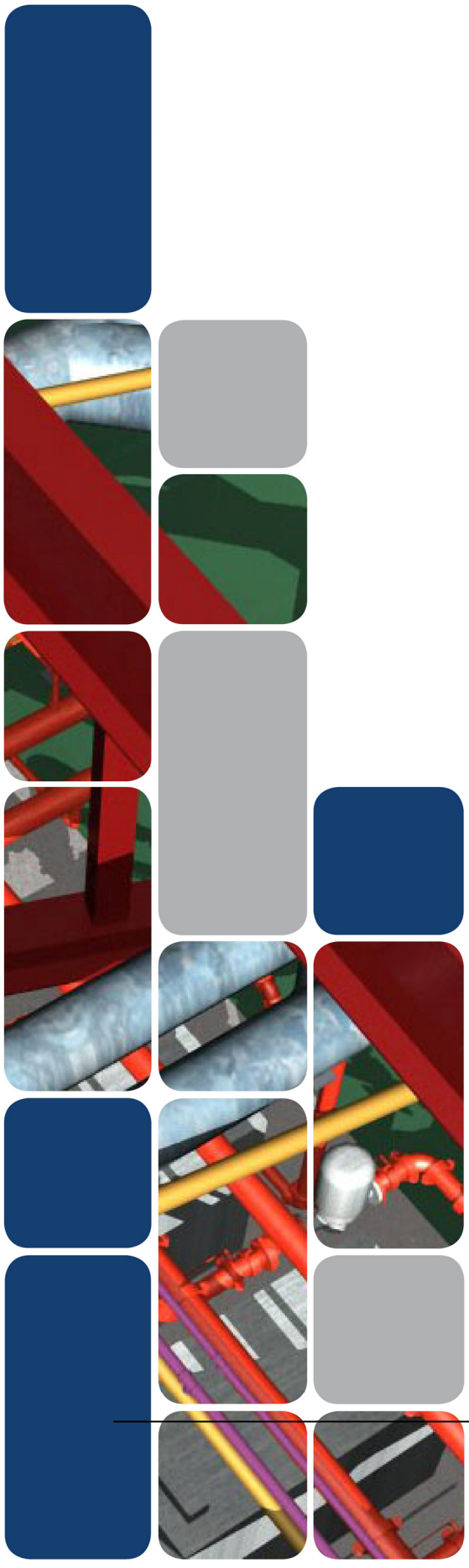

Cleveland Pools Restoration

Bath

Natural Water Treatment Specification

Report for

Cleveland Pools Trust

October 2015

23/10/2015 T01

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1. PURPOSE OF DOCUMENT

This document provides outline design information for the pool water treatment system. It shall be used as a scope of works to appoint a pool water treatment specialist contractor to design, supply, install and commission the full pool water treatment system.

The pool treatment specialist will be appointed as a sub-contractor to the Principal Contractor, and shall be referred to within this scope as the 'Treatment Contractor'.

The Treatment Contractor shall be responsible for co-ordination of the pool water treatment systems with the architectural and building services design, including co-ordination of builders work and plant space requirements.

The scope of works is indicative of the type and extent of the actual work the Treatment Contractor is required to undertake. The specification and drawings do not relinquish the Treatment Contractor from undertaking any works required for statutory or regulatory requirements or works that any competent Treatment Contractor, familiar with works of this type could reasonably anticipate. The Treatment Contractor shall have no entitlement to claim for additional cost or time as a result of anything he, or his specialist supply chain, could have reasonably anticipated was necessary to install, coordinate, test, set to work, operate, and maintain the services. The finished works shall be fit for their intended purpose.

2. BACKGROUND

The Cleveland Pools Trust Ltd have received a funding award from HLF to develop the exciting project of re-opening the existing outdoor Georgian bathing Pool in Bath, which was originally built in 1815. The site is listed grade II* and is part of the Bath World Heritage Site. The site was last used for swimming in the mid 1980's and is thought to be the oldest purpose designed Lido in the UK, possibly Europe. The project has evolved from the efforts of a committed local group who have fought to bring the site back into use as a naturally water treated open air swimming facility to serve the local community, adding a new dimension to Baths tourist offer away from the core of the City.

3. SUMMARY

Four options are required for consideration. These are;

Option 1a	1 Main Pool at 535m^2 pool surface area – maximum of 300 bathers per day
Option 1b	1 Main Pool at 535m^2 pool surface area – maximum of 600 bathers per day
Option 2a	1 Main Pool at 435m^2 and 1 Learner Pool at 100m^2 – Maximum of 300 bathers (Main Pool) and 70 bathers (Learner Pool)
Option 2b	1 Main Pool at 435m^2 and 1 Learner Pool at 100m^2 – Maximum of 600 bathers (Main Pool) and 75 bathers (Learner Pool)

Option 1 (a&b);

The existing main pool as existing will be treated as 1No. volume of water and treated accordingly with a dedicated pool water filtration and circulation system. This area is shown as both coloured blocks on the site plan in Appendix A.

Option 2 (a&b);

The existing pool shell shall be divided into 2 pools. These will be known as the Main Pool, and the Learner Pool as shown in Appendix A.

Each pool will be provided with independent pool water filtration and circulation systems.

Both Options;

The pool water primary treatment method is to be via natural biological filtration. Optional secondary means of disinfection could be provided e.g. via ultraviolet (UV) filters, employed in situations deemed as high risk of cross-infection.

Mechanical filtration should also be provided for the heating system, within an independent circulatory system. Mechanical filters should employ air scour blowers to reduce water consumption during backwashing. This system also consists of duty/standby circulation pumps and plate heat exchangers fed off the constant temperature heating system with a bypass.

The main pool filtration system would comprise standalone filtration vessels. Planted 'regeneration' areas should be minimised or excluded from the system where possible.

The learner pool system would be similar but have the ability to be cross connected with the main pool system in the event of its filter vessel being out of service.

The circulation plant will be selected with a pool water turnover time of 6-12 hours for the main pool, similar for the learner pool.

Heat recovery from the backwash water will be provided in the form of a water to water heat recovery device. This device would be a tubular heat exchanger which recovers the heat energy from the pool filter backwash water and pre-heats the raw mains water make up. The system also includes the pump to discharge the waste water to the sewer at a controlled rate. Waste shower water will also discharge into this tank to maximise waste heat recovery.

4. DESIGN REQUIREMENTS

4.1. Treatment Options

The objectives of the pool water treatment systems are to ensure that the water is:

- Clear in appearance and free of algae
- Safe and hygienic for bathers
- Free of odour
- Chemical-free fresh water

Treatment shall consist of:

- Biological decomposition of dissolved organic matter
- Removal of dissolved inorganic and organic phosphorus and nitrogen
- Mechanical filtration of particulate matter
- pH control

4.2. Applicable Legislation, Guidance and External References

The building engineering services installations shall, as far as is practicable, be designed to meet the requirements and recommendations outlined in the following briefing documentation, standards and legislation current at the time of contract.

- Building Regulations and Approved Documents
- CIBSE Design Guides and Technical Memorandum
- IEE Regulations (BS7671) 17th Edition
- COSHH Regulations
- EN's, ISO's and British Standards

- Water Regulations
- Gas Safe Regulations
- F Gas regulations
- HSE Guidance
- PWTAG Guidance

External/3rd Party References

- Architectural Design Documentation
- Structural Design Documentation
- Civil Design Documentation
- Mechanical and Electrical Services Design

4.3. Programme

The latest project programme is included within the appendices. Refer to the Main Contract documentation for details relating to the programme and limitations as to the hours/periods of working.

4.4. Maintenance

The Treatment Contractor shall include within his tender and separately identify costs for 12 months planned preventative maintenance (including consumables) for all installations provided under this contract.

All new engineering services and associated equipment shall be arranged to facilitate easy and safe operation and maintenance clearances shall be provided in accordance with manufacturer's recommendations and industry good practice guidance. Systems shall be designed so that any component that may become faulty can be removed for repair or replacement without the need for dismantling or removal of unrelated components.

Electrical supply systems shall be designed so that individual items of equipment can be isolated and maintained without switching off other unrelated systems, or switching off major parts or all of the systems of which the equipment forms part.

The Treatment Contractor shall consider all the criteria for clear access into the site location, manoeuvring, weight constraints and other key aspects of the safe use of such equipment in the building having sufficient reach to gain access to all areas of the building.

Control systems shall be designed and installed such that failure of a single central component such as a transformer or control circuit fuse does not cause failure of entire systems or major parts thereof.

4.5. Design of Maintenance Access

The Treatment Contractor shall be responsible for the co-ordination of design, location and provision of access hatches as indicated by manufacturer's recommendations and necessary to facilitate commissioning, planned preventative maintenance and repair of mechanical and electrical services and planned preventative maintenance, repair or replacement of items of mechanical and electrical plant.

4.6. Design Life

The design life of engineering services systems shall be as defined in BS 7543 and as follows below:

The start of the life cycle shall be assumed to be the date of Practical Completion of the Contract.

Static component parts of new pipework systems conveying fluids shall be suitable for use without replacement during the required services life of the systems (assumed to be 50 years for the purpose of this section). Moving parts of such systems shall be suitable for a service life of not less than 15 years before their replacement is necessary.

Static components or assemblies of components of all new systems shall be suitable for a service life of not less than 20 years before their replacement is necessary. Moving parts of such plant shall be suitable for a service life of not less than 15 years before their replacement is necessary.

Component parts of pipework system, electrical switchboards and switchgear, electrical control panels, fire alarm systems, cabling and cabling containment systems shall be suitable for a service life of not less than 25 years before their replacement is necessary.

Luminaires and component parts thereof (excluding lamps) shall be suitable for a service life of not less than 15 years, before their replacement is necessary.

Adequate protection shall be provided against corrosion to all components that may be subject to the external air and such components shall be designed to require no maintenance against corrosion for the first five years after Practical Completion.

4.7. Future Provision for Expansion and Adaptability

The Treatment Contractor shall allow for spare capacity of 25% on all distribution boards, cable containment and BMS outstations for future alterations/expansions.

5. DESIGN INTENT

5.1. Bathing Load

The pool water system shall be designed on the following maximum bathing load:

Main Pool: 1 bather/6m^2 of water area

Learner Pool: 1 bather/6m^2 of water area

5.2. Filtration

Vertical type pressure filters based upon the following design criteria shall be provided:

	Option 1a	**Option 1b**	**Option 2a**		**Option 2b**	
	Main Pool	Main Pool	Main Pool	Learner Pool	Main Pool	Learner Pool
Water area (m^2)	535m^2	535m^2	435m^2	100m^2	435m^2	100m^2
Max number of bathers	300 per day	600 per day	300 per day	70 per day	600 per day	75 per day
Water volume (m^3)	800m^3	800m^3	650m^3	80m^3	650m^3	80m^3
Turnover rate (hrs)	6-12	6-12	6-12	6-12	6-12	6-12

A manual backwash arrangement shall be employed for all filter vessels using a 4-valve arrangement for easy operation.

5.3. Water Circulation

Each pool shall be provided with its own distribution system comprising filtered water via floor inlets, bottom outlet water sumps and surface water extraction via a skimmer system.

Water extraction into the primary filtration circuit should be via wall outlets or skimmers with strainers to prevent large debris being drawn into the biological filters.

The water flow rate through the system shall be monitored and regulated using flow meters. The flow rate to each inlet shall be adjustable. UPVC pipelines shall distribute the filtered water running around the pool.

5.4. Water Temperatures

The pool water treatment will need to work under a range of temperatures throughout the year. The current preference for the pools to be unheated during the winter, and heated to 22°C during the summer. However, there is a possibility these temperatures will require increasing and therefore, the pool water treatment must be possible under the following conditions.

Main Pool	**Pool Temperature Range**	**Main Pool Typical Temperature**	**Learner Pool Typical Temperature**
Winter Condition	Unheated to 22°C (adjustable)	Ambient External	As Main Pool Temperature
Summer Condition	Unheated to 28°C (adjustable)	22°C.	Approximately 0.5°C-2.0°C above Main Pool temperature

5.5. Water Treatment

Biological treatment should provide for the following:

- Aerobic and stable filter biology
- High dissolved oxygen levels maintained at all times
- No anaerobic zones within the system
- The pH level shall be maintained between 7.5 and 8.4
- Continuous and effective nutrient control as below:
- Nitrogen as Ammonia within the pool water should be maintained at zero at all times.
- Nitrogen as Nitrite within the pool water should be maintained at zero at all times.
- Nitrogen as Nitrate within the pool water should be maintained below 25mg/l.
- Phosphorous as Orthophosphate should be maintained at or below 10ug/l.

5.6. Water Circulating Pumps

Pumps sufficient to provide 3 x 100% duty shall be employed on the main pool water treatment plant.

Pumps sufficient to provide 1 x 100% duty shall be employed on the learner pool water treatment plant.

Two half-duty pumps shall be employed on the main pool water heating circuit.

Pump heads shall be determined by the Treatment Contractor.

5.7. Heat Exchangers

Plate heat exchangers shall be provided as follows:

Description	Main Pool (Option 1)	Main Pool (Option 2)	Learner Pool (Option 2)
Quantity	1	1	1
Plant flow (m^3/hr)	200	164	164
Pool volume (m^3)	800	650	80
Heat loss (°C/hr)	0.5	0.5	0.5
Primary heating medium	70/40	70/40°C	70/40°C

5.8. Pool Water Inlets

Pool water inlets shall determined by the Treatment Contractor.

5.9. Pool Water Outlets

Pool water outlets shall determined by the Treatment Contractor.

5.10. Automatic Controls

One control panel to provide full control of the filtration and water treatment systems incorporating all necessary fail safe requirements.

5.11. Control Requirements

One control panel shall be provided for full control of the filtration and water treatment systems incorporating all necessary failsafe requirements and in accordance with BS 7671.

The panel shall be suitable for floor mounting and shall be a Type 1 and provide protection to IP54 minimum.

The panel finish shall be stove enamel blue to BS 18-E-53.

The electric supplies shall approach the panel from the top.

The control panel shall incorporate all necessary interlinking between the chemical dosing system and main circulating pumps to ensure that should a plant failure occur, fail safe conditions shall be achieved.

On the face of the panel shall be:

(a) A pool water temperature indicator (Main Pool, Learners Pool).

(b) Continuous flow metering for all biofilter circuits

(c) All necessary switches, run and trip lights and labels.

When a fault occurs it shall initiate a visual or other alarm on the face of the panel. As a minimum, fault indication is required for the following:

- Pumps trip
- Flow rates outside normal parameters (to be determined by Treatment Contractor)
- Balance tanks low/high

A remote alarm indication (red light) shall be located within the reception area desk to alert staff in the event of an alarm.

Volt free contacts shall be provided for the above alarms for integration with the BMS system.

5.12. Chemical Analysis of Fill Water

The incoming water supply is still to be determined.

In order to provide a price for the Trust, please assume water will be supplied by Wessex Water for this project. The Treatment Contractor shall obtain an up to date water analysis from the Water Supply Company to determine the suitability of the supply water for a natural swimming pool and to determine any inline water treatment required for fill water.

6. ADDITIONAL DUTIES

6.1. Testing/Commissioning

The project requirements shall include testing, setting to work, commissioning and witnessing in accordance with the BSRIA Commissioning Guides, CIBSE and BS7671 requirements.

In addition to the testing/setting to work/commissioning works detailed elsewhere within this specification the Treatment Contractor shall measure and record (for inclusion within the O&M manuals) sound pressure levels generated by mechanical and electrical plant and equipment (at agreed internal/external locations) to ensure that these comply fully with the Acoustic Requirements.

The Treatment Contractor shall ensure that the installation and testing/setting to work/commissioning of all systems including the controls is completed at least two weeks prior to handover. This final two weeks shall be treated as a proving period when the systems shall be left to run with controls system trend logging a sample number of parameters and providing a printout record based on a two day period (to be agreed with the employer/contract administrator) and to be kept to demonstrate that the system has been set up correctly. The Treatment Contractor shall adjust the parameters should the system operation be found not to be acceptable.

A power failure test shall be completed after all systems have been commissioned and signed off by the Contract administrator but before the proving period. The Treatment Contractor shall provide a detailed proposal for the failure test as part of the commissioning method statements for the works. The purpose of the failure test will be to testing the operation of all systems under system failures occur. Examples of scenarios to be tested are:

- Fail the main incoming power supplies and make sure all systems react in accordance with the design,
- Set off the fire alarm system when the power has failed,
- Set off security system when the power has failed.

All electrical and mechanical systems that have programmable controls of any nature shall be fully open protocol. The Treatment Contractor shall provide all set-up/maintenance manufacturer/user details and passwords that has been used set up or configure the systems.

6.2. Builder's Work

The demarcation of responsibilities for builders work in connection with the engineering services shall be separate to this contract.

6.3. Requirements Just Prior to/at Hand-Over

Not more than 24 hours before hand-over the Treatment Contractor shall test / demonstrate water quality, this to include pH level, iron content, conductivity, and levels of inhibitor / biocide / glycol, in the LTHW circuits and provide certification as appropriate. Should the levels not meet recommended guidelines then the systems shall be dosed as appropriate and further testing and certification provided to demonstrate the revised results are satisfactory.

The Treatment Contractor shall ensure that the installation and testing / commissioning of all systems including the controls is completed at least one week prior to handover. The specialist shall adjust the parameters should the system operation be found not to be acceptable.

The Treatment Contractor shall provide to the Employer 3 No. sets of all equipment keys, consumables / spares & special tools, including control panel keys and AHU access door keys, at handover.

The Treatment Contractor shall provide 2 No. sets of spare filters for all systems in addition to those supplied with plant. The first is to be installed after commissioning and all cleaning, and second supplied to the Employer carefully packed for use after handover and clearly labelled.

7. INSTRUCTIONS TO TENDERERS

Tenderers are required to submit the following information:

Technical submittal detailing;

- Indicative space requirement for treatment plant (All Options),
- Spare requirement for storage of sundries (All Options),
- Procedure in the event of the pool flooding,
- Procedure in the event of the plant room flooding,
- Typical maintenance regime, including consumable replacement, and life expectancy of all plant.
- A risk assessment for a typical design.

Evidence of experience in working on similar projects. Please note we will be assessing this on the following criteria:

- Experience in designing and installing Natural Water Treatment installations in a traditional pool shell.
- Experience in designing and installing Natural Water Treatment installations for public use.
- Experience in designing and installing Natural Water Treatment installations within a historic setting.
- Heritage Lottery Funded Projects. Ideally you will have experience in working on three or more HLF funded projects.
- Experience of public consultation/community engagement

Details of the proposed team the consultant has offered. We will be looking for CVs detailing each consultant's experience and qualifications.

The Trust's preference is to use the services of a Treatment Contractor who has a local office in the South West Region. Please confirm the location from which the services will be provided along with an organisation structure chart for that location, showing links to any other offices and establishing how this office will support and interact with the Trust. Please demonstrate how the location and structure chart will:

- Demonstrate value for money
- Limit travelling costs and time (please note these costs must be included within the fee proposal)
- Provide details of the timescales for availability of staff when needed to attend ad-hoc/unplanned meetings when or in the event that urgent matters arise.

Your fee proposal, including the following:

- A costed schedule detailing the following;

Activity/Period	Delivery Date	Option 1a	Option 1b	Option 2a	Option 2b
Design					
Concept Design to RIBA Stage 2	End Feb 2016	£	£	£	£
Developed Design to RIBA Stage 3	Mid-Jun 2016	£	£	£	£
Technical Design to RIBA Stage 4	Mar 2017	£	£	£	£
Construction					
Full installation in coordination with main contractor	Mar – Nov 2017	£	£	£	£
Set up and commissioning	Nov 2017	£	£	£	£

12 months maintenance	Nov 2017-Nov 2018	£	£	£	£
Operation					
Ongoing maintenance service including sundries.	Annual Cost	£	£	£	£

8. APPENDIX A – PROJECT PROGRAMME

9. APPENDIX B – SITE LAYOUT

10. APPENDIX C – WESSEX WATER MAP