

**Overton Community Pool
Lordsfield Swimming Club
Pool Plant and Equipment Recommendations**

Summary

Though functional in the short term, the current pool system is unable to meet key PWTAG recommendations.

(As far as is understood, there is no legislative for pool maintenance. BS EN 15288-2:2018 Swimming pools for public use advocates a risk based approach and offers guidance as to risk assessments without defining system capability. PWTAG recommendations are considered to be the industry standard. As detailed in the Pool, Plant & Equipment Condition Report – 01 October 2021)

The most significant shortfall is in its turnover, the rate at which the pools water can be passed through the water treatment system. This, along with other deficiencies, make the current system non-compliant with accepted industry standards, inefficient to run, and pose a risk of forcing prolonged closure for a contamination event. *(Runny stool contamination requires 6 turnovers (7.5 days at current turnover rate) before re-use.)*

In the context of proposed increases to pool usage next season, doing nothing is not considered to be a reasonable option.

So many aspects of the pool system are linked to the turnover rate that it is recommended that an independent consultant be appointed to conduct a review of the whole system, with a view to informing the scope and design of any refurbishment works. Though it may be possible to implement a limited scope of improvement works on an ad-hoc basis, these are unlikely to result in a PWTAG compliant system and risk creating further unforeseen implications.

Costs

- A single quote for an independent consultant review has been obtained for c.£3,000 and further quotes would be sought before final consultant selection.
- Unfortunately, given the level of unknowns, it is beyond the capacity of the authors at this time to provide a rough order of cost to the enclosed proposals.

Options

It is anticipated that an independent report would recommend the works listed under "Minimal Modifications / Repairs" as a minimum.

1. Minimal Modifications / Repairs

| Modification / Repair | Reason |
|---|--|
| Increase number of inlets | Required if turnover is to be improved |
| Increase number of sump outlets | Required if turnover is to be improved and to remove a single point of failure. The existing pipework appears to be original and it is thought to be leaking. |
| Install new pipework to inlets / outlets | Required if turnover is to be improved |
| Replace or refurbish existing pump | Current pump leaking & unlikely to have capacity to meet target flow rate |
| Repair damaged skimmers and associated pipework | Required to reduce pool debris & meet PWTAG recommendations |
| Install flocculant dosing system | Current flocculation method ad-hoc and unsuitable |
| Install pool vacuum points | Unknown – same as sump outlets? This is not required to improve turnover but will allow any operative to vacuum the pool without having to access the plantroom. |
| Install additional safety shut-off switch at changing room | Not strictly necessary but worth doing while pipe trenches have been excavated. |
| Note: All of these actions will greatly improve the pool turnover rate, which is required to meet PWTAG recommendations now, but of increased importance if future plans to increase pool use are implemented. | |
| Note: Any failure of the pump will lead to pool closure until the fault can be fixed. | |

2. Beneficial Modifications / Repairs

| Modification / Repair | Reason / Comment |
|---|--|
| Replace pool liner (hopefully pool walls are in good condition) | To avoid unplanned failure as nearing the end of its useful life |
| Replace sump outlets & pipework | Look at Petersfield Lido sump outlets for ideas - options available |
| Replace inlets & pipework | To achieve the capacity required of higher turnover |
| Replace, increase skimmers | To achieve the capacity required of higher turnover |
| Replace pool access ladders / hand rails / fit lane rope hooks | Old - one set of ladders already unusable, rails past sell by date. Rope hooks will prolong life of rails if lane ropes not tied to them. |
| Replace pool covers (expensive but worthwhile) | Options available that would significantly enhance safety out-of-hours, speed up the process of covering & uncovering & potentially increase heat retention while the pool is not in use |
| Install pool lighting | If night time swimming is introduced the pool surround will need to be lit |
| Consider installing cabling for future surround lighting. | Cheaper to use the pipe holes trenches whilst dug |
| Replace pool filters | Larger filters would improve efficiency |
| Replace pump | Improve efficiency and reliability |
| Replace boiler | Improve efficiency and reliability |
| Refit plantroom pipework and electrical installations as required | In accordance with other modifications |
| Demolish and re-build plantroom | Turn through 90 degrees, sized appropriately & insulated this will Improve the access around the pool. |
| Replace decking | The decking is in a poor condition as it stands |
| Rethink poolside / surround | ie. Office shed more substantial building with electricity |
| Note: A quick fix to the boiler could result in an expensive repair that does not meet future requirements | |

3. Do Nothing

| Modification / Repair | Reason |
|--|--|
| Fire fight problems, run the pool into the ground then close it. | The Pump and Boiler are cause for concern. |

Pool Plant and Equipment Condition Report

The aim of this paper is to set out the current condition of the pool plant and equipment as far as it may be ascertained by visual inspection and reference to current manufacturers published literature for similar equipment. Most of the pipework between the plantroom and the pool fittings is buried and although attempts have been made to find its location and physical condition this has been nearly impossible with the means available.

Plantroom

At present the plantroom is adequately sized but if a more ambitious renovation of the pool were to be carried out this would probably be too small. The structure itself seems to be acceptable although there is some water ingress despite recent efforts to fill external cracks and external painting. The plantroom gets very cold and damp in winter and would benefit from some additional heating and installing insulation to the roof.

Pool Lining

At present the lining is still in an acceptable condition although bleached and fading in places but it is getting towards the end of its useful life and will need to be replaced at some point.

Pump

The current pump is a Calpeda NMP65/16FE serial number 020082975 manufactured in 2007. The date of installation at the pool is unknown. The design duty of the pump is unknown as there is no historical design information. At a best guess, the flow rate is 9.25 m³/hr or 16.0 l/s at 12.0 m head. Having discussed this with the manufacturer this is not the correct pump for the installation. Other pool specialists have also said that the pump is far too large. The pump is in a poor condition and there is a noticeable leak from a water seal. At the start of the 2021 season the pump would not run and it took some time to get it to work.

It will be necessary to replace the pump at some time but this should not be done until decisions regarding the rest of the pool have been made. If required, as a stop gap measure, the pump could be refurbished if it fails completely.

Filters

There are two filters installed; these are Certikin Atika S ATK 30 F-3058 ATK serial numbers EPO 2801218 and 2801219 manufactured in 2009. The design flow rate through each filter is 22 m³/hr or 6.10 l/s. The filter media was changed in 2019 from sand to glass. The filters are adequate for the current flow rates.

Boiler

The current boiler is gas fired and manufactured by Certikin model MB 405 P and has an output of 85 kW. The dates of manufacture and installation are unknown. The boiler has been serviced regularly but was not used last season (2020), this year's service is due 19th April 2021.

It would be worthwhile changing the boiler for a modern, more efficient model to work in conjunction with a plate heat exchanger which seems to be the current method for pool water heating. This could provide more space in the plantroom.

Skimmers

It has not been possible to find the manufacturer of the skimmers but these appear to be similar to the current Certikin model HD100. The design flow rate for these is 4.5 m³/hr or 1.25 l/s. Four skimmers have been installed but as is well known, two are out of use (those on the right-hand side, looking from the changing rooms) due to problems with the pipework leading back to the plantroom. A lot of effort has been put into locating the source of the leak but this has been inconclusive.

Pool Sumps

It has not been possible to find the manufacturer of the pool sumps but these appear to be similar to the current Certikin model HD 33. The design flow rate for these is $18.0 \text{ m}^3/\text{hr}$ or 5.0 l/s . There are two sumps installed. These are connected to what is thought to be the original cast iron pipework under the pool floor. A newer connection from the cast iron pipe has been made within the manhole adjacent to the plantroom. The old pipe and connection are a potential source of failure.

It would be exceedingly difficult to modify or replace the sumps and associated pipework as this would entail excavating under the pool floor.

Pool Inlets

There are two inlet nozzles at the changing room end of the pool, these were manufactured by Certikin and appear to be similar to the current model HD53. The design flow rate for these is $5.0 \text{ m}^3/\text{hr}$ or 1.4 l/s . A simple flow test was carried out and the combined flow rate was found to be approximately $9.25 \text{ m}^3/\text{hr}$ or 2.57 l/s . This is inadequate and appears that this is the limiting factor for the pool as they are performing at or near their maximum flow rate.

The size and route of the pipework from the plantroom to the inlets is unknown except that the pipe leaving the plantroom is circa 50mm internal diameter (I.D.).

Pool Turnover

This is the time taken for the equivalent of the whole volume of the pool water to pass through the water treatment system. The pool has a volume of circa 280 m^3 : using the flow rate above of $9.25 \text{ m}^3/\text{hr}$ this gives a turnover in the region of 30.30 hrs or 1 day 8 hours. The PWTAG recommendation for this type of pool is 2.5 to 3 hours therefore the pool flow rate would have to be between $112 \text{ m}^3/\text{hr}$ (31.1 l/s) and $93.3 \text{ m}^3/\text{hr}$ (25.9 l/s).

Proposal to Improve the Turnover Rate

The filters have been sized to give a combined flow rate of $44 \text{ m}^3/\text{s}$ (12.2 l/s) so it would seem sensible to base a future design on this figure. This would give a turnover time of 6.39 hours. A new pump will be required to provide the design flow rate at a suitable head. Given the limitations noted above this flow rate would enable the skimmers and pool sumps to remain undisturbed but the pipework to all four skimmers would need to be replaced. It would require new pipework to the outlets and new outlets to be installed.

PWTAG recommends that 20% of the water is removed from the pool via the skimmers and the balance taken via the pool sumps. On this basis the figures are shown below in litres per second using the design flow rates for current equipment:

Water removed via skimmers: $12.20 \times 20\% = 2.44$ or 0.60 per skimmer

Water removed via sumps: $12.2 - 2.44 = 9.80$ or 4.90 per sump

The flow rates above are within the design limitations of the sumps and skimmers. However, the general rule is that the sumps should be able to handle the total flow rate. This would be 6.10 l/s per sump which is greater than the sump design flow rate. This might cause a problem with entrapment so it would be necessary to ensure that the lower design flow rate was not exceeded.

Water returned to the pool: 12.20

Design flow rate for inlets: 1.40

Inlets required: 9 Nr

The pipework as installed is believed to be 50 mm I.D. this would not be able to handle the required flow rate and would need to be replaced. This would require significant work in the form of digging trenches around the side of the pool and installing new correctly sized pipework to the new inlets and skimmers.

Installation of the new inlets would require the side of the pool to be diamond core drilled, the liner cut and patched as required. At this stage it is not known if this is possible.

An estimated cost has not been made at this stage.

The above would need to be reviewed by a specialist Consultant or Contractor.