

Ref 5.8B.3

# Dam Safety & Reservoirs – Cost Modelling

September 2018

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### Cost estimate build-up across the various workstreams

#### **S10 and S12 Inspections (£3.8m);**

The costs of these inspections is well understood and are based on historic costs. This is the cost for completing the statutory inspection reports across all our registered assets.

A Section 12 report is required annually for all our registered sites as well as having access to an appointed Supervising Engineer at all times. £3k / annum per site has been allowed for within the cost estimates.

A Section 10 inspection is more extensive and is required once every 10 years. Our cost build-up is based on a £10k allowance for each inspection.

#### **PCM Imp Res Base Maintenance (£3.7m);**

This is the planned investment for capital maintenance works at our large reservoir sites to address smaller items of work. Typically these small scale activities, are identified as part of the S10 /S12 report, such as;

- Patch repairs to stone and masonry spillways where stone will have come loose
- Re-new pointing (mortar infill) of masonry spillways and walls to reduce chance of stones coming loose
- Improved access to sites with localised works, a recent example was replacement of an old mine workings bridge with a weight approved structure to allow maintenance access
- Improved access on sites with the provision or replacement of access steps and handrailing to the reservoir avoiding the need to walk down a grassed slope
- In-situ repairs to leaking valves rather than replacement or wholesale refurbishment
- CCTV inspections of existing drainage pipework
- Provision of H&S signage

The average expenditure across a site is expected to be £1.25m, based on a review of historical spend at a site in response to a typical S10 inspection. We have assumed that works will be required at 50% of the sites where a Section 10 inspection will be carried that, excluding those sites where Enhanced Maintenance activities will be completed.

**RCM General Maintenance (£2.3m);** This allowance covers grounds maintenance (£1.25m, based on costs included within our grounds maintenance procurement agreement), and £1.15m for minor works across our sites which have a low risk of failure (assume £50k spend at a site covering elements such as, access track and path repairs, vegetation removal and installations such as new debris barriers or gabions to minimise bank side erosion).

**Regulation of river flows (Section 20 Water Resources Act) Base Maintenance (£10m);** This is the planned investment at specific sites where we have a responsibility to ensure that prescribed flows are maintained in the downstream watercourse. The expenditure is identified, and in accordance with, the Operating Agreements we have with NRW to manage the flow of water within the rivers to maintain the overall river ecosystem. The cost is well defined and understood. It is aligned with the maximum commitments of £2m/yr set out in the Operating Agreements.

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**PCM SRV Enhanced Maintenance Works (£2.3m);** This is the planned investment to address the outcome of service reservoir sites having had Section 10 inspections completed for the first time in AMP6. Activities we anticipate being delivered during the AMP include;

- various investigations as directed by the S10 reports
- arboricultural management
- drainage studies, and necessary improvements

### **PCM SRV Base Maintenance (£0.5m);**

This is the planned investment for capital maintenance works at our SRV sites to address issues where a Section 10 inspection is planned. These are expected to be small scale elements of work across the wider asset base.

### **PCM Imp Res Enhanced Maintenance**

This is the planned investment to address the outcome of the AMP6 investigations where we have uncovered the need, or where we forecast, based on available information, the need for significant capital investment. These items constitute major elements of construction works in excess of £4m at each site, where investment is needed as a result of changes in guidance or accelerated baseline investment.

- new / upgraded spillways where hydraulic studies identify larger design flood flows or the structural integrity of the existing structure is beyond repair. During AMP6 works of a comparable scope have cost over £3m at three sites (Usk, Rhymney, Ystradfellte). We have allowed a unit cost of £3.7m for each site.
- spillway refurbishment works are required to ensure the structural integrity of the existing structure is retained. We have allowed a unit cost of £1.6m for each site.
- upgrade valves and pipework to comply with new guidance. Works to the end of AMP6 Year 3 at Caban Coch cost £3m, with further work needed. Typically additional investment is needed to provide access to the working area where the pipework needs to be replaced, which affects the outturn costs. We have allowed a unit cost of £0.8m for sites where pipework needs upgrading and £0.3m for valve upgrades.
- replace / renew existing valves and pipework due to their risk of failure / inoperable condition. As above, additional works will be needed to provide improved access to the working area to facilitate future maintenance. We have estimated a typical cost of £0.5m for this activity.
- replace / renew existing and improve access routes into access towers to allow safer inspection and maintenance or renewal of related valves and pipework. We have estimated a typical cost of £0.5m for this activity.
- improve structural stability of the dam structure or to address observed leakage through the structure that without intervention affect will affect the stability of the structure. The extent and type of stability works needed will vary from import of additional stone and earth, to specialist grouting systems. At this stage, a cost allowance of between £0.5-1.0m has been applied with a high level of uncertainty.
- Reservoir dis-continuance under the Reservoirs Act 1975 is a major civil engineering project, requiring the need to make the site safe and ensuring it is not capable of retaining water. Historic costs for this activity have been around £3m per site. There is a medium level of uncertainty around the costs until the reservoir has been drawn down sufficiently to allow the stability of overall structure to be fully assessed and the planned works to modify them can be carried out.

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- Surveys and investigations will assist to inform the need and scope to carry out works. The scale and extent of these can vary, however in this instance we infer these to be desktop levels of investigation costing circa £25-50k each. It is likely we will undertake such investigations in an incremental manner to provide the opportunity to review and assess the obtained information prior to progressing to the next stage.