Document

Condition Survey Report

Project

Merton Schools Maintenance

Building/Asset/Site

West Wimbledon Primary School

Client

Merton Council

Date

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1.0 INTRODUCTION

A site visit to the West Wimbledon Primary School was carried out on Friday 18/02/2022. The purpose of the visit was to investigate issues with the heating system and domestic water supply systems. The issues were reported to McBains by Merton Council and described as follows:

- Water discoloration within the domestic water system
- Dead legs on the heating and domestic water systems
- Faulty LTHW heating system: missing pipework, broken TMVs, loss of circulation in some areas.

This report describes the findings of McBains during the site visit relating to these heating issues and any recommended solutions. At the time of writing this report the completion date for the project works is the 01/09/2022.

The site plan in appendix A was provided by the site team and marked by McBains up to show the areas surveyed and any findings.

The domestic water schematic in appendix B was also provided by the site team McBains up to show the areas surveyed and any findings.

2.0 ABREVIATIONS

LTHW	Low temperature hot water
PHX	Plate heat exchanger
TRV	Thermostatic radiator valve
LSV	Lockshield valve
VRF	Variable refrigerant flow
DHW	Domestic hot water
DHW-R	Domestic hot water return
POU	Point of use water heater
TMV	Thermostatic mixing valve
WHB	Wash hand basin

3.0 LIMITATIONS AND EXCLUSIONS

The site survey was visual only and non-intrusive. Many of the pipework routes are concealed and could not be accessed.

4.0 DOMESTIC WATER ISSUES – LEFT SIDE OF MAIN ENTRANCE

The site survey confirmed **water discoloration in the following areas:**

- The kitchen (ground floor)
- The girls and boys toilets (ground floor)
- The old shower block, now consisting of a WC and WHB (ground floor)

These areas have been boxed in orange in appendix A for clarity. It is noted that these areas also suffer from slow hot water supply, **reportedly the hot water taps run cold for 2 to 3 minutes before hot water is dispensed.**

Another issue that was apparent whilst running the taps is that there is a lot of air in the system. The above areas are all fed from the same HW network and the two HW cylinders located in the plant room.

The hot water cylinders in the plant room are new, with a manufacture date of 2021. According to the site team the water discoloration issues pre-existed the installation of the new cylinders.

Based on the newly installed cylinders, the cause of water discoloration points towards old pipework, likely with internal rust. Also noted that at least some of the water network is in steel piping.

The slow hot water supply is likely caused by a combination of factors:

- The internal rust of the pipe network has increased the friction of the hot water pipework, meaning that the hot water return circulation pump can no longer provide the adequate flow.
- According to the site team the hot water piping routes are very long as they seem to go to the roof before dropping back down towards the kitchen; there is scope to make these more efficient and direct.

5.0 DOMESTIC WATER ISSUES – RIGHT SIDE OF MAIN ENTRACE

The hot water supplies to the outlets on the right side of the main entrance are part of a different network of pipes than on the left side. This can be seen in appendix B. There are no known issues with water discoloration on this side of the building. However, **the gas fired hot water cylinder next to the office is showing low temperature on the HW-R leg, circa 35°C, indicating a legionella risk.**

This HW cylinder supplies hot water to the following areas (also shown in appendix A):

- Wren classroom toilets (ground floor)
- Sparrow classroom toilets (ground floor)
- Wren classroom WHB (ground floor)
- Sparrow classroom WHB (ground floor)
- Staff toilets (1st floor)

The HW cylinder is 20 years old (manufactured in 2002) and is due for replacement.

6.0 HEATING SYSTEM

The heating system consists of Remeha gas fired condensing boilers feeding the heat emitters with LTHW. A full survey of the emitters was undertaken during the site visit, the location and type of emitters is shown on the mark-up provided in appendix A. **The LTHW system is generally arranged as a two-pipe flow and return system with the radiators are typically fitted with a LSV and TMV. However certain areas appear to be on an old single pipe system.**

The **main issue is a lack of LTHW flow in a total of 27no. radiators throughout the site**, these have been labelled with N/W (not working) in the mark-up. The reason behind this lack of flow needs to be investigated further, but is likely to be one or a combination of the following:

- Sediment/magnetite build up
- Broken TMVs or LSVs
- Issues with pipework connections between the single and two-pipe LTHW systems

It is also noted that some radiators labelled as N/W may have been purposely decommissioned and replaced, although they have not been removed (it is not always clear when this is the case).

There are 2no. hot air blowers in the kitchen that have been decommissioned and may need replacing.

Two classrooms and the hall are heated with LTHW radiant panels on the ceiling, this system appears to be operating as intended.

7.0 DEAD LEGS

Areas where dead legs were found and highlighted on appendix A, further investigation required to find areas that may have been missed during site survey.

8.0 PLANT ROOM

The plant room is in good condition with the heating system components within their life expectancy. The Remeha boilers are 11 years old (manufactured in 2011) and seemingly well maintained.

9.0 RECOMMENDED WORKS

Domestic water issues – left side of main entrance

The recommended course of action is to trace the existing domestic water pipework that is fed from the new HW cylinders in the plant room. The entire piping network should be replaced and where possible re-designed to allow for a more direct route to the outlets, the kitchen is adjacent to the plant room so there should be no issues with a slow supply of hot water there.

The new cylinders are to be retained however the HW-R pump and old connecting pipework should be replaced. Despite the HW water cylinders being new, as they have been connected to an old piping system they should also be drained and checked for magnetite accumulation.

This should fix water discoloration issues and hot water return issues.

These suggested remedial actions are illustrated in appendix B.

Domestic water issues – right side of main entrance

It is recommended to replace the existing HW cylinder and the HW-R pump as these are old and past their life expectancy.

To resolve the low temperature on the HW-R leg it is recommended to introduce POU water heaters in some of the areas fed from this cylinder as this will alleviate the load on the HW-R pump. The following areas are suggested to be fed for a POU water heater:

- Wren classroom toilets (ground floor)
- Staff toilets (1st floor)

Dead legs

All locations of dead legs to be investigated, to be removed when the domestic water and heating systems are drained for the works.

Heating system

The heating system should be further investigated to identify which radiators have been purposefully decommissioned and which ones are malfunctioning. It is also recommended to trace the LTHW distribution system to gain a full understanding of which parts are two-pipe and which parts are single pipe. Further to these activities the following actions can be taken:

- The malfunctioning radiators can be replaced.
- Dispose of the decommissioned radiators.
- Consideration should be given to upgrade the single pipe areas to a two-pipe system.
- If the hot air blowers in the kitchen are decommissioned, they should be replaced.
- The LTHW pipework can be power flushed to remove any debris that may be causing low flow in certain areas.

10.0 COSTS

- Re-design and replace all domestic water pipework fed from the main plant room HW cylinders (left side of main entrance) - £100,000
- Replace DHW-R pump and connection pipework (main plant room) - £6,000
- Drain and clean HW cylinders (main plant room) - £4,000
- Replace HW cylinder and DHW-R pump (small boiler room, right side of entrance) - £10,000
- Install Point of use heaters in Wren classroom toilets and 1st floor staff toilets (right side of entrance) - £5,000
- Remove dead legs (whole site) - £7,000
- Replace malfunctioning radiators - £30,000 depending on further investigation
- Dispose of decommissioned radiators - £2,000
- Upgrade LTHW system to two pipe system where it is currently 1 pipe - £60,000
- Power flush of LTHW system - £3,000

TOTAL = £227,000

Appendix A – Site Mark-ups

Appendix B – Water System Mark-up

Appendix C – Site Photos

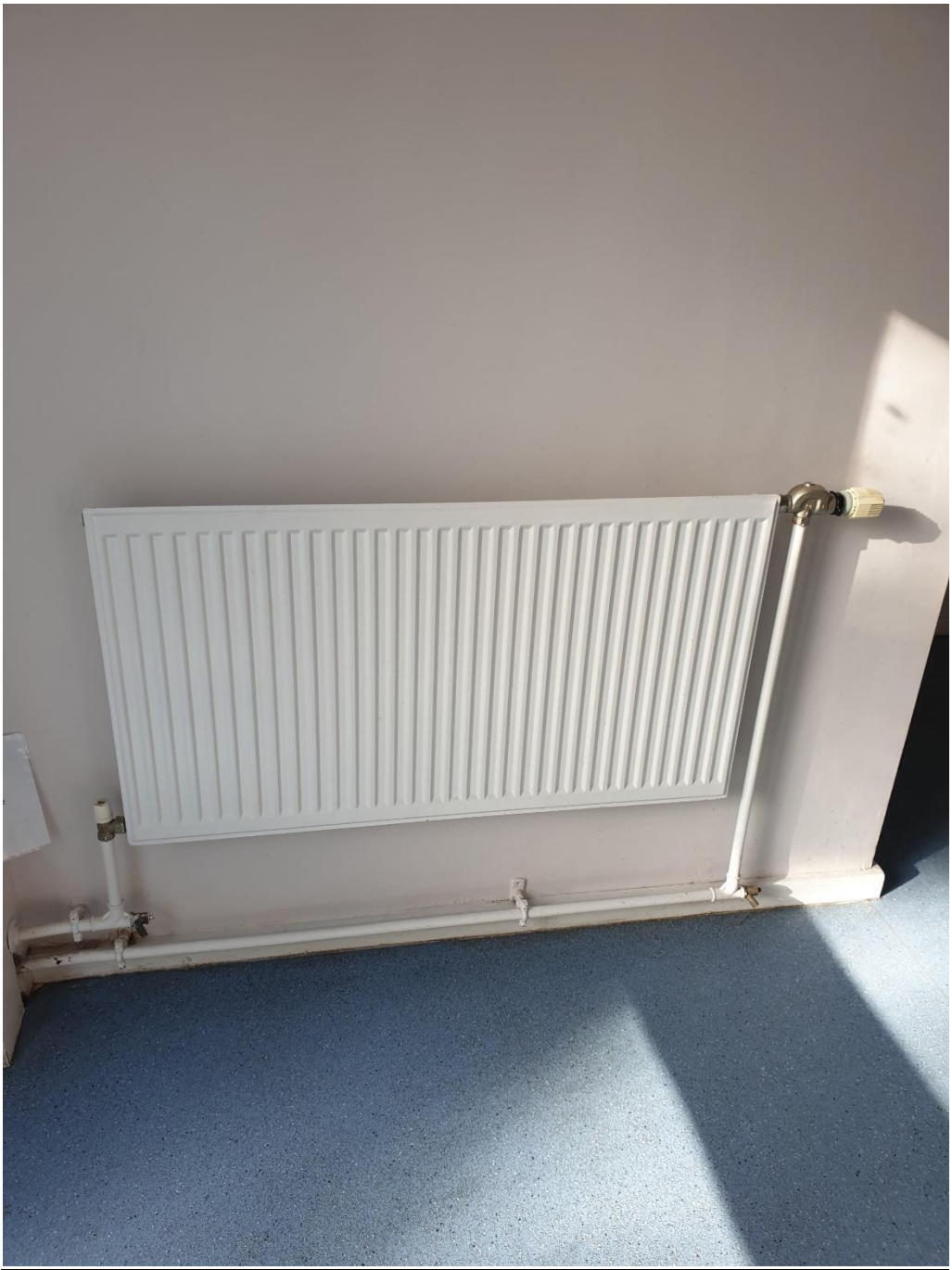

Photo 1: radiator connected to two pipe system

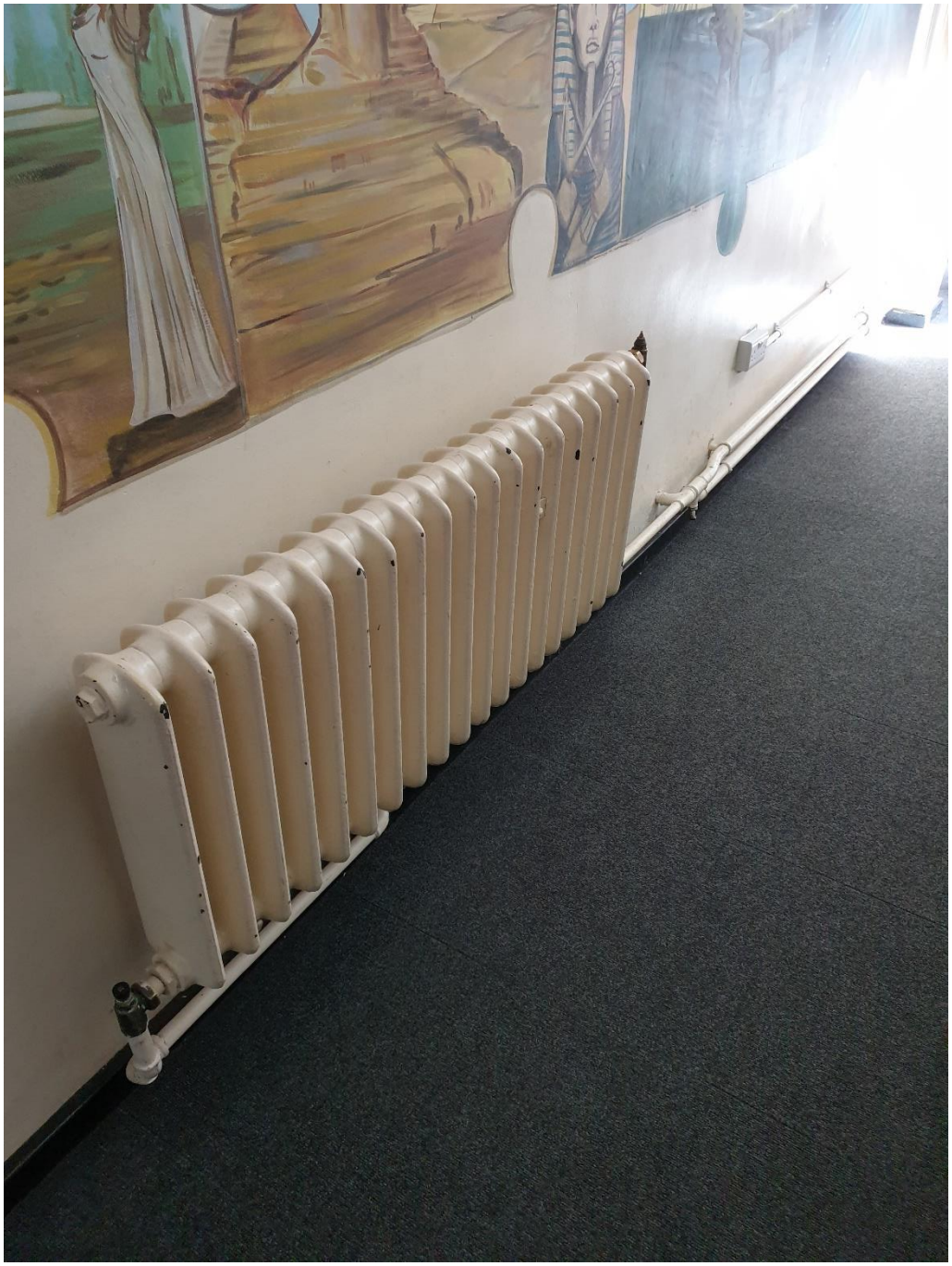

Photo 2: radiator connected to two-pipe system

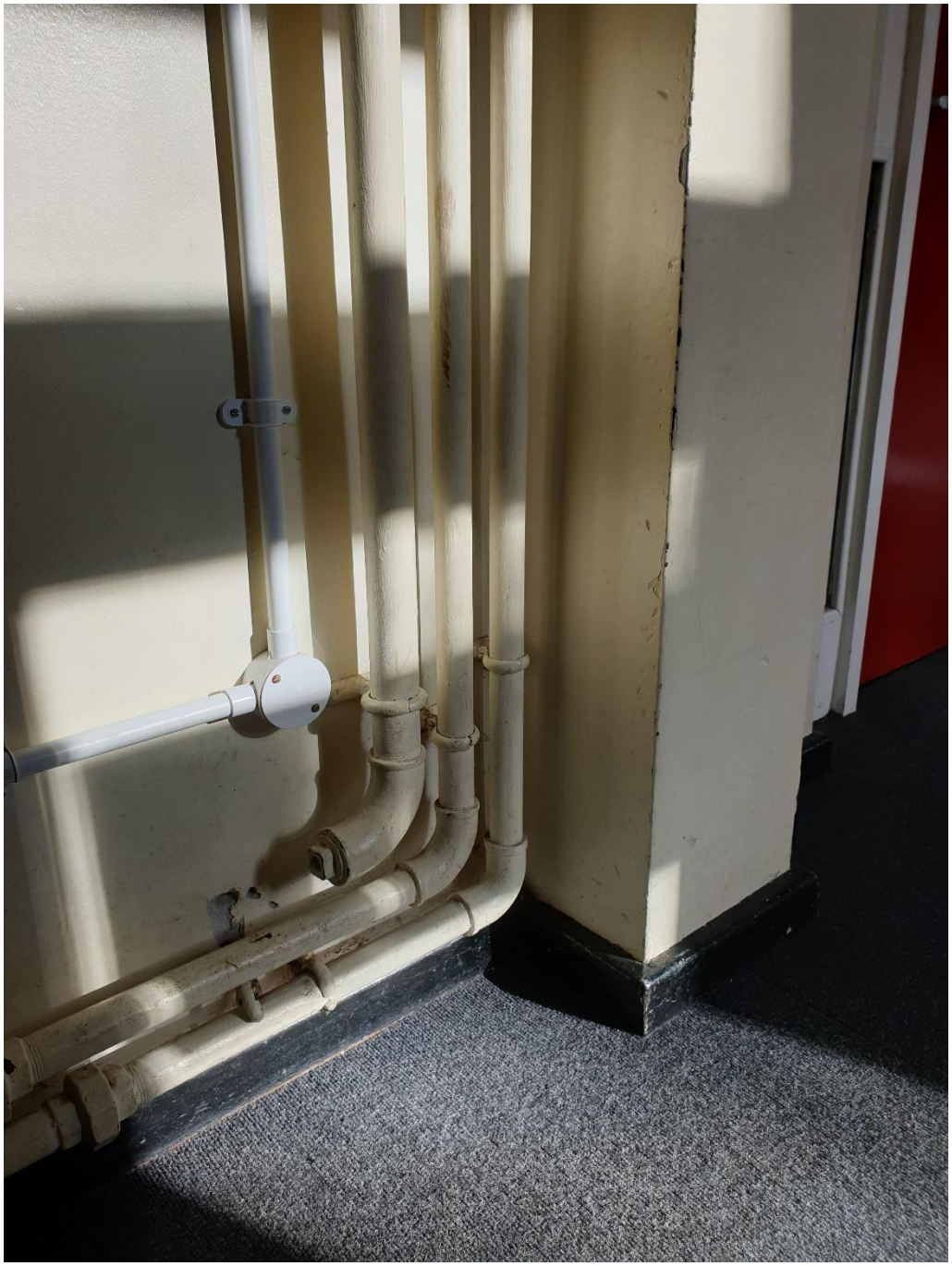

Photo 3: dead leg on heating system

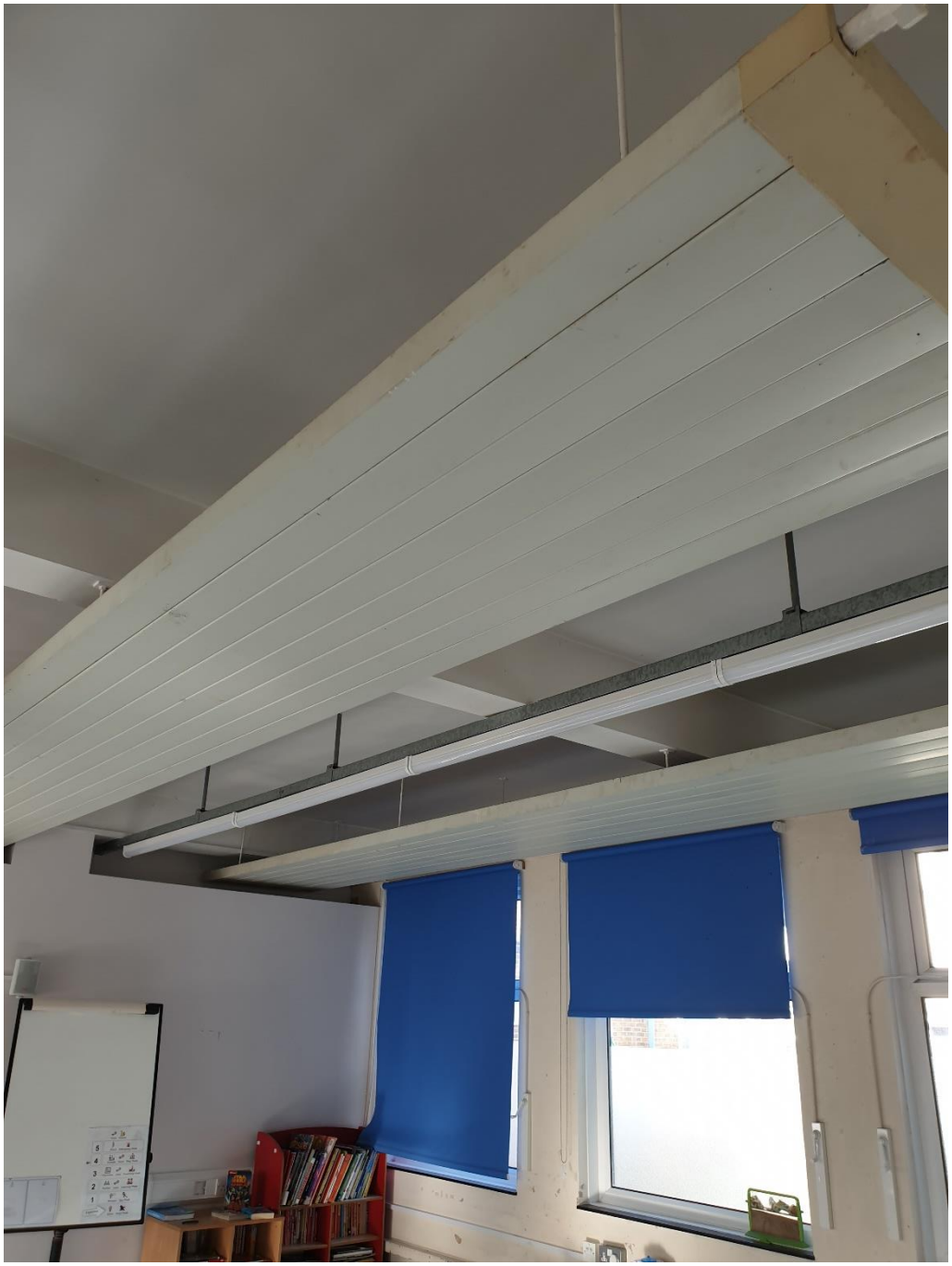

Photo 4: radiant panels in classroom

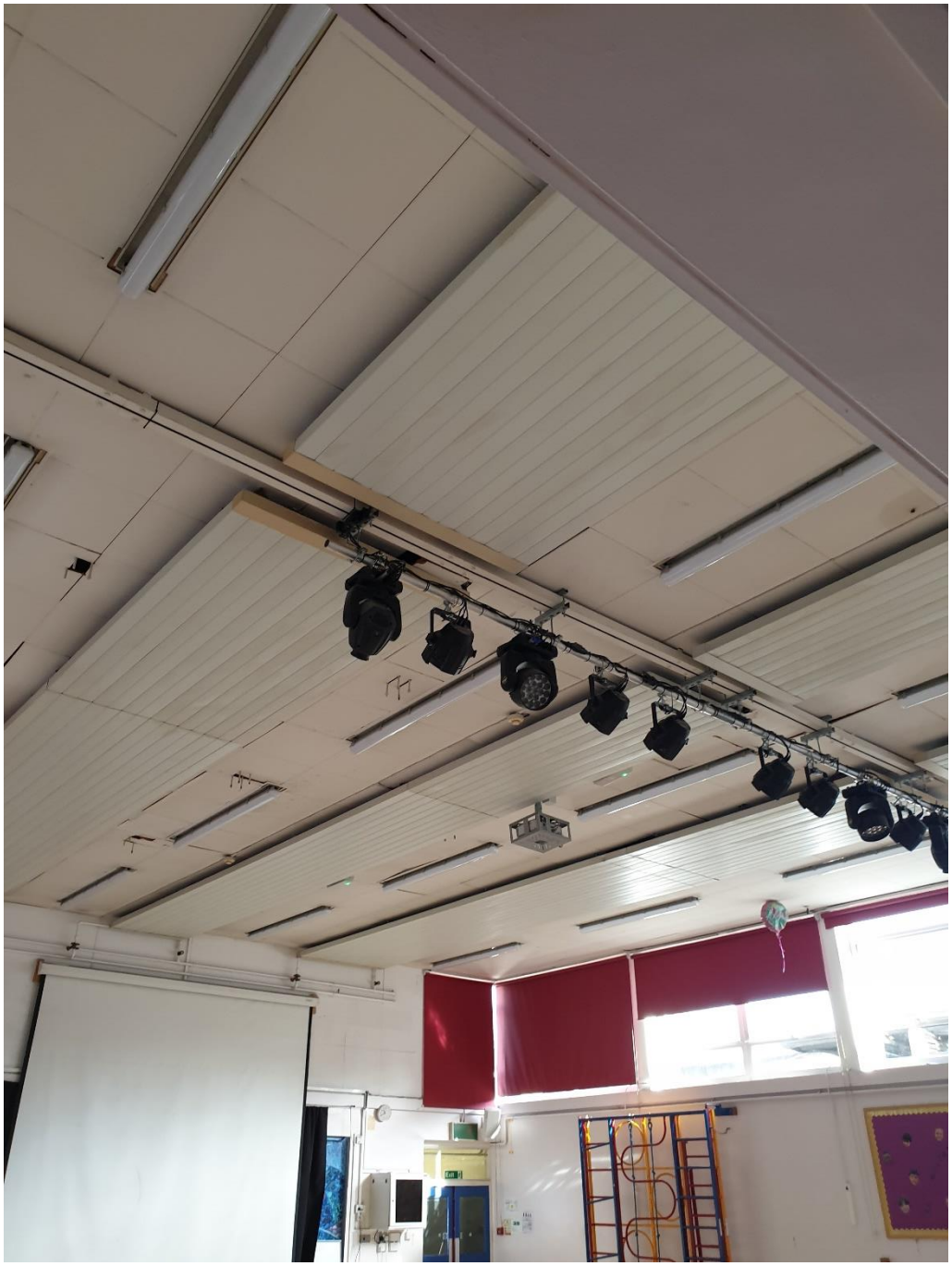

Photo 5: radiant panels in hall

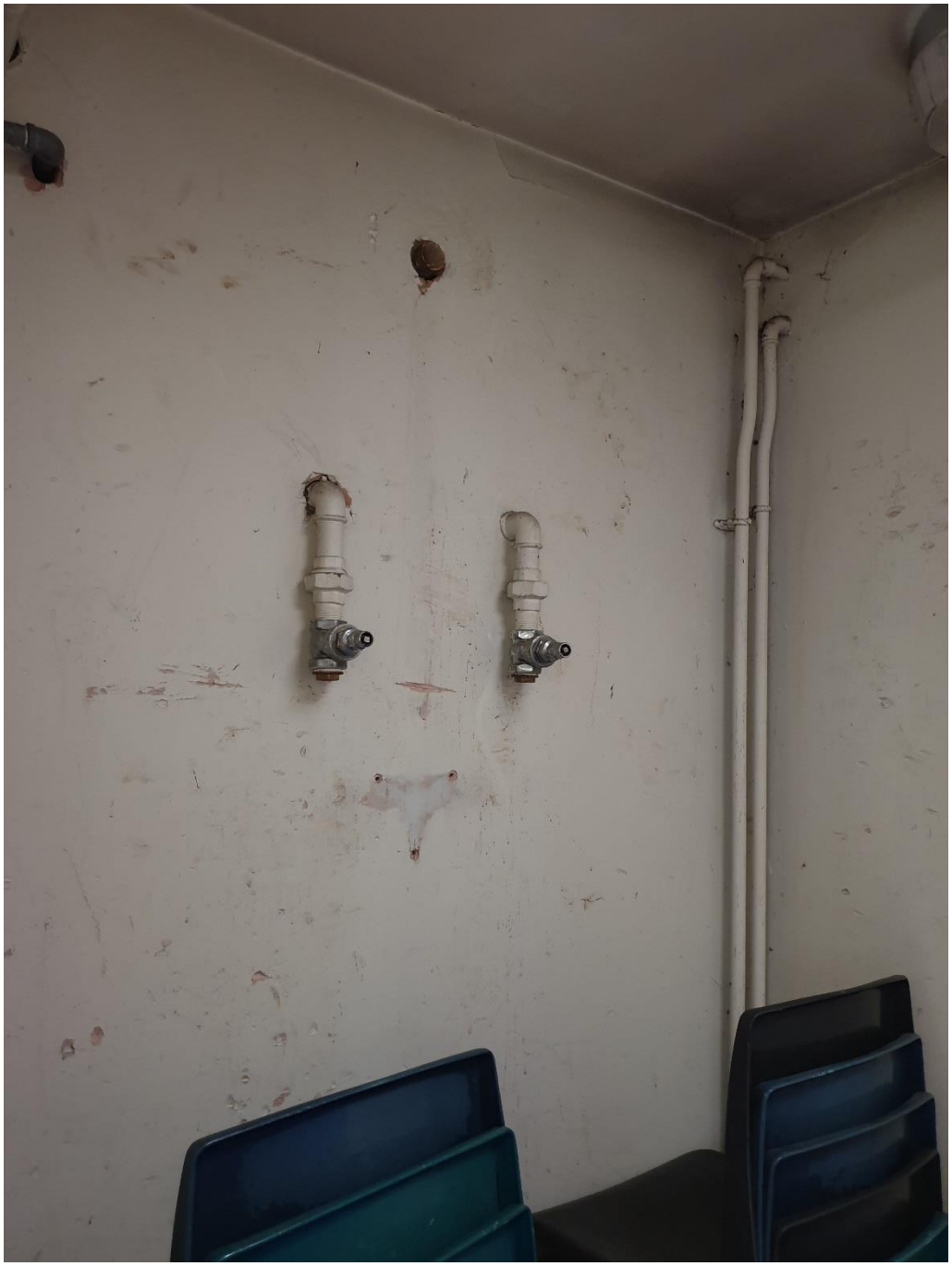

Photo 6: old shower block and domestic water dead legs

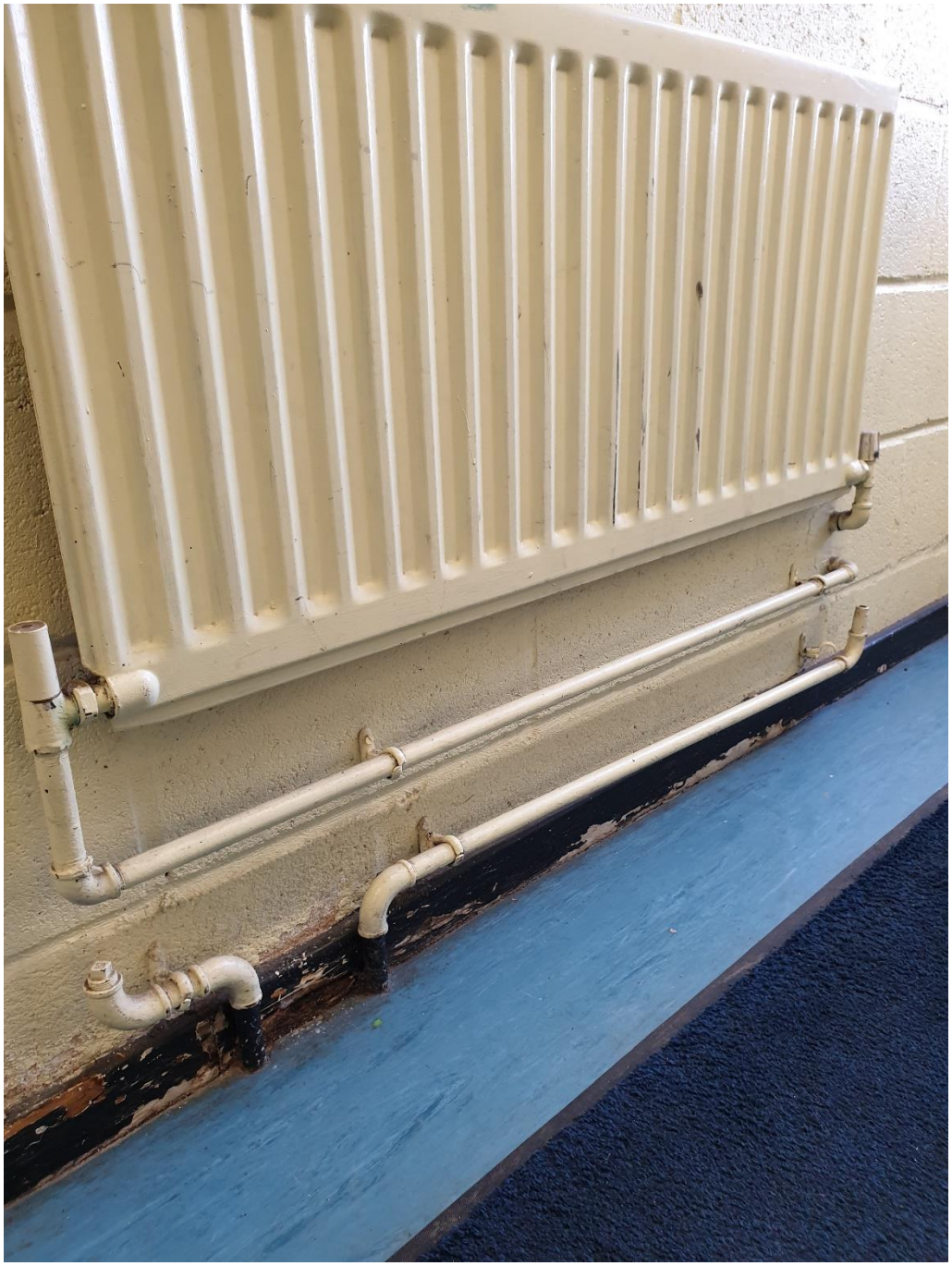

Photo 7: heating system dead legs

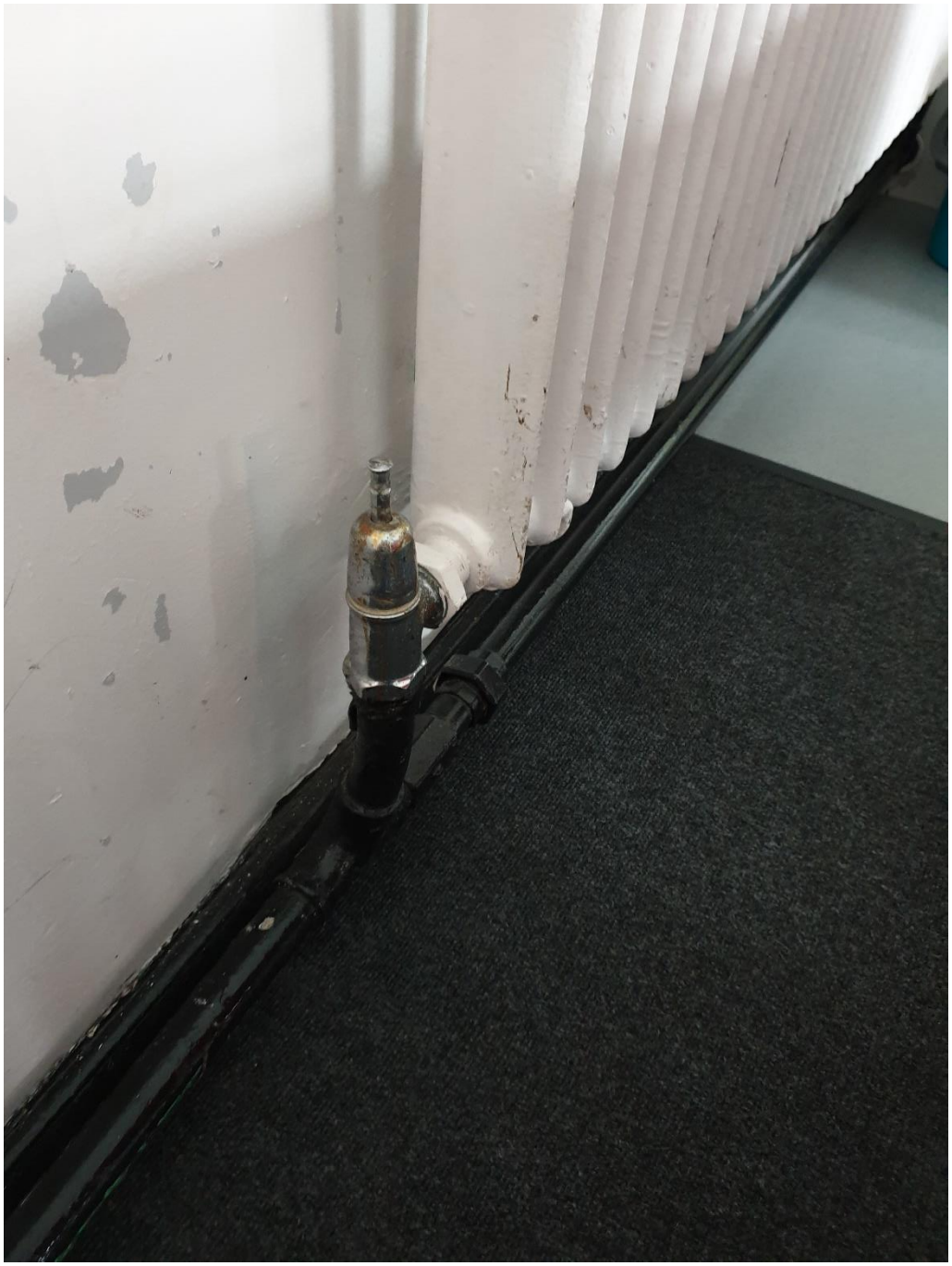

Photo 8: single pipe radiator

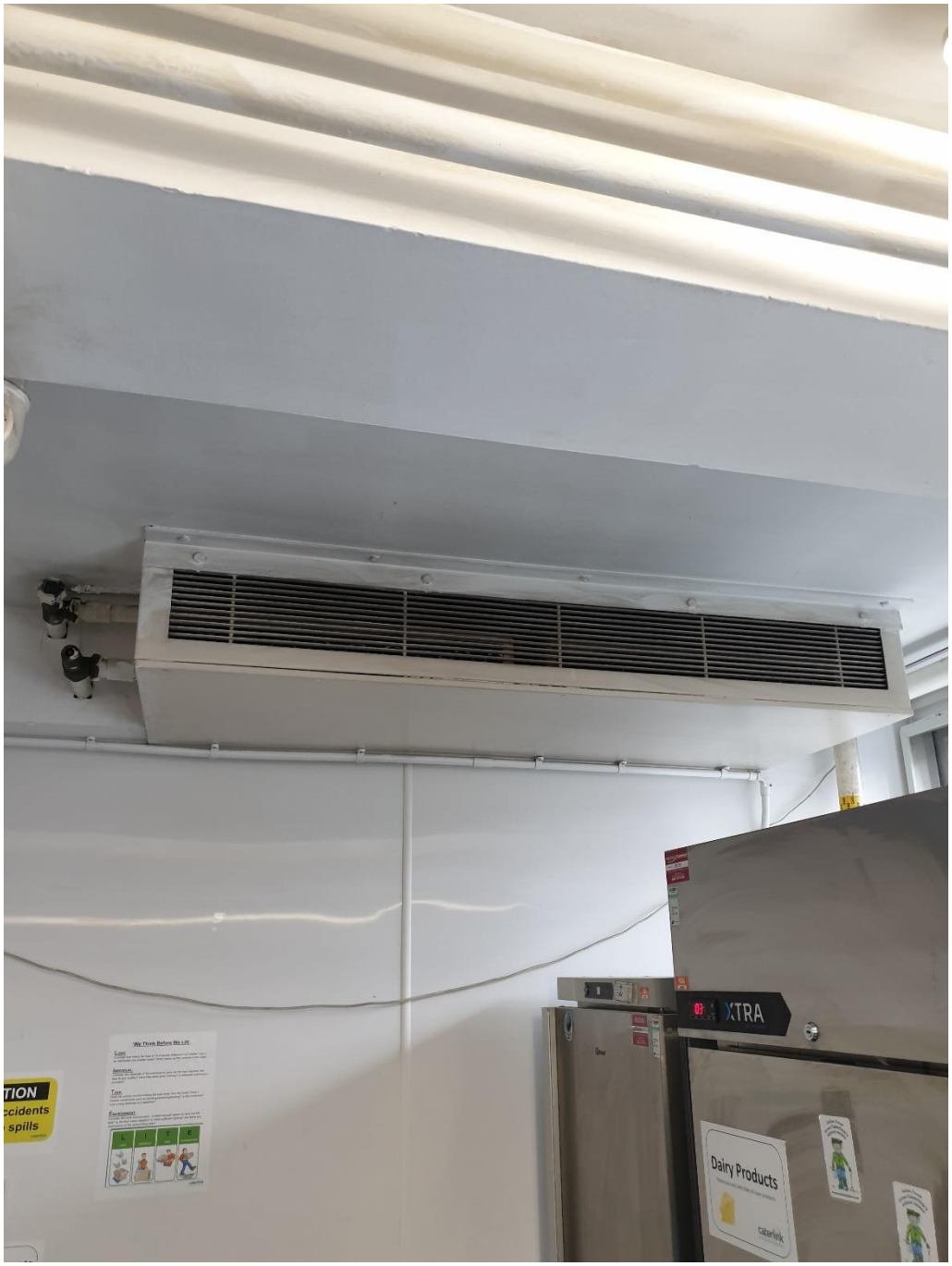

Photo 9: kitchen hot air blower

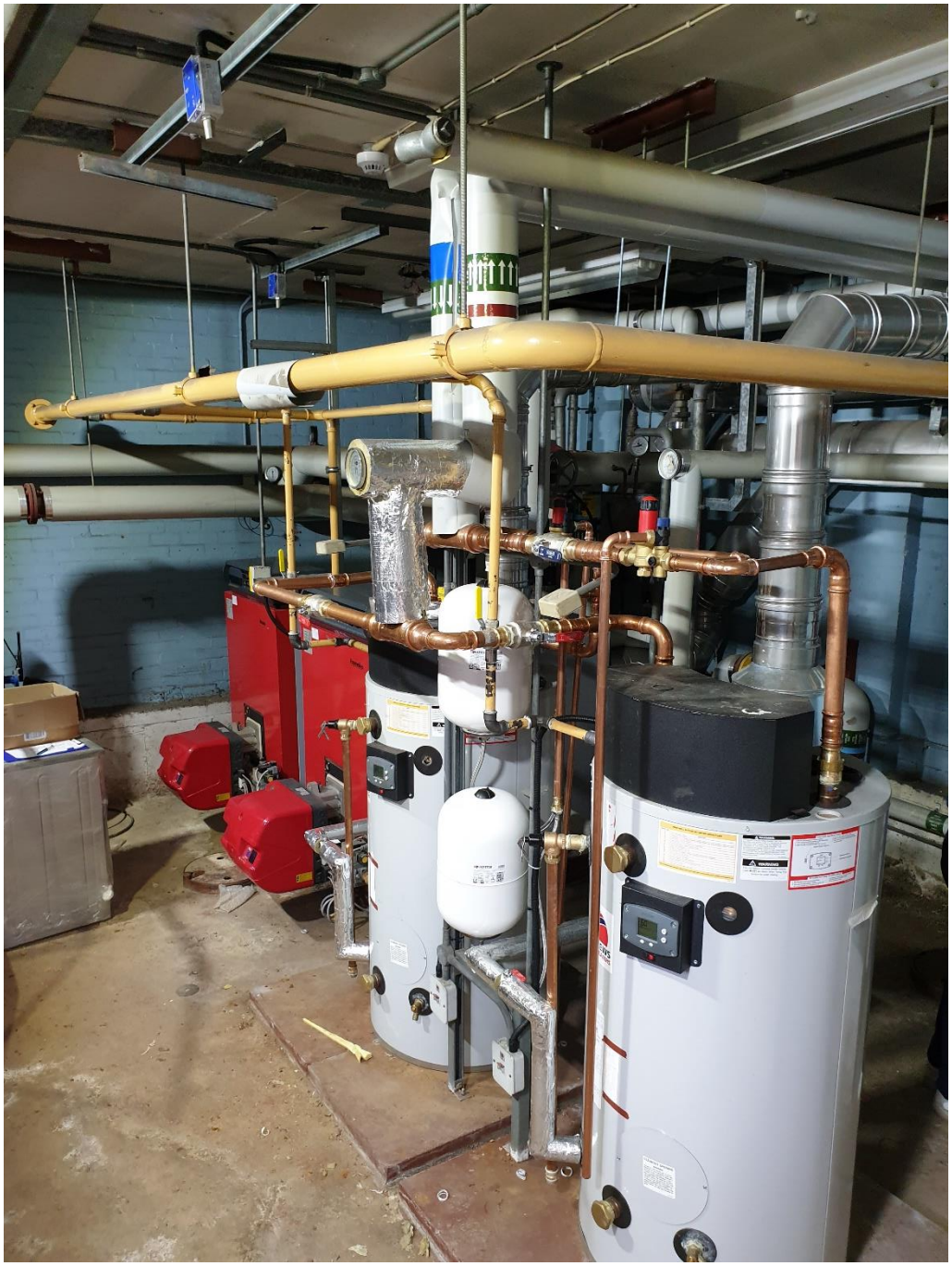

Photo 10: plant room

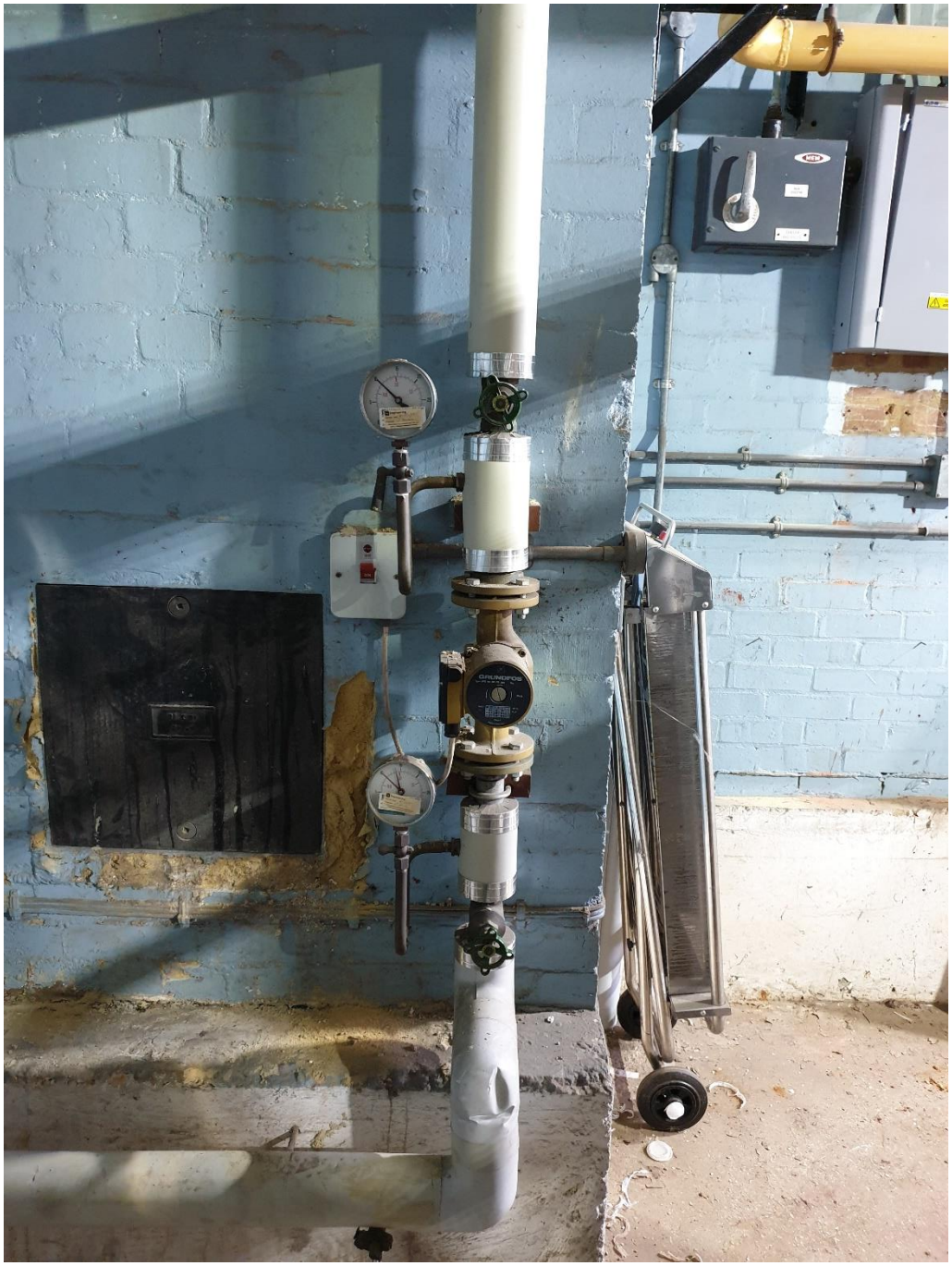

Photo 11: HW-R pump in plant room

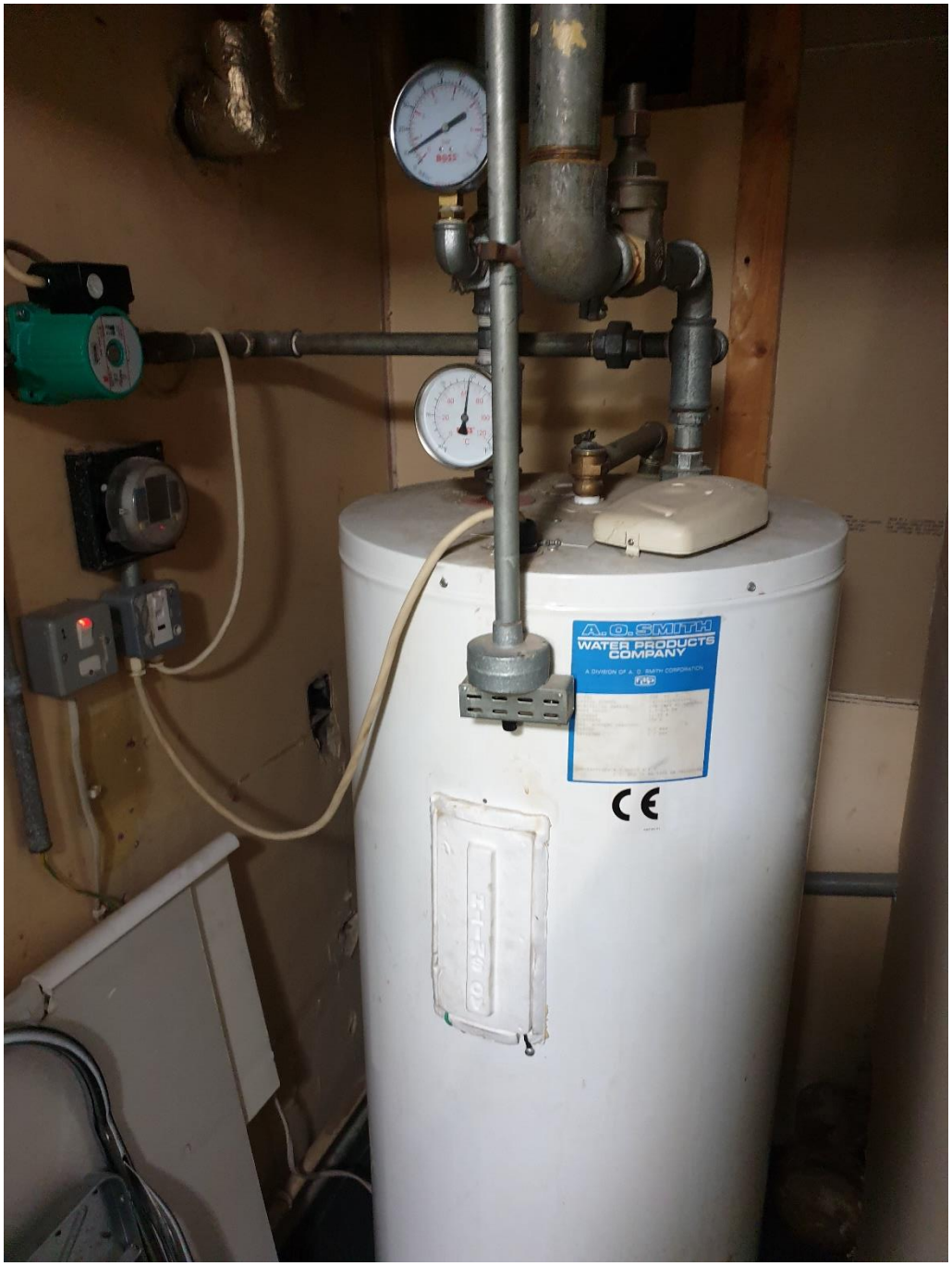

Photo 12: old HW cylinder and HW-R pump feeding right side of building