Holland I submarine:

Brief for undertaking specification and installation of air handling system to controlled gallery

1. Introduction

Commissioned in 1901, Holland 1 is the first submarine of the Royal Navy. After the boat's accidental sinking in 1913 the vessel was raised in the early 1980s. Under the care of the Royal Navy Submarine Museum (RNSM) the submarine underwent an award-winning conservation program which saw it submerged in a tank of sodium carbonate to extract the salts causing uncontrollable corrosion to her fabric. On removal from the tank after four years Holland 1's surfaces were waxed and then the vessel placed in an environmentally controlled Gallery with access for visitors inside the submarine itself. The air handling plant is housed in an annex to this room, and at the opposite end of the building is a small gallery area describing the Holland story; the flow of visitors is directed into the submarine room is isolated from any exterior doors to the building.

On assessing the performance of the environmental control in the submarine room, the National Museum of the Royal Navy has identified the need to improve the current air handling system. The original system has declined in efficiency and is now potentially detrimental to the preservation of the historic submarine, which is heavily dependent on maintaining the correct environmental conditions. Conservation of ferrous marine metals demands that a low relative humidity be maintained at a constant level, without fluctuations that can be very damaging to the historic fabric. Artificial control to introduce stable conditions is necessary both for the long-term preservation of the vessel and also the comfort and enjoyment of visitors and staff.

2. The Brief

2.1 This brief sets out the requirements for artificial environment within the submarine gallery itself. The current environment is reliant on a bespoke air-handling system to the gallery. It includes an intelligent Building Management System that is not functioning, dehumidification and heating within the controlled room. The system suffers from there being no alarm to alert staff to a trip, breakdown or other malfunction.

Contractors are therefore invited to present:

- Specification for an air-handling system that will offer stable artificial environment within the submarine room
- Itemised costs for supply and installation
- Specification of the life expectancy of the system
- Recommended maintenance schedule for plant going forward, with associated operating and through-life costs

2.2 Further to the installation of the air handling system, NMRN wish to address the issue of solar gain within the gallery. A large glass wall makes up one side of the gallery. Solar gain during sunny periods attributes to its high temperatures and low humidity, creating an unsuitable environment for both visitor and Holland 1. As part of this tender process, the NMRN require the contractor to provide;

- Proposals for the design of a system which reduces this solar glare; for example through blinds and/or screen foils and/or UV film etc.
- The cost of supply and installation of this system within the gallery, if the contractor can install the system.

3. Specific considerations

The following should be taken as the targeted conditions that the system should deliver within the Holland 1 gallery:

- Target annual temperature range should be 18-22°C
- Target annual relative humidity range should be 25-35%
- Fluctuations in humidity should not exceed 5% per day
- The system should not be designed to run at capacity, instead the specification should allow a margin of ~30% above expected requirements

Contractors must demonstrate an understanding of the need to provide a system that will allow the delivery of stable environmental conditions within the submarine gallery, while making best use of existing plant and layout. The following factors should be considered:

- The system should have an interface that is easily readable and will alert staff to any malfunction promptly
- Plant will be housed in the existing space annexed to the submarine gallery, though positioning of vents etc may be altered under advisement
- Contractors should assess existing equipment and should take advantage of any equipment which may be salvaged or re-used
- There is an existing under-floor heating system which is still operational
- System must be robust enough to run 24/7 all year round
- A back-up process should be in place with automatic alarm and start-up in the event of failure of the main plant or power-cut.

4. Information in support

The NMRN has the following information to provide to the contractor to allow informed decisions to be made in providing an appropriate specification:

- Environmental data comprising temperature and relative humidity records for one calendar year
- Visitor numbers recorded in the submarine gallery over the last year
- Plans of the submarine gallery and annex buildings, and elevations of the same

Our Requirements

The contractors should have an in-depth understanding of and experience in the installation, use and maintenance of appropriate air handling equipment for public spaces; experience of the same in museum/heritage situations would be preferable but not essential.

The contractors should familiarise themselves with the building and be fully aware of the typical conditions on board (and therefore the expected output of the system), to ensure that the system installed is reliable and efficient while remaining economic.

The contractor is required to exercise awareness and appropriate practise within both a public and historic environment. Any working methods used should not pose a risk to the public or the historic setting. Any material intervention during works on the historic vessel must be notified to the National Museum of the Royal Navy and receive written consent. For example, works that may raise dust in the submarine gallery should be planned in a way which minimises risk to the protective waxes coating the submarine.

5. What we want in response to this brief

The contractor should provide a project design in response to this brief.

The project design should set out how the air handling system will be designed to fit the space, what (if any) equipment can be salvaged from the current layout, propose the method of installation with size of team required, how the consultant will comply with H&S legislation, and any matters not covered by the brief.

The project design should include:

- Names and CVs of proposed team members and their specific responsibilities, and any arrangements for subcontracting parts of the work
- A timetable for the project, including milestones and dates, which takes account of the time needed from consultations
- The extent of professional insurance or indemnity cover.
- A breakdown of chargeable hourly rates (for all individuals) for installation works, including any travel and accommodation costs, subsistence, rental of equipment
- Chargeable hourly rates for future maintenance/service, including any travel costs and response times for future care of the system, to include the next five years

Consultations are available for contractors and a site visit will be necessary in order to complete the project design. Please send your request via email to hst.procurement@nmrn.org.uk.

6. Submitting the Project Design & Quote

Please send the project design in a Microsoft Word or Pdf format to hst.procurement@nmrn.org.uk. Tenders should be submitted no later than 5pm on April 10th, 2017.

Successful contractors will be selected on the basis of:

- Understanding of the brief
- Quality of method statement and approach
- Value for money.