

REPUBLIC OF MOLDOVA



APA CANAL CHISINAU

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## CHISINAU WATER SUPPLY & SEWAGE TREATMENT - FEASIBILITY STUDY



## EMERGENCY RESPONSE PLAN - FINAL

August 2012



A Subsidiary of



In association with

and



 **European Bank** for Reconstruction and Development and EU Neighbourhood Investment Facility

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## LIST OF ABBREVIATIONS

<b>ACC</b>	Apa Canal Chisinau
<b>EPO</b>	Emergency Planning Officer
<b>ERP</b>	Emergency Response Plan
<b>SCADA</b>	Supervisory Control and Data Acquisition
<b>TRL</b>	Tactical Response Team
<b>TOR</b>	Terms of Reference

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## DEFINITIONS

In order to focus the Emergency Response Plan, it is necessary to define an “emergency” and relate the definition to non-emergency events – “incidents”.

An **incident** can be defined as:

- “An unplanned event which has no significant affect on the service provided to customers of the ACC”.

An incident although undesirable because it was unplanned and possibly draws upon ACC resources to resolve within an unplanned way and inefficient way, is not an emergency.

An **emergency** is a serious “incident”, and which can be defined as:

- “An incident of such significant risk as to affect the ability of the business to provide the required level of customer service or in some other way adversely affects the customers of ACC or the environment of the city.”

As an example, a failure of a pump at a pumping station is an “incident” which becomes an “emergency” if a stand-by pump is either unavailable or does not start, causing customers to lose their supply.

A **crisis** is an emergency of such seriousness and catastrophic effect that it falls outside the scope of an Emergency Response Plan. As such it is outside the capability of ACC to resolve and relies upon national emergency planning..

## EXECUTIVE SUMMARY

A requirement of the Terms of Reference for the contract is Phase A.8 “*Assessment of and Proposal for Emergency Repair Requirements*” within which “*The Consultant shall carry out an Assessment of Emergency Repair Requirements and propose a short-term strategy for an Emergency Repair Programme to ensure operation of water supply and sewage collection for 12-24 months until start of Phase I of the investment programme.*”

In the opinion of Seureca, and based upon our experience, we consider that ACC has to have in place a long-term strategy for emergencies. Even with the best, most modern systems, emergencies will occur for which ACC must be prepared. Such preparation can only be achieved through the development and implementation of an Emergency Response Plan, appropriate to both short-term and long-term needs.

Accordingly, Seureca is pleased to go beyond the requirements of the ToR and to provide ACC with an Emergency Response Plan.

An Emergency Response Plan provides: “*professional, strategic and tactical managed response protocols: (i) to mitigate the effect of an emergency upon the business; (ii) that are scaled to the severity of the emergency and (iii) which set out the relationships for response teams, within and outside the business*”

ACC operational staff has available useful data on the systems, spare parts, critical customers etc. that is available to operational staff in an emergency, but it does not provide guidance to the managers on how to deal with an emergency. In other words, it is a databank not a Response Plan.

Emergency planning is contained within a Risk Management approach that comprises:

- The planning out of the system identified risks that can be removed at a reasonable cost. Typical of such risks are dependence upon: (i) single sources and process streams within treatment works and (ii) vulnerable elements of the supply network;
- Secondly, for risks that have been identified – specific or generic – that cannot be designed out of the system, or are awaiting investment of the solution, the effects of the emergency can be mitigated:
  - *Before an Emergency* by holding regular Emergency Exercises with feedback into the Capital Development Programme where capital solutions are appropriate, O&M Procedures for operational matters and into the Human Resource Plan for identified training requirements;
  - *During an Emergency* by having in place an Emergency Response Plan,
  - Managing the emergency with:
    - A strategic response – to manage the impact on the business and is directed from a central incident room location, and
    - A tactical response – the on-site action to correct the event and reduce local effects

Risks identified in the first category are considered at corporate level and solutions provided within the ACC capital development programme. Current identified risks are being addressed within the Feasibility Study.

The Emergency Response Plan is concerned with the second point.

Application of the Emergency Response Plan during an emergency will mitigate the effects of the emergency for the benefit of the: (i) public; (ii) the customers of ACC and (iii) the business reputation of the company.

The approach proposed by Seurecato to be adopted by ACC, is a four layer response:

- Provide a procedure to trigger an emergency alert;
- When the emergency event is alarmed, analyse the risk by:
  - Identifying the nature and reasons for the Emergency;
  - Assessing the consequences, and
  - Considering the effects.
- Determine the required level of response e.g. immediate or the next working day;
- Manage the Emergency.

In order to meet the requirements of the ToR, the Plan has been written as three Parts:

- The first Part sets out the principles of emergency planning;
- The second Part will specify the action to be taken by ACC during an emergency to be able to professionally and competently tackle the emergency, and
- The third part is a strategy to address the ToR requirement to ensure operation of water supply and sewage collection for 12-24 months until start of Phase I of the investment programme – the specific ToR requirement.

It is pointed out that the ToR requirement, and in line with practice for Emergency Response Plans, is to prepare a strategy, not specific actions for every emergency that might occur. Within subsequent phases and when the computer network models are available, Seureca will be pleased to assist ACC identify the major risks and the required action.



# 1. EMERGENCY RESPONSE PLANNING

## 1.1. PURPOSE OF AN EMERGENCY RESPONSE PLAN

An Emergency Response Plan provides: “*professional, strategic and tactical managed response protocols: (i) to mitigate the effect of an emergency upon the business of ACC; (ii) that are scaled to the severity of the emergency and (iii) which set out the relationships for response teams, within and outside ACC*”.

The overall purpose of the Emergency Response Plan (ERP) is to provide ACC with a standardised response and recovery protocol to prevent, minimise and mitigate injury and damage resulting from emergencies, both physical and to the business reputation of ACC.

Application of the ERP during an emergency will mitigate the effects of the emergency for the benefit of the: (i) public; (ii) the customers of ACC and (iii) the business reputation of the company.

## 1.2. OBJECTIVES OF AN EMERGENCY RESPONSE PLAN

The objectives of an ERP are to document and understand the stages needed to:

- Ensure the professional management of the emergency;
- Delegate authority to those required to take emergency response actions;
- Ensure the right people are in place to handle the emergency – the formation of strategic and tactical response teams;
- Make available the resources to resolve the situation and to mitigate the effect upon customers, the environment and the wider public;
- Provide the response teams with a full list of support and back-contacts and those to be notified at the start, during and at the end of the emergency;
- Provide emergency public information concerning progress on the emergency, and where to obtain alternative water supplies and generally keep customers informed;
- Keep the Municipality aware of progress and, if necessary, inform Government Ministries and others;
- Have in place a feed-back facility after an emergency for on-going learning, and
- Ensure ACC has the experience of emergency handling through the holding of regular exercises.

## 1.3. LEGAL REQUIREMENTS

Whilst commonly there is no specific law relating to Emergency Response Plans, there is an implicit requirement, for the local water and wastewater service provider to actively prepare for emergencies and to participate within local and national emergency planning.

## 1.4. BEST INTERNATIONAL PRACTICE

ACC will wish to emulate best international practice, as shown in Table 3.

Table 1: International Best Practice

Emergency Planning	Best Practice Requirements	To achieve Best Practice ACC must	Benefits
<ul style="list-style-type: none"> <li>a. At corporate level, design risk out of the water supply and wastewater collection systems;</li> <li>b. Adopt good practice Operational Procedures to reduce the probability of an emergency;</li> <li>c. Have in place a current Emergency Response Plan.</li> </ul>	<ul style="list-style-type: none"> <li>a. Prepare and maintain Water and Wastewater Master Plans (of which the Feasibility Study is the basis for the on-going maintenance of Water and Wastewater Master Plans by ACC) that include for risk management;</li> <li>b. Consider the Emergency Response Plan to be a “live” document to be regularly updated based upon the experience of real emergencies and exercises;</li> <li>c. Practice annual emergency response exercises with full and active staff participation, at all levels;</li> <li>d. The Emergency Response Plan to be a “controlled” document within a Quality Assurance system.</li> </ul>	<ul style="list-style-type: none"> <li>a. Ensure the currency of the Development Plans and provide for the required prioritised investment funding against emergencies;</li> <li>b. Nominate a senior manager as Emergency Planning Officer, and provide a rota of Senior Managers for 24 hour/7 day cover at a senior level;</li> <li>c. Liaise with Municipal and national emergency committees;</li> <li>d. Ensure the Emergency Response Plan is issued as a controlled document and its requirements are followed;</li> <li>e. Maintain a fully equipped Incident Room (See Section 1.10 for requirements for an Incident Rom);</li> <li>f. Use the emergency exercise as an opportunity to learn and to revise the ERP according to the conclusions of the exercises, and</li> <li>g. Use network analysis for “desk top” exercises and for the preparation of Action Plans.</li> </ul>	<p>ACC will reduce the risk of emergencies and, when they occur, be able to deal with them competently and professional to the benefit of its customers, the public and the Government.</p>

## 1.5. EMERGENCY PLANNING

### 1.5.1. EMERGENCY RESPONSE PLANNING PROCESS

Emergency planning is contained within a Risk Management approach that comprises:

- Including into the capital development programme schemes that take out of the system identified risks, at a reasonable cost. Typical of such risks are dependence upon: (i) single sources and single process streams within treatment works and (ii) vulnerable elements of the supply or wastewater collection networks;
- For risks that have been identified – specific or generic – that cannot be designed out of the system, or are awaiting investment of the solution, the effects of the emergency can be mitigated:
  - *Before an Emergency* by holding regular Emergency Exercises with feedback into Business Plans, Operating Procedures and training programmes;
  - *During an Emergency* by having in place an Emergency Response Plan, and
  - Managing the emergency with:
    - Strategic response – to manage the impact on the business, and
    - Tactical response – the on-site action to correct the event.

Risks identified in the first category are considered at corporate level. Solutions for identified risks are being provided for within the Feasibility Study and capital development programme.

The Emergency Response Plan is concerned with the second points. The approach is shown diagrammatically in Figure 1.

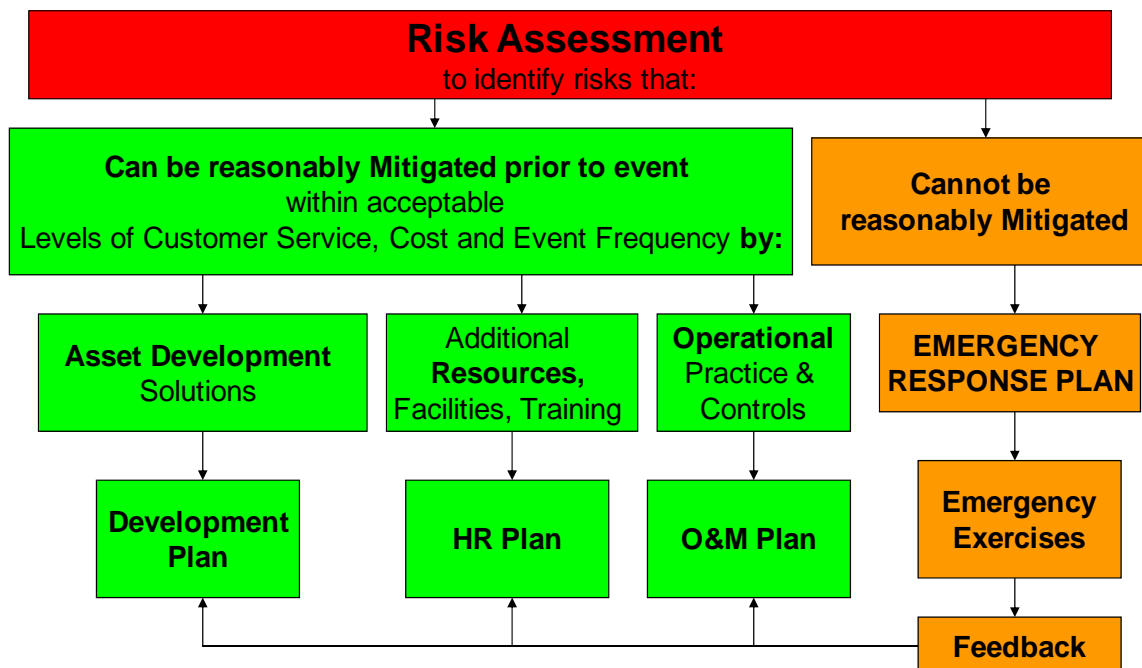


Figure 1 : Corporate Risk Management

## 1.6. CONCEPT OF SERIOUSNESS OF AN EMERGENCY

In the same way that it is necessary to define an emergency, there is a need to establish the concept of seriousness of the emergency. It would not be expected that ACC will respond in the same way to an emergency that affects 10 customers as it would to one that affected 1,000.

Beyond the “incident” level, emergencies can be considered at three levels: low, medium and high. A level of response is suggested for each, in the following Table 4, but this should be coordinated with Municipal and national security authorities for consistency in approach.

Table 2: Indicators of Severity of an Emergency

(see below for explanation of Emergency Planning Officer, Incident Room and Strategic and Response teams – Sections 1.9, 1.9.2 and 2.1.3)

Level of Severity	Severity Indicators	Indicative no. of people affected	Typical Event	Action
Level 0: An incident	No adverse affect upon the ability of ACC to maintain a normal service to customers.	0	<ul style="list-style-type: none"> <li>a. Failure of a single pump with supply maintained by standby pump;</li> <li>b. Failure of a non-critical item of plant.</li> </ul>	<ul style="list-style-type: none"> <li>a. Repair affected or incident resolved;</li> <li>b. No appointment of Strategic Response or Tactical Response Leaders;</li> <li>c. Incident Room not opened</li> </ul>
Level 1: Low	<ul style="list-style-type: none"> <li>a. Customers/public may be affected but no widespread consequences and incident can be managed by local staff;</li> <li>b. There is adequate storage capacity to see the emergency through or additional water could be made available from other sources;</li> <li>c. No adverse public reaction is expected;</li> <li>d. Unsatisfactory water quality sample from local area;</li> <li>e. Low security threat.</li> </ul>	Up to 500	<ul style="list-style-type: none"> <li>a. Local water main failure or sewer blockage;</li> <li>b. Failure of a pumping station but only a small number of customers are affected;</li> <li>c. Failed water sample taken from a single property or from distribution main;</li> <li>d. Intruder seen on an ACC site.</li> </ul>	<ul style="list-style-type: none"> <li>a. Repair by local staff;</li> <li>b. Intruder stopped and told to leave;</li> <li>c. Emergency Planning Officer manages the emergency relying upon local and/or ACC Head Office experts;</li> <li>d. Supervisor of repair gang manages the on-site response;</li> <li>e. Incident Room is not opened</li> </ul>

Level Medium	2: a. Widespread affect on ACC's ability to maintain a service with adverse consequence to the public; b. Due to the complexity of the incident, access problems or availability of spare parts etc., the duration of the emergency is likely to be such that water storage volumes will be seriously depleted with consequential expansion of the area initially affected; c. Critical customers are affected and media attention can be expected; d. Medium security threat; e. Non ACC incident for which the assistance of the ACC is requested/required.	Between 500 and 1,000 people	a. Failure of source or part or all of thewater treatment works seriously reducing the total flow into supply; b. Total failure of a strategic pumping station; c. Failure of a strategic pipeline or strategic sewer blockage or collapse; d. As a level 2 incident, but during a peak period when storage capacity is low and no additional water can be supplied into the affected area; e. Failure of a main or sewer in a major highway causing severe traffic disruption; f. Intruder is acting suspiciously, is causing actual damage or refuses to leave ACC premises or a threat is received by ACC;	a. Incident Room is opened with the Emergency Planning Officer as Strategic Response Leader b. Local manager appointed as Tactical Response Leader. c. Local police notified of intruder; d. Response to a request from non ACC entity to be appropriate for the request.
Level 3: High	a. An incident that will cause severe public reaction with potential serious affect upon ACC's image and reputation. b. High level security threat; c. A non ACC incident that has serious consequences for which ACC assistance is required to make water available for fire fighting, or other purpose.	Above 1,000 people	a. An event that has widespread consequences or severe local affects; b. Major attack or threat of attack, against ACC sites and/or personnel. c. Major source, treatment works or other pollution incident.	a. Incident Room is opened with ACC Technical Director as Strategic Response Leader b. Local manager appointed as Tactical Response Leader; c. National security forces notified of threat.

## 1.7. MUNICIPAL AND NATIONAL COORDINATION

Emergency planning is focused, in the first instance, upon the requirements of ACC, as it is ACC that is responsible for maintaining levels of water and wastewater service during an emergency.

Nevertheless, ACC cannot act in isolation. In responding to an emergency, ACC may wish to call upon the assistance of other local and national organisations e.g. military for generators, workforce or vehicles.

An emergency that is the prime responsibility of another entity might require emergency action from the ACC e.g. a major fire.

It is important that ACC is competent to actively participate in national and municipal planning committees, with representation at an appropriate level, and that ACC is capable of participating in any national or municipal emergency exercises.

## 1.8. PRIORITISATION

If required, the emergency response prioritisation to be adopted is in the order of: (i) saving and protecting the lives of people; (ii) protecting the environment; (iii) limiting damage to assets and (iv) protecting the business reputation of ACC.

## 1.9. ROLES WITHIN EMERGENCY PLANNING AND RESPONSE

### 1.9.1. EMERGENCY PLANNING OFFICER

Not necessarily a full-time position, we recommend that ACC nominate a senior member of staff as the Emergency Planning Office. Often, and applicable to ACC, this could be the Head of the Despatch Department.

The Emergency Planning Officer is the person responsible for:

- Ensuring that the Incident Room contains the required drawings, documents and other facilities as set out in the Emergency Response Plan;
- Ensuring the security of the Incident Room, and its availability at all times;
- The maintenance, updating and issue of the Emergency Response Plan;
- Maintaining a schedule of repair pipes, couplings and other such requirements and, in conjunction with the Procurement Manager, ensure that they are maintained in a special area of the stores, marked as for emergency use only;
- Maintaining a schedule of plant and equipment that might be required in an emergency, their location and current driver/operator;
- Plan, manage, referee and report on Emergency Exercises;
- Other tasks as set out in this Emergency Response Plan, and



- Coordination at appropriate level with municipal and national committees, and participate in Committee meetings as the representative of ACC.

“Incidents” will be reported upwards through the line management of the concerned department. The Emergency Planning Officer (EPO) will be kept informed of incidents, their criticality and progress on resolution.

The EPO shall assess the severity of all “incidents” and decide upon the required response in consultation with the other Senior Managers/Directors.

### 1.9.2. STRATEGIC RESPONSE LEADER

The Strategic Response Leader, normally the Emergency Planning Officer, shall:

- Assume full charge for the response to the emergency;
- Identify the causes for the emergency and the strategic response required;
- Manage the strategic response;
- Assemble the strategic response team;
- Maintain communication with the Tactical Response Leader and respond to all requests for assistance, resources and advice;
- Appoint a log-keeper;
- Arrange for press-releases and handle requests from the media;
- In conjunction with the Customer Services Manager, or equivalent, ensure that customers are kept informed of where alternative water supplies can be obtained and of progress with the emergency;
- Chair the subsequent de-briefing meeting and prepare a report on the emergency;
- Keeps Directors and senior managers aware of the situation, and
- For a prolonged incident, ensures that back up for strategic response and tactical response teams are in place.

The Strategic Response Leader shall manage the emergency but may choose to delegate some of his tasks, but not his responsibility for the management of the emergency.

For extreme emergencies, the Technical Director could be nominated as the Strategic Response Team Leader.

### 1.9.3. TACTICAL RESPONSE LEADER

The Senior Manager within whose section the emergency lies, shall appoint the Tactical Response Leader, irrespective of the level at which the emergency is first identified.

Upon appointment, the Tactical Response Team Leader shall:

- Immediately go to the site of the emergency;
- Appraise the situation and make a report to the Strategic Response Leader;
- Manage the on-site response and assemble the response team;

- Take appropriate action to rectify the emergency and manage the on-site activities;
- If appropriate, evacuate the building and/or ensure the public are kept away;
- Request additional resources as may be required;
- Keep the Strategic Response Leader informed of progress with as early warning as possible of difficulties;
- Provide assistance to members of the public who may have been affected by the emergency e.g. property flooded, and
- At the end of the emergency prepare a report upon the emergency.

The Tactical Response Leader is to appoint assistance as he thinks appropriate and, if the emergency is expected to be of long duration, assemble a stand-by team and a deputy Tactical Response Leader.

If the "normal" response team i.e. standby gang is employed for the emergency, the Tactical Response Leader will assemble a second response team to cover for any other emergency that might arise. This might require the use of staff from outside of the affected district/work location and will be arranged through the Strategic Response Leader.

#### 1.9.4. STRATEGIC TEAM MEMBERSHIP

The Strategic Response Team will be drawn from senior managers of ACC and from those with specialist skills depending upon the nature of the emergency e.g. network analysts. The composition of the Strategic Response Team will depend on the assessed severity and nature of the emergency.

In assembling a Strategic Response Team, due importance is to be given to the requirement for support staff, technical and non-technical, such as network modellers and secretarial staff for communications and message taking.

#### 1.9.5. TACTICAL TEAM MEMBERSHIP

The Tactical Response Team will be assembled by the local manager and be appropriate for the incident. If the local manager considers that he requires assistance, or specialist skills, he should have no hesitation in calling upon the strategic team for that assistance.

#### 1.9.6. STRATEGIC AND TACTICAL RESPONSE BACK-UP TEAMS

As soon as it becomes apparent that the emergency will be of lengthy duration, the Strategic Response Leader shall form back-up strategic and response teams.

All teams will then work within a rota system with adequate time allowed for a comprehensive hand-over briefing.

### 1.9.7. LOG KEEPER

A comprehensive written log should be maintained for all emergencies in order that a full record is maintained of how the emergency was managed for future internal or external inquiry, and for lesson learning.

The Strategic Response Leader will appoint a competent person to maintain the log throughout the emergency. The person appointed will have no other function during the emergency. It is important that all actions are passed to the log keeper.

The person nominated as the log-keeper shall maintain a log of the actions taken and decisions made within the Incident Room and by the Tactical Response Team, to show as a minimum:

- The date and time of the initiation of the emergency and the nature of the emergency and its level;
- The time of the opening of the Incident Room;
- All actions and the initiator;
- A record of all messages with the initiator and the recipient of the message;
- Record of all status reports received from the Tactical Response leader;
- The time when the emergency was closed;
- Record the names of the Strategic Response Team members and their designated role, as well as any other person who enters the Incident Room and the reason for their presence, and
- Note any changes to participants.

The Strategic Response Leader may decide that all actions are to be relayed via the log keeper to ensure that the log is complete.

At the end of the emergency:

- The Log Keeper shall produce a full Report of the events as recorded, and make the Report available to the Strategic Response Leader for his Report, and
- The Strategic Response Leader shall sign the log as a true record.

Attention will be given to ensure that: (i) any records that may be used later to defend the activities of ACC are maintained; (ii) records are kept of communications notifying outside organisations and (iii) copies are kept of all press releases and public notifications.

## 1.10. INCIDENT ROOM

Seureca recommends ACC to establish an Incident Room, separate from the Control Room.

The Control Room will act as the communications centre, but the Incident Room is where the strategic actions can be planned and discussed away from the more hectic activity of the Control Room.

### 1.10.1. LOCATION AND MANNING OF THE INCIDENT ROOM

The Incident Room can be located close to the central control room or remote within an entirely different location. If located close to the control room it shall be entirely separate. A separate room off the Incident Room, or close by, should be available as a “quiet room” for staff to rest.

The purpose of the Incident Room is to provide a location where the Strategic Response Leader and his team can plan the response and manage the situation.

It is essential that the Incident Room remains a “quiet” area and not become a melee of people, thus:

- Whilst communications will be required within the Incident Room, the central control room will continue with its function as the hub of the communication system and the collection point for all information required for the management of the emergency, and
- Only those appointed by the Strategic Response Leader as a part of the Strategic Response Team shall be permitted within the Incident Room.

### 1.10.2. ALTERNATIVE INCIDENT ROOM/MOBILE INCIDENT ROOM

In addition to the main Incident room, ACC may wish to consider: (i) a back-up Incident Room at a separate location in case of not being able to access the main Incident Room e.g. due to fire, and (ii) the provision of a mobile Incident Room should it be more suitable for the Strategic Response Team to be located on an identifiable ACC installation such as the wastewater treatment works as emergencies on wastewater treatment plants tend to be specific to that site.

### 1.10.3. EQUIPMENT AND FACILITIES TO BE HELD IN INCIDENT ROOM

The following equipment shall be maintained in the Incident Room, or be located close by, Table 3

*Table 3: Equipment to be held in Incident Room*

Item	Number
Work tables and chairs	Minimum 3 sets
Conference table with at least 4 chairs	
Drawing table	2 No
Filing cabinet	1 no
Book case/shelves	For copies of procedures, Manuals etc
Drawing cabinet	Copies of all strategic drawings and schematics
Table for printer etc	1 No
Fold-up bed (within rest room)	1No
Large digital wall clock clearly visible to all	
Telephone with direct outside line, open for international calls	1 set
Fax telephone facility	1 set
Computer work stations linked to ACC's Management Information System, including asset data base, and SCADA	3 No.

Item	Number
	(SCADA facility to be read only)
Network analysis work station (water and wastewater)	1 No
Small TV and radio to receive national broadcasts	1 No each
The Emergency Response Plan;	1 copy
Incident Management Policy;	1 copy
Schedule of ACC current post holders and their contact details;	1 copy
Staff organisational structure;	1 copy
Procedures, O&M Manuals and Plans (but not individual manuals for individual items of plant).	1 copy
Layman Guides to the operation of treatment works	All works
Schedules of contacts and other information e.g. <ul style="list-style-type: none"> <li>• Sensitive customers (jails, industrial installation, people on dialysis, hospital, etc.;</li> <li>• sanitary state body;</li> <li>• civil protection / fire fighter, police, etc.;</li> <li>• Municipality;</li> <li>• Newspapers &amp; TV/radio stations;</li> <li>• Other utilities;</li> <li>• Construction companies who work with ACC;</li> </ul>	
Operation schedules such as pumping station operating regimes, water supply area rotas, staff stand by lists.	1 copy
List of emergency pipes, couplings and fittings etc held within the Emergency Store	1 copy
A computer listing of all mobile plant and equipment available within the ACC giving the location of the items	1 copy
A schedule of water tank trucks and locations for filling	1 copy
Camera	1 No
Printer/copier/Scanner	1 No
Wall mounted white board	2 No – 1No for discussions, 2 <sup>nd</sup> for writing status reports and such for general information of actions
Paper flip chart with spare charts	1No
Wall mounted schematic drawing of the systems	With plastic cover and in suitable position so the Strategic response team can stand around to discuss emergency and upon which can be

Item	Number
	written.
Adequate copier/printer paper, printer cartridges, pens, papers	
Adequate coffee, tea, bottled water and packets of dehydrated food	

The number of items is indicative. The actual number and required items will depend upon space and experience, and be tested during the emergency exercises.

#### 1.10.4. DRAWINGS TO BE WITHIN THE INCIDENT ROOM

The following drawings are to be held within the Incident Room, as paper copies clearly marked as “Incident Room Copy – not to be Removed”:

- General layouts of all source, water treatment works and pumping stations that show principle components of the facilities and connecting pipe work and control valves;
- Reservoir layouts showing pipe work and flow control valves;
- Schematic layouts of the water supply and wastewater collection systems, with one copy marked to show “average” flows and “normal” operating pressures;
- A water distribution plan showing the different supply zones, areas and how water is fed to the areas, together with “average” demands for the areas;
- A wastewater collection plan showing flows;
- Water network supply plan for critical customers;
- Sensitive areas or where specific problems can be expected, located using network analysis and risk assessments;
- Plan showing location of all trade effluent discharges with reference, through the MIS, to the nature and quantity of the effluent, and
- Geographical plan of the city with districts and connecting highways.

### 1.11. THE USE OF NETWORK ANALYSIS

Computer network models for the water and wastewater systems play an important role within Emergency Planning and for responding to emergencies.

#### 1.11.1. PLANNING PROCESS

Within the planning process, network analysis is used (i) to identify “bottlenecks” within the system that hinders maximum flexibility in the use of the assets for moving water around the system in an emergency and (ii) to determine where storage or source/treatment works capacity could be advantageously augmented.

The analysis feeds required projects into the capital development programme.

### 1.11.2. PREPARATION OF ACTION PLANS

Network analysis is used to:

- Model the effects of identified risks such as the loss of critical sources and pipelines;
- Enable the best solutions to be developed for alternative supply arrangements;
- Provide an indication of the size of the area likely to be affected and the intensity of the loss of service.

The output from the network analysis is incorporated into the Action Plans.

As network analysis becomes available, specific Action Plans can be produced, in line with the above.

### 1.11.3. DURING AN EMERGENCY

During an emergency, network analysis is used to simulate the failure in order to (i) understand the consequences, (ii) evaluate the extent and seriousness of the emergency and (iii) to plan for alternative supply arrangements.

Provision is to be available in the Incident room to access the network model and to have available trained staff to analysis the network.

## 1.12. EMERGENCY PLANT, EQUIPMENT & SUPPLIES

### 1.12.1. EMERGENCY REPAIR PIPES, COUPLINGS, FITTINGS AND SPARE PARTS

The Emergency Planning Officer should prepare a schedule of essential pipes, couplings, fittings and spare parts that are to be kept within an Emergency Store, for use only in an emergency.

As a minimum, repair lengths and repair couplings are to be provided for all parts of diameter greater than 300mm for the required materials, and where applicable, varying class outside diameters. Suitable "strap-around" couplings are also to be provided.

The Procurement Manager, or his equivalent, is to: (i) allocate an area within the stores designated for the emergency stores; (ii) ensure that the emergency items are held within this area, clearly identified as emergency repair stock and (iii) not used except within an emergency. It is assumed that the stores area will be kept tidy and that the pipes etc will be kept in a condition suitable for insertion within "live" water mains, with the minimum of cleaning and sterilisation.

A copy of the emergency stock holding and the location of the items should be held within the Incident Room.

ACC may wish to consider entering into partnership with pipe providers and construction companies both to reinforce the organization during normal operations but also to ensure the availability of the emergency equipment and to reduce the amount of equipment within ACC storage there only for an emergency.

### 1.12.2. PLANT AND EQUIPMENT

Except for a few specialist items of plant and equipment such as temporary booms to place across water courses to limit the flow of a non-compliant discharge, plant and equipment is not to be purchased solely for emergency use. In this way, full benefit will be obtained from the purchase and the equipment is more likely to be available for use in an emergency.

The Plant Manager is to ensure that all equipment is maintained and available.

A schedule of all mobile plant and equipment is to be held in the Incident Room together with the "owner" and location, made available by the Plant Manager. The schedule is to include for mobile generators.

The Emergency Planning Officer is to discuss with local plant hire companies their facilities for hiring to ACC plant, in an emergency. Where considered necessary, contracts are to be produced and entered with the plant hire companies.

A schedule of plant hire companies, their contact details and the plant available for hire is to be held within the Incident Room.

Liaison should be with the military to understand the assistance that they could provide in an emergency e.g. mobile generators and workforce.

### 1.13. EMERGENCY RESPONSE EXERCISES

The Emergency Planning Officer will arrange for at least an annual full emergency exercise to test the responsiveness of ACC to an emergency and, thus, the completeness of the Emergency Response Plan. The occurrence of a real emergency is not to preclude the holding of an annual exercise.

The exercise is to be given a code name and all messages prefixed with the words: *"For the purposes of Exercise X only"* in order to differentiate the exercise from a real emergency.

The date and nature of the emergency to be tested is to be known in advance to only the Emergency Planning Officer and the Technical Director, and not to any other Senior Managers and Directors. Staff, including Senior Managers and Directors, should not be permitted to "dismiss" themselves from the exercise, and only with the prior approval of the Technical Director.

The absence of a key player due to sickness, holiday or other reason is not to preclude the exercise taking place. If such people are likely to play a critical role in an emergency, it is essential to test how ACC would perform in their absence.

The Emergency Planning Officer, in conjunction, with the Technical Director will decide the extent to which actions are to be taken. It is expected that the response will be at least as far as to: (i) open the Incident Room and assemble the Strategic Response Team; (ii) assemble the



Tactical Response Teams at a suitable location, but not necessarily the “site” of the incident; (iii) for somebody to go to the “site” and inspect valves to be operated etc to ensure their location is correct and that they can be operated and (iv) physically check the emergency store for repair fittings, plant equipment and spare parts that would be required.

During the response period, the Emergency Planning Officer will decide: (i) when it can be considered that the “emergency” can be closed down; (ii) whether the “repair” has been successful or (iii) whether there has been a problem which requires a further response.

A log of the exercise will be kept as well as the Incident Log, discussed above. Key people in the exercise, not within the Incident Room, are to maintain their own log for later comparison of the content of messages sent and the message perceived to have been received.

As quickly as possible after the exercise, the Emergency Planning Officer is to prepare a comprehensive Report as a learning exercise.

The Report is to be presented within a “wash-up” meeting to: (i) the Technical Director; (ii) the Heads of Departments; (iii) Strategic Response Team; (iv) the Tactical Response Leader and (v) others who had a managerial role in the exercise or who would otherwise benefit from the presentation. The Report and the exercise are to be openly discussed to ensure maximum benefit is drawn from the exercise.

After the “wash-up” meeting the Emergency Planning Officer is to prepare an Action Plan based upon the events of the exercise, to be placed within the Emergency Response Plan which is to be updated in light of the experiences of the exercise.

## 1.14. NON OPERATIONAL INCIDENTS

An Emergency Response Plan is primarily involved with operational incidents. There might occur non-operational incidents which will be considered as an “emergency”. Examples of such incidents are:

- Security threats;
- Fire;
- Explosions;
- Flooding;
- Suspicious packages.

These incidents need to be given equal attention as if they were operational emergencies and the same procedures are to apply for their response, the level of severity being decided in light of the risk to ACC.

## 2. THE APPROACH TO AN EMERGENCY

The Emergency Response Plan will address those emergencies which it is not practical to “design” out of the water and wastewater systems, or for which investment is planned but not achieved.

Emergency events, by definition, are unplanned and unforeseen. An Emergency Response Plan does not provide step-by-step actions to respond to specific events but provides the guidelines to which operational managers can look for how to tackle any emergency.

Our suggested approach to be adopted by the ACC for the response to an emergency is a four layer response:

- Provide a procedure to trigger an emergency alert. One of the most common failings in responding to an emergency is the slow realization that an “incident” is progressing to an emergency, or that an emergency has commenced;
- Analyse the risk. When the emergency event is alarmed, the next steps are to analyse the risk by:
  - Identifying the nature and reasons for the Emergency;
  - Assessing the consequences, and
  - Considering the effects.
- Determine the Required Level of Response. Only and after the risk has been analysed, is it possible to ascertain the required level of response, and
- Manage the Emergency. The emergency event is to be managed (i) strategically and (ii) tactically, as discussed below (Section 2.1.3).

### 2.1.1. RESPONSE 1: TRIGGER THE ALARM

There needs to be a clear escalation process that matches response with risk. The process is to be initiated by the Emergency Planning Officer and, as the level of the severity of the emergency increases, he organises the Strategic and Tactical Response Leaders.

When a crisis is identified, all necessary resources are to be mobilised promptly in accordance with the appropriate level of severity of the emergency.

An emergency alert is triggered by one of the following means, notified to the Emergency Planning Officer:

- Staff reporting of an incident that has raised in severity for whatever reason;
- As reported by a member of the public e.g. water running in the road;
- As reported by a member of staff upon visiting an installation and seeing an “event” or noticing a change from the expected duty points for flow, pressure or power consumption;
- Reported by a member of staff as a result of his own action e.g. chlorine gas escape due to incorrectly handling containers;
- SCADA alarm, and

- Notification to ACC by an outside organisation.
- Emergency events can occur inside and outside of normal working hours. ACC needs to have, and does have:
- A 24 hour manned central control room able to receive notification of emergency events, and respond by:
  - Treatment works, pumping station and other on-duty ACC staff;
  - Calls from the public, and
- 24 hour/7 days a week staff on-call who can respond to an emergency, including Senior Managers able to take a senior responsibility.

### 2.1.2. RESPONSE 2: ANALYSE THE RISK

During an alert, it is not always known at the start exactly what is the nature of the threat to resources, assets or customers, and thus its seriousness.

If an appropriate member of staff is not on site, a supervisor or suitably qualified member of staff shall be immediately despatched to the site to gather information and report back to the Emergency Planning Officer in order to allow a rapid evaluation of the situation and the risk, and decide on the response measures to be taken.

Analyses are performed as quickly as possible to identify the issues and threats. A suggested “check-list” is attached which ACC may wish to consider adopting.

### 2.1.3. RESPONSE 3: DETERMINE THE REQUIRED LEVEL OF RESPONSE

Appropriate resources will be held available and deployed at the earliest opportunity to protect the interests of customers, and ACC and the municipality assets. For example, adequate plant, equipment and emergency stores are to be available for dealing with the emergency and chemical reserves retained in case enhanced treatment is necessary at the treatment plants. The resources need not be owned by ACC but could be hired or otherwise made available.

The response will be at two levels, strategic and tactical.

#### 2.1.3.1. Strategic Response Team

The strategic response will be that which is necessary to protect the business from undue criticism. The strategic response team will be located centrally within the Incident Room. The strategic response team will, instinctively, support the on-site team by mobilising, finding and, if necessary procuring resources – labour, materials, plant and equipment, as well as any specialist skills from another district.

The strategic response team will take strategic action such as changing supply systems and bringing in additional sources.

A key task of the strategic team will be communication with the Municipality, Government Ministries and other external parties to be notified in the event of an emergency, and with the media and public.

### **2.1.3.2. Tactical Response Team**

The tactical response will be the site focused response by the repair action team.

The tactical team will (i) attend to the cause of the emergency to effect a repair; (ii) otherwise end the emergency and (iii) deal with any local consequences of the emergency e.g. property flooding from a sewer collapse or broken water main.

Contingency plans and standard operating manuals will include for taking into account operation of the plant under emergency conditions.

### **2.1.4. RESPONSE 4: MANAGE THE RESPONSE**

Effective communication is the key to successful emergency management.

Communication is required between:

- The strategic and tactical response teams;
- Appropriate external entities;
- ACC and the media and other means of communication with customers;
- Internal ACC support staff such as GIS operators and modellers, and
- The on-duty strategic response team and the strategic and tactical response back-up teams.

In particular, communication is given the highest priority and every available means of communicating with customers is used to ensure that they are regularly updated on the situation and, importantly, when the emergency can be expected to be resolved. The Municipality will require to be kept fully informed.

The Emergency Planning officer shall ensure that adequate means of communication are available and usable across the whole of the ACC service area, or where tactical response teams are likely to be deployed.

### 3. REQUIREMENT FOR SHORT-TERM PROFICIENCY

The ToR requires within Phase A.8 an “*Assessment of and Proposal for Emergency Repair Requirements*” within which “*The Consultant shall carry out an Assessment of Emergency Repair Requirements and propose a short-term strategy for an Emergency Repair Programme to ensure operation of water supply and sewage collection for 12-24 months until start of Phase I of the investment programme.*”

In this Emergency Response Plan, we have provided a strategy for the long-term capability of ACC to respond to an emergency. The following is targeted specifically at the ToR Phase A.8 requirement but does apply to the identification of all critical elements of the water and wastewater networks, short or long-term.

The recommended strategy for adoption of ACC comprises the following steps. Seureca will be pleased to assist ACC implement the suggested strategy when the computer network models are available.

#### 3.1. APPOINTMENT OF EMERGENCY PLANNING OFFICER

ACC should quickly nominate their Emergency Planning Officer.

#### 3.2. IDENTIFICATION OF CRITICAL ELEMENTS IN THE WATER AND WASTEWATER SYSTEMS

Clearly, the water and wastewater treatment works and pumping stations are critical elements in the systems. Actions to be taken to mitigate the risk of failure of these are:

- Fully trained and skilled operator and maintenance staff equipped with the correct tools and plant;
- Regular maintenance of the plant and equipment;
- Availability of spare parts and, if possible, replacement units such as pumps;
- Duty and standby configurations, and
- Dual power supplies, on-site generators or mobile generators.

For the water and wastewater networks, critical elements can be identified by:

- The use of the computer network models to identify the key elements of the networks;
- Discussion with operational staff to identify sections of the network that are critical due to their location e.g. main city roads, or due to problems of access e.g. particularly deep mains/sewers, under rivers, railways and major roads or where access is difficult or limited e.g. narrow roads;
- Discussion with Customer Services and operational staff to identify those mains which provide water supplies to key customers such as hospitals and major industry, and
- Sewers that are equally essential to the operation of the network and failure of which will lead to serious environmental pollution or unacceptable areas of flooding.

### 3.3. SCHEDULE OF CRITICAL ELEMENTS

When the critical elements are identified, our suggested strategy would be for ACC to prepare a schedule identifying:

- The diameter, pipe class and material of mains and sewers so that adequate repair lengths and couplings can be purchased and stored in the emergency repair compound;
- The location of necessary isolating and flow control valves, and
- Key customers and installations affected by a failure of the main or sewer.
- Critical elements of the network should be regularly “walked” to ensure that access remains possible and to part operate line valves to ensure that they would be available for use in an emergency.

### 3.4. ACTION PLANS

We would suggest that within the strategy, ACC prepare Actions Plans for the required actions to re-valve the network and/or other action that can be taken to mitigate the effect of a failure.

Outline Plans could be produced based upon desk-top discussions with operational staff and using the network models. The most effective way to ensure the suitability of the Action Plans would be to hold a series of emergency exercises within which the Plans would be tested on-site.

### 3.5. HUMAN RESOURCE AND TRAINING

The Human Resource department, in conjunction with the Technical Director will need to assess any additional training requirements for the operational staff and, in particular, the designated Emergency Planning Officer.

### 3.6. OTHER REQUIREMENTS

Once appointed, the Emergency Planning Officer can put in place the other actions set out in the Emergency Response Plan e.g. establishment of Strategic and Response teams; nominate Team leaders and start to furnish and equip an Incident Room.

### 3.7. TIMESCALE FOR IMPLEMENTATION

This Emergency Response Plan is, as required by the ToR, a strategy for implementation by the ACC, Following submission to the PIU, the Plan is for discussion within ACC and final agreement.

Following agreement, we would recommend that ACC moves quickly to implement the Plan and its recommendations. Key tasks would be the appointment of the Emergency Planning Office within the role foreseen within the Plan, for the holding of emergency exercises from which Action plans can be prepared and for the establishment of Strategic and Response Teams.

# Annex

## Emergency Identification Form

*(to be completed on site by ACC employee first sent to investigate the emergency)*

**To what risk situation are you confronted now? (Cf. Identification table of the crisis situations) Tick as many as may apply**

- Pollution of the potable water
- Interruption of the water supply
- Sewer collapse, blockage or failure
- Environmental pollution
- Danger to people's safety
- Risk to ACC's property
- Natural disasters

Provide a brief description of the emergency as seen by you on first arrival (please take photographs to assist the description). Include identification of any police officers or other people of authority, if on site)

	YES	NO
1. Has any ACC member or member of the general public been killed or seriously injured i.e. requiring immediate hospital attention? <b>If so, contact DG immediately.</b>		
2. Has the situation or is it likely to injure or in some way adversely affect the health and safety of ACC employees, contractors or members of the public however minor?		
3. Does the encountered situation have an impact on the environment, or is it likely to?		
4. Has the situation an impact on ACC levels of customer service?		
• Interruption to the service?		
• Restriction of service?		
• Or in some other way affect the service, if so state		
5. Is the number of households disturbed by the situation more than 500? Estimate number		
6. Is the number of households disturbed by the situation more than 1,000 ? Estimate number		
7. Are any major industries, hospitals, schools or other critical customers affected?		



8. Is there a need to notify customers? If so, have the customers been informed or can they be within the next few hours? If not, why not? If informed, how was this done?		
9. Will it be necessary to make an alternative water supply available e.g. water tanker? Provide estimate of the number of customers for whom alternative supply is required		
10. Are there any damages to property or is it likely to happen?		
• To ACC installations?		
• To external infrastructures?		
• Are properties likely to be flooded? If so, what actions are being taken to mitigate damage and hardship?		
11. Are other utility services or other public service such as public transport affected?		
12. Is traffic seriously disrupted? Are police on site managing the traffic?		
13. Are members of the press on site? If so, where from?		
14. Can the media be informed or are they likely to be informed within the next few hours? If not why not?		
15. Has the Municipality or one or more national public or administrative authorities been informed? If so, which ones		
16. Are there people from outside of ACC who are aware of the incident?(Others than the ones designated in the previous questions therefore associations, consumers, doctors, firemen, policemen, residents...)		

- At least one answer in red: Level 2 or 3
- More than 2 yellow answers and/or 4 green answers or more: Level 2
- Less than 2 yellow answers: Level 1

- If all the answers are grey:
  - Are we really facing a crisis situation?
  - We are facing an atypical situation for division

The main characteristics for this atypical situation:

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