

## Report

# Training & Flood Preparedness for SEQWater Dams

Year Beginning 30 September 2007

Date: October 2007  
Ref: R-WIXS-02-01-04  
File: 07-006241/001

Prepared by:



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## 1.0 INTRODUCTION

SunWater commenced the current facility management contract for the flood operation and facility management of the South East Queensland Water Corporation's dams in July 2001. SunWater have now undertaken the contract for the operations of flood operations of Wivenhoe Dam, Somerset Dam and North Pine Dam for 10 years and 3 months. Flood operations at these dams continue to be controlled by the provisions of the following Manuals of Flood Operations:

- Manual of Operational Procedures for Flood Mitigation for Wivenhoe Dam and Somerset Dam, Revision No.6, 20 December 2004; and
- Manual of Operational Procedures for Flood Releases from North Pine Dam, Revision No.3, 26 July 2002;

The Manual for Wivenhoe Dam and Somerset Dam is currently being reviewed to accommodate the completed Stage I works for the construction of an auxiliary spillway at Wivenhoe Dam. The changes to the manual affect the operation of the Wivenhoe Dam and Somerset Dam by taking into consideration the additional design flood levels now allowed in Wivenhoe Dam due to the auxiliary spillway and associated strengthening of the integrity of the wave wall.

Clause 7.2 of both Manuals of Flood Operational Procedures requires the Headworks Operator to submit reports to the South East Queensland Water Corporation (SEQWater) by 30 September each year on the training and the state of preparedness of operations personnel. In addition Clause 7.4 requires the Headworks Operator to review the adequacy of the communication and data gathering facilities.

This report is designed to satisfy both of these requirements. Because of the similarities between the systems adopted for Wivenhoe Dam, Somerset Dam and North Pine Dam a combined report has been prepared.

Under Clause 7.3 of these Manuals, a report is also required to be submitted by 1<sup>st</sup> May and 1<sup>st</sup> November each year on the:-

- reliability of the system over the previous period
- reliability of the system under prolonged flood conditions
- accuracy of forecasting flood flows and heights, and
- overall state of preparedness of the system.

This current report provides some data on the reliability of the data collection system since 1<sup>st</sup> April 2007.

In addition to the above manuals, the SEQWater has Emergency Action Plans (EAPs) for Wivenhoe and Somerset Dams and for North Pine Dam. These plans are used for the “*coordination of the necessary actions by the Contractor to provide timely notification to police, counter disaster groups and affected persons in the event of an emergency condition*” at the dams. The current versions of these EAPs were produced in December 2005. The EAP of Wivenhoe Dam will also be amended to account for the changes to the spillway configuration.

## 2.0 REPORT ON FLOOD PREPAREDNESS FOR 2007/2008

### 2.1 STATUS OF STORAGES

At the commencement of the period the storage levels of all of the dams were drawn down to around one fifth (30, 18 and 16% respectively for Somerset, Wivenhoe and North Pine Dam). During the period the dams continued to drain and Level 5 water restrictions were implemented once the combined capacity dropped below 20%.

No flood operations were required at any of the dams during the period from April 2007 to September 2007 however some significant inflows into Somerset dam occurred during August 2007. This provided some opportunity to review the performance of the ALERT network, especially the stream sensors located in the Upper Brisbane and Stanley River catchments.

The last flood response requiring gate operations occurred in February 2001.

The table below shows the change in storage level during the period.

Storage	April 2007		September 2007	
	Storage Level (m AHD)	Storage Volume (ML)	Storage Level (m AHD)	Storage Volume (ML)
Somerset Dam	89.76	116,040 (30.5%)	92.10	162,790 (42.9%)
Wivenhoe Dam	52.02	207,800 (17.8%)	51.16	182,480 (15.7%)
North Pine Dam	25.47	33,800 (15.8%)	25.11	31,730 (14.8%)
	Total	357,740 (20.7%)	Total	377,000 (21.8%)

## 2.2 ARRANGEMENT OF FLOOD RESPONSE TEAMS

There have been some changes in personnel that comprise the flood response team however team arrangements remain the same as for the previous twelve months. Three groups of operational personnel have been organized for the operation of the dams. These groups and the roles that they perform are as follows:-

Organisational Group	Nominated Role
Dam Operators	While on duty at a particular dam, a Dam Operator is responsible for the flood operation of that dam. While these operations will normally be under the direction of the Duty Engineer, provision has been made for the operation of each dam in the event of loss of communication with the Duty Engineer.
Duty Engineer	The engineer responsible for directing flood releases from all three SEQWater dams in accordance with the appropriate Manual of Operational Procedures for Floods.
Data Collectors	The technical staff members of the Flood Response Teams who man the Flood Control Centre, perform data gathering and verification duties on behalf of the Duty Engineer and generally support the Duty Engineer.

As required by the Manuals of Operational Procedures, overall flood operations are under the control of the Senior Flood Operations Engineer. The Senior Flood Operations Engineer organizes the other Duty Engineers and the Data Collectors into the Flood Response Teams and ensures that sufficient personnel are available to man the Flood Control Centre 24 hours a day, every day of the year.

Currently two engineers are authorized to fulfil the role of Senior Flood Operations Engineer and they are listed in the Schedule of Authorities as:-

- Robert Arnold Ayre
- John Lawrence Ruffini



Rob Ayre is the current Senior Flood Operations Engineer. Duty Flood Operations Engineer John Ruffini is also qualified to act as the Senior Flood Operations Engineer. John and Rob will share these responsibilities during the course of the wet season and SEQWater will be advised in advance as to which of these officers is the SFOE at any particular time.

It is expected that they will be both available throughout the 'wet season' with Rob Ayre normally assuming the role and John Ruffini taking on the role when Rob Ayre is unavailable.

Three SunWater staff are currently undertaking training for the role of duty flood operations engineer. The trainees include Russell Paton (Manager Planning), John Tibaldi (Manager – Proposal Development) and Terry Malone (Senior Engineer – Hydrology).

Due to the restructure of SunWater business units, a new Project Engineer (Col Bendall) is now in place. The Project Engineer for the SEQWater Contract T1 00/01, has the responsibility for ensuring that at least two fully trained operators are available for flood operations at each dam 24 hours a day, every day of the year.

All of these personnel have been trained to carry out their assigned roles in the event of a flood requiring the operation of each dam. This training is summarized in the following sections.

## **2.3 FLOOD CONTROL CENTRE PREPAREDNESS**

### **2.3.1 Flood Control Centre, Level 18 William Buck Centre**

The SunWater Flood Control Centre (FCC) is located on Level 18 of the William Buck Centre, 120 Edward St Brisbane. The FCC is fully operational and ready for flood operations as and when required. The FCC has the following features:-

- A. It is lockable with the Duty Engineers and Data Collectors having 24-hour access;
- B. It is the location of the SEQWater's computer hardware and software
- C. It is connected to the building emergency power system and an un-interruptible power supply (UPS). This unit is currently being upgraded to have sufficient capacity to run the flood computer system for about 2 hours in the event of failure of the emergency power system.

A Back-up Flood Control Centre facility has been established on Level 2 of Mineral House, which mitigates the vulnerability of the Flood Response Team as a whole. The back-up facility houses ANAR, the back-up HP workstation to RANA. It also has duplicate data gathering capability with an independent base station located on the roof.

Issues have been experienced with the communication between the Main Flood Control Centre in the William Buck Centre and the Backup FCC in Mineral House. Signal loss over the communication bridge between the two facilities seems to be suffering from a temperature induced interference and loss of performance, which was very noticeable during winter months. Ongoing investigations are trying to resolve this performance issue.

Temperature effects in Mineral House Backup facility are also affecting reliability and overall performance of this room, to the point whereby hardware systems are struggling to cope. The backup FCC does not have independent climate control and so therefore over weekends and at night, when the air conditioning is not functioning, temperatures in the back-up FCC have caused a number of computers to fail. Investigations into how to reduce the increased temperature effects are also being undertaken however installation of an independent climate control within this room is not feasible.

## **3.0 REAL TIME FLOOD MODEL PREPAREDNESS**

### **3.1 CONVERSION FROM HP-UX TO LINUX**

The RTFM software has now been converted (from HP-UX) to run on the Linux Fedora Core Operating System. Both main software components (Flood-Col and Flood-Ops) are running reliably on the new Linux PCs.

The development team have a few areas concerning Systems Administration that need implementing, and a question remains on setting up the Alarm Sub-System. The FCC will now run the old (HP-UX) system in parallel for the next wet season to ensure satisfactory performance. This does however require some time to monitor new against old performance, as well as fixing up any new problems identified in the new software.

#### **3.1.1 Systems Administration**

Currently data is backed up from both HP Workstations (Main and Back-up FCC) as well as the two new Linux PCs (in William Buck Centre FCC and the Mineral House backup FCC). Both sets of machines get data independently, but data is only validated/edited on the William Buck (main) machine. The validated William Buck data is mirrored to the Mineral House machine (in a separate area of the Mineral House machine to its live data).

Periodically (once a week, or more frequently when required) the Duty Engineer is required to copy validated/edited data over the backup machine's live data. This includes both sensor data and configuration data. This is not done automatically, since it is necessary for the Duty Engineer to ensure that suitably validated data is overwriting the existing data.

The development team need to provide some scripts to make this possible and easy in the Linux arena. The development team also need to tidy up the (converted) scripts for backup and recovery. Some aspects of the Linux File System are very different to the HP File System and this requires quite different techniques for file handling. This also means some very different methods are required in the backup/recovery processes.

In addition to day-to-day file backup/recovery, the development team need to prepare (or redo for Linux) the Disaster Recovery Strategy/Methods. This means there is a need to develop (and test) methods to completely re-build a machine. (i.e. install operating system, install FLOOD software, recover configuration data and latest sensor data, in an efficient manner).

Linux and HP-UX are both flavours of Unix, but underlying structures mean that things happen very differently. HP-UX has reached end of life, but Linux is continuing to develop, and there are many new ideas which make things more robust and secure. Most services (eg email, ssh, X-Windows, ftp, web-server) have been re-established, but still require some modification. Security issues also need some close attention; HP-UX was actually quite secure because it's use was not very widespread, and therefore not so popular with hackers. This is not the case with Linux, so the development team need to monitor developments in this area to ensure the system is quite secure.

### **3.1.2 Alarm Sub-System**

There are a number of messages which the system needs to generate. These messages take two forms:

- Heartbeat-type messages which are delivered to Duty Engineers/Development Staff periodically to signify that hardware/software is operating normally.
- Warning/error messages that are delivered (if possible) when hardware (or software) fails or when some other "interesting" event takes place.

The main type of "interesting" event is extreme rainfall or significant water-level rises, which come from the captured real-time ERRTS data.

The development team now need to "convert" the HP methodology and Telstra (HP-UX) Pager Mechanism to run under Linux. Some work has been done on this front, with techniques and machinery for delivering data via SMS and email. However, these processes are running on win32 platforms, so an interface to Linux needs to be built. This will require handling the generated group/individual alarms and warnings (i.e. handing them to the win32 system for transmission by email, SMS or any other means desired).

This involves setting hold-off periods, and later receiving 'Acknowledgement', and subsequently 'Suspending Alarms' by the Duty Engineer.

The Enviromon alarm (or Alerting Sub-System) is potentially useful in the future, depending on how much use or adoption of the Enviromon product is integrated into the overall system. At this stage, it is desirable to convert the existing system, since it is straight forward and will handle Systems warnings/alarms as well as Rainfall/Water Level alarms.

### **3.2 ENVIROMON INTEGRATION INVESTIGATION**

It is very desirable to integrate Enviromon into the system. The primary reasons are:

- Enviromon has now matured and is a quite solid product;
- Enviromon is a national standard for capturing and using ERRTS data;
- and Enviromon has a very superior data filtering system.

However, the integration requires a change of philosophy for both storing and using data (configuration and sensor data). Enviromon has a different method of storing and specifying meta-data (configuration data). Additionally it does not allow editing of sensor data, only voiding data (marking it as deleted). And it has no means of flagging OOA (Out of Action) sensors, although this can be partially simulated by setting up an OOA group.

It has not yet been determined if the integration or interfacing Enviromon to the FLOOD system can be accomplished in an efficient manner. If Enviromon data is passed onto the FLOOD system (in real time) some of the benefits of the Enviromon Filtering/Validation system will be lost. This is due to the process whereby Enviromon can often validate/edit earlier data on receipt of new data (which would not be available to the FLOOD system). If data is continuously delivered over a period (eg a day's worth) to FLOOD, then it may be likely that editing that has been done by (users of) the FLOOD system will be lost!

It is recommended that the option to try real-time delivery be trialled initially to determine if this approach can be made to work successfully. To achieve this exported filtered data needs to be passed from Enviromon into the FLOOD system (running on a test machine).

This means developing a new (sensor data) import process into FLOOD-Col (bypassing the FLOOD-Col filtering process). The development team also needs to make configuration changes to the Enviromon System as well as the FLOOD System, or request the Bureau of Meteorology to provide a method to programmatically change Enviromon Configuration Data. It is also desirable that a methodology for sharing configuration data with other ERRTS system users, especially from this neighbourhood, (e.g. BOM, BCC, Ipswich, Esk, Kilcoy, Pine Rivers Shire Council) be developed. All of these users are (or are becoming) Enviromon users.

SunWater have set up an Enviromon system for SEQWater to examine and analyse rainfall data. This system will also be provided some (automatic) methods of updating configuration data for this system as well. SunWater strongly recommend that the network go to 3 hour check signals for ERRTS Loggers to get the best results from Enviromon filtering; 3 hours check signals would also enhance filtering on the existing system.

### **3.3 TIME SERIES DATA ARCHIVE**

A permanent archive of SEQWater station data should be established. The FLOOD system was designed as a real time system that would use only a period of operational data, and there is now over ten years of data available and this puts unreasonable loads on the system. If a formal archive is established, then it will make ad hoc requests for data (for other investigations) much easier to extract and provide.

Options are:

1. Purchase an existing Time Series Database System and develop export routines from Flood-Col. (Examples include Wiski and Klusters.)
2. Set up a database of relational tables (managed by an SQL engine), mirroring what we currently have in Flood-Col, and modify Flood-Col to use that database. The database could have a real-time and an archive distinction, so that data could remain in the one place and be better managed.

### 3.4 WEB PAGE DEVELOPMENT

It is desirable that Duty Engineers and Development Staff be able to quickly and efficiently get an understanding of catchment wetness, from both in the office and from home (or other remote locations).

The development team have trialled establishing (internal) web pages of catchment data (in the form of graphs, tables and maps) for viewing from both PCs and PDAs. This is an extension of the SMS interrogation software, and it has some similar capabilities. The web page developments to date have been scheduling tasks to generate these pages every hour, but are looking to also do it on demand (refresh button). Currently these pages are only available from inside the Flood Control Centre, but the development team are looking at setting up secure access methods so they can be used from other locations.

The Apache web server (which runs on Linux) is very popular and solid, and it is proposed to use the test Linux machine for the development of some web-driven routines to provide suitable maps, graphs, tables for these pages.

The current ALERT data collection network has now been operational since 1995. This network was installed by SEQWater using FutureTech equipment and overall the performance has been mostly satisfactory, as evidenced by Section 5 of this report. A summary of the overall performance over the period from 2001 shows the following:

#### *Rainfall Stations*

	2001	2002	2003	2004	2005	2006	2007
Number of Stations	71	71	72	70	70	70	70
Average Availability (%)	84%	92%	91%	89%	85%	81%	91%
Average Duration OAA (Days)	32	27	28	29	62	60	25

### *Stream Height Stations*

	2001	2002	2003	2004	2005	2006	2007
Number of Stations	51	51	59	56	56	55	55
Average Availability (%)	82%	84%	83%	88%	74%	76%	84%
Average Duration OAA (Days)	51	49	49	31	78	76	67

The increase in the average duration of Out of Action (OOA) is the most telling characteristic that the network may be showing its age. These statistics should be tempered somewhat by the acknowledgement that some administration issues over the 2005/06 period have perhaps exaggerated the length of unavailability of the stations. It is recommended that consideration be given to rolling out a new generation of ALERT (ERRTS) sensors as part of the ongoing maintenance of the network over say the next two wet seasons. This strategy would include installation of field equipment sensors that are capable of more frequent check signals (3 hourly as mentioned previously) and get equipment which can use IFlows capability.

Parts of the network also need to be strengthened to ensure redundancy such as at Wivenhoe Dam Headwater gauge. At this time, there are only two headwater gauges, one of which is a 5m Druck and therefore the system is somewhat vulnerable if the main gauge fails.

Additional stations have been installed by other agencies such as Pine Rivers Shire Council, Kilcoy Shire Council and Esk Shire Council and the Bureau of Meteorology. It is recommended that configuration details be obtained for any such sites and these stations be added to the network. Agreements to pass configuration data between agencies would need to be put in place and it should be recognised that response times for station repairs would be in accordance with service level agreements that each party has instigated.

Recent events have highlighted the potential for some catchment blind spots, particularly in the Brisbane and Jimna Ranges. Consideration of additional rainfall stations is recommended especially with the Jimna site being OAA due to the demolition of the forestry tower.



Previous issues with the configuration of the gate opening sensors are again highlighted in this report. The gate opening sensors are not configured sufficiently well to provide useful data to confirm required gate operations. Checks conducted earlier this year when gate exercising showed poor correlation against actual openings. The calibration of the sensors and the range of coverage may need to be reviewed to ensure the data obtained is useable.

## **4.0 REPORT ON PERSONNEL TRAINING**

All operational personnel required for flood control operations have received significant training in the various activities involved in flood control operations. All continuing members of the flood response teams have undertaken 'refresher' courses and new personnel have been fully trained or have commenced training.

This section summarizes the training received by each group referred to in Section 2.

While training is seen as an ongoing function that will be regularly reviewed, it is also envisaged some form of formal training will normally need to be conducted prior to 30 September each year and this was the case for 2006/07.

### **4.1 DAM OPERATORS**

#### **4.1.1 Training of Dam Operators**

Formal training of Dam Operators at North Pine, Somerset and Wivenhoe Dams was undertaken between August and September of this year. During this training, operators were given theoretical and practical instruction in the following aspects of the operation of each dam:

- The use of the following documents, with particular emphasis on use of the documents during flood operation:-
  - (a) Standing Operating Procedures
  - (b) Manual of Flood Operations Procedures for Flood Releases
  - (c) Emergency Action Plans
- Operation of the water release infrastructure at each dam that is used during flood operations.
- Flood operation communication procedures and reporting requirements.
- Procedures for use during power and/or equipment failure during flood operations.

#### 4.1.2 Examination of Dam Operators

Examination of dam operators to verify their competency to operate the dams during flood events was undertaken over four days in August/September of this year. A day was spent on practical aspects at each of North Pine, Somerset and Wivenhoe Dams and one day was spent in SunWater's Ipswich office on theoretical aspects. The dates on which dam operators were trained and tested were:-

Somerset Dam	27 August 2007
North Pine Dam	23 August 2007
Wivenhoe Dam	30 August 2007
Ipswich	4 September 2007

The general format of the each examination period was as follows. The time spent on each component varied between dams depending on the content of the dam's Manual of Flood Operations Procedures and Emergency Action Plan, and the complexity of operation of the dam's water release infrastructure.

- Practical testing of each individual on the operation of the dam's water release infrastructure.
- Practical testing of each individual on the procedures to be followed during power and/or equipment and/or communication failure during flood operations.
- Classroom review of Manual of Flood Operations Procedures and the Emergency Action Plan and hands-on simulation of the operation of each of the dams.

### 4.1.3 Results of Dam Operator Testing

Following the completion of testing, the following operators were passed as competent to operate North Pine, Somerset and Wivenhoe Dam during flood events.

CARLSEN Malcolm	Ipswich
DAGAN Anthony	Somerset Dam
EGAN Allan	Ipswich
HAMBLETON Wayne	Ipswich
HESSE Dave	Central Lockyer
GEORGE Allan	Wivenhoe Dam
GILLAM Col	Atkinson Dam
GORDON Craig	Ipswich
GORIAN Rob	Ipswich
GRIGG Doug	Wivenhoe Dam
HAMBLETON Wayne	Ipswich
KIRCHNER Don	Moogerah Dam
PATTERSON Glenn	Somerset Dam
ROBERTS Carl	Ipswich
SCHULTZ Brett	North Pine Dam
TITMARSH Rob	Moogerah Dam

Ag Dagan (Somerset Dam) was on leave for the classroom training, but he presented the practical session at the Somerset Dam. Two new full-time operators went through training for the first time. These personnel include Glenn Patterson at Somerset Dam and Allan George at Wivenhoe Dam.

## 4.2 DUTY ENGINEERS

### 4.2.1 Nominated Duty Engineers

Three Duty Flood Operation Engineers have been trained as “Operations Engineers” for the operation of Wivenhoe Dam, Somerset Dam and North Pine Dam. These engineers, and the positions they hold within SunWater or the Department of Natural Resources and Water (DNRW) are as follows:-

Name & Qualifications	Role	Position within SunWater/NRW
Robert Ayre BE(Civil), CPEng (Reg), RPEQ	Senior Flood Operations Engineer	Engineering Design Manager Asset Solutions SunWater
Terry Malone BE(Civil)	Duty Flood Operations Engineer	Senior Engineer Asset Solutions SunWater
John Ruffini BE(Agric), MSc (Ag Eng), RPEQ	Duty Engineer & Relief SFOE	Principal Engineer Surface Water Assessment Group Resource Sciences and Knowledge Dept of Natural Resources and Water
John Tibaldi BE(Civil) RPEQ	Duty Flood Operations Engineer	Manager Project Proposals Asset Solutions SunWater

### 4.2.2 Training of Duty Engineers

Flood Operations training of the Duty Engineers has become a little more structured with more formal training sessions conducted for both the existing duty engineers and trainee duty engineers. The training is a collective effort with all Duty Engineers contributing to the process.

The current training includes instruction on the use of the RTFM and alternative arrangements for determination of gate operations. Trainee Duty Engineers will be instructed in the use of FLOOD-Col, the data collection module of the RTFM and FLOOD-Ops the data analysis component of the system. It is intended that further training will be undertaken during the course of the wet season and that a number of the candidates will become fully qualified during the course of the next six months.

While training of the Duty Engineers is ongoing, it is considered that as a team they all have sufficient skills to operate the Corporation's dams in accordance with the requirements of the Flood Operations Manuals.

A simulation exercise was conducted on 21 February 2006 for the entire SunWater Flood Response Team. This was a major training exercise that also involved testing of the new Linux version of the RTFM. A separate report was compiled for this exercise. Another simulation exercise is scheduled before the end of 2007.

## 4.3 DATA COLLECTORS

### 4.3.1 Training of Data Collectors

The following is a list of the current personnel who have been certified to fulfil the role of a Data Collector:

Name	Organisation	Designation
AI NAVRUK	SunWater	Senior Technical Officer
Andrew VOUTSIS	SunWater	Engineer (Hydrology)
Azam KHAN	SunWater	Manager Dam Safety
Brendan TREBILCO	SunWater	Civil Engineer
David SCRIVEN	SunWater	Civil Engineer
Graeme WALLACE	SunWater	Graduate Engineer
Hassan KIBRIA	SunWater	Graduate Engineer
Jon DAVIDSON	SunWater	Electrical Engineer
Ken PRICE	SunWater	Senior Technical Officer
Kim HANG	SunWater	Engineer (Hydrology)
Lisa CECCHI	SunWater	Project Officer
Manu GRAVATT	SunWater	Mechanical Engineer
Neranjala FERNANDO	SunWater	Senior Project Officer
Nev ABLITT	SunWater	Senior Technical Advisor
Peter MacTAGGART	SunWater	Project Manager
Peter RICHARDSON	SunWater	Chief Design Engineer
Ray CURRO	SunWater	Graduate Engineer
Roshan SINGH	SunWater	Engineer (Hydrology)
Simone GILLESPIE	SunWater	Senior Engineer (Hydrology)
Sunil DAYARATNE	SunWater	Manager
Yong DING	SunWater	Graduate Engineer

Refresher training for all Data Collectors included a visit to each of the dams on Thursday 20 September 2007. In addition to these personnel, five trainee Data Collectors have nearly qualified for inclusion in the roster. These trainees will complete training during October 2006 and will be ready for induction during the current wet season.

The trainee Data Collectors are:

Name	Organisation	Designation
Simon ALLISON		
Lynden DRUITT		
Dave HARRAGON		
David POKARIER		
Bob THWAITE		

All experienced data collectors are involved in the training of new data collectors. The overall approach to training has been one of maintaining and enhancing their skills through continual use of the model and exposure to the workings of the Flood Control Centre. A roster system has been operated such that each Data Collector has direct hands on practice using the FloodCOL component of the RTFM every four to five weeks. When they are rostered for 'close call', the Duty Engineer responsible for that period assigns each Data Collector the role of updating and maintaining the RTFM database at least once in the week.



## 5.0 REPORT ON COMMUNICATION FACILITIES

### 5.1 COMMUNICATIONS FACILITIES AVAILABLE AT DAMS

Currently there is a combination of standard and mobile telephone services available at Wivenhoe, Somerset Dams and North Pine Dams. The South East Queensland Water Corporation has also supplied a radio base station for the Flood Control Centre and two hand held units for each dam.

Details of standard telephones available at each of the dams are as follows:-

<b>WIVENHOE DAM</b>	
Office/Dam Wall	
Facsimile Machine	
Autodialler	
<b>SOMERSET DAM</b>	
Office/Dam Wall	
Facsimile Machine	
Autodialler	
<b>NORTH PINE DAM</b>	
Office/Dam Wall	
Facsimile Machine	
Autodialler	

In addition to the above, the dam operators also have mobile phones. In particular, the phone numbers of the full time operators are as follows:-

<b>WIVENHOE DAM</b>		
Phone No. 1	[REDACTED]	Doug Grigg
Phone No. 2	[REDACTED]	Jeff Elliott
<b>SOMERSET DAM*</b>		
Phone No. 1	[REDACTED]	Anthony Dagan
Phone No. 2	[REDACTED]	Roger Cochrane
<b>NORTH PINE DAM</b>		
Phone No. 1	[REDACTED]	Brett Schultz
Phone No. 2	[REDACTED]	Malcolm Lane

The FCC also houses the SEQWater's two-way radio equipment which enables communication with the dams and SEQWater offices.

## 5.2 COMMUNICATIONS FACILITIES AVAILABLE AT FLOOD CONTROL

Currently there are a number of standard telephone services available at the FCC. These services are listed in the following table:

FLOOD CONTROL CENTRE	
Line 1	
Line 2	
Line 3	
Facsimile Machine	
Answering Machine	
ALERT Mobile Data Only	

In addition to these services all Duty Engineers have mobile phones to enable them to be contacted at all times. These mobile phones are relied on whenever the Duty Engineers are absent from the normal working hours location or are away from their homes.


There is still no direct link between the FloodCOL data collection program and the Duty Engineer's mobile phones. Work is progressing on facilitating this option. Until this program is implemented, there is a risk that the Duty Engineer will not be aware of the conditions that generate alarm conditions such as a reservoir rise.

The contact numbers for the Duty Engineers are listed in the following Table:

DUTY ENGINEER	Work Phone	Home Phone	Mobile Phone
Robert AYRE			
Terry MALONE			
John RUFFINI			
John TIBALDI			

A message is left on the FCC Answering Machine as to the name and contact numbers of the current Duty Engineer.

Each Data Collector carries a mobile phone while on 'close call'. These phones have a range that includes all of South East Queensland.

Data Collector 1	
Data Collector 2	
Data Collector 3	
Data Collector 4	

The FCC also has a dedicated telephone line to the Duty Forecaster at the Bureau of Meteorology. Officers at the Bureau of Meteorology have also indicated that, in the event of their long-term weather models predicting extreme rainfall events, they will invite us to attend their daily briefings.

### 5.3 CONTACT REGISTER

All contact phone numbers have been updated in accordance with the numbers provided by the SEQWater in December 2005. A check of these numbers in preparation for the coming wet season revealed some changes and these changes are summarized in Appendix A.

## 6.0 REPORT ON DATA COLLECTION NETWORKS

A range of data is currently available to the Flood Control Centre. This data includes:

### 6.1 SEQWATER ALERT NETWORK

The SEQWater ALERT system is the most important element of the overall data collection system available to the SunWater Flood Control Room.

It consists of a network of 70 rainfall and 55 river height sensors spread throughout the Pine River and Brisbane River catchments. Thirty gate-opening sensors were incorporated into the system in March 2004, but calibration data for the sensors is not satisfactory. The report on the performance of these sites shows that further re-configuration of the sensors is required to ensure the gate opening data is appropriate for operational requirements. The availability of the gate sensors is not being monitored as per the remainder of the network due to the poor performance of the sensors.

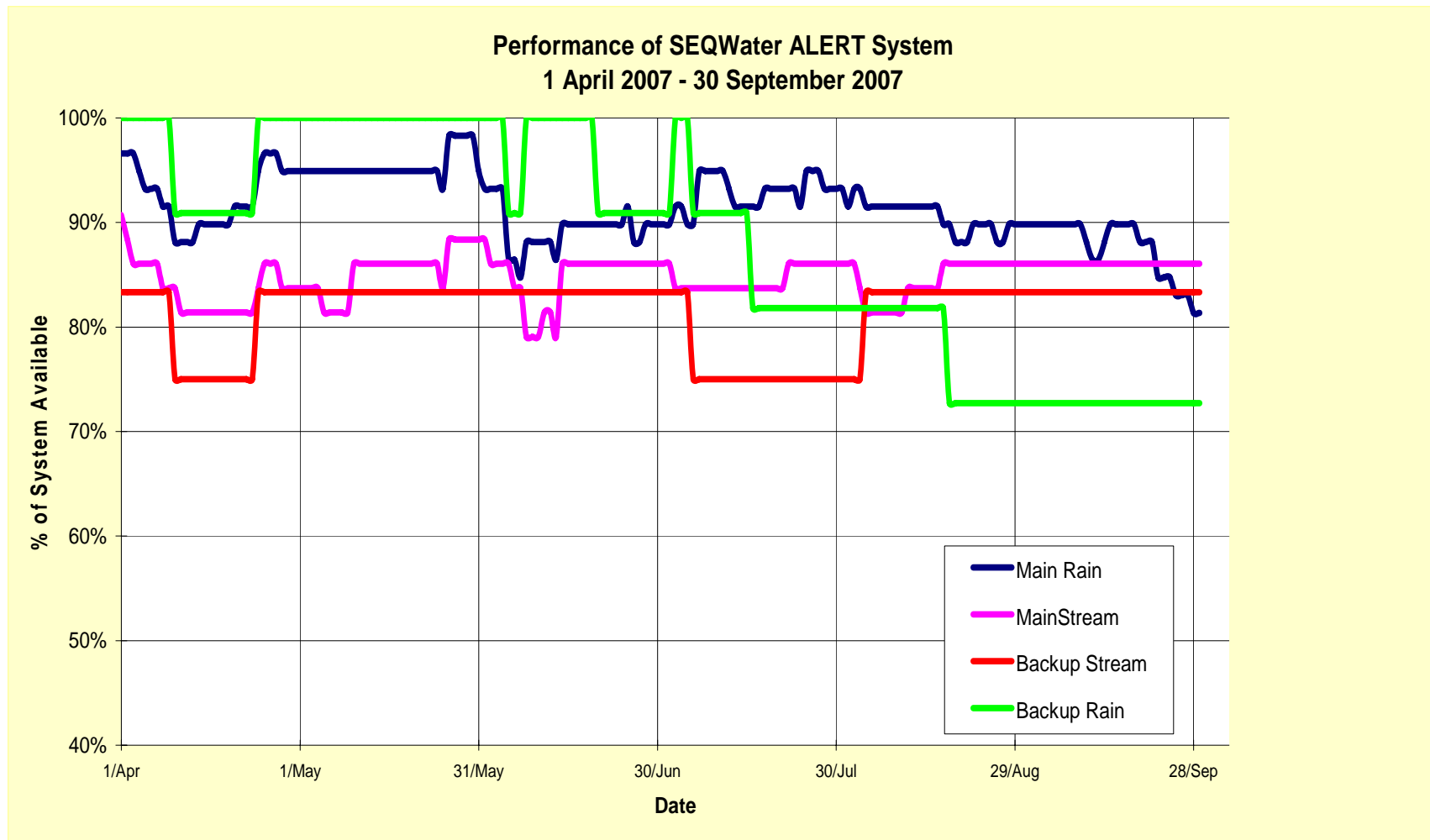
The ALERT system was supplied and installed by the SEQWater and is operated by SEQWater through a third party contract with RoadTek, a business group within the Department of Main Roads. As such, SunWater has no direct responsibility for its performance other than reporting problems to the SEQWater as they are identified.

Some summary data has been extracted on the performance of the ALERT sensors and this is presented in the following table. This data is for the period 1 April 2007 to 30 September 2007, a period of 183 days, except for the last column, which repeats the values from the previous report. Figure 5.1 illustrates this information graphically.



	Rainfall			River Height			Gates	Overall
	Main Rain	Back-up Rain	Overall Rain	Main River	Back-up River	Overall River		
Number of Sensors	59	11	70	43	12	55	30	125
Average Availability	91%	88%	91%	85%	81%	84%	0%	88%
Maximum Availability	98%	100%	-	91%	83%	-	0%	-
Minimum Availability	81%	73%	-	79%	75%	-	0%	-
Average OOA <sup>(1)</sup>	23	40	25	60	102	67	183	39
Maximum duration OOA for a single station	80	87	-	123	183	-	183	-

<sup>1</sup>OOA represents Out of Action



In this period all of the station groups show an average availability around 88%. This result is a similar performance to the previous six months, which had an average availability of 87%.

Overall performance of the network has improved since the last period, with the average availability dropping from 87% to 88%, and the average duration of 'Out of Action' (OOA) remaining at 67 days. This level of performance is assessed as being below on an inappropriate level of service. Special attention needs to be paid to the prescribed notification and recording procedures, by both SEQWater and SunWater staff.

The figures could potentially have been even better, but for some ongoing problems. Some of these are outlined below:-

### Main Rain Stations

Station	Location	Comment
6550	Bremer R at Walloon (A)	108 days OOA
6733	Bremer R at Rosewood	89 days OOA
6711	Baxter's Creek	79 days OOA
6559	Brisbane R at Savages Xing	74 days OOA
6562	Warrill Ck at Kalbar	68 days OOA
6619	Mt Castle	56 days OOA
6574	Caboonbah	50 days OOA

### Backup Rain Stations

Station	Location	Comment
6742	Bremer R at Walloon (B)	100 days OOA
6641	Wivenhoe Dam Tailwater (B)	77 days OOA
6653	Warrill Ck at Amberley (B)	58 days OOA



### Main River Stations

Station	Location	Comment
6747	Grain Terminal	183 days OOA
6761	North Pine Dam (A)	149 days OOA
6594	North Pine R at Petrie	132 days OOA
6731	Brisbane R at Jindalee	129 days OOA
6551	Bremer R at Walloon	117 days OOA
6560	Brisbane R at Savages Xing	90 days OOA
6734	Bremer R at Rosewood	87 days OOA
6756	Brisbane R at Burtons Bridge	87 days OOA
6749	Brisbane R at City Gauge	60 days OOA

### Backup River Stations

Station	Location	Comment
6642	Wivenhoe Dam Tailwater (B)	183 days OOA
6631	Lockyer Ck at Lyons Bridge (B)	125 days OOA
6743	Bremer R at Walloon (B)	87 days OOA

It is recommended that problems with the stations that are still OOA and which are located above the dams be addressed if possible prior to the onset of the wet season. Particular attention should be paid to the key sites such as North Pine Dam Headwater, Lyons Bridge and Walloon.

The performance of three stations - 6592, 6638 and 6762 cannot be determined on a regular basis as their sensors are out of water currently and have been for the entire period. These stations are set up to provide more precise water level information when the water level is at or just above Full Supply Level.

A number of 'Key' stations were duplicated to improve their reliability. These stations are indicated in the following tables:

<b>RAINFALL STATIONS HAVING FULL BACKUP</b>			
<b>Location</b>	<b>A Station</b>	<b>B Station</b>	<b>No. of Days BOTH Stations unavailable</b>
Mt Pechey	6511	6513	0
Brisbane River at Gregors Ck	6514	6517	0
Somerset Dam Headwater	6593	6590	3
Stanley River at Woodford	6705	6702	0
Wivenhoe Dam Headwater	6639	6636	0
Wivenhoe Dam Tailwater	6643	6641	0
Mt Mee	6690	6701	0
Lockyer Ck at Lyons Bridge	6633	6630	0
Bremer R at Walloon	6550	6742	92
Warrill Ck at Amberley	6651	6653	4
Brisbane River at Lowood	6649	6646	0

<b>RIVER HEIGHT STATIONS HAVING FULL BACKUP</b>			
<b>Location</b>	<b>A Station</b>	<b>B Station</b>	<b>No. of Days BOTH Stations unavailable</b>
Brisbane River at Gregors Ck	6515	6518	0
Somerset Dam Headwater	6594	6591 6592	0
Stanley River at Woodford	6706	6703	0
Wivenhoe Dam Headwater	6637	6638	0
Wivenhoe Dam Tailwater	6644	6642	0
North Pine Dam Headwater	6761	6762	0
Lockyer Ck at Lyons Bridge	6634	6631	0
Bremer River at Walloon	6551	6743	86
Warrill Ck at Amberley	6652	6654	0
Brisbane R at Lowood	6650	6647	0

The situation at Walloon on Warrill Creek whereby both river height stations were unavailable for 86 days is a major concern. Fortunately, the seriousness of this situation has been mitigated due to the dry season and lack of any significant runoff, however, the situation needs to be remedied as a matter of urgency.

The occurrence of both A and B stations being out of action at the same time has increased when compared to the previous six months.

There remains concern that the gate opening sensors are not configured sufficiently well to provide useful data to confirm required gate operations. The calibration of the sensors and the range of coverage may need to be reviewed to ensure the data obtained is useable.

Overall the performance of the ALERT network has remained at a level of the past twelve months.

## **6.2 NRW HYDROMET TELEPHONE TELEMETRY SYSTEM - SIS**

A copy of the NRW HYDROMET telephone telemetry software has been installed on the FCC computers. This software allows for polling of NRW hydrographic stations to obtain the available NRW rainfall and river height data in the Brisbane River and Pine River valleys.

A complete download of all relevant rainfall and river height data for the Brisbane River and Pine Rive catchments is carried out periodically using the SIS system and compared to the ALERT sensor data. No major problems were noted during this period.

## **6.3 MANUAL DATA GATHERING FROM DAM OPERATORS**

Every week the Dam Supervisors provide a check on the performance of the headwater gauges. The ALERT sensor data is compared to gauge board readings to ensure that a significant 'drift' in the data has not occurred. It is not possible to check the 5m Druck sensors at this time because the water level of all dams is below the lower operating range of these sensors.

## **6.4 RAPIC WEATHER RADAR**

The Flood Control Centre continues to receive the RAPIC weather radar images from a direct link to the BoM. The Mt Stapylton Radar was opened and became operational during the period. Some problems have been experienced with the system due to the more detailed data available from the new radar during this period.

## **6.5 BOM QUANTITATIVE PRECIPITATION FORECASTS**

Quantitative Precipitation Forecasts (QPFs) are received twice daily via facsimile from the Bureau of Meteorology. These QPFs are provided for both the Somerset and Wivenhoe catchments and also for the North Pine Dam catchments. They have proved a relatively reliable indicator of the likelihood of rainfall in the catchments up to 24 hours in advance.

## **6.6 SILO METEOGRAMS**

Meteograms provide up to seven-day outlooks on weather variables such as temperature, wind and precipitation. The estimates of the weather variables are derived from latest climatic models and the user can specify the location for which the estimate is required. The estimates can also be obtained at any time, making the service ideal for regular short-term guidance of likely weather conditions. This service is available on subscription.

## **6.7 SMS – SHORT MESSAGE SERVICE**

SMS is available through Optus MobileNet Digital which provides convenient message handling options with the mobile phones issued to the Duty Engineers. Duty Engineers regularly use this facility as a means of remote access to key stations or groups of key stations.

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## 7.0 REFERENCES

DNR State Water Projects, 1999, "*Report to South East Queensland Water Board on Flood Events of February and March 1999 at Somerset Dam, Wivenhoe Dam & North Pine Dam*", 14 September 1999.

SunWater, 2001, "*Investigation into Relocation of Flood Control Centre from Mineral House to 120 Edward Street*", November 2001.

# **APPENDIX A**

## **REVISED COMMUNICATION LIST**

**REGISTER OF CONTACT PERSONS FOR FLOOD INFORMATION**  
**MANUAL OF OPERATIONAL PROCEDURES FOR FLOOD MITIGATION FOR NORTH PINE DAM**

Clause 6 of manual refers

(List of persons to be contacted by Flood Operations Engineer )



Agency	Position	Working Hrs Priority	Out of Hrs Priority	Name	Work	Fax	Pager	Mobile	After Hours	Contacted By
South East Queensland Water	Operations Manager	1	1	Rob DRURY*	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	FCC
	Operations Engineer	2	2	Barton MAHER						FCC
	Chief Executive Officer	3	3	Peter BORROWS						SEQWater
	Chairman	4	4	Annabelle CHAPLIN						SEQWater
	Operations Supervisor	1	1	Bob EISENTRAGER						SEQWater
	Senior Maintenance Ranger	2	2	Ian KENT						SEQWater
	Other On-call Staff		3							Call-service identifies on-call staff
Department of Natural Resources & Water	Director, Dam Safety	1	1	Peter ALLEN	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	FCC
	Director, Water Industry Asset Management & Standards	2	2	Peter ARTEMIEFF						FCC
Flood Control Centre Level 18 William Buck Centre	Dam Safety Engineer	3	3	Ron GUPPY	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	FCC
	Senior Flood Operations Engineer	3	3	Rob AYRE						
	Senior Flood Operations Engineer	4	4	John RUFFINI*						
	Flood Operations Engineer	5	5	Terry MALONE						
	Flood Operations Engineer	6	6	John TIBALDI						
	Flood Control Room, operational	1	1	General Phones						
	Flood Control Room, operational									
	Flood Control Room, operational									
Flood Control Room - when non operational	2	2		recorded message identifies "on-call" enginee						
Headworks Operator	Contracts Manager Ipswich Office	1	1	Colin BENDALL*	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	FCC
	Service Co-Ordinator	2	2	Rob GORIAN						FCC
	A/Operations Manager	3	3	Wayne HAMBLETON						FCC
	Maintenance Engineer	4	4	Mick DREWS						FCC
North Pine Site Office	Dam Supervisor	1	1	Brett SCHULTZ	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	FCC
	Technical Officer, Electrical	2	2	Malcolm LANE						FCC
Brisbane City Council and Brisbane City Counter Disaster Committee	Principal Engineer - Floodplain	1	1	Ken MORRIS *	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	FCC
	Disaster Management Co-ordinator	2	2	Greg SCOOPPE						FCC
	SES Local Controller	3	3	John BUTLER						Ph 016070 Pager 6721000
Pine Rivers Shire Council and Counter Disaster Committee	Manager, Waterways Program	4	4	Barry BALL	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	FCC
	Call Centre (24 hours)	5	5							FCC
	Director of Assets & Infrastructure Services	1	1	Brendan SOWRY						FCC
Main Roads Metropolitan (Brisbane, Redcliffe, Pine Rivers, Redlands, Logan, Ipswich)	Manager Parks, Reserves & Landscape Services	2	2	Peter SAVAGE	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	FCC
	Manager, Roads & Design Services	3	3	Glen LEE						FCC
	Divisional Business Co-ordinator	4	4	Mark LETICA*						FCC
Try contacts in order of priority as indicated.	Principal Engineer	3	4	TBA	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	SEQWater
	Senior Engineer	4	5	Andrew NGUYEN						SEQWater
	Manager Infrastructure Delivery	1	2	Jenny McMILLAN						SEQWater
	Senior Engineer	2	3	Paul McCORMACK						SEQWater



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(List of persons to be contacted by Flood Operations Engineer )



Agency	Position	Working Hrs Priority	Out of Hrs Priority	Name	Work	Fax	Pager	Mobile	After Hours	Contacted By
Port Control	Emergency Number		1	Traffic Mgmt Centre						SEQWater
	MUTM			Hooked up onto rota						SEQWater
	Vessel Traffic Services Operators			system						SEQWater
Any of these numbers (24 hours)				SEQWater						
Police	Duty Officer * (24 hours)	1	1							SEQWater
Bureau of Meteorology	Engineer in Charge Flood Warning*	1	1							FCC
	Meteorologist in Charge (24 hours)	2	2							FCC
Petrie Ambulance	Officer in Charge	1	1	John CAMPBELL						FCC
Department of Emergency Services Disaster Operations										
	Duty Officer * (24 hours)	1	1	Rostered						FCC
<p>* = contact person nominated by agency as contact point for amendments</p> <p>Procedure to amend list: Advise Rob Drury of South East Queensland Water Corporation Ph: 54278131, fax 54261097. FCC FLOOD CONTROL CENTRE</p> <p>Rob Drury to issue amended list to persons nominated by agencies as contact point for amendments. SEQWater STH EAST QLD WATER</p> <p>Contact persons for amendments to acknowledge receipt and distribute within agencies.</p>										
Revised Jun 2007										

**REGISTER OF CONTACT PERSONS FOR FLOOD INFORMATION**

**MANUAL OF OPERATIONAL PROCEDURES FOR FLOOD MITIGATION FOR WIVENHOE DAM AND SOMERSET DAM**

Clause 6 of manual refers

(List of persons to be contacted by Flood Operations Engineer )



Agency	Position	Working Hrs Priority	Out of Hrs Priority	Name	Work	Fax	Pager	Mobile	After Hours	Contacted By
South East Queensland Water	Operations Manager	1	1	Rob DRURY*	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	FCC
	Operations Engineer	2	2	Barton MAHER						FCC
	Chief Executive Officer	3	3	Peter BORROWS						SEQWater
	Chairman	4	4	Annabelle CHAPLIN						SEQWater
	Operations Supervisor	1	1	Bob EISENTRAGER						SEQWater
	Somerset Ranger	2	2	Rohan THOROGOOD						SEQWater
	Other On-call Staff		3							SEQWater
Department of Natural Resources & Water	Director, Dam Safety	1	1	Peter ALLEN	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	FCC
	Director, Water Industry Asset Management & Standards	2	2	Peter ARTEMIEFF						FCC
	Dam Safety Engineer	3	3	Ron GUPPY						FCC
	Senior Flood Operations Engineer	3	3	Rob AYRE*						
Flood Control Centre Level 18 William Buck Centre	Senior Flood Operations Engineer	4	4	John RUFFINI	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	
	Flood Operations Engineer	5	5	Terry MALONE						
	Flood Operations Engineer	6	6	John TIBALDI						
	Flood Control Room, operational	1	1	General Phones						
	Flood Control Room, operational									
	Flood Control Room, operational									
	Flood Control Room - when non operational Back up FCC(Mineral House)	2	2							[Redacted]
Headworks Operator	Contracts Manager Ipswich Office	1	1	Colin BENDALL*	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	FCC
	Service Co-Ordinator	2	2	Rob GORIAN						FCC
	A/Operations Manager	3	3	Wayne HAMBLETON						FCC
	Maintenance Engineer	4	4	Mick DREWS						FCC
	Dam Supervisor Wivenhoe	1	1	Doug GRIGG						FCC
		2	2	Allan GEORGE						FCC
	Dam Supervisor Somerset	1	1	Anthony DAGAN						FCC
2		2	Glenn PATTERSON	FCC						
Brisbane City Council and	Principal Engineer - Floodplain	1	1	Ken MORRIS *	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	FCC
Brisbane City Counter Disaster Committee	Disaster Management Co-ordinator	2	2	Greg SCOOPPE	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	FCC
	SES Local Controller	3	3	John BUTLER						FCC
	Manager, Waterways Program	4	4	Barry BALL						FCC
	Call Centre (24 hours)	5	5							FCC
Esk Shire Council and Counter Disaster Committee SES Controller	Operations Manager	1	1	Vim BALACHANDRAN	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	FCC
	Council Overseer	2	2	Rob BOURCHIER						FCC
	SES Controller	3	3	Andy BICKERTON*						FCC
	Works Engineer	4	4	Tony JACOBS	[Redacted]	[Redacted]	[Redacted]	[Redacted]	[Redacted]	

**REGISTER OF CONTACT PERSONS FOR FLOOD INFORMATION**

**MANUAL OF OPERATIONAL PROCEDURES FOR FLOOD MITIGATION FOR WIVENHOE DAM AND SOMERSET DAM**

Clause 6 of manual refers

(List of persons to be contacted by Flood Operations Engineer )



Agency	Position	Working Hrs Priority	Out of Hrs Priority	Name	Work	Fax	Pager	Mobile	After Hours	Contacted By
Kilcoy Shire Council and Counter Disaster Committee	Chief Executive Officer	3	3	Ken TIMMS						SEQWater
	Mayor	4	4	Terry DREDGE						SEQWater
	Manager-Works and Services	1	1	Gary BOWTELL						SEQWater
	Overseer	2	2	Dan HALL						SEQWater
Ipswich City Council and Counter Disaster Committee	Works Manager	1	1	Andrew UNDERWOOD						FCC
	Deputy Works Manager	2	2	Tony DILEO						FCC
	SES Local Controller	3	3	Arie van den ENDE						FCC
Main Roads Metropolitan (Brisbane, Redcliffe, Pine Rivers, Redlands, Logan, Ipswich) Try contacts in order of priority as indicated.	Principal Engineer	3	4	TBA						SEQWater
	Senior Engineer	4	5	Andrew NGUYEN						SEQWater
	Manager Infrastructure Delivery	1	2	Jenny McMILLAN						SEQWater
	Senior Engineer	2	3	Paul McCORMACK						SEQWater
	Emergency Number		1	Traffic Mgmt Centre						SEQWater
Port Control	MUTM			Hooked up onto rota						SEQWater
	Vessel Traffic Services Operators			system						SEQWater
	Any of these numbers (24 hours)									SEQWater
Wivenhoe Power Station	Wivenhoe Power Station Manager			Sorin LUPULESCU			Office Hours Only			SEQWater
(Tarong)	On - Call Officer - Rotational			Contact Tarong Power Station Shift Co-ordinator						SEQWater
Wivenhoe Small Hydro (Stanwell)	Site Manager	1	1	Scott HANNAY						
	Wind & Hydro Manager	2	2	David PHILLIPS						
Police	GM Operations & Maintenance	3	3	Brett SMITH						
	Duty Officer * (24 hours)									FCC
Bureau of Meteorology	Engineer in Charge Flood Warning*	1	1							FCC
	Meteorologist in Charge (24 hours)	2	2							FCC
Department of Emergency Services Disaster Operations	Duty Officer * (24 hours)	1	1							FCC
Procedure to amend list:	* = contact person nominated by agency as contact point for amendments Advise Rob Drury of South East Queensland Water Corporation Ph: 54278131, fax 54261097. Rob Drury to issue amended list to persons nominated by agencies as contact point for amendments Contact persons for amendments to acknowledge receipt and distribute within agencies.						FCC	FLOOD CONTROL CENTRE		
Revised Jun 2007							SEQWater	STH EAST QLD WATER		