

COMMUNITY FLOOD MANAGEMENT PLAN

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SECTION 1: INTRODUCTION

1.1 Background

The City of Greater Sudbury is geographically the largest municipality in Ontario. Contained within the 3627 sq km are 330 lakes and four major rivers. In addition, some of the major tributaries are known hazard areas that can experience annual/seasonal flooding.

Many watercourses within the City limits respond quickly to weather events such as heavy rainfall or rain/snowmelt. Therefore, an emergency response to flooding requires collaboration between agencies, sectors and departments.

The extent of the initial flood response will depend on the warning time (which will vary based on the cause of the flooding) and on the scale of the flood event. Intense storms may produce a flood in minutes or a few hours, while areas downstream from heavy rains may have from twelve hours to several weeks to prepare. Flash floods can occur within six hours or less from the beginning of a heavy rainfall. Dam failure may occur within hours of the first signs of breaching.

Although it has been several years since the City of Greater Sudbury experienced significant flooding, the municipality, Conservation Sudbury (CS), and other partner agencies recognize the need for a Community Flood Management Plan to coordinate flood preparedness and response actions.

1.2 Purpose

The purpose of this Community Flood Management Plan is to prepare for the most efficient deployment of resources to achieve the following:

- To provide effective intra-agency and inter-agency cooperation and communication before, during, and after a flood event.
- A coordinated response consistent with prevailing conditions and information provided by external agencies including CS Flood Forecasting and Warning System, local dam operators, and/or other sources.
- To define the roles and responsibilities of the City departments and supporting agencies involved in a flood emergency.

- To define the procedures to be utilized in minimizing the effects of a flood emergency in the City of Greater Sudbury.

1.3 Scope

The Community Flood Management Plan outlines the assistance that will be provided to the municipality and its residents during flood emergencies.

The City of Greater Sudbury (CGS) will work in conjunction with CS, stakeholders and Provincial authorities to help prepare for, prevent and/or mitigate where possible, and coordinate a response to flood emergencies.

1.4 Planning Assumptions

The plan assumes the following:

- CS will provide watershed condition statements as they become available.
- CGS will have the primary responsibility for mitigation, prevention, preparedness, response and recovery in flood emergency/disaster situations.
- It is highly probable that with events such as climate change and weather anomalies Greater Sudbury could experience flash flooding or a major flooding event to some degree in the future.
- City of Greater Sudbury and partner agencies will follow the response activities set out in the Emergency Response Plan, the Community Flood Management Plan and Departmental Operating Procedures.
- Residents of Greater Sudbury will take active measures to protect personal property.

1.5 Plan Limitations

- While efforts will be made to assist residents in the protection of their property during a flood emergency, the protection of critical municipal infrastructure must be the first priority to ensure continuity of municipal services to the community.
- As per the City of Greater Sudbury's policy, the City will provide sandbags and sand to residents, when adequate supplies are available, however, no City personnel will be deployed for the protection of private property.
- There may be factors that will adversely affect the municipality's ability to respond to flood emergencies. Response may be delayed if roads become impassable, normal channels of communications may be disrupted and utilities may be unavailable for extended periods of time.
- Response to flooding varies depending on the cause of flooding. In the event of a heavy rainfall / severe summer storm the response and recovery may take place simultaneously as there is little or no time to prepare.

1.6 Authority

This plan is published as an annex to the City of Greater Sudbury Emergency Response Plan, as authorized by By-law 2011-162; the *Emergency Management and Civil Protection Act, R.S.O. 1990* and the City of Greater Sudbury Emergency Management Program.

1.7 Activation of the Plan

This plan may be activated in whole or in part, as required, by any member of the City of Greater Sudbury's Community Control Group, with or without the formal declaration of an emergency.

Upon activation, all participating agencies will respond in accordance with the procedures described within this plan and in accordance with their agency operating procedures.

SECTION 2: FLOOD INFORMATION

2.1 Types of Flooding

The causes of flooding within the City of Greater Sudbury could include one of the following, or a combination thereof:

Snow and Ice Melt Runoff Floods

Snowmelt runoff floods are the most common type of flooding in the City of Greater Sudbury. During the winter, most of the precipitation is stored as snow or ice on the ground. When the spring melt occurs, heavy runoff results from the rapid melting of the snow under the combined effect of sunlight, winds, and warmer temperatures. This causes huge quantities of water to be released. When the ground is frozen or paved over, the melting snow is unable to penetrate and runs off over the ground surface into streams and lakes resulting in flooding.

Spring Rainfall

In the spring, the predominant form of precipitation changes from solid (snow and ice) to liquid (rain). The impact of spring rainfall will vary depending on a number of factors including:

- How much rain falls
- How much melting occurred before a rain event
- The water content of the existing snow on the ground
- The ground conditions (frozen or unfrozen)

The worst-case scenario is above-zero temperatures combined with rain on frozen ground, or rain on snow with above-average water content. These conditions provide the greatest threat for flooding.

Severe Summer Storms

During high intensity thunderstorms, rainfall is often so heavy (torrential downpours) that the ground is incapable of absorbing the water quickly enough, resulting in very high runoff rates. As a result, flash flooding may occur. Greater Sudbury has experienced flash flood events in the past. They usually occur on the small urban watercourses.

Ice Jams / Frazil Ice

Ice jams result from the accumulation of ice fragments that build up to restrict the flow of water and then act as a temporary obstruction. Jams form during both the freeze-up and break-up periods, but it is usually the break-up jams that have the greater flood potential.

Ice jamming may also occur in the coldest period of winter, owing to the formation of anchor ice or frazil ice. Ice jamming occurs after prolonged periods of anchor and/or frazil ice formation resulting in ice build-up around bridge piers, islands, bends, shallow slope reductions, and constrictions.

Debris Jams

Debris jams typically occur at crossing structures, and are triggered during extreme, high-intensity rainfall events where large quantities of organic and inorganic material are washed into streams.

Dam Break or Breach

When a dam fails and water is released from a reservoir, the flood wave travelling downstream can cause significant property damage and possible loss of life.

Dam failures can be divided into two broad classifications:

- 1) Failures caused by overtopping during extreme rainfall / snowmelt events, or failure of an upstream dam.
- 2) Structural failures due to foundation problems (i.e. deterioration of concrete, erosion of earth, etc.), geological conditions, or earthquakes.

Overtopping the crest of the dam (i.e. dam breach), whether alone or in combination with a dam failure, can occur when an extreme hydrologic event or failure of an

upstream dam causes large water inflows to exceed the capacity of the reservoir and its spillway. Overtopping may also be caused by an accumulation of debris or ice that restricts flow through the dam's spillway.

Urban Flooding

Urban flooding may occur when the rainfall exceeds the municipal storm drainage system's ability to handle the volume of rain. Urban flooding is common during flash flood events. This type of flooding occurs in urban / built up areas during thunderstorm events because the surrounding ground surfaces are largely paved over, thereby decreasing the capability of the ground to absorb even small amounts of rainfall quickly enough. During these types of events, the streets may become inundated, sewer systems may surcharge, and basements may fill with water.

Water Main Break

In extreme circumstances, water main breaks could result in large volumes of water being released and result in flooding. During such situations the streets may become inundated, sewer systems may surcharge, and basements may fill with water, creating issues similar to floods caused by natural phenomenon.

2.2 Potential Adverse Effects Caused by Flooding

A flooding event could result in, but is not limited to, the following:

- Threat to life and property
- Destruction of public property
- Utility failure (power, water / wastewater, gas)
- Communications disruption (telephone, internet, radio, television, newspaper production, delivery, etc.)
- Structural damage
- Erosion
- Damage to the watershed ecosystems

- Traffic disruptions (road, bridge or rail closures, stranded motorists)
- Difficulty in attaining and delivering emergency services (Police, Fire, Paramedic Services, Public Works)
- Food and water shortages
- Evacuation of people and animals
- Crop damage
- Threat to public health (dangerous goods accidents, contaminated water - both potable and non-potable water sources)

2.3 Factors Affecting Emergency Response to a Flood Event

- Flooding can occur at any time during the year due to a variety of natural phenomenon (i.e. weather) and/or human induced circumstances (i.e. debris jamming, improper dam operation, etc.), but is most likely to occur during inclement weather conditions that will affect response times and procedures.
- The amount and extent of damage caused by any flood depends on several variables, including how much area is flooded, the depth of flooding, the velocity of flow, the rate of rise, sediment and debris carried, the duration of flooding and the effectiveness of mitigation strategies.
- The potential for damage and/or loss of life due to flooding is magnified because, generally, the public may not recognize the safety hazards associated with flooding.
- Flooding does not necessarily occur in isolation of other emergency situations, and may occur simultaneously with another unrelated type of emergency, whether it is a natural or human-induced emergency.
- Flooding can also result in secondary emergency events, including landslides, contamination of drinking water supplies, sewage back-up in homes and businesses, overloading of the sewage treatment plants resulting in the release of untreated sewage and a significant impact on the environment, etc.

2.4 Flood Emergency Management Priorities

In a flood situation, the City of Greater Sudbury and its partner agencies will focus its efforts on achieving the following objectives:

- Preservation of life and safety of emergency responders, residents and visitors.
- Support for stranded and evacuated persons.
- Protection of the water supply system, sewage treatment and other critical infrastructure of the City of Greater Sudbury.
- Protection of the environment, watercourses and potable water supplies.
- Reducing the economic and social suffering and losses to the residents of Greater Sudbury where possible.
- Returning communities to normal through a coordinated recovery process that includes re-entry of displaced persons.
- Reducing the impact to private property where possible and appropriate.

SECTION 3: FLOODING EVENTS

3.1 Sources of Flooding

Greater Sudbury's watersheds are characterized by four (4) major rivers, namely the Wanapitei, Vermilion, Onaping and Spanish. There are also various major tributaries of these rivers that are known hazard areas and can experience annual / seasonal flooding. Examples include but are not limited to:

- Coniston Creek
- Romford Creek
- Whitson River
- Junction Creek
- Nolin Creek
- Copper Cliff Creek
- Fairbanks Creek

3.2 Response Time of Watercourses

In the City of Greater Sudbury various watercourses take different lengths of time to reach flood stages due to snowmelt / rain, heavy rainfall events, etc. Flood conditions can vary based on the size, shape, watershed development, and land use characteristics.

Generally the large river systems are slow to respond to snowmelt / rainfall events and can sometimes take days to reach flood stage. In contrast, peak flooding on smaller, urban watercourses can occur in less than 24 hours of the onset of snowmelt / rainfall or rainfall alone. Severe thunderstorm events can trigger flooding in a few hours, therefore, many of the smaller tributaries in the City are termed "flash flooders". The large river systems usually consist of lower flows from early summer through the winter months with peak flows in April, May and sometimes June. Large river flows will increase due to snowmelt, heavy continuous rainfall, ice jams or a combination of all.

Compounding the problem is flooding associated with impacts to urban infrastructure such as storm drains, storm / sanitary sewer pipes, etc., due to severe rainfall or freeze / thaw conditions.

In some older homes, rain gutter downspouts, weeping tiles and sump pumps are directly connected to sanitary sewers. While this was once an acceptable practice, the municipal wastewater treatment system serves more customers today than in the past, leaving less excess capacity to process rainwater. Systems are designed solely for wastewater, meaning that additional water flow from other sources can exceed the design capacity of pipes and treatment systems. This increases the risk of flooded basements and overflow of untreated wastewater into waterways. For this reason, residents are encouraged to disconnect rainwater drainage systems from the sanitary sewers.

3.3 Knowing Where It Floods

Baseline knowledge of flood-vulnerable areas is important to providing emergency response during flood events. The CS has flood plain maps available for operational use to illustrate areas that may be flooded based on level / flow forecasts.

The City of Greater Sudbury's zoning maps, which are available on the City's website, illustrate the flood plain of the various watersheds within the city's boundaries.

SECTION 4: RESPONSIBILITIES

4.1 Federal

Part of Environment Canada's mandate, as it relates to this Community Flood Management Plan, is to preserve and enhance the quality of the natural environment, including water, air and soil quality, conserve and protect Canada's water resources, and to carry out meteorology.

In partnership with the Ministry of Natural Resources and Forestry, Environment Canada (Water Survey Canada) maintains a network of hydrometric stations under a Federal / Provincial Agreement. There are seven (7) of these stations in the watersheds around Greater Sudbury.

There are also two weather observation sites located at the Sudbury Airport. The first is maintained by NAV Canada in support of aviation activities at the airport and provides detailed hourly weather observations to Environment Canada.

The second site is also located at the airport and is maintained by Environment Canada. This is a fully automated site that is part of Environment Canada's Climate Observation Network. These observation sites are but two of the hundreds used by Environment Canada to monitor current weather conditions across North America.

Environment Canada's Ontario Storm Prediction Centre in Toronto uses current weather observations in combination with information from weather radars and satellites, a North American lightning detection network and a number of computer models to provide seven day forecasts for locations across the province.

This information is also used to issue Special Weather Statements, Watches and Warnings when severe weather that could endanger life and property becomes a possibility.

Some weather events can be extremely localized and are not always captured by an observation site. Examples include intense, localized rainfall due to severe thunderstorms during the spring and summer or snow squalls during the fall and winter.

Municipal staff across departments receive regular weather reports, advisories and warnings from Environment Canada weather services. These services are provided by severe weather meteorologists located in either Ottawa or Toronto.

4.2 Provincial

The Province of Ontario, through its various ministries, provides resources and support to Municipalities and Conservation Authorities. The province will:

- Declare a Provincial emergency when warranted.
- In a declared Provincial emergency, invoke the Provincial Emergency Response Plan and coordinate delivery of the Provincial response.

4.2.1 Ministry of Natural Resources and Forestry (MNR)

- Responsible for Provincial flood emergency management (Provincial Order in Council No. 1157/2009).
- Maintain a Provincial Flood Warning System to provide Conservation Authorities with early alerts of major precipitation events.
- In partnership with Environment Canada, maintain a network of hydrometric stations under a Federal / Provincial Agreement that ensures all water level / flow data is collected in such a way as to conform to national standards.
- Conduct flood damage estimation and assessment after the flood.

4.2.2 Office of the Fire Marshall and Emergency Management (OFMEM)

OFMEM through the Provincial Emergency Operation Centre (PEOC) is the Municipal link to provincial and federal resources and support. OFMEM will:

- Provide appropriate provincial assistance as required.
- Determine provincial funding as appropriate.
- Assist with the identification of potential liability issues and possible solutions.
- Liaise with other municipalities as required.
- Liaise with federal government agencies as required.

- Assist with emergency information communication.
- Assist with the identification and implementation of short and long term recovery strategies.

4.2.3 Conservation Sudbury (CS)

CS's legal authority comes from the *Conservation Authorities Act of Ontario* and the *Lakes and Rivers Improvement Act*.

It is the goal of the CS to:

- Prevent future loss of life and property by limiting flood plain / hazard land development.
- Reduce or minimize the risk of loss of life and property damage due to flooding in areas of historical development through the issuance of timely watershed conditions / flood messages and other information to those persons that may be at risk and to those agencies and individuals that respond to flood emergencies.
- Assist the City of Greater Sudbury and the Province (if necessary) with the implementation of their flood responsibilities.

CS Preparedness / Mitigation Activities

CS maintains a network of automated gauging stations on the various watercourses around the watersheds in Greater Sudbury. The information gathered on a continuous basis assists CS in advising when flood events are possible or likely in known hazard areas. Water Survey of Canada and Ontario Power Generation also have monitoring stations on some watercourses in the City which can be accessed if required.

CS also:

- Restricts development in flood prone / hazard areas and provides technical advice to the City in preventing or reducing the effects of flooding.
- Maintains a manual monitoring network of snowcourse survey stations.

- Maintains a network of automated stream gauges for monitoring rising water levels upstream and within areas subject to flooding.
- Maintains an information warning system to alert Municipal Officials, Emergency Services (Fire, Police and Paramedic Services), School Boards, Media, MNRF, etc. of potential flood situations.
- Operates two flood control dams in the Junction Creek watershed to provide flood protection for highly developed parts of this urban watershed.

CS Response Activities

- Predict water level / flow responses based on existing resources / capabilities to forecast potential flood occurrences in different parts of the City.
- Appoint a CS Flood Coordination Advisor to oversee the CS's flood response operations, coordinate the daily determination of flood potential and, during times of pending and actual flood events, issue the appropriate messages for the expected magnitude of the event.
- Maintain lines of communications and constant liaison with all other operators of dams and control structure in the watersheds to coordinate management and response to pending or actual flood events.
- Maintain complete awareness of the status of Municipal and Provincial responses to flood emergencies.
- Assist with flood damage assessment where possible after flood events.

4.3 Municipal

Prevention / Mitigation Responsibilities

The Municipality is responsible for developing and implementing mitigation strategies to prevent or lessen the occurrences and/or severity of flooding.

These strategies include:

- Controlling development in and around flood zones using Zoning by-laws, Official Plans and Site Plan Development.

- Working with CS to map the flood areas and the impact on critical infrastructure.
- Developing and circulating public education material concerning flood prevention and clean-up.

Response / Recovery Responsibilities

When flooding occurs, the initial responsibility for the welfare of residents is at the Municipal level. As with any emergency, the first priority is responder and public safety. The second priority is the protection and maintenance of public critical infrastructure in order to maintain basic services (hydro, water / wastewater, gas, telecommunication systems, etc.).

When flood conditions are present the City of Greater Sudbury will:

- Activate the Community Flood Management Plan.
- Activate the Municipal Emergency Response Plan.
- Convene the Community Control Group.
- Appoint an Incident Commander.
- If necessary, recommend the declaration of a Municipal emergency.
- Direct and control all flood response operations in the Municipality.
- Coordinate the acquisition of emergency response equipment, personnel and other resources required at the incident site.
- Provide assistance to residents displaced by flooding.
- Address concerns related to homes in Greater Sudbury that are on private wells or have private surface water intakes.
- Liaise with CS, local dam operators, Environment Canada, and the Ministry of Natural Resources and Forestry.
- Disseminate vital emergency information to staff, the media and citizens using appropriate channels.

- Provide information to the public concerning water supply safety, alternative sources of water, and protective actions to be taken.
- Request assistance from agencies not under Municipal control, as required (i.e. Municipal Mutual Assistance Agreements, Red Cross, local industry, etc.).
- Request Provincial assistance to perform specific flood combat / control tasks as may be required.
- Coordinate disaster recovery assistance (Municipal Disaster Recovery Assistance) as deemed necessary.
- Facilitate arrangements for the inspection of evacuated premises and provide for their orderly re-occupation as appropriate.
- Assist the Provincial authorities with damage estimation and assessment after the flood.
- Provide residents and businesses with information on safe handling of items damaged by water / sewage.
- Explore mitigation and prevention strategies to reduce the impact of future flood events.

4.3.1 Site Operations (Incident Commander)

The Incident Commander (IC) assumes responsibility for the overall coordination of all operations at the emergency site and is the point of contact between the Community Control Group and site operations.

The Incident Commander is responsible for:

- Identifying the flood risk areas.
- Prioritizing response activities.
- Evaluating and identifying equipment and resources needed.

The City of Greater Sudbury's Mobile Command Unit (MCU) may be deployed to provide a secure central location at the emergency site from which response operations are coordinated by the Incident Commander.

The following City departments and partner organizations will assist the Incident Commander in the response and recovery efforts at the emergency site:

4.3.2 Greater Sudbury Corporate Communications

- Act as liaison between Incident Command and the media.
- Designate and supervise an area for the media.

4.3.3 Greater Sudbury Fire Services

- Conduct floodwater rescue, as required.
- Rescue / evacuate any persons in danger with minimum delay and provide first aid as necessary.
- Assist Greater Sudbury Police Services with evacuations in the affected areas as required.

4.3.4 Greater Sudbury Police Services

- Evacuate the affected areas as required.
- Perform traffic and crowd control operations.
- Disperse people not directly connected with the operations who, by their presence, are considered to be in danger, or whose presence hinders in any way the efficient functioning of the flood combat/control operation.
- Secure the affected areas (based on need and availability of staff).

4.3.5 Greater Sudbury Paramedic Services

- Provide pre-hospital medical care and transportation of ill or injured persons as required under legislation.
- Assist all Allied Agencies where appropriate during the response.
- Update the Ministry of Health and Long Term Care Central Ambulance Communication Center.
- Endeavor to maintain balanced emergency coverage within the municipality.

4.3.6 Greater Sudbury Growth & Infrastructure Services – Water / Wastewater

- Implement actions to protect water and sewer systems and identify threats to drinking water.
- Work with Greater Sudbury Corporate Communications to advise the public of protective actions that may be required in the event of damage or concerns related to the sewer systems and/or drinking water sources.
- Request the disconnection or discontinuance of any service that may constitute a public hazard.
- In the event a flood emergency results in the release of untreated or partially treated sewage into lakes and rivers, implement internal procedures and notify the Ministry of the Environment, Conservation and Parks, Spills Action Centre Sudbury, Public Health Sudbury & Districts, and the Department of Fisheries and Oceans Canada.

4.3.7 Greater Sudbury Community Development– Transit

- Provide transportation for residents and emergency responders as required.

4.3.8 Greater Sudbury Community Development – Social Services

- Provide assistance to residents displaced by flooding as required.

4.4 Public Health Sudbury & Districts

- Coordinate with Greater Sudbury Growth & Infrastructure Services to ensure the availability of potable water.
- Monitor health and sanitation conditions of Reception/Evacuation Centres.
- Provide the public with information about potable water (i.e. boil water advisories) in conjunction with Greater Sudbury's Corporate Communications.

4.5 Dam Operators

There are several dam operators throughout the watersheds and watercourses in Greater Sudbury:

- Ontario Power Generation
- Conservation Sudbury
- Domtar
- Vale
- Glencore
- Ministry of Natural Resources and Forestry, and
- City of Greater Sudbury

Dam Operators are required to comply with all applicable legislation.

Prevention / Mitigation Responsibilities

- Maintain dam operations and emergency preparedness plans.
- Perform annual structural inspections on all dam facilities.

Response / Recovery Responsibilities

- Notify the City of Greater Sudbury and other community agencies when any concerns are raised regarding water levels, flows, or the potential for dam break / breach that could result in localized or widespread flooding.
- Maintain awareness of the status of Municipal and Provincial response to a flood emergency.
- Provide on-going information and technical advice to the City of Greater Sudbury, CS, and other area water managers for the operation of structures used for water/flood control to reduce the effects of flooding.
- Assist with flood damage assessment and estimation after the flood.

4.6 Union Gas / Hydro One / Greater Sudbury Utilities

- Perform disconnect operations where this is considered necessary and in the interest of public safety.
- Secure services and equipment to ensure continuity of supply.
- Coordinate the priority restoration of affected services as dictated by emergency needs of city services and other essential users.
- Assist with clean up and restoration of services.
- Assess ability to resume normal operations.

SECTION 5: EMERGENCY INFORMATION AND NOTIFICATION

5.1 Provincial Notification

Both the Ministry of Natural Resources and Forestry and CS have separate flood forecasting and warning systems. The Provincial Flood Forecasting and Warning System is maintained in Peterborough to provide Ontario's Conservation Authorities with early alerts of major precipitation / snowmelt / ice cover break-up events.

Conservation Authorities and the Ministry of Natural Resources and Forestry typically consider flooding with regard to riverine flooding only and do not normally forecast urban flooding, therefore, flood-warning messages have not normally been issued if watercourses were not expected to leave the confines of their channels. However with the increased frequency of severe storms and the impacts of a changing climate, the Province has initiated a multi-sectoral working group which is developing standards and capabilities to begin dealing with forecasting and alerts related to urban flooding events.

5.2 Local Notification

CS has an established notification procedure with critical community partners to facilitate an immediate, planned and coordinated response to a flooding emergency.

For the purposes of flood forecasting and warning CS notifies the following agencies / organizations / individuals:

- City of Greater Sudbury
 - Growth & Infrastructure Services Department
 - Community Safety Department
 - Corporate Communications Section
 - Mayor and Council
- CS Board
- Public Sudbury and Districts

- Ministry of Natural Resources and Forestry (Surface Water Monitoring Centre in Peterborough and Sudbury District)
- Dam owners and operators around the watersheds
- School Boards
- Media Outlets
- General Public
- Local MPs and MPPs

5.3 CS Notification

The CS issues Watershed Condition Statements in the form of Water Safety and Flood Outlook Statements.

Watershed Condition Statement – Water Safety

This is the least serious type of message issued by CS. The two types of bulletins issued are Watershed Conditions and Water Safety.

Watershed Condition Statement:

A general notice issued by CS as a reminder of the potential for high flows, such as those that might occur before or during spring runoff when ice cover breakup begins.

Water Safety Statement:

A general notice issued to residents advising of the potential dangers of current watershed conditions. It advises residents to exercise caution and take steps to protect themselves and their property.

Standard content for a Water Safety Statement includes:

- Date and time issued

- Period for which message is in effect
- Description of watershed conditions (level, flow, ice conditions, etc.)
- Weather forecast (current and long range)
- Relationship of weather forecasts to watershed conditions

Watershed Condition Statement – Flood Outlook

Flood Watch:

The purpose of a Flood Watch message is to notify primary municipal contacts and other partners that the potential for flooding exists. Receipt of a Flood Watch does not normally require specific action, however having been advised of a Flood Watch permits agencies to review their response plans, preparation status, etc.

Flood Watch messages are typically more general in geographical scope than a Flood Warning message. A Flood Watch message may be updated depending on how weather and runoff conditions change over time.

Standard content for a Flood Watch Message includes:

- Message number
- Date and time issued
- Period for which the message is in effect
- Date and time of expected up-date message, if any
- Name of sender and intended recipient(s)
- Summary of weather forecast information (current and long range)
- Description of watershed conditions including snowmelt / rainfall / ice jams
- Assessment of possible flooding and potential impacts

- Designated CS contact for additional information and liaison

Flood Warning:

The Flood Warning message advises the primary municipal contacts and other partners that a flood is imminent or occurring. Unlike a Flood Watch message, which provides generalized information, a Flood Warning message will provide detailed information on a specific watercourse(s) in an identified hazard area(s). Receipt of a Flood Warning message will require the municipality to take action to control / combat the impending or occurring flood and will likely include the activation of the Municipal Emergency Response Plan.

Flood Warning messages may be updated depending on weather and runoff conditions. A final update will be issued stating that the flood situation has ended and the Flood Warning has been terminated.

Standard content for a Flood Warning Message includes:

- Message number
- Date and time issued
- Date and time of expected up-date message
- Name of sender and intended recipient(s)
- Summary of weather forecast information (current and long range)
- Description of watershed conditions including snowmelt / rainfall / ice jams
- Assessment of expected flood magnitude and extent of impact
- Designated CS contact for additional information and liaison

All Clear:

The All Clear Message advises the public that flood conditions have stabilized and that residents and businesses may return to the flooded areas.

Standard content for an All Clear Message includes:

- Message number
- Date and time issued
- Date and time of expected up-date message
- Name of sender and intended recipient(s)
- Description of area
- Watershed conditions (i.e. levels have peaked, water is receding)
- Instruction to displaced residents (i.e. safe return to homes, begin clean up)

5.4 Municipal Public Warning Strategy

The City of Greater Sudbury's public emergency notification system, Sudbury Alerts, may be used to notify residents of a flood emergency. While Sudbury Alerts is an additional level of functionality to current communication methods, additional notifications will be sent through local media (radio, television, newspaper) and social media (Facebook, Twitter). Alerts will also be posted on the City's of Greater Sudbury's website. In extreme circumstances, public warning may also be done through vehicle public address systems and/or door to door contact by emergency services personnel, municipal services staff and/or volunteers.

5.5 Public Information Sharing

The City of Greater Sudbury has compiled information for residents on what to do before, during, and after a flood emergency. This information is available on the City's website and in print.

After a flood emergency, the City will circulate information to affected residents to assist them in accessing services and recovering from the event. Information will be disseminated through local media, social media, on the City website, and through other appropriate means.

SECTION 6: VOLUNTEERS

In extreme cases the City may need to supplement the existing municipal workforce with volunteers. If it becomes necessary, Greater Sudbury's Corporate Communications Section will work with local media to recruit volunteers.

Roles and responsibilities of volunteers will vary depending on the situation, safety considerations and the immediate needs of the City. All volunteers will be briefed and supervised by qualified City staff and assigned tasks based on their skills and abilities.

SECTION 7: TRAINING AND SUPPLIES

Each participating agency is responsible for defining and providing, at its own cost, the necessary training and supplies in order to perform its emergency roles.

The City of Greater Sudbury, CS, and the Ministry of Natural Resources and Forestry each carry a limited inventory of sand and sandbags for their own use. In the event the City requires a significant number of sandbags for the protection of critical municipal infrastructure, a request will be made to the Provincial Emergency Operations Centre for consideration. The City's requirements will be assessed based on urgency, available supplies and provincial priority.

SECTION 8: RECOVERY

The ability to recover from the physical damage, injury, economic impairment and human suffering resulting from a disaster is a critical element of any emergency program. It is essential to recognize that successful recovery planning and activities depend on the rapid start-up of a recovery plan and must begin during the emergency response phase.

Through the implementation of a municipal disaster recovery strategy, the City of Greater Sudbury will work with its Departments, partner agencies, and volunteer resources to restore critical infrastructure (both public and private), systematically clean up affected areas, and return the community to a state of normalcy.

The prioritization of restoration and clean up efforts will be determined by the City's Community Control Group based on a number of influencing factors, with the primary focus being on the protection of public safety.

SECTION 9: PLAN MAINTENANCE AND REVIEW

This plan will be reviewed annually by the Emergency Management Section of the City of Greater Sudbury and, where necessary, revised with input from municipal departments, CS and other responding agencies.

SECTION 10: REFERENCES

The websites listed below will provide the reader with additional information on flood preparedness and response from the various levels of government and the Conservation Authorities.

Ministry of Natural Resources and Forestry

- <https://www.ontario.ca/ministry-natural-resources-and-forestry>

City of Greater Sudbury

<http://greatersudbury.ca/beprepared/>

Conservation Sudbury

- <http://www.nickeldistrict.ca/en/>

Public Health Sudbury & Districts

- <https://www.phsd.ca/>

SECTION 11: ACRONYMS

Acronym	Definition
CAO	Chief Administrative Officer
CCG	Community Control Group
CGS	City of Greater Sudbury
CS	Conservation Sudbury
EM	Emergency Management
OFMEM	Office of the Fire Marshall and Emergency Management
EOC	Emergency Operations Centre
ERP	Emergency Response Plan
ES	Emergency Services
IC	Incident Commander
ICP	Incident Command Post
MNRF	Ministry of Natural Resources and Forestry
OPG	Ontario Power Generation
PEOC	Provincial Emergency Operations Centre
PHSD	Public Health Sudbury & Districts
W/WW	Water / Wastewater

SECTION 12: GLOSSARY OF TERMS

Term	Definition
Community Control Group	A group comprised of key municipal department heads and officials who are responsible for decision-making and the provision of essential services needed to minimize the effects of a large-scale emergency on the municipality. The Chief Administrative Officer is responsible for coordinating the actions of the Community Control Group.
Emergency	Situations or the threat of impending situations abnormally affecting the lives and property of society, which by their nature and magnitude require a controlled and coordinated response by many agencies distinct from routine operations.
Emergency Operations Centre	A location outside of the Emergency Site with adequate space and communications for the Community Control Group to control emergency operations.
Emergency Response Plan	Establishes the methodology through which the City will mobilize its resources in the event of an emergency to coordinate the earliest possible response, protect lives and property, and restore the municipality to a state of normalcy.
Emergency Site	The location where the emergency exists.

Term	Definition
Flood	The overflowing of the normal confines of a stream or other body of water (i.e., lake, pond, wetland, reservoir) or uncontrolled overland flow of an urban nature.
Flood Emergency	An incident wherein the safety and welfare of people, and/or damage to public property and/or private property, is threatened by the effects of flooding.
Flood Forecast	Provides warnings for people threatened by floods and helps in the operation of water control structures.
Incident Commander	The agency / individual responsible for all incident activities, including the development of strategies and tactics and the ordering and the release of resources. The Incident Commander has overall authority and responsibility for conducting incident operations and is responsible for the management of all incident operations.
Mitigation	Actions taken to reduce the impact of emergencies.
Mobile Command Unit	A mobile communications / central control centre from which the Incident Commander oversees and coordinates the management of the incident. The Mobile Command Unit provides a communication link between Incident Command and the Emergency Operations Centre.

Term	Definition
Preparedness	Actions taken to prepare for emergency situations. This includes developing emergency response plans, conducting training and exercises and providing education and awareness information geared towards personal preparedness.
Prevention	Actions taken to prevent emergencies from happening.
Recovery	Actions taken to return the community to a state of normalcy. This includes developing and implementing measures that expedite a return to normal activities and the recovery of losses.
Response	Actions taken to respond to an emergency that includes providing timely, relevant and accurate emergency information to the public.
Watershed Conditions Statements	General watershed condition notices related to potential flooding or other conditions that pose a risk to personal safety (high flows, unsafe ice, slippery banks, high lake levels, etc.). Statements are initially directed to municipal departments and agencies followed by the general public through the local media.