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An assessment of fungal growth and moisture distribution at

DEVIZES ASSIZE COURT

INTRODUCTION

Following instructions from Colin Johns, Architect for Devizes Assize Court Trust, I visited the above building on 09.08.19. The object of the survey was to record the condition of the building with regard to fungal infection and moisture and to recommend appropriate remediation with regard to the 'moth-balling' process, set to continue for a number of years.

The report is in the form of a schedule of observations – most of which are accompanied by photos – referenced to floor and roof plans at the end of the report.

Except for the partially accessible central roof light, it was not possible to access the remainder of the roof voids. However, points of current and historic water ingress and timber decay were reasonably clear from below, extents of which are marked on the roof and ground floor plans.

1 The significant degree of decay initiated in the ceiling structure is the result of water ingress through damaged rooflights. The principal roof structure-composed of four trusses-has not suffered to the same extent as it bears on the masonry wall heads which are approximately 500 mm above the line of the ceiling. However, some of the truss connections, mainly the purlin- principal rafter connections, have been affected by decay, where water has run over the top of them (from the defective rooflights). On the E elevation there is compression in the rafter plate below the second truss from the N which has caused it to drop slightly at this point. All bar two small areas, most of the water ingress appears to have been stopped for the time being. There is still a possibility that the tie beams of the four principal trusses may have been compromised by decay mid span above the coffered ceiling, but this will only become apparent when the exposure of the damaged areas of the coffered ceiling is completed.	

2 Photo 882 showing previous remedial steel repairs below the valley gutter. There does not appear to be water ingress at present.		3 Photo 873 showing the relatively recent floor screed poured over the slab in the Entrance Hall.	

4 Photo 887 showing what appears to be relatively recent fill below the Entrance Hall slab. It may be that this is just a filler for the threshold – or that the entire Entrance Hall slab is a relatively recent addition.		5 Photo 874 showing active growth of Dry rot below a point of water ingress through the roof. The fungus is decaying the skirting – and possibly other embedded timber – not the hardwood block floor. However, wetting and expansion of the wood block is causing it to lift.	
6 Photo 889 showing the footing of the S wall, where a hole has formed (or been made) in the sub base layer of the sub floor. The probable line of a physical damp proof course is arrowed.		7 Photo 894 showing the arrangement of what is a relatively recent (and not well executed) floor construction. The general over site however seems dry.	
8 Photo 908 showing water coming into the cellar under the door. Damp shadows on the floor indicate the extent of standing water is occasionally much greater.		9 Photo 871 showing the loosely bricked up opening for what is assumed to be previous external stairs. Water is entering freely at this point – see ob 10 below.	

10 Photo 902 showing where the external ground levels have risen over the years – with the arrow marking the point where water is finding its way – via the surface of the concrete slab – into the building envelope ob 9.		11 Photo 863 showing the area left after removal of the flat roof. The sub base material will be acting as a sump, collecting water and channelling it into the wall bases.	
12 Photo 862 showing the light well area to be over grown – the drains of which are almost certainly blocked.		13 Photo 861 showing a physical slate damp proof course between brick and facing stone – arrowed.	
14 Photo 899 showing the external ground levels adjacent to the portico. The arrow shown in ob 6 above is approximately 500mm below the top of tarmac which indicates external ground levels have risen along this elevation also.			

DISCUSSION

Much of the internal joinery and suspended ground floor structures have previously been removed-presumably the result of decay. There are signs that historically the building has been prone to water ingress with masonry irrigation injection holes visible throughout-predominately below those areas of the gutters which have historically-and continue to-allow the ingress of water. Other signs such as the work carried out to the floor of the Central Hall also indicate past problems. Some joinery and suspended floor structures still remain in the W and E offices, although it is probable most of this will also eventually require removal as a result of current water ingress.

The current condition of the building is principally dependent on two factors. The first is the original system of roof drainage which - as with many polite and municipal buildings of this era - attempts to keep all rainwater downpipes to the rear of the building with as few water collection points assigned as possible. This has caused overloading of the gutters at various points, together with associated blockage of outfalls, downpipes and almost certainly subsurface drainage.

The secondary factor which has contributed to keeping the building wet is the fact that those measures originally incorporated within the building structure to protect it from damp – incorporating a physical damp proof course which is visible in places - have been compromised over the years-generally with rising external ground levels (which is not uncommon for buildings of this age). Large concrete slabs have been constructed along the E and N elevations, the levels of which are considerably higher than the original external ground level would have been. The central courtyard area (once covered by a flat roof) is now full of sub base which acts as a very effective sump. The two light well areas which run along the N elevations of the W and E Courts have blocked drains in the case of the W, and possibly been filled in the case of the E. The blue line on the ground floor plan below shows the extent of exceptionally wet walls which have very high moisture contents for at least 1 m above current internal floor levels.

Water ingress is current - see plans below. If this situation continues, the roof structures of the W and E Offices will deteriorate relatively rapidly. It appears the roof structures of the W and E Courts have survived in slightly better condition - presumably due to relatively recent remedial work. However, there are signs of historic fungal growth-particularly around the upper levels of the E Court- and it is not clear whether the gutters were simply cleared and the roof timbers left uninspected.

There is some active dry rot fungal growth in the W Office. There is not much soft wood left at floor level for the fungus to attack-although if current conditions continue it will not be long before there are further outbreaks and decay to the small amount of softwood remaining in the rooms of the S elevation.

The environment of this building is further humidified by blocked drains in the light well and stairwell in the NW corner and the pre-existing cellar entry on the E elevation-observations 8 and 9 respectively.

RECOMMENDATIONS

Fungal growth is totally dependent on water. Any volume of water which is able to enter this particular building envelope will have a greater adverse effect in terms of fungal growth due to the inability of the building structure to dry-as detailed above.

It is essential that the roofs are made watertight. It is also essential that a full drainage survey is carried out and that all surface perimeter water and that emanating from the downpipes is effectively collected and discharged clear of the building. This is difficult in the case of the central courtyard which, as discussed above, is effectively a very large stone filled sump.

It is often impractical to recommend that all external ground levels are returned to those to which the building was designed. Even if the roof was made watertight immediately, the building in its current incarnation would take a considerable amount of time (years) to dry. Once the building is made watertight, there is a possibility that decay-particularly to the roof structures-will continue slowly but should eventually stop. The future rate of growth of fungi will be dependant on how soon the water ingress can be stopped.

There is no point in treating any of the masonry with surface biocides while water is still entering the building.

Once the building is made watertight, then it will be possible to navigate a way forward in terms of how to treat the fabric of the building at ground floor. Hopefully the strategy will involve clearing all the drains and ensuring the external perimeters discharge all water clear of the building.

As mentioned above this will be technically difficult. The recommendation is to ensure all surface perimeter water is effectively collected and discharged clear of the building. Any perimeter around any building should not be permeable and preferably paved or surfaced to allow water to run towards a defined collection point. However again, this would involve the areas to the E and N being surveyed to investigate what levels could be achieved for surface formation and drainage – preferably with regard to the position of any physical damp proof course in the masonry.

Forced drying techniques could then be employed such as accelerated air movement and possibly even heat and dehumidification.

It may be that the wall bases stay in equilibrium with the material of the external perimeter (even if external ground works are initiated) – which will probably be damp for much of the year. In this case, it is possible that damp management may have to be affected internally – using profiled membranes. If the building dries well and its perimeter can be effectively protected from wetting, then a lime plaster system may prove sufficient.

Tim Floyd – August 2019

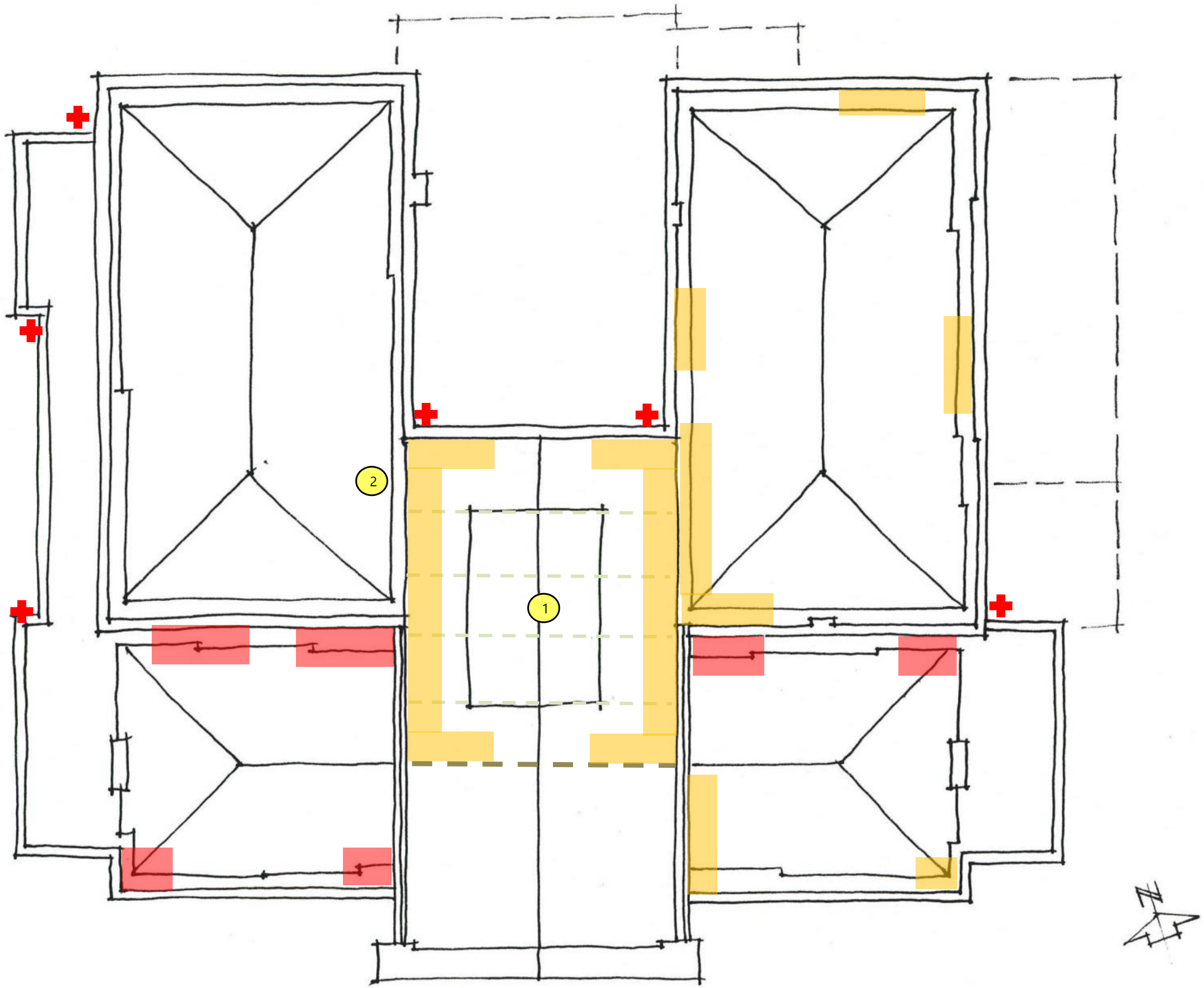

Figure 1 – Roof

Yellow shading indicates historic or inactive decay

Red shading indicates active wetting and decay.

Red crosses indicate downpipe positions.

Numbers indicate observations in the text.

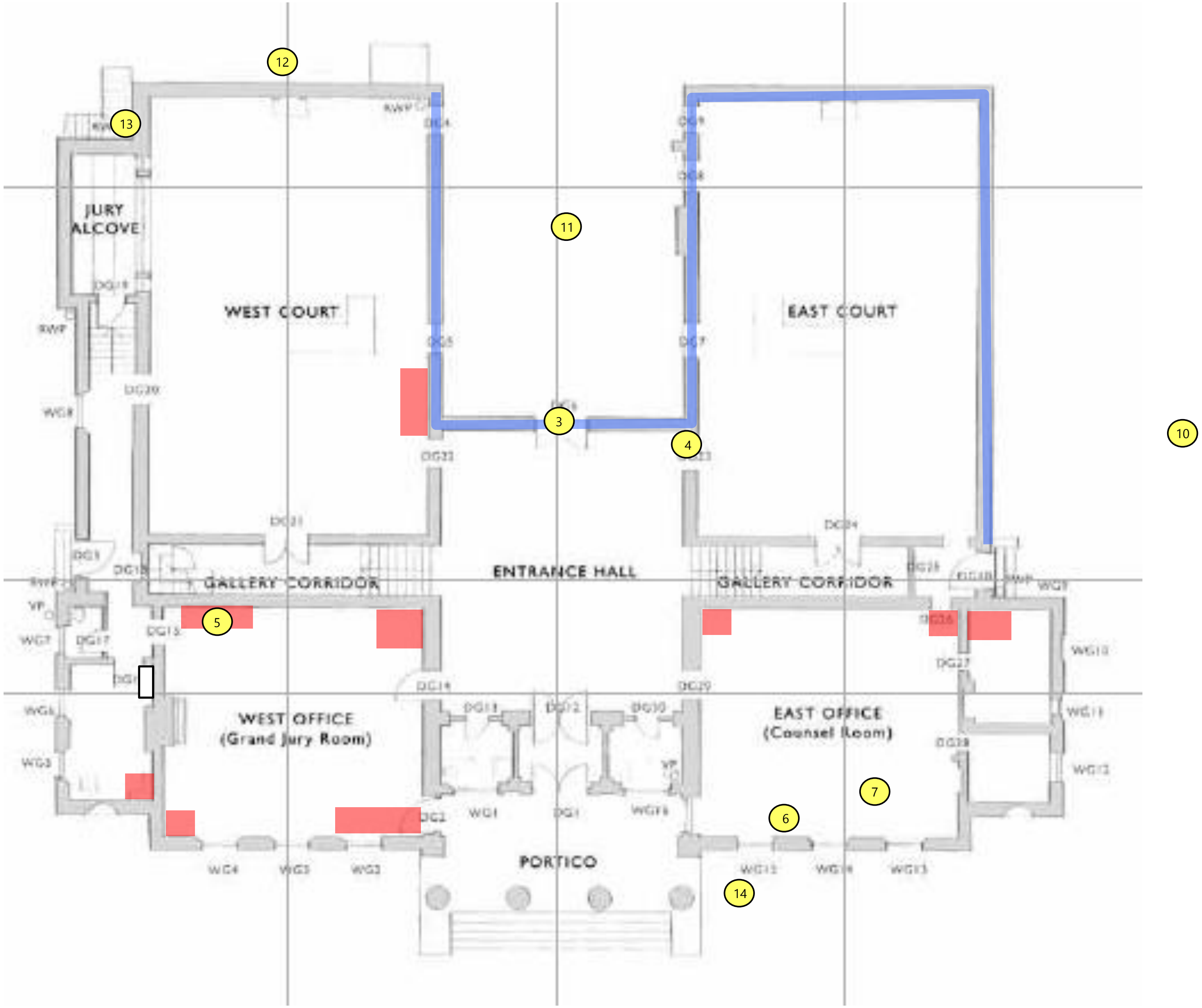

Figure 2 – Ground floor

Red shading indicates active wetting and decay.

Blue line indicates wet wall bases.

Numbers indicate observations in the text.

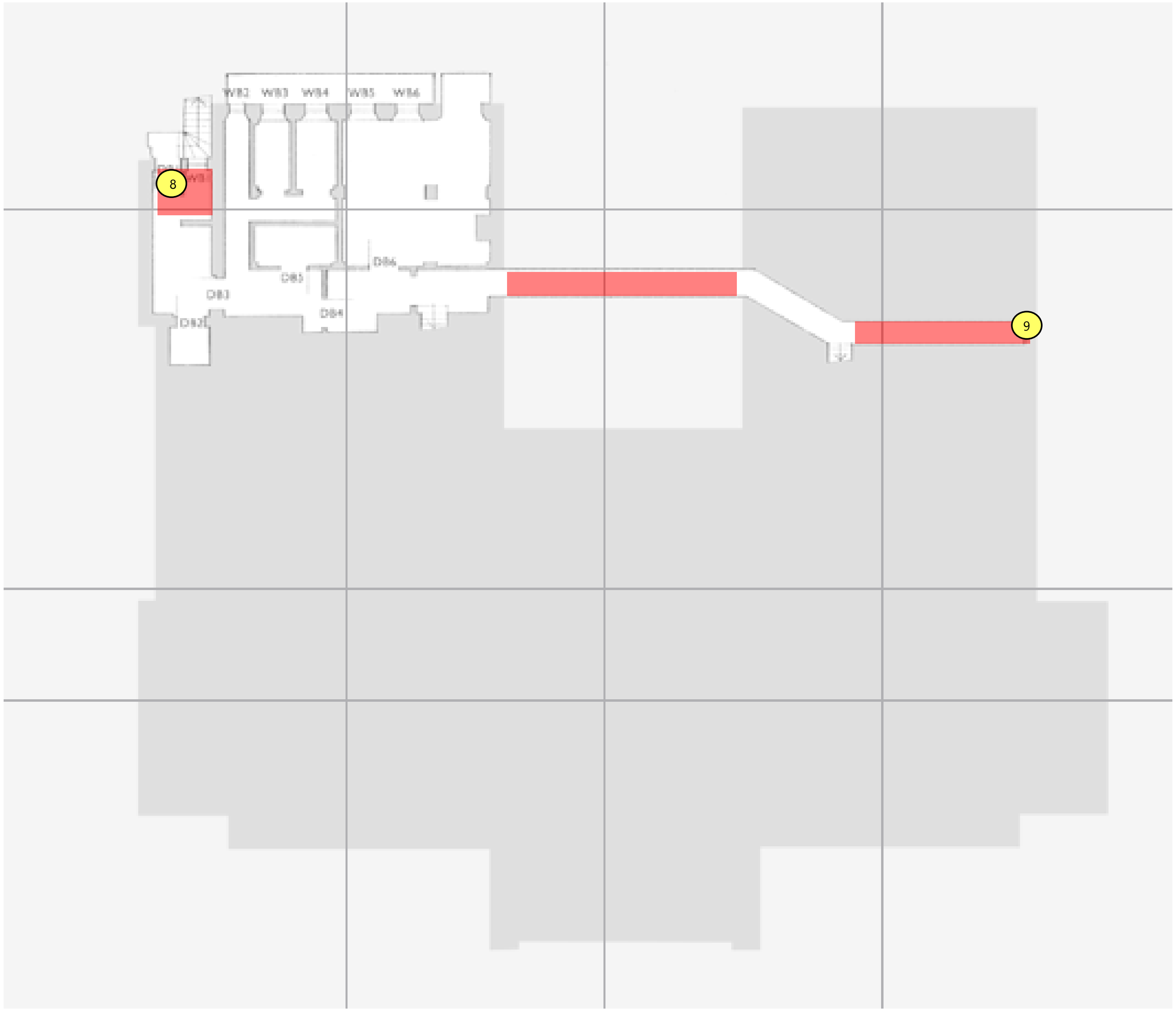

Figure 3 - Cellar

Red shading indicates active wetting and standing water.

Numbers indicate observations in the text.