The Paddock Information Collection – The most comprehensive source of information about Paddock

Understanding the water ingress problem – a discussion paper (Bill Ridgeway)

Introduction
Paddock has been damp since it was built in 1940. The Sub Basement had dry lining throughout although there is evidence to suggest that some (if not all) was installed after Paddock was opened. The water ingress problem was noted when Paddock was accessed soon after it was acquired by Network Homes when there was about 16 inches (16cm) of water in the Sub Basement. There are three points at which water actively ingresses Paddock and one point which water ingress has now ceased.

Possible sources of ingressing water

Precipitation (rain)
This is supported by the fact that the flow rate seems to change with natural precipitation.

Springs
It is recorded that "*In October 1922 "agreement was reached with the West Middlesex Water Company that the western edge of the smaller pond should be filled in and that an overflow pipe should be connected to the surface water sewer laid in the approach road."* and *"The two ponds* [one of which is, I believe, still extant] *were fed by natural; springs. The overflow from the larger pond and general land drainage was taken away by a ditch running along the south boundary of the site and through the west boundary. When the permanent brick boundary wall was erected 1930/31 a drainpipe was substituted for the ditch."* [2]

Structural weaknesses may include
- damaged (breached) tanking (a protective covering) during the demolition of the surface building and the construction of the houses above
- deteriorating structure which allows water directly into Paddock

Other sources
- fractured water supply pipe under the pavement outside Paddock
- leakage from the Thames Water covered reservoir opposite in Brook Road. I believe this has been denied by Thames Water. Paddock was noted to be damp from when it was first pout into use and therefore pre-dates the construction of the Dollis Hill Reservoir which commenced in August 2000. The reservoir was put into operation 28 January 2002.

Tracing the water
A horizontal fault (a bad joint between concrete and brick) runs between the half-landing (on the main entrance stair well) (LRS79) (**Image 1**) to above the bottom of the stairs (LR160) **(Image 2)**. There are two flows of ingressed water. One flow emerges from the wall in the half-landing and the other emerges from the wall of above the area at the bottom of the stairs. Both flows accumulate at the bottom of the staircase (LRS78) and in the small room (LR131) adjacent to and underneath the staircase and overflows the gas-tight door frame and into the gas lock (LR162). Duckboards have been placed in LR160 and LR162. Water in this area is not cleared prior to open days. I believe that water percolates through the wall into the kitchen (LR130) (**Image 3**). The point under the sink in the kitchen is directly over a conduit pipe (which originally contained a pipe for the extraction of water from the south sump). (LR028) (**Image 4**). The water flows through this, now broken, conduit and into the Sub Basement spine corridor (LR051 and LR055) (**Image 5**).

Water also ingresses into the (large) room adjacent to the Air Conditioning Plant Room (LR133) (**Image 6). W**ater flows within the air ducting from here into the Air Conditioning Plant Room (LR134) and into the heat exchanger (**Image 7**) from which it overflows on to the floor resulting in permanent flooding of this room, the adjacent ground dewatering wellpoint room (LR136) (**Image 8**) and the adjacent spine corridor. Duckboards have been placed in the Air Conditioning Plant Room (LR133) and in the adjacent corridor (but not the ground dewatering wellpoint room (LR136) (**Image 9**) and the spine corridor (LR164) **(Image 10).**

A third point of water ingress occurs in the area containing the South end (emergency) helical (spiral) staircase between the Basement and Sub Basement (LRS83 and LRS84). Here water flows down either the wall or the ducting, into the 'lobby' (LR165) and into the Basement spine corridor (LR164). The point of this water ingress has not yet been identified.

Water collected in the Sub Basement spine corridor (LR055, LR056) may be cleared by a contractor prior to open days.

In the Sub Basement the South pump transfers water to the North pump sump from where it is lifted to the sewer system (we know not where). It is interesting to note that at the time until Network Homes acquired the property in 1997 the water rose only to a depth of about 16 inches (61cm). The pumps were not operational at the time which suggests this is a natural level to which it would rise.

Water from the south pump sump is pumped into the north pump sump (via a large diameter pipe running the length of the corridor) from whence it is pumped to the surface and discharged into the sewer system (we know not where). If the north end pump were to fail water would backup and the south end pump would do nothing but recycle water to the north end pump sump from where it would flow along the corridor ad infinitum until it too failed - perhaps from overwork and lack of maintenance. It was noted that, at open days, the sump pumps were unreliable. They usually required 'some adjustments' to get them going at the start of and throughout the day. Water was also swept into the North end sump and the South end sump at the start of open days (taking two people up to 45 minutes) and also at semi-regular times throughout the day.

There is a fourth area from which water may have ingressed (but not since 2000). A horizontal conduit runs along the outside wall between the battery room (LR101) (**Image 11**) (collecting leakage from the ceiling presumably). This runs through intervening rooms (LR103) (**Image 12**), LR104 (**Image 13**) and LR107 (**Image 14 and Image 15**) until it meets five drainage holes. From here a white plastic pipe runs around the room, through a narrow room (LR158) across the corridor (LR151), into the opposite room (LR129) and down until it ends up in one (possibly the northern) sump. It is not known why or when this was installed.

Consequences of excessive moisture

The consequences of excessive moisture are –

> Dry rot which occurs when airborne spores come into contact with damp timber that has a moisture content of over 20%. These spores then germinate and sprout grey root hyphae strands. The hyphae grow into mycelium which covers the timber in a thick cotton-wool like substance. The fungus eats the wood and sucks the moisture from it, leaving it weakened. The fungus then advances into a fruiting body known as sporophore which sprouts more spores to continue the life cycle. [3]
>
> Wet rot which requires a source of moisture to grow, as wet rot spores are attracted to wet wood with a high moisture content. Timber which is exposed to excess moisture provides the ideal environment for wet rot growth, as it allows fungal spores to germinate and grow, as they use the timber as a food source and eat away the wood, weakening its structural integrity. [4]

Appendix 1 – possible sources of water ingress (Hugh Ainsley, C.Eng, MICE)

I would say that the major problem has arisen because the surface building was demolished. It is not (yet) possible to tell just how the surface building connected to the basement, but since there is good reason to believe that the surface building itself was almost certainly of brick face reinforced concrete "bunker" construction, it is highly probable the walls were actually founded on the roof slab of the basement.

If that was the case, the brick wall (through which water currently penetrates) was only originally designed to support a small amount of fill between the edge of the staircase and the concrete wall of the surface building a little distance behind it and, as such, would not have to have been very substantial or indeed waterproof – we are only talking about 18" of fill in width here which would have been more or less isolated from the rest of the world anyway.

But when the north end of the surface building was demolished, all that changed: immediately that bit of fill was either exposed on top or in any case connected to the rest of the surrounding fill, and quite apart from the fact that the demolition itself would have seriously shaken things up. Remember that the staircase we see now is only half of that eastern extension of the surface building (and I would hypothesise that the other half might well have contained the loos!) so everything got bashed around.

The new houses will have contributed to all this as well - but their foundations are actually south of where the leakage is, so I think all that would have happened there is that the gardens exposed more fill to be in contact with the leaking bit.

As regards the ponding of water in the Basement we do have evidence that there was some water penetration on the east side of the basement - see the bodged up weep holes and drainage channel on the wall in the rooms opposite the main staircase eventually draining to the sump – but I doubt that is particularly significant in this context. If there are springs in the area (and we do not know where) then they too would contribute to a higher water level in the fill overlying the clay in which the whole building was built.

We still need every scrap of evidence we can gather as to the construction of the surface building and indeed anecdotal evidence as to where the toilet facilities were and/or plant rooms in that building. Lots of unknowns, but hopefully not unknowables!

Appendix 2 – mystery drainage holes (Hugh Ainsley, C.Eng, MICE)
They would have (probably) been drilled because the external water pressure was such that it was seeping through the walls. Conjecture of course - but assuming clay backfill, then there is not a massive flow, but there can be a lot of pressure - which will give rise to a continuous seep. So weeps like those will not give rise to a torrent, but will reduce the overall outside water pressure.

Interestingly, the pipes are clogged with what looks like hard-water calcite (same as we see coming through the roof) (I've been up and looked at them closely) so they will certainly not seep now - and who knows what the water pressures etc are like on the outside of the wall after all the building and messing around. It's entirely possible that boring them out somehow would result in a flow of water which in turn might relieve the pressure on the roof and the formation of stalactites - (or not - either way its a bit academic! :-)

As to why they are there I can only think that there was possibly more seepage in that region than elsewhere.

Appendix 3 – An historical aspect (Hugh Ainsley, C.Eng, MICE)
1) While a bitumen coat does a certain amount to keep out groundwater, the type of bitumen used pre-war was not very elastic, and consequently movement of the structure would undoubtedly have ruptured it in places - this is assuming that there WAS a sealing coat applied in the first instance - for which we have no actual evidence - although its most likely to be true.

2) The engineers involved in the construction of Paddock clearly foresaw that water could be a problem, and they provided dewatering well-points at either end of the basement with the wells going down to below the floor level of the sub-basement. Whether these extended below the bottom of the bottom slab is conjectural - had I been designing it, they would have, but that too would have been dependant on the thickness of porous material underlying the base slab - and cost would also have entered the equation.

3) Historical evidence suggests that Paddock was always damp: the actual structural evidence that one can now see indicates that although the walls may have originally been bare concrete, dry lining was applied either early on or certainly in the Post Office era.

4) There was definitely an issue of water ingress - or at least damp walls - in the area beneath the main entrance, as evinced by the weep pipes and drainage channel in that region, which drain to the sumps via polythene pipe, which is clearly not contemporaneous with the construction of Paddock.

5) The two distinct areas of ingress are, I suggest, the result of somewhat different causes, though both related probably to the demolition of the surface building - either in "phase 1" when the surface building was truncated, or "phase 2" when the remaining part was demolished.

My suspicion is that the principal flow down the staircase (actually occurring all along the joint between the top of the roof of the basement and the walls to the staircase - though most obviously on the landing) may have originated in phase 1, since the northern wall of the staircase was the limit of the remaining part of the surface building and there would have been severe disturbance when the northern end was demolished. This is not capable of proof of course - not least since we do not know exactly when that demolition occurred in the first place.

The leakage over the air-con room is almost certainly the result of the demolition contractors - or the builders subsequently - failing to properly seal the ducts that penetrate the roof slab of the basement at that point. As we now know, both the diesel intake pipe and at least two air ducts went through the slab at this point - there is no actual internal communication between the air passing through the air conditioning plant and the air circulation plant across the corridor - this must all have happened in the surface building. There are some indications that the primary air inlet to the air conditioning plant was outside the surface building - certainly the intake duct is outside the putative line of that building and coincides with an external rectangular object visible on the aerial images.

Since this was all demolished in phase 2, care would have had to have been taken to properly seal these ducts and pipes, and one can conjecture that this did not actually occur. In passing it is worth noting that this DID occur in the case of the air ducts passing through the roof into the northern part of the surface building - we do not see any water ingress through those holes.

6) Solutions - are expensive! Without checking my drawings and images I'm not sure if the southern ducts are under a house or in the front gardens. In either case, there is no real possibility of access to repair the seals, leaving the only real alternative of grout injection - which carries with it the risk of heave under the houses and consequent damage - if done properly it would do the trick, but it is not cheap!

The northern end could possibly be mitigated by setting a deep land drain immediately adjacent to the staircase wall and pressure injecting grout into the line of weakness where the brickwork (which may or may not actually front a concrete wall) meets the roof slab of the basement - but grouting on its own without a drain would simply force the water to find another path along that line of weakness - as it can be seen to be doing in a small way already. Again, the solution is not cheap - although possibly easier than that for the southern end.

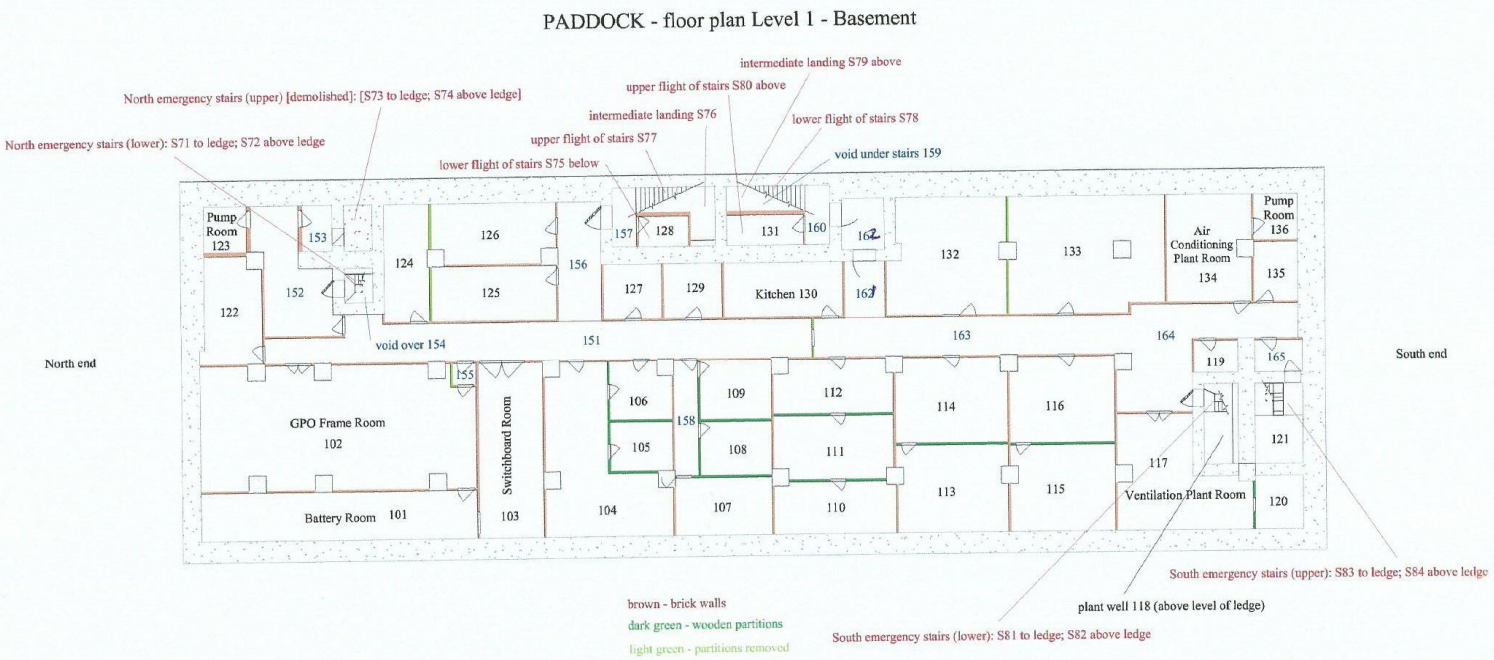
7) Draining the water from the "pond" outside the Air conditioning plant room could be achieved by cutting a small slot in the pipe that goes through the floor against the wall opposite - water would then run down to the lower basement and into the sump. It could even be channelled by a gutter directly into the sump to avoid discomfort to passers-by below!

There is no simple solution to the water ponding in the lower basement - it flows down a duct which surfaces more or less under the staircase wall - and blocking that would simply create a less manageable pond at the foot of the staircase. Annoying though it is, the water runs down the wall in the lower basement and at least only gives rise to wet feet rather than wet heads!

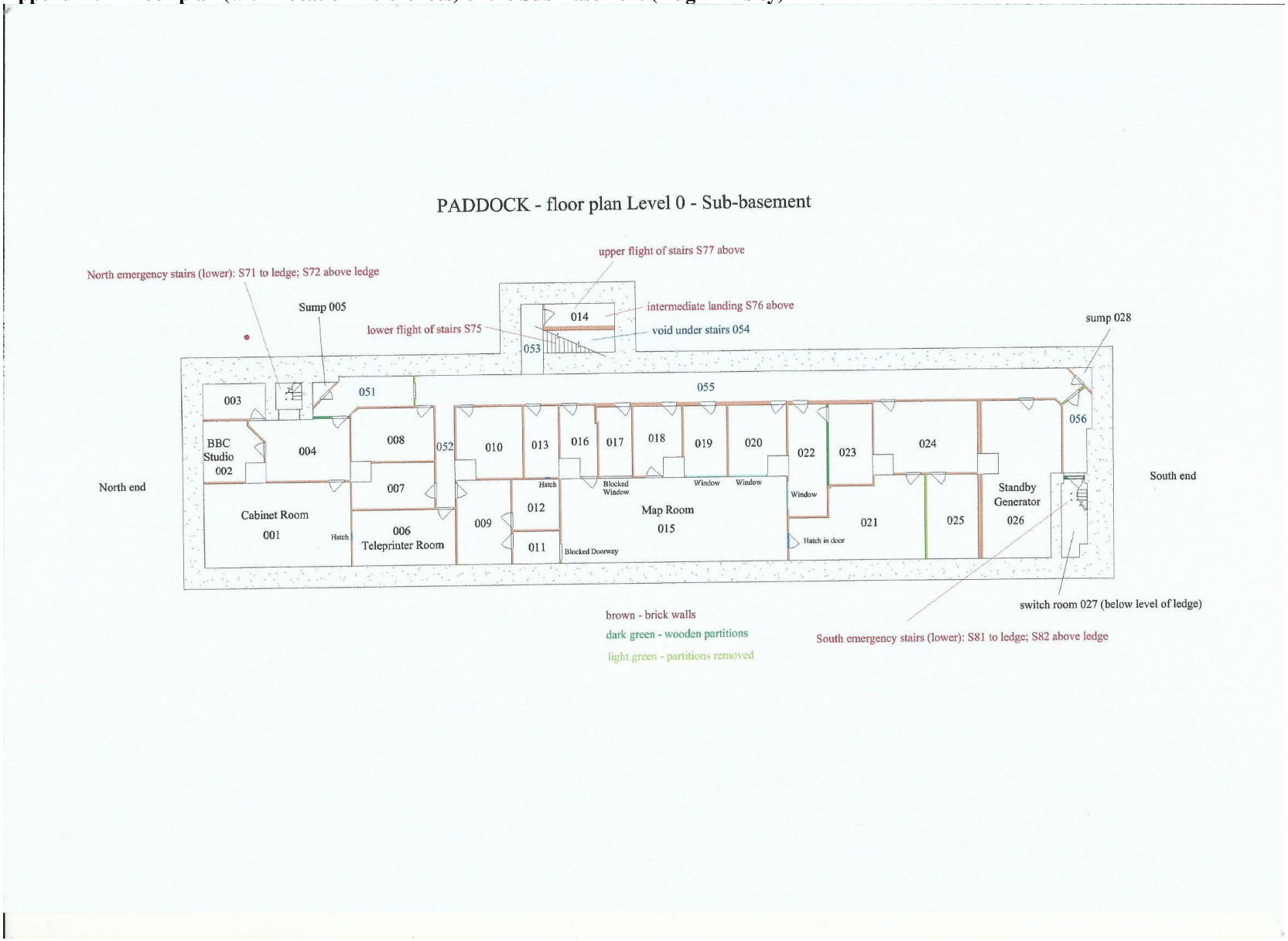
Source

[1] Dewatering, https://en.wikipedia.org/wiki/Dewatering
[2] Wadsworth, Cliff; *Dollis Hill Research Station and the secret wartime bunker* (2002) www.willesden-local-history.co.uk/books.htm
[3] Dry rot, www.allcottassociates.co.uk/blog/dry-rot-causes-identification-solution
[4] Wet rot, www.allcottassociates.co.uk/blog/wet-rot-causes-identification-solution

Appendix 4 – Floor plan (with Location References) of the Basement (Hugh Ainsley)



Appendix 5 – Floor plan (with Location References) of the Sub Basement (Hugh Ainsley)



Gallery

Image 1 (Photo: Bill Ridgeway)

Image 2 (Photo: Bill Ridgeway)

Image 3 (Photo: Bill Ridgeway)

Image 4 (Photo: Bill Ridgeway)

Image 5 (Photo: Bill Ridgeway)

Image 6 (Photo: Bill Ridgeway)

Image 9 (Photo: Bill Ridgeway)

Image 7 (Photo: Bill Ridgeway)

Image 10 (Photo: Bill Ridgeway)

Image 8 (Picture: Bill Ridgeway)

Image 11 (Photo: Bill Ridgeway)

Image 12 (Photo: Bill Ridgeway)

Image 14 (Photo: Bill Ridgeway)

Image 13 (Photo: Bill Ridgeway)

Image 15 (Photo: Bill Ridgeway)

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