

JOB NAME	LORDSFIELD SWIMMING CLUB
JOB No.	7483
	OVERTON SWIMMING POOL – STRUCTUAL ASSESSMENT
	January 2023

REPORT

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1 BRIEF:

Furness Partnership have been instructed by Abacus Consultant Management (Steve Emmas) to carry out a structural assessment for the Swimming Pool at Overton, currently being managed and maintained by Lordsfield Swimming Club (LSC).

The assessment is based on historical archive information and a site visit on Friday 2nd December 2022 accompanied by Janice Stott (LSC's Chair of Trustees).

2 EXECUTIVE SUMMARY:

The swimming pool at Overton would need to undergo a major overhaul of its water treatment system and plants to bring it up to the standard requirements of PWTAG. The cost and level of commitment involved for this improvement has made it necessary to include an assessment of the pool tank's structural condition. Within this report, observation of the swimming pools condition is provided. Due to limited access to the pool tank's structure, various options have been put forward as to how best to carryout investigation works for establishing the structural integrity of the pool tank's structure.

The reports also cover the condition of the existing plantroom and pool surround and provides initial advice on the proposed new plantroom and how best to improve the pool surround.

3 INTRODUCTION:

The swimming pool at Overton is an outdoor pool built back in the late 1950s within the grounds of Overton Church of England Primary School (Overton CE Primary School). The address of the site is Court Drove, Overton, Basingstoke, Hampshire RG2 3ES. The pool is operated by LSC between May and August every year, providing essential leisure facilities for the residents of Overton and the surrounding communities. The pool was historically managed by the school whom have since transferred control to LSC to manage and operate the pool using local volunteers.

The pool site's general arrangement comprises of a 23 x 9 meter rectangular pool (1-1.5m deep), pool surrounds, single storey changing facilities to the North and Single storey plant room on the South Eastern corner. Acces to the pool is through a recently built ramp off Court Drove. Timber fencing separates the pool from the surrounding school's ground with noticeable dense vegetation and trees on the East side of the site. The pool site stands proud of the surrounding area on an approximated 3m elevated level with sloping landscaped ground around it.



Figure 3.1: Aerial view of Overton Pool

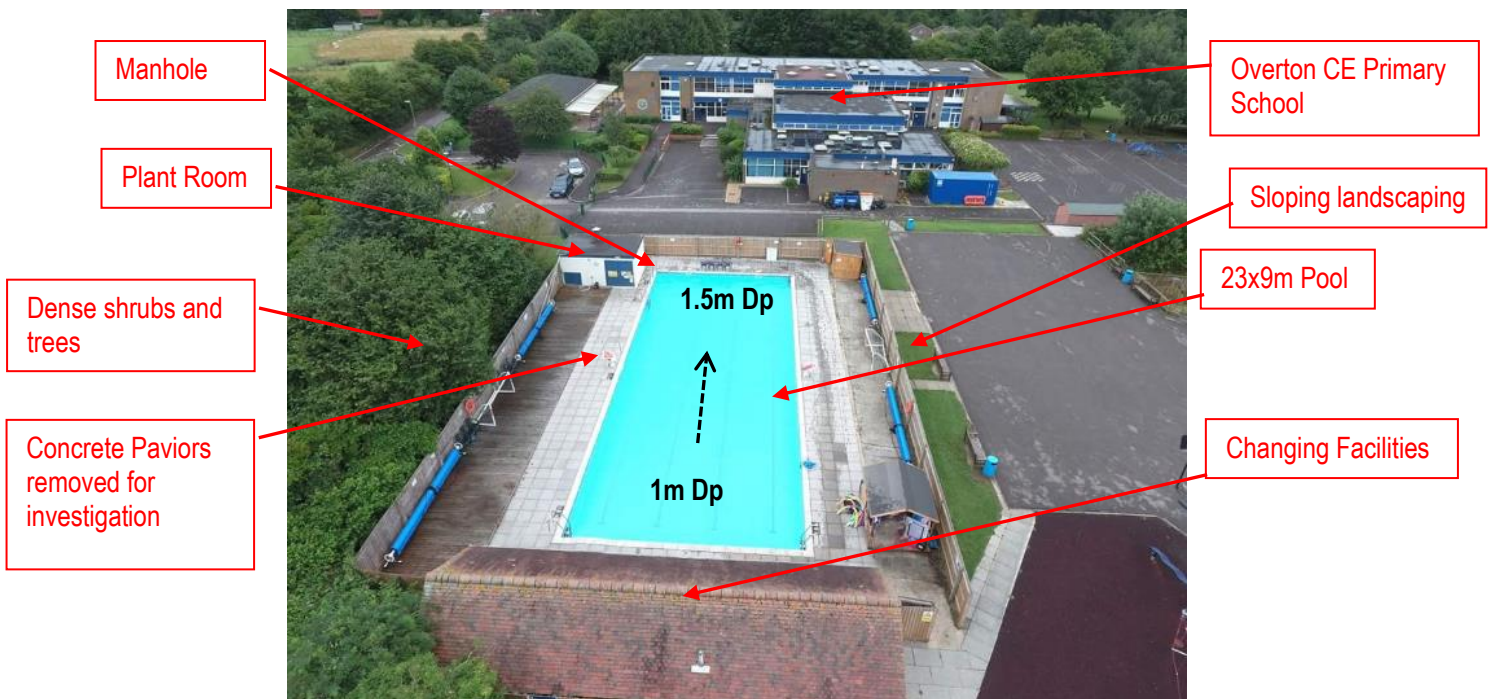


Figure 3.2: Drone view of Overton Pool looking South.

The pool has been gradually refurbished / improved since the original pool tank construction, with the introduction of concrete paviours / timber deckings to parts of the pool surrounds, new changing facilities in 1990s and new access ramp as recently as 2019. The pool's water level was approximately 350mm below the pool's edges, at the time of the site visit. Being closed for the winter season and presumably with less onerous maintenance regime, the water visibility was limited and not easy to see the bottom of the pool. However, it is possible to confirm that the pool tank is fully lined to the top edge, just below the perimeter concrete coping stone. We understand that the lining was introduced or lastly replaced back in 1987, which would make it well past its useful design life expectancy of 10-15 years for a lining typically made of some type of vinyl or plasticized PVC.

An approximate time line provided to us by LSC for the swimming pool is as follow:

- The pool tank built in late 1950s, open for swimming during schools summer break only.
- Filtration first installed in the mid 1960s followed by pool heating installed in the 1970's.
- A new pool tank liner installed in 1987.
- New changing block built in 1990s.
- Top of the pool liner updated and new concrete coping stone to the pools edge were introduced in 2000.
- Refurbishment carried out to the pool site mainly the changing block 2008.
- New entrance ramp built in 2019.
- Equipment shed erected in 2020.
- Changes and upgrade of plants has been made post 2015 with a plant room interior refurbishment in 2020.

4 SITE VISIT STRUCTURAL OBSERVATIONS:

4.1 Pool Tank

Although the pool lining covers the pool tank's structure, the back of the pool tank is visible at a location on the East side where a few surround paviours are removed, exposing the back of the tank's wall. As the concrete surface appears to be smooth, this could be taken as concrete built within formworks which is common for reinforced concrete structures. The wall is estimated to be 300mm thick based on approximate site measurements. The pool inlets and outlets are 350mm from the pools edge, approximately where the water level is. There is no evidence of any major defects to the pool tanks but considering the limited visibility of the water and being fully covered by an internal lining, there are little opportunity to confirm the tanks structural condition during the site visit.

There had been reports by the operators that the pool requires to be topped up by 25mm everyday on a regular basis which indicate loss of water. There are no obvious signs of leaks but the possible suspects for the leaks could be leaks from the water treatment pipes below the ground, service penetration into the pool tanks, possible breach of the tanks lining and loss of water through evaporation. Without, carrying out further testing, it would not be possible to confirm the leak(s) source(s).

4.2 Pool Surround

The pool surround is currently a combination of concrete coping stone to the edge of the pool built back in 2000 and concrete paviours to the immediate circulation area beyond. Concrete rough finish and partly timber decking on top of it can be seen on the outer periphery of the site's boundary meeting the wooden fencing.

The coping stone to the edge of the pool appears to be intact with little visible defect other than staining that can be easily jet washed. There is no overlap between the pool lining and the coping stone which makes it an easy weak junction for the water to scape behind the lining when the pool is being used by swimmers.

The concrete paviours generally appear weathered and sloping away from the pools edge. They appear to be intact, other than on the East side of the pool where a few of the paviours have been removed to further investigate the reason they have become loose and uneven. The hardcore below these appear to have been washed away by perched water that has loosened the ground and formed voids below the paviours. The source of the perch water would need to be further investigated and is likely to be water leaking from the pool tank, leaks from below ground services or as there are no drain gullies, rainwater has gradually found a natural draining route through the hardcore below the paviours.

The concrete and timber decking on the periphery of the site are showing signs of cracks and timber decay that need to be repaired or replaced subject to further investigation of their condition. There are a couple of timber shed type structure that are used for storage that appear to be a more recent introduction and have been well maintained.

4.3 Pool Plant Room

The pool plant is a single storey building located on the South Eastern corner of the site, covering an approximate footprint of 5.0 x 3.2 meters. The structure of the plant enclosure comprises of a flat lightweight timber felt roof supported on perimeter 100mm thick block walls with an internal ground bearing concrete slab. The foundation for this type of building is generally expected to be of a shallow concrete strip foundation below the walls.

Although the plant appears to be watertight and dry, there are signs of damp / moisture at various height of the block wall. The plant is also suffering from subsidence to one corner, with diagonal cracks as large as 6mm visible to the internal face of the walls corner. The damp to the wall appears to be a combination of rising damp, condensation, leaky plants and rainwater finding its way through the external render / single skin block wall. The concrete slab finish is uneven and roughly finished and shows signs of some cracks that could be due to ground movements.

The general arrangement of the plants and their condition is evident of a space that has gradually been changed as required to accommodate new plants as others have been decommissioned. To bring the plant room up to the current standard, the room's water tightness would need to be improved and the subsidence further investigated.

4.4 Manhole

A manhole has been located at the pinch point between the pool and plantroom that is providing drainage for the plant room and the pool. The manhole chamber is 600x500 internal dimensions, 2020mm in depth to invert level. The chamber is unusually made of block walls rather than brick and is unlikely to have been part of the original built. It could be that the manhole was introduced at a later date as a new chamber or replaced an original manhole. A recently constructed chamber of this depth could be associated to the subsidence identified in the plant room as it is in close proximity of the manhole.

There is no evidence of blockages to the chamber, but there are some crack to the upper parts of the chamber. There is no safe means of access to the bottom of the chamber for future inspections or maintenance.

4.5 Changing block

The new changing block on the North side of the site was constructed in late 1990's and refurbished back in 2008. The building's structure comprises of single storey tiled pitched roof supported by cavity masonry walls and vinyl internal finish surfaces. There are no visible signs of structural defects and the building appears to have been well maintained.

4.6 New Access Ramp

The latest addition to the site is the new access ramp providing access from Court Drove to the entrance next to the changing block. The ramp is covered by concrete pavements and enclosed with timber fencing. Considering the recent age of the ramp, there are no signs of defect to comment on.

5 DISCUSSIONS:

The general consensus is that the swimming pool at Overton would need to undergo a major overhaul of its water treatment system and plants to bring it up to the standard required by PWTAG (Pool water Treatment Advisory Group). This has been confirmed by Devin Consulting Limited Audit Report dated 03/11/2022 that generally recommends that the plant room would need to be increase in size and the water treatment systems renewed in order to significantly improve the pools water quality. The upgrade would come with a significant cost to introduce a much larger plant area of approximately 9x4 meter footprint, new plants and below ground pipe runs as well as additional service penetrations into to the pool tanks. The reports also mention the option of incorporating a level deck surface water removal system for further enhancement of pool's circulation system. This would generally involves introducing pool surround channels to the tanks perimeter instead of skimmers and adding a balancing tank along the side of the pool.

Considering the extensive level of work proposed for improving the overall condition of the swimming pool, the structural condition of the pool tank would also need to be considered for the improvement. Usual signs of a pool tank having structural problems have been noted below and commentary made on circumstances and scenarios that would need to be addressed:

1. **Loss of pool water** – A significant regular loss of pool water, can be indicative of structural defect and the pool tank not being watertight. This is usually investigated by an initial visual survey of the tank at close range, looking for signs of cracks and structural deformities. Unfortunately, this has not been possible, due to the fact that the pool tank is fully lined and full of water that is quite murky. The most likely scenario is that the pool tank was built and rendered originally and in due course a pool lining was introduced to maintain the pool tank 's watertightness. Historical photos of 1980's shows the pool empty and lined which could be the first time it pools lining was introduced. There has been reports of the pool loosing 25mm of water per day. That equates to over 5 m³ (5000 litres) loss of water or approximately 3.5% of the water volume per day. This is considered to be a significant amount of water loss indicative of a leak from the pool tank or the water treatment system, even if some is associated to evaporation. As there are no official records of the loss of water, it is best to collaborate this by maintaining a constant water level (clearly marked on the wall) and the depth of water lost recorded and volume of water used to top up to the same level over 24 hours period also noted, for a total period of 72 hours. It would also help to make a note of the water and air temperature and the weather condition (ie. Sunny, cloudy, rainy and windy). Following the testing we can then take a view of whether we would need to carryout further rigorous testing to identify the source of the water lost.
2. **Pool Tanks Structural Condition** – To assess the tanks structure, we would need to first establish type of construction. Looking at historical photos, period of build and observations on site, the tank is likely to be a reinforced concrete structure designed as cantilevered walls and ground bearing slabs. The walls thickness is estimated to be 300mm. The ideal option would be to empty the pool, remove the lining and carryout a visual survey, followed by hammer testing, and locally exposing the reinforcement to establish the condition of the reinforcement. Additional trial pits would also be dug to the ground face of the tank to assess the ground and wall condition. If this level of investigation is considered to be far too intrusive then the next option would be to dig out trial pits on the earth side of the tank to get a better understanding of the tanks and condition. Depending on the finding, we can then decide whether emptying of the pool is essential.
3. **Pool Lining** – The condition of the pool lining would need to be confirmed by specialist, to confirm whether it is still watertight and an estimate of its useful performance expectancy, if any. If the lining is the same one that was installed back in 1987, then it has long passed it design life and would need to change as part of the pool enhancement. Considering the level of service penetration required through the pool as part of the upgrade and the linings age, it is likely that the lining would need to also be changed which would provide the opportunity to better inspect the pool tank's structure. If this can be done early enough, then we can provide a better insight of the pool tanks condition, prior to fully committing to the pools upgrade of services.

The current plantroom would need to increase in size to accommodate the new water treatment system. Considering the existing plantroom requiring works to address rising damp, subsidence and improved weather tightness, the most suitable option would be to construct a new plantroom of the required larger size. This would be best done to a similar type pf construction as the changing room with loadbearing masonry cavity walls and insulated roof. The foundation is expected to be of a shallow strip foundation but would need to be considered in more detail, if the plantroom is to be located on the Easter Side of the site near the existing dense vegetation at an elevated level.

To introduce a level deck pool would require significantly greater level of structural intervention with the introduction of pool surround channels and new balancing tank. This would involve the trimming down of the existing pool wall in order to form the new channel in reinforced concrete, doweled to the top of the existing assumed concrete walls. The balancing tank would generally be formed as a reinforced concrete box of 250mm thickness.

6 CONCLUSIONS AND RECOMMENDATIONS

The Swimming Pool at Overton is in need of a full water treatment system upgrade that would include a bigger plantroom, replacement of the pool surrounds service pipes and an increase in numbers of service penetrations. If a level deck pool is also considered, pool surround channel and balancing tank would also need to be incorporated. The feasibility of the above works also depends on the structural condition of the pool tank and watertightness.

Based on the discussions and observations of the previous sections, the concluding option(s) have been summarised below and where necessary, recommendations provided:

- **New Plantroom** – A new plantroom would be the best way forward to provide the desired size for the proposed works and avoid the cost of improving / refurbishing the existing plantroom. The new plantroom position and design developed for the required plants general arrangement.
Recommendations: Based on a new 9x4m single story building, the structure can be of load bearing masonry cavity walls, ground bearing slab and lightweight insulated timber roof either flat or pitched. Ground investigation would be necessary to advise on foundation and ground bearing slab. If the plantroom is to be located close to the perimeter fencing on the East side, there is a level drop beyond the fence which would need a deeper footing and retaining wall.
- **Existing Plantroom** – The existing plantroom becomes redundant once the new one is built. The removal of the plantroom would also get rid of the pinch point of the circulation due to the current small gap between the plantroom and pools edge.
Recommendations: Demolish the existing plantroom and incorporate the space as part of the pool surround.
- **Existing Manhole** – The manhole adjacent to the existing plantroom is suffering from some cracks to the walls and inadequate safe access provided for maintenance.
Recommendations: Carryout remedial works to repair high level cracks to the wall chambers and carryout assessment as the best safe access for maintenance of the chamber. A CCTV of the drainage would be necessary to confirm their condition and suitability for the proposed improvement works.
- **Pool Surround** – The pool surrounds pavements appear to be fine other than on the Eastern side where a number of pavements have been removed to investigate the condition of the substrate. It is not clear how rainwater currently drains and the concrete / timber decking finish are not suitable for a public space and would need to be replaced with nonslip pavements to match the existing.
Recommendations: Carryout investigation as to the suitability of the substrate local to where the pavements have been removed. The rain water appears to be soaking into the ground through the pavement joints. Using containment membrane and manging the water soaking through the pavement should be considered as part of the proposed improvement.
- **Pool Lining** – The existing pool lining appears to be passed its useful design life. The timing of replacing the lining would influence to the way the investigation works for assessing the tank's structure is carried out. Early change would provide us the opportunity to inspect the structure prior to committing to the improvement works. Whilst, if it is decided to keep the lining for much longer, investigation would be limited to the ground side of the pool tank.
Recommendations: Seek advice from a pool specialist as to the condition of the pool's lining. The advice should confirm whether the lining would need to be changed fully or can it remain for a period of time with specific repair and enhancement works. If the decision is to retain the lining for longer, detail of accommodating new service penetrations through the lining should also be established. Improvement of the existing lining detail with the pools edge coping stone would also need to be considered.
- **Watertightness of the pool tanks** – It is unlikely for the pool tank to be considered as a watertight structure, considering its age and history. Hence, the most plausible option would be to provide the pool tanks watertightness by lining the internal face.

Recommendations: Carryout an initial watertightness monitoring test for 72 hours as explained in the previous section. This test would provide an insight on the effectiveness of the existing pool lining and help in deciding on whether the lining would need to be changed and a more detailed testing regime required to identify the specific source(s) of any leak(s).

- **Pool Tank Structural Integrity** – When assessing the tanks structure, the level of access we are able to have to the tanks structure would define the risk the client is exposed to prior to committing to the improvement works. The various options are explored below:
 - a) Access is provided to the waterside face of the pool tank early, before committing to the improvement works. We are able to carry out surveys of the tank on the waterside of the pool tank and based on the finding confirm whether addition opening up works are necessary. A limited number of trial pits would also be required to inspect the ground side of the tank.
 - b) Investigation work is limited to trial pits on the ground side face only to provide some insight on the condition of the tank. Further investigation works would then be carryout when the enabling works for the improvement works commences.
 - c) Investigation works and assessment of the structure is carried out only when enabling works starts for the improvement works.

Option (a) would provide certainty of the tank's condition / detail, prior to committing to the improvement works and gives the opportunity to provide better structural input if the level deck pool option is chosen. Option (c) obviously have the greatest risk of not knowing the tanks structural condition until the contractor is on site.

Recommendations: A decision on the above options should be made by LSC. Option (b) can be a reasonable compromise to provide some assurance as to the tanks condition. This can be in the form of 8 trial pits (4 at corners and 4 in between) of an approximate size of 750x750mm and 1.2m deep. This can be carried out as part of the ground investigation works, recommended above for the design of the new plantroom foundation.

APPENDIX A - PHOTOS



1959- Pool Official Opening Ceremony



Swimming Club Gala

Photo 1: Historical photos 1959 opening ceremony and 1960's Swimming Club.
For more historical photo refer to Galley & Pool Historical in link
<http://www.overtonswim.org.uk/community/lordsfield-swimming-club-6047/home/>



Lynne & Penny Stott with Maria Reed on the side of the pool

Photo 2: Historical photos 1970s. For more historical photo refer to Galley & Pool Historical in link <http://www.overtonswim.org.uk/community/lordsfield-swimming-club-6047/home/>



New Pool Lining 1987

Photo 3: Historical photo 1987 New pool lining. For more historical photo refer to Galley & Pool Historical in link <http://www.overtonswim.org.uk/community/lordsfield-swimming-club-6047/home/>



Fun with the Kids

Photo 4: Historical photo 1980s showing the plantroom in the background. For more historical photo refer to Galley & Pool Historical in link <http://www.overtonswim.org.uk/community/lordsfield-swimming-club-6047/home/>



Lordsfield Swimming Club 1990's

Photo 5: Historical photo 1990s showing the plantroom in the background and pool lining remains. For more historical photo refer to Galley & Pool Historical in link <http://www.overtonswim.org.uk/community/lordsfield->

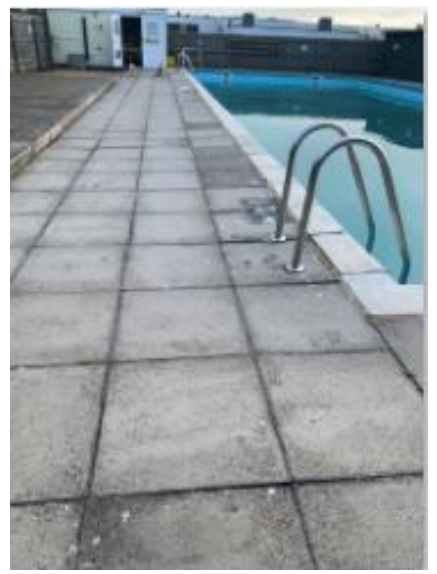


Photo 6: Overton General Site visit photos



Photo 7: Site visit photos - Plantroom



Photo 8: Site visit photos – Manhole photo next to Plantroom



Photo 9: Site visit photos – location of paviers removed to investigate substrate. Back of pool tank visible



Photo 10: Site visit photos – Examples of the pools edge and weak junction of the coping stone and lining