



5. Improved service delivery: The innovative flood incident management plan

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BACKGROUND AND INTRODUCTION

Several flooding events occurred during January and February 2006 throughout the City of Tshwane (CoT). These incidents caused severe damage to property and infrastructure and endangered life. The flooding events however did not reach disaster proportions as defined in the Disaster Management Act of 2002 and therefore all responsibility to deal with the consequences lay with the CoT, resulting in a serious strain on the municipality's resources.

Every municipality has certain obligations with regard to both flood incidents and disaster risk management planning in order to respond to adverse events. In view of the above a coordinated flood risk management plan needed to be compiled that would enable the CoT to provide its residents with an improved level of service, specifically in the event of flooding. The flood risk management plan would also assist the Local Authority in coordinating and planning resources needed to provide the expected levels of service in the event of flooding.

As a solution a Flood Incident Management Plan (FIMP) was compiled to aid in effectively managing flooding incidents in the CoT. In the short term the FIMP provides the CoT with contingency plans to mitigate the impact of flooding and in the long term assists the municipality with the development of flood incident and disaster prevention strategies.

The main actions in the compilation of the FIMP were:

- The revision of legal requirements and existing flood disaster management related documents relevant to the CoT
- The revision of the current structure of the disaster management centre
- Defining roles and responsibilities at a corporate as well as functional unit level regarding flooding events
- Identification and mapping of high risk flood areas
- Compilation of incident management plans giving guidelines on how flooding events should be handled efficiently

LEGAL REQUIREMENTS AND RELATED DOCUMENTS

It was important to review existing policies, frameworks and current legislation to ensure that the proposed FIMP is legally compliant and does not contradict current policies. Each municipality has certain obligations with regard to Disaster Risk Management planning needs in order to respond to adverse events; providing relief where this is necessary; to compile plans in the event of a disaster or threatening disaster and to be aware of hazards and risks pertaining to its area of jurisdiction.

This document deals with flood incident management planning, which at the time may not qualify to be declared a local disaster in terms of the Disaster Management Act (Act 57 of 2002). It would however be short sighted not to submit proposed procedures and plans that also address a declared local disaster should a flood incident escalate to disaster proportions.

The following documents have accordingly, been reviewed, having taken the previous paragraph into consideration:

- Relevant sections of the Disaster Management Act (Act 57 of 2002)
- A brief referral to the Municipal Systems Act (Act 32 of 2000)
- Relevant sections of the National Disaster Management Framework

(29 April 2005; Govt. Gazette 27, volume 478)

- Disaster Management Master Plan for City of Tshwane compiled by Stewart and Scott International (19 February 2004)
- Policy to deal with localised incidents/events that are not declared disasters (document submitted to the Mayoral committee on 16 August 2006)
- CoT Bylaws pertaining to stormwater management

In order to enforce the control of stormwater and development in flood prone areas, municipal bylaws have been established at some local authorities. The CoT Bylaws state that no development is allowed within the 1-in-50-year floodplain.

REVIEW OF THE CoT DISASTER MANAGEMENT CENTRE

The current structure of the CoT Disaster Management Centre (DMC) was investigated and analysed. Although it is a well thought out structure, the level of vacant posts in the DMC at the time was of concern as this could severely hamper the functioning of the centre during a major incident. It was also noted that serious consideration should be given to the current level and interaction of the DMC with other functional units or departments within the CoT. It seemed that there were discrepancies in the way certain responsibilities of functional units within the City were perceived with some line functions not aware of responsibilities that should be attributed to them.

DEFINING ROLES AND RESPONSIBILITIES FOR FLOODING EVENTS

The general tendency is to expect the Disaster Management Centre to perform duties that would normally be the task of a line function service during flooding and other hazardous incidents. The need for all functional units within the municipality to take ownership of their specialised duties during flooding events was therefore identified.

Unless these issues are successfully addressed, it will be difficult to cost-effectively maximise the available resources within the municipality during any flooding (or any other major adverse event). The need to agree formally to which roles and responsibilities are best performed by which functional unit (department) was evaluated during a series of workshops. From these workshops the specific duties and responsibilities of each of the line functions during different flooding incident types were identified. The different functional units or line functions identified to play a role in flood incident management in the CoT are:

- Roads and Stormwater - Inform and advise other functional units and role players of all matters during flooding and the primary role player responsible for stormwater management. Should the matter become a major flood, they would still be the lead agency, although the coordination between services should at that stage become the responsibility of the DMC.
- The Disaster Management Centre - Must remain abreast with developments, as the situation could become a major incident at which stage the DMC should start performing the coordinating role. The incident could further deteriorate and consideration may have to be given to declaring a local state of disaster.
- Metro Police - Responsible for the general safety and security of the public, road blocks to limit access to the area and to undertake traffic management in the immediate vicinity. Also responsible for the enforcement of municipal bylaws to prevent possible incidents. Assist in communicating important messages (i.e. public address system).
- Fire and Rescue - Responsible for rescue of trapped persons and

animals and to coordinate evacuation of an effected area should this be necessary.

- Ambulance Service - Provide emergency rescue, medical assistance and patient transportation services.
- Corporate GIS - Give spatial data and mapping support to all the departments involved.
- Finance - Assist with safe storage of and control over bulk belongings salvaged (stores control) and facilitating additional funding needs.
- Legal Services - Processing of possible claims against the Municipality and publishing of identified bylaws/directives in terms of the Disaster Management Act provisions.
- Customer Care - Provide an information/enquiry service.
- Public Relations - Responsible for messages to affected communities and media liaison.
- Social Development - Responsible for determining and coordinating the social needs of those affected by the flooding.
- Community Health - Responsible for monitoring and identifying any human health risks and treat contaminated water supplies.
- Housing - Facilitate the establishment of an emergency housing centre.
- Transport - Provide transport for evacuation of persons (to emergency housing centres).
- Electricity, Water and Sanitation - Responsible for disrupted and/or damaged services supply and equipment.
- Environmental Management - Establishing environmental degradation/impact caused by floods.

The immediate need in CoT was to establish a task team that will react in the event of a major flood occurring. The task team must determine the impact of the incident and measures to be taken in order to reduce immediate risk and to provide effective immediate relief and response.

The task team should also be able to operate in determining priority matters in order to mitigate the impact of a potential flooding scenario (short to medium term planning) and ultimately to prevent flooding in identified high risk areas (long term planning). Further details of the proposed task team structure are given below.

The following functional units were identified as permanent members on the CoT flood incident management task team:

- Roads and Stormwater
- Fire and Rescue
- Social Development
- Community Health
- Metro Police
- The Disaster Management Centre

IDENTIFYING AND MAPPING OF HIGH RISK FLOOD AREAS

It is important to identify and categorise flood types as well as risk areas to aid the CoT flood incident management task team in both risk reduction and active disaster response activities. A study carried out by the Roads and Stormwater Division “Flooding in Tshwane, January and February 2006” categorised some of the main incident types. Furthermore, details on the position of flooding were logged. This data was then used to expand and augment the flooding types and to identify potential regional flood risk areas.

A flood incident risk identification model was developed to calculate the potential risk of flooding incidents in the CoT area of jurisdiction. The model took into account the following parameters:

- Socio-economic status
- Topography

- Recorded flooding incidents
- Land-use (open spaces, state and conservation areas)
- 1-in-200 year indicative flooding areas

Based on the above model regional flood incident risk areas were determined and categorised in Table 1 as follows:

Table 1 : Flood risk categories

Flood Risk	Probability of Occurrence per Annum
High	100-50%
Medium	49-20%
Medium to Low	19-10%
Low	Less than 10%

The identified risk areas for the CoT are shown on Figure 1.

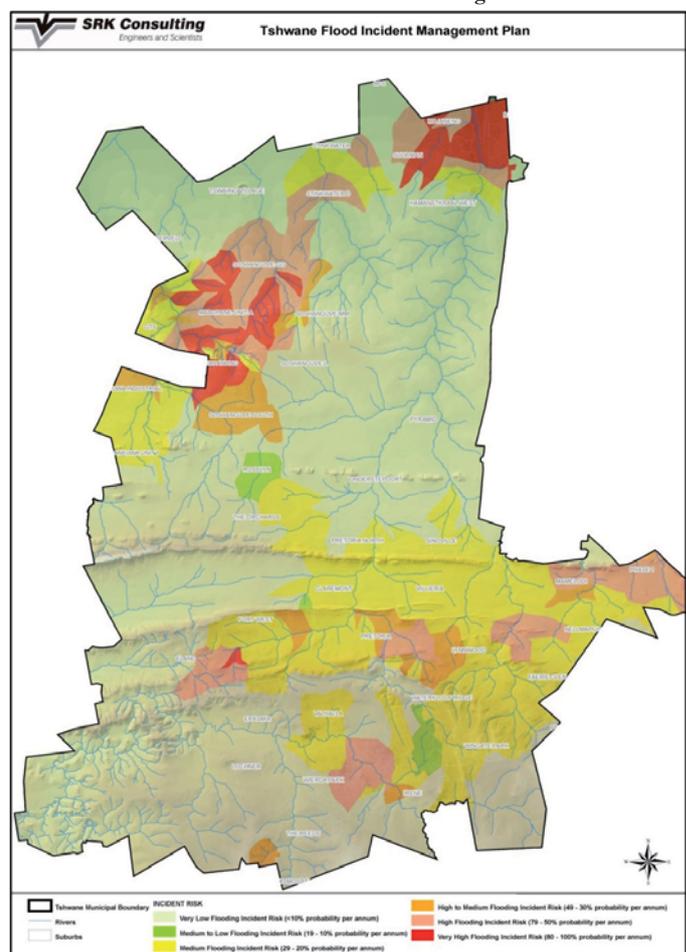


Figure 1 : CoT flood incident risk map

It was also important to identify the types of flooding incidents that could be expected in the CoT as different flooding types require different prevention and reaction strategies from a combination of different functional units. The major flooding types identified for CoT were:

- Watercourse flooding
- Buildings flooding
- Informal settlements flooding
- Ponding
- Roads flooding
- Erosion damage
- Deposits on roads



- Road damage
- Stormwater infrastructure damage
- Electricity supply infrastructure damage
- Water supply infrastructure damage
- Ingress of storm water to sewer system
- Blockage of storm water structures

COMPILING OF INCIDENT MANAGEMENT PLANS

The FIMP aids functional units to prepare for potential flooding incidents as described in the previous section as well as to co-ordinate functions/resources during and after a flooding incident. The detailed FIMP comprises the following main components:

- Proposed chain of management
- Flood management and flood warnings
- Quick reference to functional unit’s involvements, functions and resource planning

Proposed chain of management

To aid in the communications and line of action between various involved functional units the following strategic action flowcharts were compiled:

- Chain of management at strategic level during a flooding incident
- Chain of management for warning of possible flooding
- Chain of management during flooding
- Chain of management if disruption in community life occurs
- Chain of management if disruptions in essential services occur
- Chain of management for media liaison and communication
- Chain of management if extensive environmental impact and degradation occurs

Figure 2 indicates an example flow chart of the chain of management at strategic level during a flooding incident.

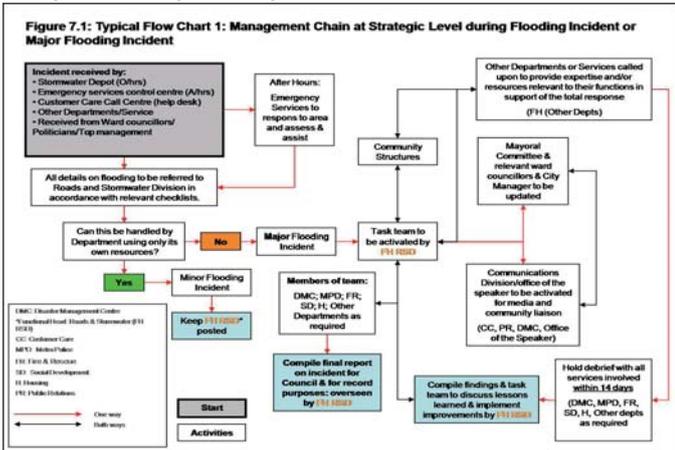


Figure 2 : Example flowchart of Chain of Management at Strategic Level during Flooding

The use of these flowcharts will aid in efficient reaction to flood incidents and thereby improve service delivery in the long term as duplication of efforts and misinterpretations of responsibilities will be avoided.

Flood management and flood warnings

Checklists were also compiled for specific functional units that would have responsibilities for action during a specified flood event. These checklists contain possible specialist functions (responsibilities) for which the relevant functional unit would be responsible.

In addition, possible supporting roles are listed that could be performed by the functional unit in support of another functional unit requesting assistance. This is on condition that the functional unit has the capacity to perform the extra tasks at the time and that this will not restrict the effective execution of that functional unit’s primary responsibility. The responsibility checklists are also supported by checklists of resources that each functional unit will need during the execution of its responsibilities. These checklists contain items that will be needed during different stages of an incident and relevant to the functional units including:

- Typical equipment/resources needed as part of preventative and mitigation measures
- Resources and equipment that could be utilised during a flood
- Resources and equipment needed during the post incident stage and preparedness/awareness stages

A benefit of the checklists is that they will enable the functional unit to budget for specific items during preparation stages. The checklists should be adapted and modified on a continuous basis as new technologies or improved flood mitigation, reaction and recovery measures could need new or different items and actions.

Quick reference guide to functional unit’s involvements, functions and resources planning

A digital and hardcopy summary matrix listing all potential expected flood incident types and existing functional unit involvements were compiled to simplify the use of the flood incident management plan. The matrix indicates the level of involvement of the functional units for each category of flooding and provides a hyperlink function to open the functional unit’s responsibility and resources checklists. The summary matrix assists functional units by enabling them to identify their exact roles and responsibilities in any flood incident and providing details on actions and resources needed in the execution of their responsibilities.

The plans could be kept on a compact disc for easy distribution or made available on the city’s intranet to enable all functional units to have quick and easy access to the necessary information during flood incidents.

Figure 3 indicates a section of the flood incident management summary matrix.

Flooding Type, required Functions and Equipment/Resources	Functional Unit		Functional Unit Role
	Disaster Management Centre (DMC)	Task Team (Major Incident) (TT)	
Watercourse flooding	Coordinate & Monitor Incident & Response	Responsible for Decision Making	B
Buildings flooding	Coordinate & Monitor Incident & Response	Responsible for Decision Making	A
Informal settlements flooding	Coordinate & Monitor Incident & Response	Responsible for Decision Making	A
Ponding (P)	Coordinate & Monitor Incident & Response	Responsible for Decision Making	B
Roads flooding	Coordinate & Monitor Incident & Response	Responsible for Decision Making	A
Erosion damage(ED)	Monitor Incident	< NOT INVOLVED >	A
Deposits on roads (debris, sand, gravel)	Monitor Incident	< NOT INVOLVED >	C
Road damage (RD)	Monitor Incident	< NOT INVOLVED >	B
Stormwater infrastructure damage (SWID)	Monitor Incident	< NOT INVOLVED >	A
Electricity supply infrastructure damage (DES)	Monitor Incident	< NOT INVOLVED >	B
Water supply infrastructure damage (DWS)	Monitor Incident	< NOT INVOLVED >	A
Sewer system damage (SSD)	Monitor Incident	< NOT INVOLVED >	A
Ingress of storm water to sewer system (IWS)	Monitor Incident	< NOT INVOLVED >	A
Blockage of Stormwater Structures (BSW)	Monitor Incident	< NOT INVOLVED >	C

Figure 3 : Flood incident management summary matrix



Benefits of the Flood Incident Management Plan

The introduction of the FIMP in the CoT has brought awareness among line functions of their specific primary and secondary roles pertaining to the mitigation and reaction to flood incidents. Functional units are now aware of their exact duty and requirements in the event of different flooding incidents. This awareness will ensure that the resources of the City are optimally used and should therefore contribute to improved public service delivery.

The main benefits of the FIMP include:

- Proactive and integrated approach to managing flooding incidents
- Defining roles and responsibilities to all line function departments and managers
- Improving service delivery in emergency situations
- Reducing property damage, health risks and potential loss of life

This system should help to ensure that any major flooding can now be dealt with cost effectively by the CoT, resulting in minimum losses and negative impacts as a result of the adverse event. Several high flood risk areas have been identified mostly in areas along rivers and where the topography is very flat.

CLOSING COMMENTS

From discussions with the regional depot managers it was established that to date no reliable information was available on costs incurred during previous floods. For this reason it is currently difficult to establish emergency funding requirements. It is furthermore to be noted that emergency funds can only be put aside once National Treasury has published regulations specifically aimed at relief measures.

No integrated early flood warning system currently exists within the CoT municipal area, making the FIMP the primary tool for mitigating and preventing damage to property and loss of life due to flooding. The successful handling of the consequences of a major flood will require the input and support of, in most cases, several functional units, and it is thus important that all agree to the final adopted planning material and take ownership of their agreed functions, roles and responsibilities. If this does not materialise, the negative compounding effect could increase the suffering and loss of those affected; in particular those most at risk, which more often than not, are the poor.

Part of the ongoing planning will require a sustained programme of community awareness and preparedness, as well as community participation towards acceptable mitigation and prevention measures. The successful implementation of the FIMP for CoT will make a significant positive contribution towards the perceived and actual service delivery levels of the City.

8. ACKNOWLEDGEMENTS

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