USER REQUIREMENT

SPECIFICATION

Project / contract information

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Author	Donna Willis & Pat Salbany

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Approval by

	Name	Signature	Job Title	Date
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1. General

1.1 Introduction

The current heating and hot water systems in the lock house is served by an LPG boiler with electric immersion for hot water back up. This is not an efficient system. Access to the house is via a footpath, bridge and across the lock gates and delivery is not easy, in addition the cost of LPG is expensive.

Because of the inefficiencies, high cost of heating and difficulty getting the fuel across the lock, the lockkeepers often rely on wood burners, which is also not a sustainable fuel.

The LPG system is to be completely replaced with an energy efficient “Green Energy” solution and this site has been identified as being a suitable for a water source heat pump.

1.2 Current installations

Heating – LPG boiler - Worcester 21i System – the boiler is located in the First-Floor room off landing with the hot water cylinder in a cupboard in the front bedroom.

There are wood burners located in the living room and kitchen – the one in the kitchen is used the most to reduce the cost of using the LPG heating system down.

The recent heat loss report shows high costs for heating and hot water running costs mainly due to the high price of LPG.

The property has an electric shower in addition to the existing heating system – advice should be provided as to how best make use of this in the future as part of this heat pump design or as a separate future project.

1.3 Location and access

Front elevation overlooking lock

Rear elevation with single story utility room (overlooking river with access across garden)

The lock house is located on an island site in between the lock and the weir stream (river). Access to the house is via Mill Lane a narrow road off the main A4155 through Shiplake, parking is available along Mill Lane adjacent to the hedge. Pedestrian access only is then available along a section of foot path over a timber bridge, across the lock gates and onto the island. This makes current delivery of the bottled gas difficult.

Location of Shiplake Lock House

Please see the appendices for Heat Loss Survey, Floor plans, Site plan, Services plan, Access Plan and Pre-Construction Information with Asbestos Survey and EA SHEWCoP and MEICA Specifications.

1.4 Plant & site accessibility

The site is accessed off the A4155 via Mill Lane - parking is available to the side adjacent the hedge (this gets busy in the summer months with people accessing the river and the camp site on the island)

Access to the island site is by foot and all materials would have to be taken this route unless barge access is arranged at the contractors expense and coordination from the river and approved by the EA Waterways team and Lock Keeper.

This will need to be taken into consideration when planning any machinery and deliveries.

2. Requirements

2.1 Contractor Requirements

The appointed mechanical and electrical/heating engineering contractor shall design and install the water source heat pump system and ensure that the heat emitters are sufficiently upgraded to suite.

The appointed contractor will need to provide design drawings for approval by the EA and to apply for a Flood Risk Activity Permit (FRAP) prior to any works starting on site (this can take up to 3 months so early design drawings would be required (preferably in September 2023)

The design and installation engineering contractor shall undertake a site survey, design, provide drawings, install new system, test, commission and cover the works with insurance.

- **The contractor must be MCS certified** (Microgeneration Certification Scheme), as they will need to apply for the Boiler Upgrade Scheme (renamed from the Clean Heat Grant) on behalf of the Environment Agency. The contractor must obtain the necessary EPC for the property. External wall insulation is not possible due to the possible risk of flooding – the property is located within a high flood risk area.
- The contractor must comply with the CDM 2015 (Construction, Design & Management) Regulations with the Environment Agency additional requirements for this and the EA SHEW CoP (Safety, Health, Environment & Wellbeing Code of Practice.)
- The contractor must be member of the **Relevant Competent person Scheme** and ensure that the scheme complies with and that the contractor obtains Building Regulation approval for the scheme
- The contractor must obtain an Electrical Safety Agreement (ESA) prior to being able to undertake any electrical works on any Environment Agency Site or make use of the Environment Agency Electrical Framework Contractor to undertake and sign off the electrical works associated with the installation.
  (Prior to application for ESA the contractor will need to have the Construction Phase Plan and RAMS signed off by the EA Principal Designer)
- **As a minimum requirement the contractor must have suitably qualified Site Supervisors with the relevant SSSTS accreditation and Site Managers with SMSTS (or equivalent) qualifications.**
- The contractor must design the scheme and provide all necessary details of trenching and work to the river-bank including providing drawings and information on the size and location of pipework, manifolds and heat exchange units that will be located in the ground and river and where required obtain the necessary **Planning Permission** from the local authority and the necessary **Flood Risk Activity Permit** from the Environment Agency as early as possible following agreement of design and on site investigations for the Water Source Heat Pumps. Designs will need to be submitted to the EA Residential Team for approval during September 2023.

2.2 Decommissioning of old system

Strip out the old system (including boiler, flues, pipework, LPG tanks, supply pipes, redundant electrical supply, and controls), ensuring no contamination of surrounding ground or water.

All redundant equipment is to be removed from site and waste transfer notice provided.

Recycling of materials is reommended.

2.3 Heat Source Pump Requirements

The Water Source Heat Pump solution is considered the shortest payback time and suitable for this site this is a lower carbon system and comparably less expensive to run than the existing LPG gas boiler.

Water/air source heat pumps will be eligible for the Boiler Upgrade Scheme, which started in April 2022 and is running for three years. The grant is an upfront payment towards the cost of installation. Eligible properties can get £5,000 off the cost of installation of an air source heat pump – the contractor is to make the application for this scheme.

- The pump system and hot water tank should be of a standard that it has a minimum expected lifespan of 15 years.
- The system should have a warranty of 5 years.
- The hot water tank will need to be able to heat the water to 60 °C once a week, to reduce the risk of legionella.
- A+++ heating efficiency.
- A+ hot water efficiency.
- Closed, pressurised system.
- If the refrigerant selected contains F gas, this shall not exceed the equivalent of 5 tonnes or more of carbon dioxide.
- New radiators in each room, sized appropriately for the lower temperature output of the heat pump system, and in line with the heat loss calculations for each individual room.
- The contractor is to ensure that the water pressure is high enough that the house has reasonable pressure even when boat-keepers are drawing water outside for their own use.
- The hot water tank needs to have a separate electric immersion, which has the capability of being connected to a solar photovoltaic system immersion diverter/optimiser. This will direct excess solar power to the hot water tank.
- Design drawings are to be submitted for approval before works take place. These should include the intended locations of the radiators and all the necessary design of the heat exchange unit including sizes and location and all the necessary trenching and works to the river bank and bed including sizes and location/positions
- All selected equipment shall be compliant with LIT 13220 MEICA Specification – Materials and Mechanical Installations.
- The systems need to be designed to run off a single-phase electricity supply and be compliant with LIT 13230 MEICA Specification – Electrical Installations
- Any external items/ components shall be fabricated from suitable materials and coatings for being located nearby to a fresh-water river environment in relation to painting and protection
- A new hot water tank is to be installed in a suitable location, the utility room adjacent to the rear door has been identified to house all the necessary equipment associated with the new installation
- The Water source system is to be a closed system heat exchange unit with the heat exchanger units positioned in a suitable area of non-navigable water as close to the house as possible avoiding

existing services and located, where possible, under existing jetties. Any amendments or additions to existing jetties must be included in the design drawings and the FRAP application and the tender sum. Shiplake Lock House has an existing metal decked jetty and steps down from the garden which is highlighted on the plans and is deemed suitable for locating the heat exchange units but may need some alterations or increases in size depending on the designs proposed

- The heat pump and any other water tanks or buffer vessels will need to be located within the existing property and locations agreed prior to installation – this is likely to be the existing ground floor utility room adjacent to the back door
- The refrigerant must be suitable for use in rivers and streams and not cause harm to fish or other aquatic life and environments if a leak should occur
- The hot water tank must have a separate electric immersion, which has the capability of being connected to a solar photovoltaic system immersion diverter/optimiser. This will direct excess solar power to the hot water tank. This could be via a Solar Eddi System or Immersion Diverter such as a Solar I-Boost or equivalent
- On-site investigation into existing services will be required prior to breaking ground – this includes CAT scanning and marking up the ground prior to hand digging to determine depth of localised services in the areas where trenching is to be carried out prior to the use of any mechanical excavating machinery

Design drawings are to be submitted for approval before works take place. These should include the intended locations of the radiators, water tanks, heat pumps, heat exchangers, manifolds, trenching, pressure vessels, control panels and all other installations associated with the heat pump and the heating system - to be agreed prior to installation.

This information must also be included in the O&M manual provided at the end of the project as part of the H&S File. It is essential that the Environment Agency holds and maintains an accurate set of documentation and drawings for all its systems and equipment and can locate the newly installed equipment in the future for maintenance and repair requirements and this information must be provided as detailed in '**LIT 13240 MEICA Specification – Documentation**' but relevant to this domestic installation i.e. simple plan format with the necessary operating instructions

Full commissioning and instruction on use must be provided to the lock keeper and EA project manager upon completion of the works.

A year of on hand assistance and free call outs must be provided during the first year after installation to ensure the installation runs correctly and residents and operators are supported so that they understand how the system works.

3. Legislation and standards

The project will need to comply with all Environment Agency MEICA, British and European standards, these should include but not be limited to the following:

3.1 Legislation

Directive on limitation of emissions of volatile organic compounds
Health and Safety at Work etc. Act 1974
The Workplace (Health, Safety and Welfare Regulations) 1992
The Health and Safety (Safety Signs and Signals) Regulations 1996

The Lifting Operations and Lifting Equipment Regulations 1998
The Provision and Use of Work Equipment Regulations 1998
The Ionising Radiations Regulations 1999 (IRR)
The Dangerous Substances and Explosive Atmospheres Regulations 2002
The Control of Substances Hazardous to Health Regulations 2002
The Control of Noise at Work Regulations 2005
The Work at Height Regulations 2005
The Environmental Noise (England) Regulations 2006
The Construction (Design and Management) Regulations 2015
The Electricity at Work Regulations 1989
The Supply of Machinery (Safety) Regulations 2008
Relevant British Standards

3.2 Environment Agency MEICA Standards

LIT 13219 MEICA Specification – General
LIT 13220 MEICA Specification – Materials and Mechanical Installations
LIT 13230 MEICA Specification – Electrical Installations

4. Appendices

Shiplake Map of Site
Shiplake Heat Loss Report
Shiplake Ground Floor Plan
Shiplake First Floor Plan
Shiplake Services Plan
Shiplake Pre-Construction Information (including SHEWCoP & Asbestos Survey)