
- Installation of new aluminum stoplog closures;
- Removal of approximately 80 trees/stumps along the levee embankment;
- Placement of new concrete multi-use riverine pathway;
- Placement of rip-rap along the north embankment and in the Cass River main channel;
- Removal of broken concrete and debris and backfilling with clean levee fill (clay);
- Purchase of a portable generator;
- Implementation of stormwater pump station electrical and I&C upgrades and refurbishment and rewinding existing motors; and
- Implementation of other related levee system improvements.

The Frankenmuth Levee Improvements Project Contract Award and Final Completion dates were September 9, 2019 and May 14, 2021, respectively.

Historic Flooding Events

Table 2 presents the top ten historical flood events sorted and ranked by measured gauge height (stage) at the USGS stream gauge station. It is important to note that the stream gauge records gauge height only and the corresponding flow rates are obtained using the latest rating curve relationship.

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Table 2. Top Ten Recorded Flooding Events

Rank	Date	Field Measurements (Collected by USGS at/near Gauge ID 04151500)		
		Measured Stage (feet)	Flooding Elevation (feet -- NAVD88) *	Calculated Discharge (cfs)
1	9/12/1986	27.29	610.71	22,300
2	5/22/1996	23.02	606.44	14,700
3	3/7/1976	21.99	605.41	12,400
4	9/15/1986	21.98	605.40	12,200
5	3/31/1960	20.84	604.26	11,600
6	3/29/1967	20.53	603.95	10,900
7	3/17/1982	19.78	603.20	8,280
8	5/25/2004	19.69	603.11	8,600
9	4/2/1960	19.44	602.86	9,670
10	3/12/1985	19.30	602.72	8,450

***NOTE:**

Stream gauge vertical datum is 583.96 feet (NGVD29 datum) per USGS. Conversion of -0.54 feet to NAVD 88 vertical datum in Saginaw County, Michigan.

KEY RIVER LEVELS AND RESPONSE ACTIONS

Table 3 presents a summary of key flooding levels on the Cass River at the Frankenmuth USGS stream gauge and associated actions to be taken in response. Additional information such as collected precipitation data and consideration of time of year, flood response elsewhere in the watershed and other field evidence may assist in the decision process and affect actions.

The key river levels and response actions shown in Table 3 were determined to provide adequate response times for the Floodplain Administrator’s notifications and the City’s Department of Public Works (DPW) Superintendent’s mobilization, placement of levee/flood wall closure devices and other response actions. The City DPW Superintendent determined that approximately 4 hours will be needed to complete closure of flood wall openings, and another approximately 4 hours will be needed for sandbagging roadway openings. Based on historical data, it appears the key river levels in Table 3 provide adequate response times, assuming the river levels increase by about 6 inches to 12 inches per hour during peak flood conditions. Using this approximate rate of rise range, it is estimated that it may take approximately 5 hours to 10

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hours for flood levels to rise from the 10% annual chance flood to the lowest flood wall opening sill elevations. It is also estimated that it may take an additional approximately 5 hours to 10 hours for flood waters to reach the roadway opening elevations. Therefore, based on rough approximations and review of historical stream gauge data, it appears likely that there would be sufficient time to place the stop logs and sandbag roadway closures during a flood condition.

Table 3. Summary of Key River Levels (Cass River at Frankenmuth)

Cass River Flooding Level at USGS Stream Gauge		Action/Response (assuming levee/flood wall is not breached or otherwise compromised)
Depth (feet)	Elevation (feet -- NAVD88)	
17.0	601.0	NOAA National Weather Service (NWS) Flood Stage. Begin flood notification process.
21.0	605.0	Approximate 20% annual chance (aka “5-year”) Flood Level. Notify all parties per Plan of monitoring data and alert crews of possible mobilization. Prepare equipment for possible utilization.
22.5	606.5	Approximate 10% annual chance (aka “10-year”) Flood Level. Notify City Police and Fire Departments. Mobilize crews and install steel stop gates (Closures A and B), sandbag flood wall closures (Closure C and Staircase), and aluminum stop logs (Closures D, E, F and G). Stage sandbagging materials and other removable flood protection equipment for roadway closures (Main Street [M-83], Pedestrian Bridge, and Wooden Covered Bridge).
24.0	608.0	Notify City Police and Fire Departments and Michigan Department of Transportation. Close and sandbag Main Street (M-83), Pedestrian Bridge and Wooden Covered Bridge and establish detour routes per this Plan.
26.5	610.5	Approximate 1% annual chance (aka “100-year”) Flood Level. Ensure all detour routes are in-place.
28.0	612.0	Approximate 0.5% annual chance (aka “200-year”) Flood Level. Notify all parties and prepare for possible evacuation. Ensure all detour routes are in-place.
29.0	613.0	Risk of improved levee/flood wall overtopping. Evacuate all landward areas at or below this elevation, including of all structures normally protected by the levee/flood wall.

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Table 4 presents a summary of levee/flood wall closures for reference.

Table 4. Summary of Levee/Flood Wall Closures

ID	Nearest Cass River Station	Levee Project Station	Left or Right Bank	Opening Type	Opening Invert Elevation (feet -- NAVD88)	Type of Closure Device
A	904+54	3+15	Right (north)	Flood Wall Opening	612.2	Steel Stop Gate or Sandbagging
Government Drain	906+59	6+80	Right (north)	36" Stormwater Outfall	588.4	Actuated Knife Gate
PS Drain	907+49	8+25	Right (north)	30" Stormwater Outfall	590.3	Flap Gate
PS Force Main	911+20	8+80	Right (north)	20" Pump Station Force Main Outlet	607.1	Flap Gate
PS Force Main	911+20	8+90	Right (north)	22" Pump Station Force Main Outlet	607.3	Flap Gate
B	913+50	11+55	Right (north)	Flood Wall Opening	612.2	Steel Stop Gate or Sandbagging
C	916+00	14+24	Right (north)	Flood Wall Opening	612.4	Steel Stop Gate or Sandbagging
Main Street Bridge	918+50	15+83	Right (north)	Roadway	613.4	Sandbagging
Staircase	918+53	16+65	Right (north)	Flood Wall Opening	613.3	Sandbagging
Pedestrian Bridge	919+05	17+00	Right (north)	Roadway	615.0	Sandbagging
Wooden Covered Bridge	920+10	19+33	Right (north)	Roadway	615.6	Sandbagging
D	920+30	21+13	Right (north)	Flood Wall Opening	612.7	Aluminum Stop Logs
E	921+15	23+17	Right (north)	Flood Wall Opening	613.2	Aluminum Stop Logs
F	935+15	31+82	Right (north)	Flood Wall Opening	613.3	Aluminum Stop Logs
G	937+50	34+23	Right (north)	Flood Wall Opening	613.3	Aluminum Stop Logs

MAJOR RESPONSIBILITIES

The City of Frankenmuth staff, including but not limited to the City Manager, City Clerk, DPW Superintendent, and Assistant DPW Superintendent, is prepared and equipped to assume the following responsibilities, as defined in this Plan, if a flooding event occurs or appears to be imminent along the Cass River in Frankenmuth.

A. Monitoring

The City Manager or designee will assign a Floodplain Administrator for each flood event and primary contact responsible for all monitoring, coordination, and response activities.

1. Weather and River Conditions

The City will continue to monitor National Oceanic and Atmospheric Administration (NOAA) and other local precipitation gauges and the USGS stream gauge on the Cass River at Frankenmuth. Near real-time data from this stream gauge will be monitored using the USGS on-line web interface at the following URL:

http://waterdata.usgs.gov/mi/nwis/uv/?site_no=04151500&PARAMeter_cd=00065,00060

2. During Flooding Events

The Floodplain Administrator will continue to monitor the levee/flood wall conditions during and directly after flooding events. The Floodplain Administrator, with support from the DPW Superintendent, will document any evidence of leakage, seepage via sand boils, and levee/flood wall breaching.

The DPW Superintendent will periodically inspect the stop log closures and document any leakage. Refer to the Frankenmuth Levee Improvements Project as-built drawings dated May 2021 for the locations of Closures A through G. Sandbag closures are Closures A through C and the three roadway closures. Aluminum stop log closures are Closures D through G, which are located on the upstream side of the Wooden Covered Bridge. The DPW Superintendent stores the stop logs in storage racks, lifting yoke, and locking pins in a DPW warehouse behind City Hall (DPW Plant 3). The stop logs are tagged with labels that associate them with a particular closure for quick identification.

B. Notification/Coordination

In the event of a flood condition as defined in this Plan, the Floodplain Administrator will be responsible for notifying all appropriate parties on a periodic basis, depending on weather and flooding conditions. City Department of Public Works (DPW) staff, led by the DPW Superintendent and including the Assistant DPW Superintendent, and supported by other DPW team members identified by the DPW Superintendent, will primarily be utilized for flood response activities.

C. Inspection

The DPW Superintendent will conduct periodic inspections and will be primarily responsible for operations and maintenance (preventive and corrective) of the levee system in accordance with the levee O&M plan. Regular, periodic full inspections will

continue to take place. In the event of a flood condition, City DPW personnel led by the DPW Superintendent will conduct site visits to inspect the site and condition of the levee system.

D. Mobilization

The DPW Superintendent and other City personnel assigned by the DPW Superintendent, will mobilize, when deemed necessary and appropriate per this Plan, to prepare and respond to flooding events. This will require an organized and coordinated effort, which will be in accordance with City protocols.

E. Flood Protection Measures Implementation

Flood protection measures such as aluminum stop logs and City-fabricated steel stop gates and sandbagging, among other devices, will be put in place at the direction of the DPW Superintendent per this Plan. Sandbagging or other temporary, movable flood protection devices across major roads will be coordinated with the appropriate authority having jurisdiction (AHJ) with as much advance notice as possible. Sandbagging across Main Street (M-83) will not be put placed until proper notification and coordination with AHJs has occurred.

F. Road Closures

Road closures will occur in emergency situations and will be fully coordinated with the Michigan Department of Transportation (MDOT). A state authorized contractor (e.g., Give Em A Brake Safety) will immediately mobilize upon being contacted by the City Floodplain Administrator to provide traffic control and to put the barricades in-place. The Floodplain Administrator for this event will ensure that proper authorization by MDOT is received before closing M-83 and detouring traffic. Written approval will be sought via e-mail or fax.

G. Regular Updates

The City recognizes that communication is critical during flooding conditions and flood-related emergencies. The Floodplain Administrator, assigned by the City Manager, will make regular contact to appropriate parties throughout a flooding event per this Plan until flooding has subsided below flood stage.

H. Post-flooding Notification and Reporting

Depending on extent of flooding and observed and/or reported flood-related damages, the City Manager or Floodplain Administrator, at the direction of the City Manager, will notify and may submit written field reports to appropriate parties, if requested.

I. Post-flooding Clean-up

The DPW Superintendent will be responsible for directing the removal of debris and the cleaning all facilities including Main Street (M-83) and the Main Street bridge crossing if related to a flooding event on the Cass River.

COORDINATION WITH AUTHORITIES HAVING JURISDICTION (AHJ)

In the event of a flood condition as defined in this Plan, the Floodplain Administrator will be responsible for notifying all AHJ including MDOT and all appropriate parties on a periodic basis.

At a minimum, the Floodplain Administrator will issue notification to MDOT at the following phases per this Plan. Refer to Table 3 in this Plan for key river levels that will trigger each phase.

- A. Flood Advisory
- B. Flood Warning
- C. Flood Safety Bulletin/Road Closures

MDOT will commit to responding as rapidly as possible and providing reasonable accommodations and authorization for road closures when requested by the City.

The Floodplain Administrator will ensure that proper authorization by MDOT is received before closing M-83 and detouring traffic. Written approval will be sought via e-mail or fax.

Potential Emergency Detour Routes

Figure 2 presents a map of potential road closure sites in the event of an extreme flood on the Cass River at Frankenmuth.

Road closure sites include:

- Jefferson Street
- Flint Street
- North bank of Cass River at Main Street (M-83)
- Southbound Main Street at Tuscola Street
- Southbound Gunzenhausen Street at Rosstal Street

In addition, the Floodplain Administrator will coordinate with private land and business owners to close the Wooden Covered Bridge near the Bavarian Inn Lodge.

TRAINING PROCEDURES

The City will test and update the flood response and warning plan on an annual basis. Reviews and updates will be completed on an annual basis as new information and technologies become available.

An annual tabletop exercise will be conducted to test the plan and train personnel on the use of this flood response plan. For the tabletop exercise, all department heads and personnel that department heads consider essential will be present. After the exercise is completed, the City will record the following information:

- List of participants;
- Lessons learned; and
- Recommendations or changes to this flood response plan. The flood response plan may be revised based on the recommendations or after an actual flood event.

Revised pages will be provided to department heads. Each plan holder will maintain all copies of the most current flood response plan.

A field test will be performed on an annual basis. The field test will include dry run notifications, mobilization of DPW staff, and placement of aluminum stoplogs in at least one flood wall closure. The response times and closure times will be tracked and recorded.

COMMUNITY OUTREACH AND NOTIFICATION PROCEDURES

In 2020, the City of Frankenmuth established an Emergency Task Force (ETF). The ETF is comprised of local community officials, businesses, religious institutions, and other local organizations. The primary focus and purpose of the ETF is to respond, especially in terms of communication or organizing, to emergencies within the City. In the event of a flooding emergency, the ETF will be activated. A message will be shared that the ETF will send to their constituents. Distribution of these emergency message will range from social media, email, business text alerts from the Chamber of Commerce to places of worship using phone trees.

The City uses the emergency notification alert system available to it via Saginaw County Emergency Management. After submission of a geo-caste form that identifies a specific geographic area within Frankenmuth, a custom phone call (and email and text message as appropriate) delivers a message, crafted by the City, to all residents in the area.

The City will update its website, which also includes an alert system as well as its social media accounts regarding the flood risk.

The City has a generic flood risk press release and updated press contacts saved in a location accessible to all staff on the network.

The City maintains an information line that is used to provide information to residents as needed. The information line will be updated regarding the flood risk.

EVACUATION PROCEDURES

The following is a summary of emergency evacuation procedures.

When stop logs and other devices must be placed, the City will issue recommendations to the impacted areas that flooding of the Cass River is likely, recommending that they make plans to shutter business and evacuate patrons should the flooding continue or increase.

At the flood stage specified in Table 3, the City will declare a local emergency and recommend evacuation of businesses and dwellings/structures within the potentially impacted area. Detour routes will be established in accordance with this Plan.

Notification procedures will occur as outlined in the previous section of this Plan.

City staff and firefighters will go door-to-door in the potentially impacted areas and recommend evacuation. Maps for this purpose were prepared and saved in an accessible location to City staff.

CONTACT LIST

The following is a summary of contacts to be used as points of coordination in preparing and responding to a flood and implementing flood protection policies and procedures.

City of Frankenmuth – City and Township Government Center

Bridget Smith, City Manager: 989-652-9901

City of Frankenmuth – City and Township Government Center

Phil Kerns, City Clerk: 989-652-9901

City of Frankenmuth – Department of Public Works

Randy Braeutigam, DPW Superintendent: 989-652-3430 x. 200

Kenton Scherzer, Assistant DPW Superintendent: 989-652-3430 x. 207

Give Em A Brake Safety (Traffic Control)

989-752-6333

Michigan Department of Transportation – Bay Region Office

Robert Ranck, Region Engineer: 989-754-7443

Jocelyn Hall, Communications Representative, 989-245-7117

Michigan Department of Transportation – Bay City TSC

Jack Hofweber, Manager: 989-671-1555

Police Chief

Donald Mawer: 989-652-3430 x. 154

Fire Chief

Phil Kerns, Fire Chief: 989-652-3430 x. 111

DDA Director/Public Information Officer

Dan Hopp, DDA/EDC Director: 989-652-3430 x. 120

Water Superintendent

Ken O'Brien: 989-652-3430 x. 226

WRRF Superintendent

Mark Schluckbier: 989-652-3445

Parks & Recreation Director

Daren Kaschinske: 989-652-3430 x. 141

Mayor

Mary Ann Ackerman: 989-652-9901

Mayor Pro-Tem

Carl Schoenow: 989-652-9901

Frankenmuth Chamber of Commerce

Jamie Furbush, President: 989-652-6106 x. 21

Frankenmuth Public Schools

Adele R. Martin, Superintendent: 989-652-9958

St. Lorenz Lutheran Schools

Joshua Swartz, Principal: 989-652-6141 x. 155

Frankenmuth Township

Tim Hildner, Supervisor: 989-652-3430 x. 181

Saginaw Co. Emergency Manager

Lieutenant Mark Przybylski, Saginaw County Sheriff's Office: 989-790-5434

Saginaw County 911 Authority

989-797-4580

Mobile Medical Response/EMS provider

989-758-2900

Saginaw County Road Commission

989-752-6140