

## APPENDIX G : ON-SITE PLAN EXAMPLE A

**APPENDIX G : EXAMPLE OF  
ON-SITE PLAN  
Example A – Owner of single Consequence Class B dam**

**ON-SITE PLAN  
FOR GOLF RESERVOIR ON  
RIVER GILRAIN**

**Preface**

This example plan, although based on a real cascade, has been edited in respect of the names and key features of the reservoir and local environment to preserve the anonymity of the reservoirs

**Change log for plan**

| Rev    | Date       | Details of nature of change                                 | By   | Ckd | Approved |                       | Accepted by EA |
|--------|------------|---|------|-----|----------|-----------------------|----------------|
|        |            |   |      |     | Owner    | Panel AR <sup>1</sup> |                |
| A01.01 | 17/06/2005 | Issued to Environment Agency for examination and acceptance | FJBS | AJB | EHG      | JDG                   | Na             |
| A01.02 | 15/08/2005 | Accepted by Environment Agency                              | -    | -   | -        | -                     | ABC            |
| A1.03  | 2/8/2006   | Update contacts   | RTS  | SEG | Na       | Na                    | Na             |
|        |            |   |      |     |          |                       |                |

Notes

1. Documented in signed off separate statement by Qualified Civil Engineer

## Contents

|       |   |    |
|-------|---|----|
| 1     | Objectives, Scope and administration of the plan .....                            | 4  |
| 1.1   | Objective .....   | 4  |
| 1.2   | Scope.....  | 4  |
| 1.3   | Administration of the plan .....  | 4  |
| 2     | Management of emergency by undertaker .....                                       | 6  |
| 2.1   | Undertaker’s procedures and authorised personnel .....                            | 6  |
| 2.2   | External communications.....  | 6  |
| 2.3   | Checklist for those attending emergency .....                                     | 7  |
| 3     | Description of the reservoir and retaining dam .....                              | 7  |
| 3.1   | Situation .....   | 7  |
| 3.2   | Detailed Records.....   | 7  |
| 3.3   | Physical dimensions and features .....  | 7  |
| 3.4   | Other features relevant to on-site operations .....                               | 8  |
| 3.5   | Access to reservoir .....   | 8  |
| 3.5.1 | Access to elements of dam .....   | 8  |
| 3.5.2 | Access to reservoir from nearest public highway .....                             | 8  |
| 3.5.3 | Access to edge of Undertaker’s land .....   | 9  |
| 3.6   | Communications at reservoir site.....   | 9  |
| 3.7   | Welfare facilities.....   | 9  |
| 3.8   | Normal Operation .....  | 9  |
| 4     | Actions by undertaker on site.....  | 10 |
| 4.1   | Situation assessment .....  | 10 |
| 4.2   | Undertaker’s Resources relevant to on-site activities .....                       | 10 |
| 4.2.1 | Equipment at dam site .....   | 10 |
| 4.2.2 | Resources which could be brought to site .....                                    | 10 |
| 4.3   | Reservoir drawdown .....  | 11 |
| 4.3.1 | Permanent installations.....  | 11 |
| 4.3.2 | Provision for installing and operating pumps.....                                 | 11 |
| 4.4   | Other measures.....   | 11 |
| 4.5   | Off-site impacts of site activities .....   | 12 |
| 4.6   | Assistance from external organisations with on-site measures.....                 | 12 |
| 5     | Measures at other installations .....   | 12 |
| 5.1   | Upstream reservoir.....   | 12 |
| 5.2   | Other installations .....   | 12 |
| 6     | Maintenance of the plan .....   | 12 |
| 6.1   | Training of staff .....   | 12 |
| 6.2   | Periodic testing of equipment .....   | 12 |
| 6.3   | Exercising of On-site plan .....  | 12 |
| 6.4   | Review and updating of plan .....   | 13 |
|       | Attachment A : Maps showing access to dam site .....                              | 14 |
|       | Attachment B : Hydrometric data and estimated inflows.....                        | 15 |
| B.1   | Base Flows .....  | 15 |
| B.2   | Flood Estimates.....  | 15 |
| B.3   | Nearest Environment Agency Gauging Station data .....                             | 15 |
|       | Attachment C : Reservoir level vs elevation .....                                 | 17 |
|       | Attachment D : Information supplementary to reservoir record .....                | 17 |
|       | Attachment E : Information to be updated frequently.....                          | 18 |
| E.1   | List of GAS committee members.....  | 18 |
| E.2   | Owner of upstream reservoir .....   | 18 |
| E.3   | Pump suppliers.....   | 18 |
| E.4   | Panel AR Engineers .....  | 18 |
| E.5   | GAS members who would be called upon first in an emergency at Golf reservoir..... | 19 |
| E.6   | Schedule of associated documents to be read with this plan .....                  | 19 |

|  |    |
|--|----|
| Attachment F : Maintenance Log.....                      | 20 |
| F.1    Exercising since On-site plan issued.....         | 20 |
| F.2    Contact verification and callout simulation ..... | 20 |

**Tables**

|   |    |
|---|----|
| Table 1 : Reservoirs and dams in cascade .....  | 4  |
| Table 2 : Distribution list for copies of this document, and personnel who would be involved in<br>managing any emergency on site ..... | 5  |
| Table 3 : Stages in escalation of incident management by GAS.....   | 6  |
| Table 4 : Key dimensions of dams in cascade.....  | 7  |
| Table 5 : Access to elements of Golf dam.....   | 8  |
| Table 6 : Alternative access routes to undertaker's land from nearest A road .....  | 9  |
| Table 7 : Risk assessment of issues relevant to the ability to lower the reservoir rapidly .....  | 10 |
| Table 8 : Frequency of exercising of on-plan for this group of reservoirs .....   | 13 |
| Table B.1 : Inflows for Reservoirs in cascade.....  | 15 |

# 1 OBJECTIVES, SCOPE AND ADMINISTRATION OF THE PLAN

## 1.1 Objective

This plan forms part of the risk management of Golf reservoir, comprising the measures that would be taken on site in the event of a serious problem with the structural stability of the dam. It also satisfies the requirements for Element II of a Flood Plan under Section 12A of the Reservoirs Act 1975 (added through Section 77 of the Water Act 2003).

## 1.2 Scope

This plan covers Golf reservoir, owned by Gilrain Angling Society (GAS) which is one of two reservoirs on the River Gilrain. The principal characteristics of the reservoir are summarised in Table 1 and are shown in plan in the figures in Appendix A. The upstream reservoir is owned by Mr Smith, a local farmer.

Actions relating to the notification of any incident to the emergency services are covered in a separate plan, the “external interfaces plan”.

## 1.3 Administration of the plan

The status of this document is as shown in the document history record on the cover, and it is issued to those shown in Table 2. It has been prepared by Dam Consultants plc for Gilrain Angling Society.

**Table 1 : Reservoirs and dams in cascade**

| <b>Reservoir name</b>                                    | <b>Foxtrot</b>     | <b>Golf</b>  |
|--|--------------------|--|
| Owner  | Mr Smith           | Gilrain Angling Society (GAS)                                    |
| Capacity at spillway crest m <sup>3</sup>                | 15,000 (estimated) | 48,000   |
| Number of dams retaining reservoir                       | 1                  | 1  |
| Names  | Foxtrot            | Golf   |
| Grid Ref <sup>1</sup>                                    | (AA) 1234 5678     | (AA) xxxx xxxx   |
| <b>Consequence Class</b>                                 | <b>Not known</b>   | <b>B</b>   |
| Reservoir that would receive breach                      | Golf               | None   |
| Frequency of surveillance visits                         | Not known          | Reservoir manager visits weekly.                                 |
| <b>Personnel with a knowledge of the dam’s behaviour</b> |                    |  |
| Undertaker’s Staff                                       | Not available      | Mr A Smith – GAS Secretary<br>Mr B Green – GAS Reservoir manager |
| Other  |                    | Sup Eng – Mr E Brown (Consultants)                               |

1. Shown on Landranger (1:50,000 scale) Map No xxx and Explorer (1:25,000 scale) Map No xxx
2. This plan covers only Golf reservoir

**Table 2 : Distribution list for copies of this document, and personnel who would be involved in managing any emergency on site**

| Position                                  | Name    | Postal Address  | Phone  |                    |              |
|---|---------|---|--------|--------------------|--------------|
|   |         |   | Office | Home/ Out of hours | Mobile       |
| <b>Undertaker</b>                         |         | <b>Gilrain Angling Society</b>  |        |                    |              |
| Secretary                                 | A Smith | Xxxxx   | xxxx   | xxxx               | xxxx         |
| Reservoir Manager                         | B Green | Xxxxx   | xxxx   | xxxx               | xxxx         |
| Back-up Committee member                  | xxxxx   | Xxxxx   | xxxx   | xxxx               | xxxx         |
| <b>External</b>                           |         |   |        |                    |              |
| Supervising Engineer                      | E Brown | Xxxxx   | xxxx   | xxxx               | xxxx         |
| <b>Enforcement Authority</b>              |         | <b>Environment Agency:</b>  |        |                    |              |
| a) Technical Manager-<br>Reservoir Safety | xxxxx   | Reservoir Safety - Technical Manager, The<br>Environment Agency, Manley House, Kestrel<br>Way, Sowton Industrial Estate, EXETER, EX2<br>7LQ | xxxx   | xxxx               | Not relevant |
| b) Regional office- Operations<br>Manager | xxxxx   | Xxxxx   | xxxx   | xxxx               | xxxx         |

## Notes

1. All receive (and acknowledge receipt by e-mail) an electronic copy of this plan.

## 2 MANAGEMENT OF EMERGENCY BY UNDERTAKER

### 2.1 Undertaker's procedures and authorised personnel

The reservoir is owned by Gilrain Angling Society. There are no employees, with the various functions of the club being carried out voluntarily by members.

GAS employs a Supervising Engineer supplied by Dam Consultants plc, who visits once a year.

The same company has two All Reservoirs Panel Engineers whose contact details are given in Appendix E, and one of whom will be appointed by GAS in an emergency to come to site and supervise the situation. Any of the committee members listed in Table 2 are authorised to appoint a Panel AR Engineer.

Any incident would be escalated as shown in Table 3. The responsibility for implementing each stage and where appropriate escalating to the next stage lies with one of the GAS committee members listed in Table 2. Initially responsibility would be with the first of these who could be contacted and visit the site; passing to the Reservoir Safety Manager or Club Secretary when they arrive on site.

**Table 3 : Stages in escalation of incident management by GAS**

| Stage | Title                  | Activity   |
|-------|------------------------|--|
| 1     | Preliminary assessment | GAS representative visits site, determines whether a serious incident  |
| 2     | Situation assessment   | a) A panel engineer visits site<br>b) Declare serious incident<br>c) Set up incident control centre<br>d) Panel AR Engineer appointed, and comes to site (where 'a' by Supervising Engineer) |
| 3     | On-site measures       | Initiate on-site measures  |
| 4     | External notification  | Notify Local Authority Emergency Planning Officers of serious structural problem with dam  |

The GAS Incident control room would be set up in the clubhouse at Oscar reservoir, the other reservoir owned by GAS. This would be manned by two GAS members, one of whom will be designated Incident Control manager. He will be responsible for

- a) Contacting the designated GAS members to provide the frontline team (Appendix E.4)
- b) Facilitate implementation of on-site measures
- c) Any other actions requested

One member of the committee will be designated as the Press Officer at the start of the incident. All questions posed by the media shall be directed to this Press Officer. No other member of the GAS, or the Supervising Engineer shall provide information direct to the media unless specifically requested to by the Press Officer.

### 2.2 External communications

External notification will be made by the Incident Control Manager. Notification will be to the nominated member of the Local Resilience Forum shown in Element II of the Flood plan and use the form set out in that element.

### 2.3 Checklist for those attending emergency

No specific equipment is required, other than

- a) a copy of this plan
- b) the key for the padlock on the gate to the Lower Car Park (see Table 6)

## 3 DESCRIPTION OF THE RESERVOIR AND RETAINING DAM

### 3.1 Situation

The reservoir is retained by a single dam, being situated in a wooded valley with scattered houses down the valley downstream. A B road (Anfalas Street) runs down the valley in the flood plain, being variously on the right and left hand sides of the watercourse (looking downstream).

Due to the permanent groundwater inflows entering the base of Golf reservoir and emerging in the sides of the valley the lake water levels remain almost constant throughout the year

### 3.2 Detailed Records

The reservoir record is held at the Gilrain Angling Society Clubhouse, Oscar reservoir, The Lane, Arnor, XXX XXX. A copy of the key is held by all those listed under Undertaker in Table 2.

### 3.3 Physical dimensions and features

This plan summarises the key dimensions and other information which would be of value to have to hand in an emergency, as follows

|                                  |  |
|----------------------------------|--|
| Element                          |  |
| Reservoir level versus elevation | Attachment C                                 |
| Dam                              | Table 4                                      |
| Appurtenant works                | In Reservoir Record                          |
| Draw off capacity                | In Reservoir Record                          |
| Schedule of valves               | In Reservoir Record                          |
| Instrumentation data             | Standpipe piezometers, with Reservoir Record |
| Other information on dam         | Attachment D                                 |

**Table 4 : Key dimensions of dams in cascade**

(ordered upstream to downstream)

|   |     | Foxtrot             | Golf                |
|---|-----|---------------------|---------------------|
| Date built                                  |     | 1990 approx         | 1896                |
| Crest level typical/ min                    | mOD | Not available       | 76.94/ 76.81        |
| Maximum retention level (MRL)               | mOD | Not available       | 75.54               |
| Height of crest wall above crest            | m   | None                | None                |
| Invert of downstream river bed              | mOD | 76 approx           | 68                  |
| Lowest excavation level                     | mOD | Not available       | Not available       |
| Crest length                                | m   | 60                  | 150                 |
| Crest width                                 | m   | 1                   | 4                   |
| Maximum height of dam crest above river bed | m   | 3                   | 7                   |
| Downstream slope                            | V:H | Not available       | 1V:2H               |
| Upstream slope                              | V:H | Not available       | Not known           |
| Type  |     | Probably homogenous | Probably homogenous |



3.4 Other features relevant to on-site operations  
 None

3.5 Access to reservoir

3.5.1 Access to elements of dam

**Table 5 : Access to elements of Golf dam**

| Issue                                 | Access  | Locks   |
|---------------------------------------|---|---|
| Public access                         | Footpath along crest  |   |
| Undertaker's Personnel                | Public highway to 200m from end of crest, then gravel site road.                    | A wooden swing gate is located in the Lower Car Park preventing unauthorized access to the gravel site road. It is secured with a padlock on the latch (Note 1) |
| <b>Access for operation of valves</b> | Valves in manhole in crest, not used in living memory                               | a) Manhole cover- Manhole key (or screwdriver)<br>b) Valve – handwheel in water at bottom of manhole  |
| <b>Access for works</b>               |   |   |
| Upstream face                         | Heavily overgrown by mature trees   |   |
| Crest                                 | Ordinary Car – 8t (spillway bridge)   |   |
| Downstream toe                        | Heavily overgrown and boggy in places due to seepage. Would need to cut trees down. |   |
| Spillway weir crest                   | From dam crest.   |   |

Notes :

1. Keys held by
  - 4 GAS members listed in Table 2
  - Supervising Engineer

3.5.2 Access to reservoir from nearest public highway

Vehicular access is possible along the entire width of the dam embankment, on a gravel track. There is however, an 8 tonne weight limit over the spillway culvert located close to the right hand end of the embankment (looking downstream).

Vehicular access is possible to both ends of the embankment. However, preferred access is on the right abutment on a good gravel track from the lower car park located on Anfalas Street which runs along the eastern boundary of the Undertaker's land. The grid reference and relevant land ranger map number for Golf Lake are shown on Table 1. The location of the Lower Car Park and the access track are shown on the plan in Appendix A.

In heavy rain, if Anfalas Street is blocked access is possible by 4WD from the main car park (NB the track leading down to the reservoir is narrow with a poor surface, steep gradient and through woods).

There are no other elements of the reservoir where it is envisaged access would be necessary in an emergency.

### 3.5.3 Access to edge of Undertaker's land

Access is as shown on Table 6

**Table 6 : Alternative access routes to undertaker's land from nearest A road**

| Route   | Risk of being blocked   | Weight/ height restriction   |        |
|---|---|--|--------|
| <b>To right abutment from Anfalas Street via Lower car park</b> |   |  |        |
| 1   | From Ax at turnoff to Arnor, through Arnor onto B1234 and thus the west end of Anfalas Street           | a) Wooded (trees blown over)<br>b) In deep cutting (landslips in heavy rain) | Note 1 |
| 2   | From Fornost on Axxx (Fornost- Erebor road) turn off in Romeo village at the east end of Anfalas Street | As '1'   | Note 1 |
| <b>To left abutment from B1234 via main car park</b>            |   |  |        |
| 3   | As I, but turnoff B1234   | Wooded (trees blown over), but 2 lane B road                                 | None   |

Notes

1. No restrictions as such, but Anfalas Street
  - is a single track public road with only occasional passing places and moderate gradients, with signs at both ends "Unsuitable for heavy vehicles"
  - would be flooded in places in a 100 year flood, as shown on the extract of the Environment Agency flood maps in Attachment A.

### 3.6 Communications at reservoir site

Mobile phones do not work at the reservoir. They only work when you come out of the valley (approx.0.5km up steep hill to north; at Grid Ref XX XXX XXX)

The nearest landlines are as follows:

| Location                             | Owner           | Number | Distance from dam site |
|--------------------------------------|-----------------|--------|------------------------|
| Gilrain Angling Society's club house | GAS             | xxxxx  | 8km                    |
| 2 The Warren                         | Mr & Mrs Beaver |        | 1.2km downstream       |

### 3.7 Welfare facilities

There are no facilities at the dam. There is a public toilet at the main car park, a 350m walk up the hill.

### 3.8 Normal Operation

All functions are carried out by club members, under the direction of the committee.

## 4 ACTIONS BY UNDERTAKER ON SITE

### 4.1 Situation assessment

In the event of a problem Gilrain Angling Society would contact the Supervising Engineer for advice, which if a serious incident was in progress would lead to the appointment of an All Reservoirs Panel Engineer.

This would include the situation where Gilrain Angling Society was informed of a serious incident at Foxtrot dam upstream, giving an increased risk of failure and release into Golf dam.

The situation would be assessed by Gilrain Angling Society in collaboration with the panel engineers from Dam Consultants Plc.

The Health and Safety plan prepared for reservoir surveillance would apply to the situation assessment phase. Selected risks that are relevant when considering the ability to lower the reservoir rapidly in an emergency are shown in Table 7.

The list of Indicators given in the Engineering Guide would be used to assess the seriousness of the emergency and actions required, in consultation with the panel engineer.

**Table 7 : Risk assessment of issues relevant to the ability to lower the reservoir rapidly**

| Risk  | Mitigation at Golf Reservoir   |
|---|--|
| Access to site is single track public road with occasional passing places | Take into account when planning which vehicles are to be used in the emergency e.g. to deliver pumps to site, to deliver fuel  |
| Weight limit along selected sections of embankment crest                  | Vehicles to be limited to 8 tonne over spillway culverts located at right end of embankment (looking downstream)   |
| No electrical power at site   | All pumps etc to come complete with power supply and 24 hour fuel storage  |
| No lighting at site   | Provide vehicles with floodlights on vehicle   |
| No staff resources on site  | Details of GAS members who could be called upon to assist in emergency are given in Appendix E (6 staff minimum allowed, on basis to provide 24 hour cover with minimum of 2 staff on each 8 hour shift) |
| Mobile phones do not work when standing at dam                            | Nearest fixed landlines to dam, that could be used in emergency listed in Section 3.6.   |

### 4.2 Undertaker's Resources relevant to on-site activities

#### 4.2.1 Equipment at dam site

There is no equipment at the reservoir.

#### 4.2.2 Resources which could be brought to site

The companies shown in Appendix E offer a 24 hour emergency pump supply service.

## 4.3 Reservoir drawdown

### 4.3.1 Permanent installations

There is no working outlet (the original bottom outlet pipe, controlled by a valve in manhole in the crest of the dam, has not been operated in living memory) . Thus pumping is the only means of lowering the reservoir.

There are no indirect inflows, other than the releases made within the cascade

### 4.3.2 Provision for installing and operating pumps

The area of the reservoir basin between the existing spillways and the island is relatively shallow and is not a suitable location for the suction hoses if the reservoir water level is to be reduced to below the syphon intake (73.54mOD). Deeper areas exist in the main body of the reservoir directly in front of the syphon control chambers.

Delivery hoses should either be positioned directly into one of the gabion lined stilling basins or beyond the downstream toe of the embankment to ensure that no erosion of the embankment occurs as a result of the flowing water.

| Pump Location                                 | Estimated suction hose length | Estimated delivery hose length |
|---|-------------------------------|--------------------------------|
| Pumps located on new spillway                 | 25m                           | 10m                            |
| Pumps located close to syphon control chamber | 20m                           | 20m                            |

The required number of pumps may be estimated from the following data

- Inflows and flood volumes in Attachment B.
- Reservoir capacity vs. depth in Attachment C

These are used to provide illustrations of required pumping capacity to reduce the load on the dam by half (lower to 71% water depth), as follows:

|   |                      |        |        |
|---|----------------------|--------|--------|
| Required rate of lowering                                 | m/day                | 1.0    | 0.5    |
| Reservoir capacity in top 29%                             | m <sup>3</sup>       | 22,000 | 22,000 |
| Days to lower   | days                 | 1.7    | 3.4    |
| Inflow volume in winter (at 7000m <sup>3</sup> /day)      | m <sup>3</sup>       | 11,900 | 23,800 |
| Total volume to be evacuated                              | m <sup>3</sup>       | 33,900 | 45,800 |
| Pumping rate  | m <sup>3</sup> / sec | 0.23   | 0.16   |
| Number of 100mm pumps required (at 160m <sup>3</sup> /hr) |                      | 5      | 4      |

## 4.4 Other measures

The checklists in the Engineering Guide to Emergency Planning would be used in the event of an emergency.

If the incident relates to overtopping of the dam, an emergency spillway could be excavated through the dam at the extreme right abutment, where only about 0.5m of water is retained and flow would discharge into a ditch.

#### 4.5 Off-site impacts of site activities

The watercourse downstream passes through woodland with occasional houses. If the reservoir were lowered one metre in one day the average outflow would be 0.2m<sup>3</sup>/s, which is significantly less than the 100 year flood (see Appendix B).

The only impact of loss of operation of the reservoir would be loss of fishing for club members.

#### 4.6 Assistance from external organisations with on-site measures

Assistance may be required with

- a) closing the public footpaths across the dam
- b) limiting public access to Anfalas Street (which is narrow, being single track in places)

### 5 MEASURES AT OTHER INSTALLATIONS

#### 5.1 Upstream reservoir

The upstream reservoir, owned by Mr Smith, could be considered for use to reduce inflows to Golf reservoir.

#### 5.2 Other installations

There are no other installations which could be used to reduce the likelihood of failure of the dam

### 6 MAINTENANCE OF THE PLAN

#### 6.1 Training of staff

The members of Gilrain Angling Society listed in Table 1 have each bought and read a copy of the Engineering Guide to Emergency Planning for UK reservoirs. There is also a copy in the clubhouse. The panel engineers at Dam Consultants Plc are kept up to date in respect of the following training courses: confined spaces, CDM Regulations.

A seminar should be held at the frequency shown in Table 8, to discuss the arrangements, confirm their practicality and identify improvements that could be made to increase the value of the plan and/or reduce costs. It should be attended by the following

- GAS members listed in Table 2
- The Supervising Engineer
- At least two other GAS members

In addition at least one of the GAS members listed in Table 2 should attend a site visit with the Supervising Engineer to check the practicality of implementation of the on-site arrangements set out in this Plan

#### 6.2 Periodic testing of equipment

There is no fixed equipment

#### 6.3 Exercising of On-site plan

At least one of the GAS members listed in Table 2 will attend any exercises organised for owners of single reservoirs by the local resilience forum. In addition elements of the Contingency Plan should be tested as shown in Table 8.

**Table 8 : Frequency of exercising of on-plan for this reservoir**

| <b>Item in plan to be checked</b>             | <b>Method of testing</b>                   | <b>Frequency of testing</b> | <b>Responsibility for testing (sign off on test sheet)</b> |
|---|--|-----------------------------|--|
| 24 hour contact number for pump supplier      | Phone numbers at 2300 hrs                  | 2 yearly                    | Reservoir safety manager                                   |
| Undertaker's 24 hour emergency response       | Phone designated number at 2300 hrs        | Annually                    | Supervising Engineer                                       |
| Contact of GAS members listed in Appendix B.4 | Check details correct                      | Annually                    | Reservoir safety manager                                   |
| In-house Seminar                              | See Section 6.1                            | 5 yearly                    | Reservoir safety manager                                   |
| Control post/ operations room                 | Inc in seminar                             |                             |  |
| Site attendance                               | Check practicality of on-site arrangements | 5 years                     | Reservoir safety manager                                   |

#### 6.4 Review and updating of plan

The list of contacts in Attachment E should be checked annually by the Supervising Engineer, with a checklist of dates and times phone numbers were checked recorded as Attachment F.2 and included in his annual statement.

This plan should be reviewed (and updated or modified as appropriate)

- annually by the Supervising Engineer
- as part of a periodic Section 10 Inspection

## ATTACHMENT A : MAPS SHOWING ACCESS TO DAM SITE

|  | Item   | Size   | No of sheets | Scale   |
|--|--|--------|--------------|---------|
|  | Regional access  | Note 1 | 1            | 100,000 |
|  | Local access routes and constraints to cascade   | Note 1 | 1            | 10,000  |
|  | Extent of fluvial flooding in 100 and 1000 year floods (from Environment Agency website) | A4     | 1            | 20,000  |

Note :

1. Original at A3, reduced to A4 in plan

*These maps are omitted from the Guide in the interests of maintaining the anonymity of the reservoirs covered by the plan*

## ATTACHMENT B : HYDROMETRIC DATA AND ESTIMATED INFLOWS

### B.1 Base Flows

.50 and 10 percentile daily inflows to the reservoir are given in Table B.1. These have been derived from data at the gauging station at Rhum Mill.

**Table B.1 : Inflows for Reservoirs in cascade**

| Reservoir name | Catchment area<br>km <sup>2</sup> | SAAR<br>mm/yr | Method                                    | Daily inflow                      |                                | Median annual flood<br>(2.33 year return period)<br>m <sup>3</sup> /sec |
|----------------|-----------------------------------|---------------|---|-----------------------------------|--------------------------------|---|
|                |                                   |               |   | Median 50%<br>m <sup>3</sup> /day | Wet 10%<br>m <sup>3</sup> /day |   |
| Golf           | 3.4                               | 800           | Prorata to gauging station catchment area | 4,300                             | 7,000                          | na  |
|                |                                   |               | From monthly spot depth at weir           | 1,700                             | 4,500<br>(Note 1)              |   |

Notes

1. Wettest month in 12 years, excluding winter of 2000/01, when up to 27,000m<sup>3</sup>/day

### B.2 Flood Estimates

Flood estimates carried out as part of the last Section 10 Inspection and subsequent spillway enlargement are:

#### Estimated floods (10 and 50 years using methodology in FEH, 2000; 5 year estimated)

|                                      | Duration (hours) | 5 year  | 10 year | 50 year | 1,000 years |     |
|--------------------------------------|------------------|---------|---------|---------|-------------|-----|
|                                      |                  |         |         |         | FSR         | FEH |
| Peak inflow (m <sup>3</sup> /s)      | 7                | 1.4     | 1.8     | 3.3     | 6.9         | 7.4 |
| Total flood volume (m <sup>3</sup> ) | 7                | 30,000  | 43,000  | 80,000  |             |     |
|                                      | 24               | 70,000  | 85,000  | 126,000 |             |     |
|                                      | 48               | 110,000 | 127,000 | 175,000 |             |     |

### B.3 Nearest Environment Agency Gauging Station data

(downloaded from internet)

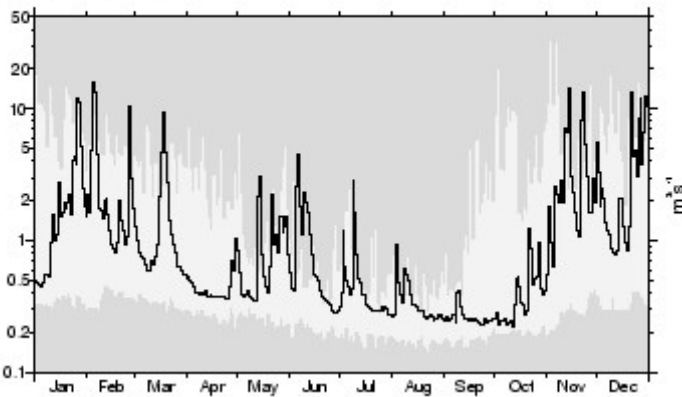
#### xxxx – River Gilrain at Romeo village

Grid Reference: Xx (AA) xxx xxx  
 Operator: EA  
 Local number: Xxxx  
 Catchment Area: 109.5 km<sup>2</sup>  
 Mean flow: 1.14 m<sup>3</sup>s<sup>-1</sup>  
 95% exceedance (Q95): 0.194 m<sup>3</sup>s<sup>-1</sup>  
 10% exceedance (Q10): 2.54 m<sup>3</sup>s<sup>-1</sup>  
 61-90 Av. Ann. Rainfall: 787 mm

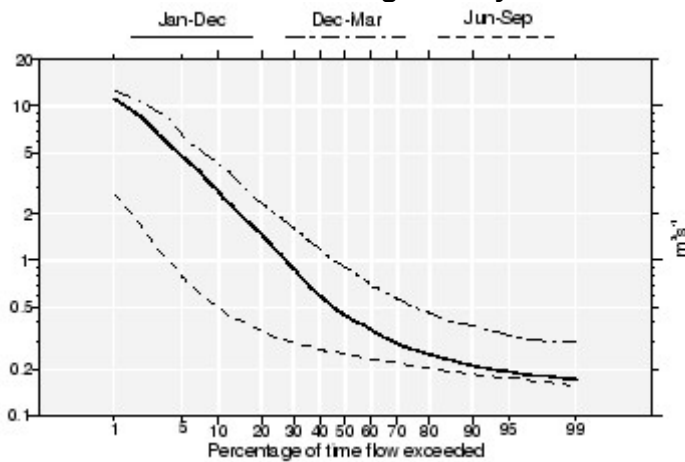


### Sample Hydrograph of Gauged Daily Flows

Max. and min. daily mean flows from 1990 to 2003 excluding those for the featured year (2002; mean flow: 1.49 m<sup>3</sup>s<sup>-1</sup>)



### Flow Duration Curve for Gauged Daily Flows



### Station Description

Multi-path cross-configuration ultrasonic gauging station beneath road bridge; enlarged bridge opening creates large capacity but, correspondingly, low velocities; these can impact on low flow precision. Full range station. Flashy response with lengthy periods of very low flow. Low flows influenced by effluent returns. Station is used for flood monitoring purposes.

### Catchment Description

Rural catchment, predominantly impervious clay with some sand in lower reaches.

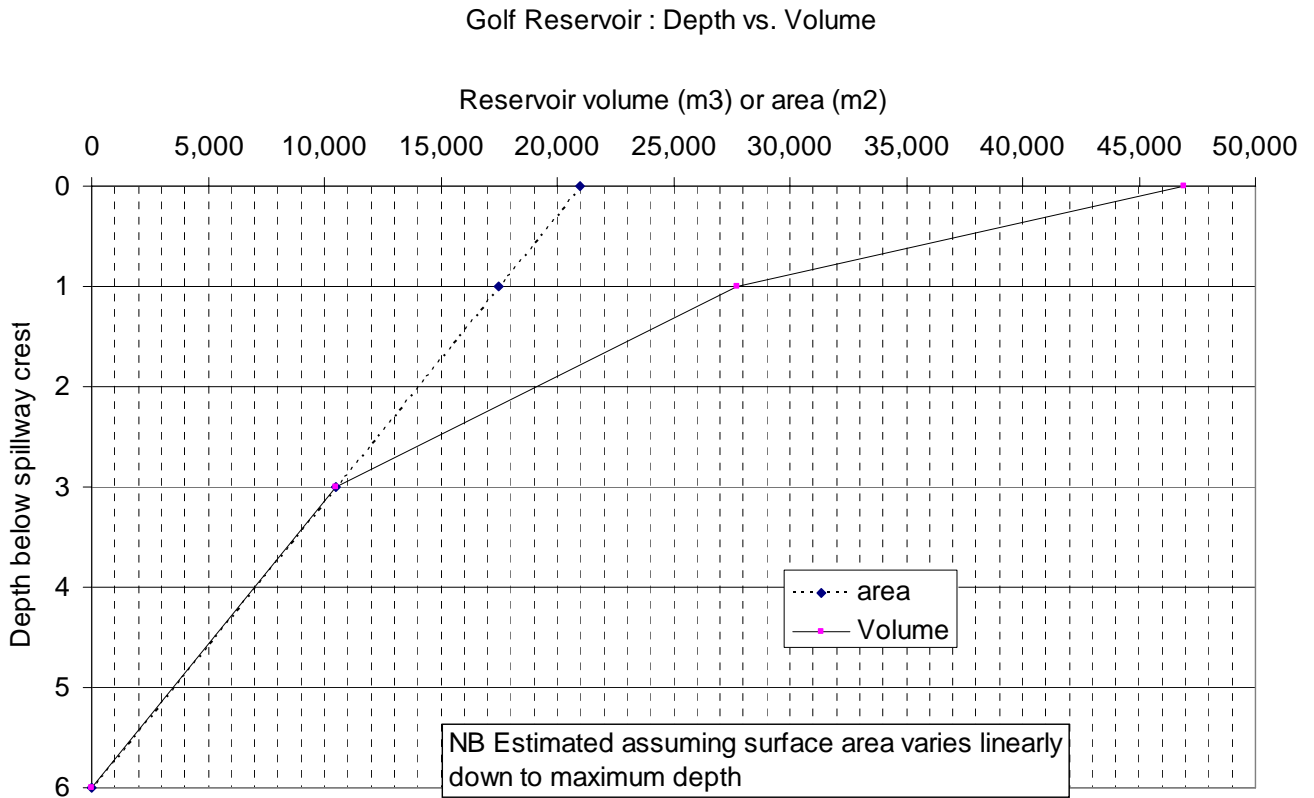
### River Flow and Catchment Rainfall on the National River Flow Archive

Gauged Daily Flows (gdf): 1990 to 2003

Monthly Catchment Rainfall (rnf): 1961 to 2001

| Datatype | 1960s  | 1970s  | 1980s  | 1990s | 2000s  |
|----------|--------|--------|--------|-------|--------|
| gdf      | Yellow | Yellow | Yellow | Blue  | Yellow |
| rnf      | Yellow | Blue   | Blue   | Blue  | Yellow |

### ATTACHMENT C : RESERVOIR LEVEL VS ELEVATION



### ATTACHMENT D : INFORMATION SUPPLEMENTARY TO RESERVOIR RECORD

None

ATTACHMENT E : INFORMATION TO BE UPDATED FREQUENTLY

*Details of checks/ updates since last major revision of plan*

| Date           | Updated by | Comments            |
|----------------|------------|---------------------|
| 5th Dec 2005   | B Green    | No change           |
| 5th March 2006 | B Green    | Some changes in E.5 |
|                |            |                     |
|                |            |                     |

E.1 List of GAS committee members

Omitted for brevity.

E.2 Owner of upstream reservoir

| Position                    | Name     | Postal address                                 | Phone           |                               |         |
|-----------------------------|----------|--|-----------------|-------------------------------|---------|
|                             |          |  | (working hours) | Out of hours (24hour contact) | Mobile  |
| Owner of upstream reservoir | Mr Smith | 1 The road<br>Some town<br>A County<br>AB1 CD2 | xxxxxxx         | xxxxxxx                       | xxxxxxx |

E.3 Pump suppliers

| Pump suppliers   | Phone   |                  | Distance from site |
|--|---|------------------|--------------------|
|  | Working hours   | Out of hours     |                    |
| <b>Master Plant Hire</b><br>Kiln Lane<br>North Road<br>Sierra<br>AB1 CD2                     | Mon-Friday 0800-1600<br>Oxxxx-xxxxxx                  | Oxxxx-xxxxxx     | 30km               |
| <b>Plant Hire Ltd</b><br>761 - 762 Edoras Road<br>Quebec Trading Estate<br>Quebec<br>AB1 CD2 | Mon-Friday 0800-1700<br>Sat 0800-1200<br>Oxxxx-xxxxxx | As working hours | 35km               |

E.4 Panel AR Engineers

| Name       | Office address                                    | Home address                                      | Phone           |                               |         |
|------------|---|---|-----------------|-------------------------------|---------|
|            |   |   | (working hours) | Out of hours (24hour contact) | Mobile  |
| Fred Brown | 1 High Street<br>Some town<br>A County<br>AB1 CD2 | 1 The road<br>Some town<br>A County<br>AB1 CD2    | xxxxxxx         | xxxxxxx                       | xxxxxxx |
| John Smith | As above  | 59 Upper Lane<br>Some town<br>A County<br>AB1 CD2 | xxxxxxx         | xxxxxxx                       | xxxxxxx |

E.5 GAS members who would be called upon first in an emergency at Golf reservoir

| Name     | Office address                                 | Home address                                   | Skills, equipment            | Phone   |         |         |
|----------|--|--|------------------------------|---------|---------|---------|
|          |  |  |                              | Work    | Home    | Mobile  |
| Member 1 | 1 High Street<br>Some town<br>A County AB1 CD2 | 1 The road<br>Some town<br>A County AB1 CD2    | Farmer, owns JCB, 2 tractors | xxxxxxx | xxxxxxx | xxxxxxx |
| Member 2 | 1 High Street<br>Some town<br>A County AB1 CD2 | 59 Upper Lane<br>Some town<br>A County AB1 CD2 | Owens 30t truck              | xxxxxxx | xxxxxxx | xxxxxxx |
| Member 3 | 1 High Street<br>Some town<br>A County AB1 CD2 | 59 Upper Lane<br>Some town<br>A County AB1 CD2 |                              | xxxxxxx | xxxxxxx | xxxxxxx |
| Member 4 | 1 High Street<br>Some town<br>A County AB1 CD2 | 59 Upper Lane<br>Some town<br>A County AB1 CD2 | Solicitor                    | xxxxxxx | xxxxxxx | xxxxxxx |
| Member 5 | 1 High Street<br>Some town<br>A County AB1 CD2 | 59 Upper Lane<br>Some town<br>A County AB1 CD2 |                              | xxxxxxx | xxxxxxx | xxxxxxx |
| Member 6 | 1 High Street<br>Some town<br>A County AB1 CD2 | 59 Upper Lane<br>Some town<br>A County AB1 CD2 |                              | xxxxxxx | xxxxxxx | xxxxxxx |

E.6 Schedule of associated documents to be read with this plan

| Type                            | Title   | Plan                          |          | Latest Revision |          |                       | Remarks |
|---------------------------------|---|-------------------------------|----------|-----------------|----------|-----------------------|---------|
|                                 |   | Originator                    | Owned by | Rev No          | Date     | Custodian/ Contact    |         |
| Undertaker's internal procedure | Health and Safety plan for reservoir surveillance | Girlain Angling Society (GAS) | GAS      | 05              | Jan 2003 | GAS Reservoir Manager |         |

ATTACHMENT F : MAINTENANCE LOG

F.1 Exercising since On-site plan issued

| Details of entry |      | Details of exercise |                                |                 | Details of debriefing/ lessons learnt |                 |                    | Actions taken/ remarks |
|------------------|------|---------------------|--------------------------------|-----------------|---------------------------------------|-----------------|--------------------|------------------------|
| Date             | Name | Date                | Level (as Table 4.14 of Guide) | Lead individual | Date                                  | Lead individual | Location of report |                        |
|                  |      |                     |                                |                 |                                       |                 |                    |                        |
|                  |      |                     |                                |                 |                                       |                 |                    |                        |
|                  |      |                     |                                |                 |                                       |                 |                    |                        |
|                  |      |                     |                                |                 |                                       |                 |                    |                        |

F.2 Contact verification and callout simulation

| Details of entry |      | Details of verification |      |      |                 | Result of call | Any Actions taken/ remarks |
|------------------|------|-------------------------|------|------|-----------------|----------------|----------------------------|
| Date             | Name | Date                    | Time | Type | Lead individual |                |                            |
|                  |      |                         |      |      |                 |                |                            |
|                  |      |                         |      |      |                 |                |                            |
|                  |      |                         |      |      |                 |                |                            |
|                  |      |                         |      |      |                 |                |                            |