Condition Survey & Report

for the

Mechanical & Electrical Services Installation

at

St Georges Swimming Pool

221 The Highway

London, E1W 3BP

Report produced for

London Borough of Tower Hamlets

Technical Services Team

2nd Floor (Annexe)

Mulberry Place

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London, E14 2BG

Report produced by

GDN Support Services

Reference	21012-CSR-101a
Prepared by	S Godden
Date	November 2021

Contents

1 Issue & Amendments

Description	Reference	Date	Amendments
Follow Up Survey Report	21012-SCR-102	06 July 2021	Original Follow Up Document
Other surveys added	21012-SCR-102a	29 Nov 2021	Subcontracted surveys added

2 Introduction & Contact Details

GDN Support Services are delighted to present this Condition Survey Report on behalf of Building Logic (UK) Ltd.

GDN Support Services is a small company offering professional support to the building services industry both in the projects and facilities management sectors for the benefit of end users, consultants and contractors.

GDN Support Services specialises in undertaking condition and validation surveys and producing detailed, illustrated reports with our survey findings along with a professional analysis and conclusion.

Contact Details

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Sites Covered In This Report

St Georges Swimming Pool
221 The Highway
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3 Scope of Survey & Report

In the autumn of 2019 GDN Support Services have been engaged by the Technical Services Team at the London Borough of Tower Hamlets to undertake a survey of the Mechanical, Electrical, Control and Pool Specialist services as installed at St Georges Swimming Pool in Wapping, London, E1.

In July 2021 GDN Support Services were instructed to undertake a follow-up survey of the Mechanical and Electrical Services and to report on the current condition at that date and in particular to record any improvements,

The brief for the original survey was given as follows;

VENTILATION SYSTEM

The inspection will include the following areas:

* Reception and stairwells/landings
* Main pool hall
* Main pool Changing Rooms:
* Teaching Pool
* Teaching Pool Changing Rooms
* Fitness Area (First Floor)
* Dance studio (Laundry)

The inspection will include the following elements:

* Air Handling Unit (AHU) for the main pool/associated area
* AHU for the teaching pool/associated areas
* Fans
* Filters
* Heating elements
* Cooling units
* All ductwork
* Fire dampers
* Diffusers
* Inspection and comment on the ongoing maintenance regime currently in place

POOL PLANT

The inspection will include the following elements:

* Boilers
* Filtration
* Pumps

* Heating (Calorifiers)
* Pool pipework
* Hot water supply to showers
* Drainage
* Chorine injectors and disinfection system
* Inspection and comment on the ongoing maintenance regime currently in place

The report should include the following time categories in relation to all items inspected:

* Immediate repair/replace
* Repair/ replace Within 1 year
* Repair/ replace Within 3 years
* Repair/Replace within 5 years or after

Each item should have an estimate cost of repair or replacement with a brief comment for each suggested action.

The report should itemise all element inspected and provide copies of any current certification. The report should provide a narrative summary of the suggested works/replacement

Our survey has been based on the following criteria;

* Collection of Plant Details where available
* Visual Inspection of External Condition
* Visual Inspection of Internal Condition where accessible
* Plant Operating Condition & Faults
* Controls Operating Conditions & Faults
* General Observation of Overall Performance

No validation works have been undertaken on any of the mechanical or associated electrical and control services in the building.

There were no deep intrusive surveys to establish routes of any pipework, ductwork, electrical or data services throughout the building.

No drawings have been produced to record the location and nature of any of the mechanical or electrical services through within the building.

Our site surveys were undertaken on 19th to 22nd & 29th August 2019,

All our condition survey works have been undertaken from scratch as we have found no Operating & Maintenance Manuals or As Installed Drawings although a simple building plan for each level of the building was made available in order to provide location references and mark-up notes.

Follow-up Report

Our original survey report based on the above criteria was issued as 19009-CSR-101 on 23 October 2019.

We have considered revising this report page-by-page with our current finding but as this report was just over 200 pages long we have decided this would create a confusing document to use.

Accordingly, we have chosen to add an Addendum at the end of each individual section covering the relevance of the Follow Up report to that section.

All the Follow Up information is presented in BOLD type such as this

4 Description of Site & Services

St Georges Swimming Pool is located to the north of The Highway, the name of the A1203 in London E1W. The Highway was historically the main link between The City of London and the London Docks and is still the main road artery out of London to the east.

The building is in a west to east orientation with the main front aspect of the building facing south and the rear aspect of the building facing north. To the east of the building is an entrance to a small pay-and-display car park where there are also three staff/engineers parking bays.

The building dates from 1965 and was designed by the renowned modernist architect Reginald Uren.

It was originally planned as a part of a new St Georges Estate, a development never fully realised.

A picture from the British Newspaper Archive (copyright unknown) showing the newly opened St Georges Swimming Pools in 1965.

The design of the swimming pools was one of the last commissions completed by Reginald Uren.

The rear of the building showing part of the pay-and-display car park and, on the left hand side, the public entrance to the building.

At the far end of the car park are the staff and engineers parking spaces.

The public reception area off the car park entrance road on the northeast corner of the building.

The building is a concrete construction built over 5 levels, basement, ground, first floor, second floor, third floor and then roof level.

The basement area comprises solely a double height plantroom built beneath the main swimming pool.

The ground floor comprises the main public reception area. From the reception area there is access to a small teaching tool and associated changing rooms. The teaching pool is located on the southeast corner of the building.

The stairs to the first and second floors lye beyond the teaching pool and the male, female and family changing rooms and toilets. To the west of the reception area a door takes you into a staff only area. There is a long corridor with an access door to the basement and then a solid wall on the left (south) side whilst on the right (north) there are various staff offices, mess rooms and toilets. At the western end the corridor turns south and has a number of deep, full height storage areas. At the southern end of the corridor there is a fire escape door on the western perimeter wall whilst the corridor turns east where there is a fire escape door from the basement area.

Along the western corridor there is an opening through to both a small and a medium sized hall as well a small office and storage area. There are also male, female and disabled toilet facilities betweenthe halls and the office and storage areas.

At ground floor on the northern aspect of the building and with access from both the car park and the main staff corridor is what is known as the new plantroom.

At first floor level there is the main swimming pool that has glazed southern, western and northern aspects and a partially glazed eastern aspect. Also, on the eastern side of the main pool are the male, female and family changing rooms and toilets.

At second floor level is a public gallery overlooking the main swimming pool. Also, at second floor level is access to the lower roof level and a small plantroom. The small plantroom comprises an accessible GRP (glass reinforced plastic) housing supported on steelwork.

At third floor level is another public gallery overlooking the main swimming pool. This gallery is now out of use.

The main roof of the building a comprises barrel vaulted sections in a north-south orientation.

The roof over the ground floor teaching pool is of a similar barrel vaulted construction and it is believed that the ceilings in the teaching rooms changing rooms and toilets conceal a similar construction to this.

The main swimming pool from the eastern side looking at the south and north facing aspects of the building and showing the barrel roof construction. Also visible are the second and third floor level public viewing galleries. It is interesting to compare the view of the north facing aspect with the press picture from 1965.

The teaching pool looking at the east and south facing aspects of the building and showing the barrel vaulted construction of the roof.

From the basement plantroom there is, at the eastern end, a vertical services riser that terminates above the third floor area and which forms a tank room for the building. There is a south facing external weather louvre at the top of the vertical services riser

Also accessible off the basement plantroom is a staircase at the western end that forms a fire escape route up to ground floor level and a fire escape door in the southwest corner.

The building is recorded as having had a major refurbishment in 2008 and, accordingly, we shall be referring to original equipment (that dating from 1965) and refurbishment equipment (that dating from 2008).

Because of the relatively complex nature of the installation, before going on to look at how the building is currently serviced it is important to understand how we believe it was originally designed to be serviced.

Original Installation

Gas boilers were provided as the heat source to the building. The original gas supply appears to have been in the northwest corner of the plantroom as there and old gas meter and yellow painted mild steel pipework abandoned in this area along with further, abandoned gas service pipework at high level within the plantroom.

The gas boilers would, most probably, been atmospheric and drawn combustion air from the basement plantroom.

It would appear that the original boiler flues rose through the vertical service void to terminate above the flat roof to the tank room.

The low pressure hot water heating was distributed around the building by the use of heavy duty mild steel pipework with welded fittings. The original mild steel pipework appears to have been insulated using a loose rockwool type material secured in place with a chicken wire type netting in voids whilst in visible areas it had a hard cast plaster finish.

Ventilation to the pool halls and changing rooms appears to have been provided by systems of galvanised sheet steel ductwork originating in the basement plantroom. Each system appears to have been powered by a large, belt driven centrifugal fan both of which are still located within the plantroom, disconnected and abandoned.

The original pool halls belt driven centrifugal supply air fan and some of the disconnected and abandoned ductwork at high level.

An opening from the fresh air plenum chamber in the basement plantroom that originally connected to the belt driven centrifugal supply air fan.

The ductwork in the foreground is a part of the 2008 refurbishment.

It is not possible to view the original air intake at ground floor to the plenum chamber as this has been lost in the construction of the new plantroom in 2008. However, the original outlet from the fresh air plenum that must have connected to the supply air fan is still in evidence.

The original pool halls belt driven centrifugal return air fan and some of the disconnected and abandoned ductwork at both high and low level.

Note the "boarding up" applied to protect the openings.

It appears that fresh air was originally drawn from a room sealed plenum located on the north wall of the basement plantroom. Although it is inaccessible a view through the doors indicate there are still some bag filters in a frame in there along with a lot of general rubbish.

A view of the pressure sealed door to the original fresh air intake plenum along with a view of the remaining bag filters and the accumulated general rubbish.

The return air fan exhausted used air to the roof via the vertical services duct

The original pool halls return air ductwork that connected to the belt driven centrifugal fan from both the north and south aspects of the building and discharged through the vertical services riser to the roof.

It appears there was some de-humidification of the return air from the pool halls centred around an air cooled liquid chiller located in the basement plantroom. The chiller must have had a cooling tower or flat-bed cooler somewhere external to the building but all evidence of this has disappeared.

It is most likely the liquid chiller connected to a chilled water coil in the common return air ductwork from the pool halls that acted to de-humidify the air before it was reheated and re-supplied to the pool halls mixed with fresh air. All evidence of the fresh air/return air mixing chamber and the cooling coils have disappeared.

The old York air cooled liquid chiller in the basement plantroom where it has been left disconnected and abandoned. The evaporator shell and tube and flow and return valved pipework connections are clearly visible.

It is most probable that the original supply air to the changing rooms and toilets was a part of the overall fresh air supply system. It appears that the branch that supplied the changing rooms is still in existence and is being re-used and will be covered further on in this report.

It is probable that the original extract air from the changing rooms was a stand-alone system similar to that still being used and will be covered further on in this report.

On the flat roof to the north of the building over the fitness suite there are two curb mounted axial fans that provided extract to these first floor areas.

The original hot water system was most probably a low pressure hot water to secondary hot water calorifier in the basement plantroom. A lot of the original distribution flow and return pipework appears to be still in use in service risers and voids and ceiling voids where these are visible. The pipework is all installed in heavy grade galvanised mild steel tube and is evidenced through the rockwool with chicken wire covering.

The majority of the original cold water down service from the roof tank room appears to still be in use and will be covered further on in this report.

The majority of the original mains cold water service up to the roof tank room appears to still be in use and will be covered further on in this report.

Within the roof tank room are built three concrete cold water storage tanks as a part of the top of the vertical services riser.

Evidence of where the original mains cold water, cold water down and hot water service pipework is still in use.

It is interesting to note the mixture of pre and post 2008 insulation on the pipework and the post 2008 insulation that was never fitted to re-used hot water service pipework.

The original control panel appears to still be in use, albeit with some severe modification and will be covered further on in this report.

Current Installation

The basement plantroom houses the majority of the plant to service the building.

The heating for the main and teaching pool water as well as for the ventilation systems originates at a bank of six atmospheric gas boilers.

The gas boilers are split into two banks of three boilers with each bank having a common flue system that passes up the vertical services riser to discharge above the flat roof to the tank room.

The flues to each bank of three boilers is fitted with a single, bifurcated axial flue dilution fan at high level in the basement plantroom.

Combustion make-up air is provided to the basement plantroom trough a system of square galvanised sheet steel ductwork. The ductwork originates from a high level louvre in the new plantroom at ground floor level and which passes down to the plantroom through the old fresh air plenum chamber.

The boiler supply air system is fitted with a single axial fan at high level before discharging through three grilles at low level.

An extract ventilation system has been installed comprising three grilles on a single ductwork run located just above the height of the boilers and angled at 30^{o} down towards the boilers. The extract ventilation system is constructed in spirally wound galvanised sheet steel that passes at high level through the plantroom. The boiler extract duct is powered by a single axial fan at high level before passing into the old fresh air plenum chamber and rising into the new plantroom and discharging to atmosphere.

Gas is provided to boilers through a cased gas meter located at high level on the south wall near the fire escape stairs in southwest corner of the basement plantroom. The gas meter is fitted with a pulse reading head and a remote meter reading transmission device.

The gas supply pipework rises to high level in the plantroom before passing through a gas safety solenoid valve and then traversing at high level to the boiler location where it drops to low level and connects to each boiler through an individual supply pipe fitted with a gas cock.

All the gas service pipework is installed heavy grade mild steel pipework with a mixture of welded and threaded joints and is painted yellow throughout.

The boilers are piped up in a reverse return configuration.

Each of the boilers has its own safety valve that discharges onto the plantroom floor and a three way vent and drain cock on each of the flow connections.

There is a common open vent from the flow header that passes at high level into the vertical services riser to a polyethylene feed and expansion tank at the top. From the feed and expansion tank a new cold feed drops down the vertical services riser before passing at high level through the basement plantroom and connecting into the reverse return pipework before the connection to the first boiler.

The heating flow pipework passes through a twin head circulation pump before traversing at high level through the plantroom and connecting to the shell & tube calorifiers for the main and teaching pool, a high level two part heater battery in the changing rooms supply air duct, the hws calorifier, a heating coil in the air handling unit in the new plantroom, a heating coil in the air handling unit in the roof plantroom and the radiators in the ground floor staff areas and first floor fitness suite.

The heating circuits to the hws calorifier and the two air handling unit heating coils are fitted with their own circulation pumps.

The shell and tube calorifiers for both the main and teaching pools appear to have been taken out of use and replaced with plate heat exchangers each with its own circulation pump.

All the heating pipework appears to be installed in heavy grade mild steel pipe with a mixture of welded and screwed fittings and valves. The pipework installed as a part of the 2008 refurbishment appears all to be insulated using rigid glass fibre sectional lagging with either an aluminium hammerclad sheet covering or a sealed foil faced covering. The heating pipework installed pre the 2008 refurbishment has loose rockwool lagging with a chicken wire finish or no insulation at all.

Domestic hot water for the building is provided by a floor standing horizontal calorifier in thebasement plantroom. The hws calorifier is of the shell and tube style with the heating tubes fitted horizontally at the bottom of the vessel. The heating tubes are connected to the main heating circuit through the previously mentioned pumps and a three port diverting valve.

The hws calorifier has an open vent that passes at high level through the plantroom before passing up the vertical services riser to discharge over one of the tanks in the tank room. Also, from this tank, a cold feed pipe extends down the vertical services riser before traversing at high level across the basement plantroom and connecting into the underside of the hws calorifier.

Both the open vent and cold feed are installed in heavy grade galvanised mild steel tube.

The secondary hot water service extends from the calorifier and through a circulation pump fitted on the flow to high level within the basement plantroom and branching with one circuit going to the east side and into the vertical services riser whilst the other branch traverses at high level before dropping and passing into the undercroft.

The hot water service in the vertical services riser appears to serve the changing rooms and toilet areas whilst the hot water service in the undercroft appears to serve the toilets and staff facilities of the ground floor northern corridor. In all cases there is a complementary hot water service return backto the hws calorifier following a similar route.

The majority of the hot water used within the building is in the male, female and family changing rooms to both the main and the teaching pools.

Within the changing rooms are both thermostatically controlled showers and ranges of wash hand basins. Both the showers and the wash hand basins utilise both hot and cold water connections.

The majority of hot water service flow and return pipework is installed in copper tube with a mixture of mechanical and soldered fittings and valves but there is some installed in heavy grade galvanised mild steel pipework.

The pipework installed as a part of the 2008 refurbishment appears all to be insulated using rigid glass fibre sectional lagging with either an aluminium hammerclad sheet covering or a sealed foil faced covering. The heating pipework installed pre the 2008 refurbishment has loose rockwool lagging with a chicken wire finish or no insulation at all.

A mains cold water supply enters the building as a supply at low level on the south aspect of the building. The incoming water main enters the building in the southeast corner of the basement plantroom very close to the structure of the teaching pool.

After passing through a rotary turbine meter and an in-line filtration unit, the mains cold water service rises to mid-level on the east wall of the basement plantroom and pass along to the vertical services riser where it rises to connect to the three cold water storage tanks.

Another branch from the high level water main transverses at high level towards the west end of the basement plantroom where it supplies the chlorine room and a cleaning sink before dropping to low level and entering the undercroft where it is believed to serve the staff facilities.

There are at least three cold water down services taken from the roof tank room. The first of these passes down the vertical services riser as the cold feed to the secondary hot water calorifier. The second passes down the vertical services riser as the cold feed to the male, female and family changing rooms for both the main and teaching pools. The third supply passes down the vertical services riser before traversing at high level through the basement plantroom before dropping to low level and entering the undercroft at the west end of the plantroom where it is believed it goes on to serve the staff facilities on the ground floor.

Ventilation to the main pool is provided by a heat recovery air handling unit located in the new plantroom accessible from both the ground floor staff corridor and the car park to the north of the building.

The air handling unit comprises a belt driven supply and extract fan, a heating coil fed from the lphw heating system, a heating coil fed from the swimming pool return water and a refrigeration section and cooling coil. The heating circuit from the return swimming pool water is powered by a twin headed circulation pump at high level in the basement plantroom adjacent to the hot and cold water services heading for the western undercroft.

The fresh air is drawn in through an external louvre in the new plantroom and exhausted air is discharged through another external louvre at the other end of the new plantroom.

Supply air from the air handling unit to the pool hall is ducted external to the new plantroom to where there are two vertical risers on the north face of the building. The first rises to discharge into the building at first and second floor level whilst the second riser discharges into the building at third floor level.

At first floor level the supply air enters at high level just to the west of the fitness suite and branches in two directions both with a volume control damper on each branch.

The branch to the east serves a single grille on the north side of the pool whilst the branch to the west serves 27 grilles, 7 on the north side, 4 on the west side and 16 on the south side. The eastern supply air duct terminates after the single grille as does the western branch at the eastern end of the south wall. There is no ductwork and grilles on the eastern side of the building.

All the ductwork is installed as flat oval installed at high level to the underside of the concrete structure of the public viewing galleries. All the grilles are of a double deflection style and all are directed at the inside of the external face of the building.

At second floor level the supply air enters at high level at the eastern edge of the recess for the diving board where the supply air duct branches both to the west and to the east. There are volume control dampers on each branch and the two branches pass around at high level to the underside of the concrete structure of the public viewing galleries in a continuous loop. There are 22 grilles covering the north face of the building, 7 covering the west and 7 covering the east and 24 covering the south side of the building. All the grilles are of a double deflection style and all are directed at the inside of the external face of the building.

At third floor level the second of the external supply air risers enters the building at high level at the western edge of the recess for the diving board where the supply air duct branches both to the west and to the east. There are volume control dampers on each branch and the two branches pass around at high level to the underside of the roof slab of the public viewing galleries in a continuous loop. There are 21 grilles covering the north face of the building, 9 covering the west and 8 covering the east and

24 covering the south side of the building. All the grilles are of a double deflection style and all are directed at the inside of the external face of the building.

Return air from the pool hall is captured by a large grille located on the north wall of the building in the second floor public viewing gallery. A single return air duct external to the building drops to low level before passing through the flat roof, entering the new plantroom and connecting the heat recovery air handling unit.

All 4 ductwork connections to the heat recovery air handling unit are fitted with in-line attenuators within the new plantroom. All the external ductwork has glass fibre matting type thermal insulation overcovered with a painted hammerclad aluminium sheeting.

The ventilation to the teaching pool is provided by a heat recovery air handling unit housed in a purpose built plantroom constructed from reinforced glass fibre on a steel frame on the southwest corner of the flat roof over the teaching pool.

The air handling unit comprises a belt driven supply and extract fan, a heating coil fed from the lphw heating system and a refrigeration section and cooling coil. The lphw circuit to the heating coil is fitted with a single head pump located at high level behind the boilers in the basement plantroom. The heating flow and return pass into and rise up the vertical services riser before passing out onto the flat roof through a louvre and passing around at low level before finally rising into the roof plantroomand connecting to the air handling unit.

Fresh air is drawn in and extracted air exhausted through two ductwork cowls on the roof of the plantroom.

The supply air extends eastwards along the flat roof before in passes through a roof light and into a bulkhead on the north side of the teaching pool. Supply air is distributed to the teaching pool hall through three double deflection type grilles located at high level in the space between the barrel vaults forming the roof structure. The supply air is installed in thermally insulated galvanised sheet steel ductwork located on the flat roof on a purpose built support frame.

Return air from the teaching pool hall is captured by three double deflection grilles located between the barrel vaults of the roof structure. At roof level, a single insulated return air duct rises through an opening in the roof and immediately connects onto the air handling unit.

Supply air for the changing rooms is drawn in through an external weather louvre located at high level in a recess of the basement plantroom immediately to the west of the original intake plenum chamber. At ground floor level the external louvre draws fresh air from the car park to the north of the building.

Within the basement plantroom the changing rooms supply air is contained within a system of spirally wound galvanised steel ductwork installed at low level. The incoming fresh air passes through a system of bag filters before being handled by a pair of contra rotation cased axial fans.

After passing through the axial fans the supply air duct rises to high level and connects to the 2 part lphw heating coil previously described in the heating section. From the heating coil the ductwork system remains at high level before splitting into two branches, one for the main pool and one for the teaching pool that pass up the vertical services riser before passing through the walls into the respective areas served where the ductwork splits into separate runs to serve all areas.

Within both the teaching pool and main pool changing areas the supply air is distributed via a system of 4 way diffusers located in the false ceiling. These diffusers are connected to the supply air ductwork system by the use of foil faced flexible ductwork.

Air is extracted from the changing areas within both the main and teaching pool hall through a system of 4 way diffusers or eggcrate grilles located within the false ceiling. These diffusers are connected to the supply air ductwork system by the use of foil faced flexible ductwork.

The extracted air is handled by a ductwork installed within the ceiling void that passes back into the vertical services riser from where it passes to the flat roof level. The ductwork exists through an external weather louvre at the top of the services riser and into two contra rotating axial fans that power the complete system and which discharge via an angled, mesh covered, cowl.

Extract to the male & female toilets in the teaching pool is provided by two curb mounted extract fans located on the flat roof above the pool. These fans are connected to ductwork systems within the ceiling void that in turn connect to circular air valves installed within the false ceiling.

In the chlorine room a galvanised steel extract hood is installed over the dosing plant. The hood is covered in a heavy, black bitumastic type paint. From the hood a spirally wound galvanised steel duct traverses horizontally at high level through the plantroom before turning twice and entering the vertical services riser. On the high level horizontal run through the plantroom the extract duct is fitted with an in-line cased axial extract fan.

After entering the vertical services riser, the chlorine room extract duct turns to rise vertically as far as the south facing external weather louvre at the top of the services riser. The chlorine room extract duct discharges to atmosphere at the top of the external weather louvre through an angled, mesh covered, cowl.

All the hvac plant is powered from a large control panel located in a central position within the basement plantroom. The two heat recovery air handling units have their own built in temperature control panels as do each of the boilers.

The swimming pool plant operates continuously as does the heat recovery air handling units and the changing rooms supply and extract fans. Likewise, the boilers operate continuously along with all the associated circulation pumps.

All drainage systems are primarily installed in cast iron pipework although uPVC pipework has been used locally around wc’s, wash hand basins and sinks.

The drainage within the male, female & family changing rooms is mainly achieved through the use of floor channels with a stainless steel lift out grille. All the cast iron drainage that takes waste-water away from these channels in the teaching pool areas is built into the concrete slab. A lot the cast iron drainage from the main pool areas is visible below the slab above the teaching pool. All the wc pans and wash hand basins connect into vertical cast iron soil and vent pipes that appear in the vertical services riser or at high level in the basement plantroom.

The drainage from the western end of the building, mainly associated with ground floor staff areas and the old laundry area is again in cast iron pipework that goes into the concrete slab and connects into a cast iron pipe in the undercroft. This cast iron pipe exits the undercroft and turns before running in a fall to drop into the ground behind the three swimming pool circulation pumps. Just in front of the swimming pool circulation pumps there are two manhole covers at the bottom of the fire escape staircase from the basement plantroom.

On the right hand side of the swimming pool circulation pumps is a cast iron collar at floor level into which the sink unit adjacent to the chlorine room discharges via a run of surface waste-water pipework. In the chlorine room itself there is an open cast iron collar at floor level into which the overflows from the chlorine dosing meters discharge via small diameter plastic tubing.

All the soil and waste-water services eventually make their way to a large manhole situated adjacent to the south wall of basement plantroom behind swimming pool filter units no. 4 & 5. Within the manhole there is a cast iron access chamber with a bolted down lid.

All the rainwater drainage is installed in cast iron pipework and there are numerous rainwater pipes around the building.

At the eastern end of the building there are two rainwater pipes within the vertical services riser, one that picks up the rainwater from the main roof and lower roof over the teaching pool whilst the other picks up water from the roof over the fitness suite.

At the western end of the building there are rainwater pipes that drop down within each of the structural concrete columns adjacent to the south wall of the basement plantroom. On exiting the structural concrete-columns the cast iron pipework turns and connects into a long horizontal run of cast iron pipework installed with a fall along the south wall of the basement plantroom. At the western end of this run connects a vertical cast iron pipe that drops from high level ground floor where, at the top of the fire escape staircase and corridor, are four further connections at high level from above.

All these rainwater connections come together in a single cast iron pipe that drops into the floor very near to the large manhole previously described.

Follow Up Report – July 2021

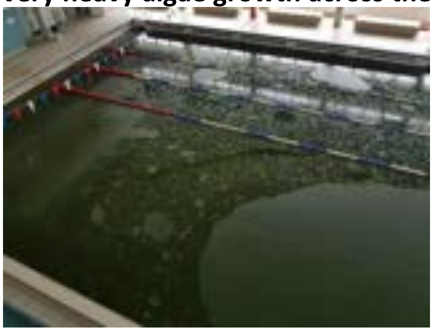
In essence, the Description of the Site and Services remains as accurate today as when our original report was written and published in 2019.

There have been some minor works carried out such as the replacement of a twin head heating pump but that is the limit of it. We have recorded these changes on the appropriate pages in Section 5 - Detailed Condition Survey.

With the outbreak of the Covid-19 virus the complete building was closed on the 23 March 2020. All plant was isolated in the plantrooms, but no services were drained.

The immediate outcome for this is that the main swimming pool, and to a lesser extent the small swimming pool have been left full of water but without any suitable water treatment for more than 15 months.

The result of this action is that the main swimming pool has experienced serious damage from a very heavy algae growth across the complete surface of the pool.



The main swimming pool as observed from the 3rd Floor Viewing Gallery.

The densely growing algae on the surface of the water

The densely growing algae growing up the wall on the north side of the pool where it is in the sunshine from the south facing widows on The Highway side of the pool. There is very little growth on the south wall of the pool where the wall is in shade from the sunlight.

The water in the smaller Teaching Pool is discoloured but is showing no signs of the heavy algae growth seen in the main pool. This is most probably because the blinds have been left down and restricted the direct sunlight onto the pool water.

Although the swimming pool specialists have been unable to meet the follow up reporting deadlines we have briefly discussed our photographs and observations with them.

The conclusion is that this level of contamination will have spread and will be contaminating the filter tanks and all the associated pipework systems.

5 Detailed Condition Survey

The key to the condition survey;

A	Very Good – No need for further action beyond regular maintenance
B	Satisfactory – Minor defects only requiring attention at next maintenance visit
C	Unsatisfactory – Major defects requiring immediate attention
D	Dangerous – Major defects requiring isolation until defects corrected
E	Requires Further Detailed Investigation
O	Non Operational
M	Parts Missing
N	Not Applicable
U	Unable to Identify
X	Life Expired

The key to the Life Cycle Assessment - A

A	Good for a further 10 years
B	Replacement required in the next 5 to 10 years
C	Replacement required in the next 5 years
D	Replacement required in the next year
E	Immediate replacement required

The key to the Life Cycle Assessment - B

A	No Required
B	Up to £500
C	Between £500 & £2,500
D	Between £2,500 & £5,000
E	Between £5,000 & £10,000
F	In excess of £10,000
U	Unable to assess

1	Building	Basement Plant Room	**Condition**
2	Description	Boiler No 1	
3	Manufacturer	Hamworthy	
4	Type	Atmospheric Gas	
5	Model	UR 365	
6	Serial No	Not Known	
7	Date	Not Known (circa 1980)	
8	Duty (input – kW)	101.40	
9	Duty (Output – Kw)	79.20	
10	Flow & Return - mm	50	
11	Min Flow Rate – l/s	Not known	
12	Gas - mm	20	
13	Gas Consumption – m^3/hr	Not Known	
14	Flue - mm	200	
15	Dimension – H x W x D	1010 x 535 x 1008	
16	Weight – kG (dry)		
17	Power Supply – V/Ph/Hz	240/1/50	
18	Power Rating - A	5.00	
19			
20	Operational Condition	Boiler non-operational – Life expired	**O - X**
21	Lifecycle Assessment **A**		**E**
22	Lifecycle Assessment **B**		**E**
23	Notes		

Dangerous – Do Not Use label attached dated 25 October 2012

Last maintenance – 24 August 2011

Part of casing missing

Burners badly corroded

Lower casing badly corroded

Parts missing

Flue overheated (galvanised finish burnt)

LPHW pipework still connected – losing heat

Missing casing

Dangerous – Do No Use label

Last Maintenance

Damaged Burner

Corroded lower casing

Damaged flue

1	Building	Basement Plant Room	**Condition**
2	Description	Boiler No 2	
3	Manufacturer	Hamworthy	
4	Type	Atmospheric Gas	
5	Model	Purewell Classic 80 Auto	
6	Serial No	SK12A1HGB36626F	
7	Date	2008	
8	Duty (input – kW)	90.90 (high Fire) – 35.10 (low fire)	
9	Duty (output – Kw)	80.00 (high fire) – 31.60 (low fire)	
10	Flow & Return - mm	50	
11	Minimum Flow Rate -l/s	1.74	
12	Gas - mm	20	
13	Gas Consumption – m^3/hr	9.44	
14	Flue - mm	206	
15	Dimension – H x W x D	870 x 532 x 954	
16	Weight – kG (dry)	285	
17	Power Supply – V/Ph/Hz	240/1/50	
18	Power Rating - A	2.00	
19			
20	Operational Condition	Boiler operational	**B**
21	Lifecycle Assessment **A**		**C**
22	Lifecycle Assessment **B**		**F**
23	Notes		
Last maintained – 05 October 2017 & 29 July 2019			

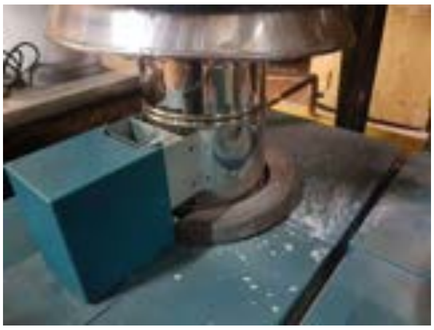
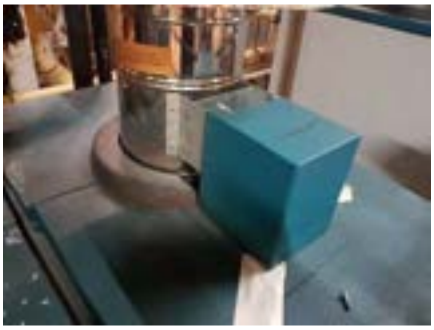
1	Building	Basement Plant Room	Condition
2	Description	Boiler No 3	
3	Manufacturer	Hamworthy	
4	Type	Atmospheric Gas	
5	Model	Purewell Classic 80 Auto	
6	Serial No	SK12A1HGB36627F	
7	Date	2008	
8	Duty (input – kW)	90.90 (high Fire) – 35.10 (low fire)	
9	Duty (output – Kw)	80.00 (high fire) – 31.60 (low fire)	
10	Flow & Return - mm	50	
11	Minimum Flow Rate -l/s	1.74	
12	Gas - mm	20	
13	Gas Consumption – m3/hr	9.44	
14	Flue - mm	206	
15	Dimension – H x W x D	870 x 532 x 954	
16	Weight – kG (dry)	285	
17	Power Supply – V/Ph/Hz	240/1/50	
18	Power Rating - A	2.00	
19			
20	Operational Condition	Boiler operational	**B**
21	Lifecycle Assessment A		**C**
22	Lifecycle Assessment B		**F**
23	Notes		
Last maintained – 05 October 2017 & 29 July 2019			



Boilers 2 & 3 in modular installation showing the previous 2 maintenance visits.



Boilers 2 & 3 have very clean burners and are clear of any major debris beneath.

The known problem areas with these boilers is the failure, and often seizure, of the nylon bearings on the flue standing loss damper. On boilers 2 & 3 these are intact and in a reasonable condition.

1	Building	Basement Plant Room	Condition
2	Description	Boiler No 4	
3	Manufacturer	Hamworthy	
4	Type	Atmospheric Gas	
5	Model	Purewell Classic 105 Auto	
6	Serial No	SF07A1HGB34416F	
7	Date	2008	
8	Duty (input – kW)	118.80 (high Fire) – 42.90 (low fire)	
9	Duty (output – Kw)	105.00 (high fire) – 38.0 (low fire)	
10	Flow & Return - mm	50	
11	Minimum Flow Rate -l/s	2.28	
12	Gas - mm	20	
13	Gas Consumption – m3/hr	12.36	
14	Flue - mm	256	
15	Dimension – H x W x D	1060 x 532 x 954	
16	Weight – kG (dry)	350	
17	Power Supply – V/Ph/Hz	240/1/50	
18	Power Rating - A	2.00	
19			
20	Operational Condition	Boiler operational	**B**
21	Lifecycle Assessment A		**C**
22	Lifecycle Assessment B		**F**
23	Notes		
Last maintained – 29 July 2019 & 12 September 2019			

1	Building	Basement Plant Room	Condition
2	Description	Boiler No 5	
3	Manufacturer	Hamworthy	
4	Type	Atmospheric Gas	
5	Model	Purewell Classic 105 Auto	
6	Serial No	SF07A1HGB34441F	
7	Date	2008	
8	Duty (input – kW)	118.80 (high Fire) – 42.90 (low fire)	
9	Duty (output – Kw)	105.00 (high fire) – 38.0 (low fire)	
10	Flow & Return - mm	50	
11	Minimum Flow Rate -l/s	2.28	
12	Gas - mm	20	
13	Gas Consumption – m3/hr	12.36	
14	Flue - mm	256	
15	Dimension – H x W x D	1060 x 532 x 954	
16	Weight – kG (dry)	350	
17	Power Supply – V/Ph/Hz	240/1/50	
18	Power Rating - A	2.00	
19			
20	Operational Condition	Boiler operational	**B**
21	Lifecycle Assessment A		**C**
22	Lifecycle Assessment B		**F**
23	Notes		
Last maintained – 30 July 2019 & 11 September 2019			

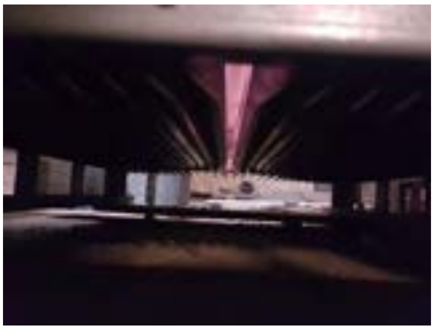
1	Building	Basement Plant Room	Condition
2	Description	Boiler No 6	
3	Manufacturer	Hamworthy	
4	Type	Atmospheric Gas	
5	Model	Purewell Classic 105 Auto	
6	Serial No	SF07A1HGB34419F	
7	Date	2008	
8	Duty (input – kW)	118.80 (high Fire) – 42.90 (low fire)	
9	Duty (output – Kw)	105.00 (high fire) – 38.0 (low fire)	
10	Flow & Return - mm	50	
11	Minimum Flow Rate -l/s	2.28	
12	Gas - mm	20	
13	Gas Consumption – m3/hr	12.36	
14	Flue - mm	256	
15	Dimension – H x W x D	1060 x 532 x 954	
16	Weight – kG (dry)	350	
17	Power Supply – V/Ph/Hz	240/1/50	
18	Power Rating - A	2.00	
19			
20	Operational Condition	Boiler awaiting replacement thermocouple, later seen working	**B**
21	Lifecycle Assessment A		**C**
22	Lifecycle Assessment B		**F**
23	Notes		
Last maintained – 06 October 2017 & 11 September 2019			



Boilers 4, 5 & 6. The known problem areas with these boilers is the failure, and often seizure, of the nylon bearings on the flue standing loss damper. On boilers 4, 5 & 6 these are intact and in a reasonable condition.




The last serviced dates including the previous last date and the current last date for information for boilers 4, 5 & 6

The clean burner frontage on boiler 4 and an evenly burning flame.


The clean burner frontage on boiler 5 and an evenly burning flame.

The clean burner frontage on boiler 6 and the clean underside of the burner assembly. Boiler 6 was out of service awaiting a thermocouple on our first visit but was observed as operational on our last visit.

1	Building	Basement Plantroom	**Condition**
2	Description	Boiler Flue System	
3	Manufacturer	Not known	
4	Type	Galvanised Sheet Steel into Stainless Steel twin wall vapour sealed	
5	Serial No	N/A	
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20	Operational Condition		**B**
21	Lifecycle Assessment **A**		**C**
22	Lifecycle Assessment **B**		**F**
23	Notes		

Galvanised sheet steel not best suited to use as boiler flue

Flue system showing minor water stains from leaks

Flue system generally sound



The three rising flues from boilers 6, 5 & 4 rise and connect into the 300 dia common flue.

The back draught damper in the common flue.

The three flues from boilers 1, 2 & 3 rise and connect into the 300 dia common flue.



The two common header flues turning towards the vertical services riser

The two common flues rise slightly into the vertical services riser

The vertical flues within the vertical services riser

Within the vertical services riser the two boiler flues turn and enter a purpose made brick shaft before rising to the roof and terminating at roof level (no access to survey fully)

1	Building	Basement Plantroom	**Condition**
2	Description	Flue Dilution Fan 1	
3	Manufacturer	Woods of Colchester	
4	Type	Direct Drive	
5	Serial No	JN 0257/1	
6	Filters (No. x size)	N/A	
7	Fans (Model)	Woods J Type Long Case Axial	
8	Fans (Type)	Galvanised Steel Case 320°C Bifurcated Axial	
9	Motor (Model)	Not Known	
10	Motor (Type)	Out of Airstream	
11	Motor (Voltage x Phase x Hz)	415/3/50	
12	Motor (Current Amp)	1.0	
13	Belts (No. x Type)	N/A	
14	Fan Controller	D.O.L.	
15	Fan Changeover	From Control Panel	
16	Fan Casing (Internal)	Galvanised Mild Steel	
17	Fan Casing (External)	Galvanised Mild Steel	
18	Duct Connections (mm dia)	300	
19	Duct Connections (Integrity)	Direct flange	
20	Operational Condition	Fan operational	**B**
21	Lifecycle Assessment **A**		**C**
22	Lifecycle Assessment **B**		**E**
23	Notes		

Signs of gaseous leaks on dried out flange gaskets

Fan noisier than expected

1	Building	Basement Plantroom	**Condition**
2	Description	Flue Dilution Fan 2	
3	Manufacturer	Woods of Colchester	
4	Type	Direct Drive	
5	Serial No	JN 0257/1	
6	Filters (No. x size)	N/A	
7	Fans (Model)	Woods J Type Long Case Axial	
8	Fans (Type)	Galvanised Steel Case 320°C Bifurcated Axial	
9	Motor (Model)	Not Known	
10	Motor (Type)	Out of Airstream	
11	Motor (Voltage x Phase x Hz)	415/3/50	
12	Motor (Current Amp)	1.0	
13	Belts (No. x Type)	N/A	
14	Fan Controller	D.O.L.	
15	Fan Changeover	Automatic from Control Panel	
16	Fan Casing (Internal)	Galvanised Mild Steel	
17	Fan Casing (External)	Galvanised Mild Steel	
18	Duct Connections (mm dia)	300	
19	Duct Connections (Integrity)	High temperature flexible on mild-steel flanges	
20	Operational Condition	Fan operational	**B**
21	Lifecycle Assessment **A**		**C**
22	Lifecycle Assessment **B**		**E**
23	Notes		

Signs of gaseous leaks on dried out flange gaskets

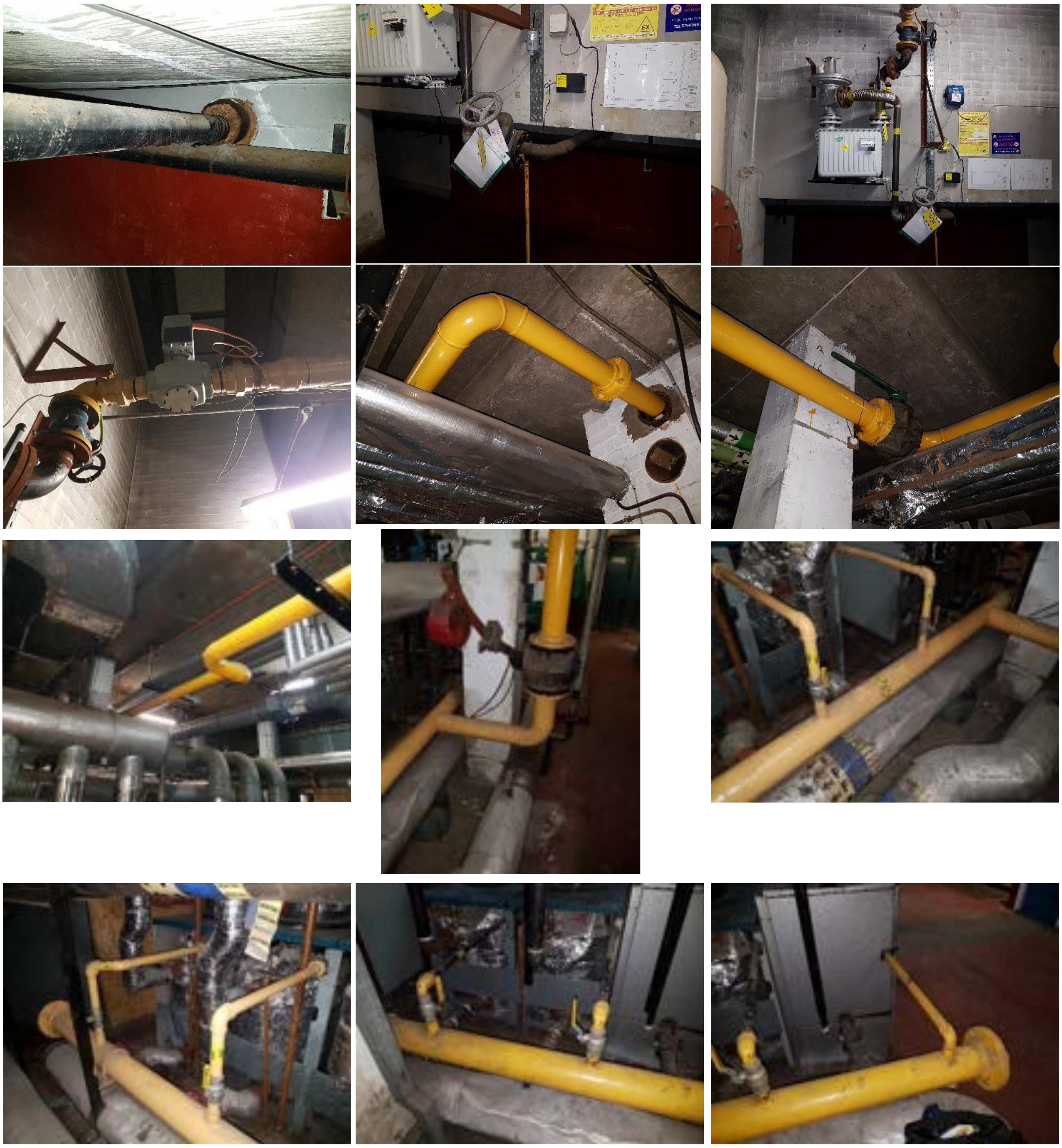
Fan noisier than expected



The two Woods of Colchester galvanised steel cased bifurcated flue dilution axial fans at high level

The motor plates on the bifurcated axial fans

1	Building	Basement Plantroom	**Condition**
2	Description	Gas Supply to Boilers	
3	Gas Meter Manufacturer	Elster	
4	Type	Cased Gas Meter	
5	Serial No	M100 K07165 15D6	
6	Date	2006	
7	Q Max m^3/hr	100	
8	Q Min m^3/hr	0.65	
9	Accessories	G4s Remote Meter Reader	
10	Gas Safety Valve	Blacks SafetySeat	
11	Gas Safety Valve Size - mm	100	
12	Gas Pipework	Black Mild Steel – Painted Yellow	
13	Gas Pipework Size - mm	100	
14			
15			
16			
17			
18			
19			
20	Operational Condition		**A**
21	Lifecycle Assessment **A**		**A**
22	Lifecycle Assessment **B**		**A**
23	Notes		



The gas service installation from incoming supply, gas meter, remote meter reader, gas safety solenoid valve, high level pipework, drop to boilers, mechanical gas safety valve and final connections to boilers.

Follow Up – July 2021

All gas services are isolated with the gas valves turned off at both the main meter and at each individual boiler.

1	Building	Basement Boiler Room	**Condition**
2	Description	Gas Safety System - Mechanical	
3	Manufacturer	Landon Kingsway	
4	Type	Electromec Mk ll	
5	Serial No	Not Known	
6	Valve Size - mm	100	
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20	Operational Condition		
21	Lifecycle Assessment **A**		**D**
22	Lifecycle Assessment **B**		**C**
23	Notes		

No record of last test
No written test procedure
Mechanical cable rubs on structural concrete
Mechanical cable rubs on flue casing
No proof of electric gas safety interlock







The Landon Kingsway mechanical gas safety system. The system has a drop weight on the end of the cable run next to boiler 6. There are bi-metallic thermal links in front of each boiler.

The cable rises to high level and then drops and connects to an emergency knock-off button adjacent to the main plantroom entrance door.

The cable rises again to connect to the weighted gas safety valve. On the way the cable rubs the boiler flue casing and a concrete column.

It could not be established if the mechanical gas safety system interlocked with the gas safety solenoid valve near the incoming gas meter.

1	Building	Basement Plant Room	Condition
2	Description	Primary Heating Circulation Pump	
3	Manufacturer	DAB Pumps Ltd	
4	Type	Canned Rotor Twin Head Pump	
5	Model	DKLP 80/1200 T	
6	Serial No	6.2014.41	
7	Date	Not Known (2014 ?)	
8	Speed - RPM	2840	
9	Duty – m^3/hr (design)	45.00	
10	Duty - m head (design)	10.00	
11	Duty – m head (min)	2.00	
12	Duty – m head (max)	11.80	
13	Connections - mm	80	
14	Connection - Type	Solid Flange	
15	Weight – kG (dry)	76	
16	Power Supply – V/Ph/Hz	415/3/50	
17	Power Rating - kW	1.84	
18	Power Consumption - A	6.80	
19			
20	Operational Condition		**B**
21	Lifecycle Assessment A		**B**
22	Lifecycle Assessment B		**E**
23	Notes		

No anti-vibration flexible connections

A lot of dust in motor housing (fire hazard)

There are no inlet and outlet pressure gauges

The primary twin head circulation pump installed on the common flow pipework and the manufacturers plate

Note the pump has no anti-vibration flexible connections but is protected by an in-line strainer

The pump has no inlet or outlet pressure gauges

1	Building	Basement Plant Room	Condition
2	Description	HWS Primary Circulation Pumps	
3	Manufacturer	Grundfos Pumps Ltd	
4	Type	Canned Rotor Twin Head Pump	
5	Model	UPCD 40-60-Type A	
6	Serial No	Not known	
7	Date	Not Known	
8	Speed - RPM	2790	
9	Duty – m^3/hr (design)	Not Known	
10	Duty - m head (design)	Not Known	
11	Duty – m head (min)	Not Known	
12	Duty – m head (max)	Not Known	
13	Connections - mm	40	
14	Connection - Type	Solid Flange	
15	Weight – kG (dry)	Not Known	
16	Power Supply – V/Ph/Hz	415/3/50	
17	Power Rating - kW	0.29	
18	Power Consumption - A	0.64	
19			
20	Operational Condition		**B**
21	Lifecycle Assessment A		**C**
22	Lifecycle Assessment B		**F**
23	Notes		
No anti-vibration flexible connections There are no inlet and outlet altitude gauges			

The hws primary twin head circulation pump installed on the flow pipework to the hws calorifier and the pump details

Note the pump has no anti-vibration flexible connections but is protected by an in-line strainer

The pump has no inlet or outlet pressure gauges

1	Building	Basement Plant Room	Condition
2	Description	Main Pool AHU Heating Circulation Pumps	
3	Manufacturer	Grundfos Pumps Ltd	
4	Type	Canned Rotor Twin Head Pump	
5	Model	UPSD 50-120-F-A	
6	Serial No	96403969-0111	
7	Date	Not Known	
8	Speed - RPM	Not Known	
9	Duty – m^3/hr (design)	Not Known	
10	Duty - m head (design)	Not Known	
11	Duty – m head (min)	Not Known	
12	Duty – m head (max)	Not Known	
13	Connections - mm	50	
14	Connection - Type	Flanged Flexible Bellows	
15	Weight – kG (dry)	Not Known	
16	Power Supply – V/Ph/Hz	415/3/50	
17	Power Rating - kW	0.72	
18	Power Consumption - A	1.30	
19			
20	Operational Condition		**C**
21	Lifecycle Assessment A		**E**
22	Lifecycle Assessment B		**F**
23	Notes		

A very bad leak on the lower head no. 2

A leak on upper head no 1

Fitted with working inlet and outlet altitude gauges

A very bad leak on adjacent automatic air vent

Follow Up – July 2021

It is noted that both these pump heads have been changed for new but installed on the same base casting. The associated automatic air vent has also been replaced.

The twin head heating pumps serving the heating coil in the main pool air handling unit itself located in the new plantroom.

There is a minor leak on the upper head no. 1 and a very bad leak on the lower head no. 2.

Both the inlet and outlet altitude gauges are working

There is a very bad leak on automatic air vent associated with these pumps

Follow Up – July 2021

The twin head heating pumps serving the heating coil in the main pool air handling unit itself located in the new plantroom have been replaced for new heads onto the existing body.

The associated automatic air vent has also been replaced.

The twin head heating pumps serving the heating coil in the main pool air handling unit itself located in the new plantroom have been replaced for new heads onto the existing body.

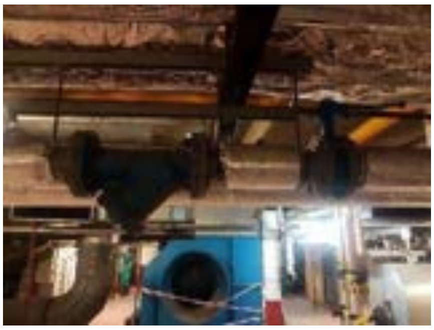
The corroded pump housing has been left in-situ where the staining of the previously leaks are in evidence.

1	Building	Basement Plant Room	Condition
2	Description	Main Pool AHU Recovered Heat Circulation Pumps	
3	Manufacturer	Grundfos Pumps Ltd	
4	Type	Canned Rotor Twin Head Pump	
5	Model	UPSD 50-120-F	
6	Serial No	96403969	
7	Date	Not Known	
8	Speed - RPM	Not Known	
9	Duty – m^3/hr (design)	Not Known	
10	Duty - m head (design)	Not Known	
11	Duty – m head (min)	Not Known	
12	Duty – m head (max)	Not Known	
13	Connections - mm		
14	Connection - Type	Solid Flanged Connections	
15	Weight – kG (dry)	Not Known	
16	Power Supply – V/Ph/Hz	415/3/50	
17	Power Rating - kW	0.720	
18	Power Consumption - A	1.30	
19			
20	Operational Condition		**B**
21	Lifecycle Assessment **A**		**B**
22	Lifecycle Assessment **B**		**F**
23	Notes		

Neoprene anti-vibration flexible connections

Strainer on inlet pipework – appears never to have been opened

Inlet and outlet altitude gauges both operational






The main pool recovered heat pumps and associated fittings. The pumps appear to be operational with only minor leaks from the motor access screw. The pumps are fitted with inlet and outlet isolating valves, neoprene anti-vibration bellows and altitude gauges and there is a differential pressure switch to activate auto-changeover in the event of a pump failure.

1	Building	Basement Plant Room	Condition
2	Description	Teaching Pool AHU Heating Circulation Pumps	
3	Manufacturer	Grundfos Pumps Ltd	
4	Type	Canned Rotor Single Head Pump	
5	Model	UPS 32-60-C	
6	Serial No	96405980	
7	Date	Not Known	
8	Speed - RPM	Not Known	
9	Duty – m^3/hr (design)	Not Known	
10	Duty - m head (design)	Not Known	
11	Duty – m head (min)	Not Known	
12	Duty – m head (max)	Not Known	
13	Connections - mm	32	
14	Connection - Type	Solid Flanged Connections	
15	Weight – kG (dry)	Not Known	
16	Power Supply – V/Ph/Hz	240/1/50	
17	Power Rating - kW	0.91	
18	Power Consumption - A	0.88	
19			
20	Operational Condition		**B**
21	Lifecycle Assessment A		**B**
22	Lifecycle Assessment B		**E**
23	Notes		

No anti-vibration flexible connections

There are no inlet and outlet altitude gauges

The single head circulation pump for the heating coil on teaching pool air handling unit

1	Building	Basement Plant Room including Vertical Services Riser & Undercroft	Condition
2	Description	Heating System Pipework, Valves & Gauges	
3	Manufacturer	Various	
4	Type - Pipework	Mild Steel and Some Copper	
5	Type - Valves	Cast Iron & Bronze and Ametal	
6	Size - mm	Various for ½" bsp to 6" bsp	
7	Pipe Fittings	Screwed and Welded Flange – Screwed Malleable Iron Threaded	
8	Pipe Jointing	Screwed and Welded Flange – Screwed Malleable Iron Threaded	
9	Pipe Supports	Various – U Cleats on Channel, Munsen Rings, Unistrut Systems	
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20	Operational Condition		**B + C**
21	Lifecycle Assessment **A**		**B + D + E**
22	Lifecycle Assessment **B**		**F**
23	Notes		

The majority of the original pipework requires immediate attention – external condition

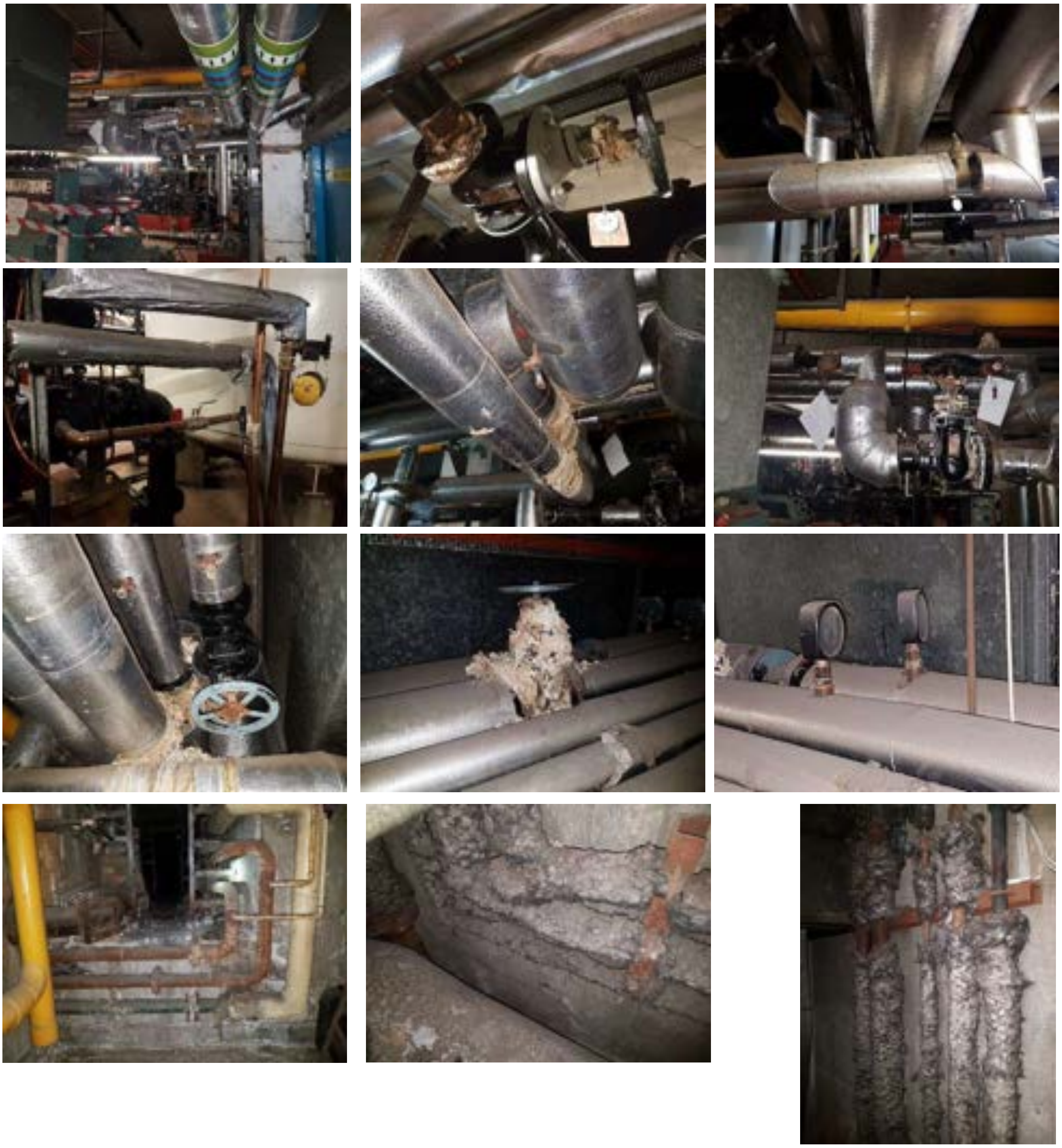
Major leaks on valves and fittings require immediate attention

Weeping or leaking glands on most valves require attention

Strainers never been opened & cleaned

Inaccessible gauges require relocation

No dosing pot or injection & monitoring point for water treatment to the heating system has been seen



Various images of the heating pipework in the basement plantroom. The level of leaks on valve glands is enormous. The existing heating pipework into the undercroft is still in use, badly corroded and uninsulated. The existing heating pipework into the vertical services riser is again in very poor condition.

The vertical services riser and the undercroft must be considered confined spaces and we did not enter them to undertake the survey.

1	Building	Basement Plant Room	Condition
2	Description	Main Pool Recovered Heating System Pipework, Valves & Gauges	
3	Manufacturer	Various	
4	Type - Pipework	uPVC	
5	Type - Valves	Cast Iron & Bronze and Ametal	
6	Size - mm	2”	
7	Pipe Fittings	Solvent welded spigot & socket + flanged transition to pumps	
8	Pipe Jointing	Solvent Welded spigot & socket + flange transition to valves & meter	
9	Pipe Supports	Various – U Cleats on Channel, Munsen Rings, Unistrut Systems	
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20	Operational Condition		**B**
21	Lifecycle Assessment **A**		**C**
22	Lifecycle Assessment **B**		**F**
23	Notes		

Minor leaks on valves and fittings require immediate attention
Weeping or leaking glands on most valves require attention
Strainers never been opened & cleaned
Low level water meter requires cleaning to read
Thermal insulation to low level pipework requires replacement











The main pool heat recovery pipework from its connection to the return water header to the riser where is passes vertically to enter the new plantroom.

The pipework is only insulated after the double regulation valve and water meter and the low level insulation is in a very poor condition. The insulation to the high level pipework is in a reasonable condition but clearer identification as heat recovery pool water would be a good idea.

Se separate section for main pool heat recovery pumps.

1	Building	Basement Plant Room including Vertical Services Riser & Undercroft	Condition
2	Description	Heating System Pipework – Thermal Insulation	
3	Manufacturer	Various	
4	Type - Pipework	Mild Steel and Some Copper	
5	Size - mm	Various for ½" bsp to 6" bsp	
6	Thermal Insulation - Old	Rock wool with chicken wire or canvas scrim	
7	Thermal Insulation - New	Glass fibre sectional with foil face or aluminium hammerclad	
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18			
19			
20	Operational Condition		**B + C**
21	Lifecycle Assessment **A**		**B + D + E**
22	Lifecycle Assessment **B**		**F**
23	Notes		

The majority of the original pipework requires immediate attention – thermal insulation missing or in very poor condition

New insulation badly damaged in places

New insulation covered in leaked water in places

Loose or disturbed thermal insulation is creating a dangerous dust hazard in the vertical services riser and the undercroft

Identification banding incorrect direction arrows












Various images of the heating pipework insulation in and around the basement plantroom. Some is in very good condition, some is water damaged but a lot is life expired or non-existent. The heating flow and return identifications are correct but the direction of flow arrows are incorrect.

The old rockwool insulation is creating a dangerous dust hazard in the vertical services riser and the undercroft.

1	Building	Basement Plant Room	Condition
2	Description	HWS Calorifier	
3	Manufacturer	Heat Transfer Ltd	
4	Type	Horizontal shell and tube calorifier	
5	Model	SMG 1500L/53W/H	
6	Serial No	HW3413G	
7	Date	1983	
8	Capacity – Litres (secondary)	1500	
9	Capacity – Litres (Primary)	Not known	
10	Duty – LPHW Primary	Not known	
11	Connections mm – Primary F	50	
12	Connections mm – Primary R	50	
13	Connections mm – HWS F	50	
14	Connections mm – HWS R	25	
15	Connections mm – HWS CF	50	
16	Connections mm HWS OV	50	
17	Connections – Type (LPHW)	Screwed black heavy grade mild steel	
18	Connections – Type (HWS)	Screwed galvanised heavy grade mild steel	
19			
20	Operational Condition		**B**
21	Lifecycle Assessment **A**		**C**
22	Lifecycle Assessment **B**		**F**
23	Notes		

Bad leak on LPHW tube cluster flange onto calorifier shell

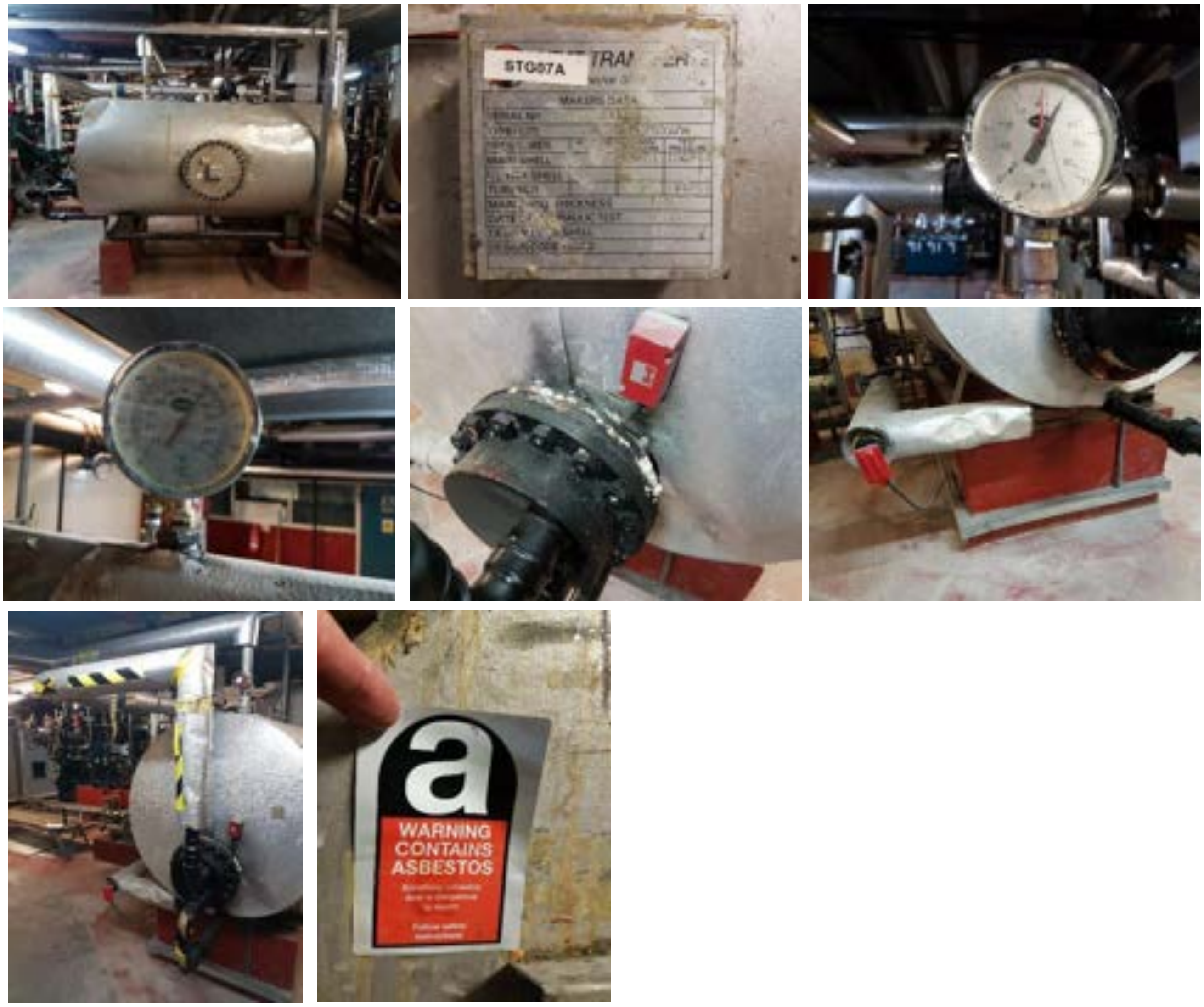
Minor leaks on valve glands

Thermal insulation in poor condition

3 port diverting valve on primary return seems non-operational

HWS stored at 75°C

HWS stored at 15m static head



The general layout of the LPHW to HWS shell and tube calorifier showing the manufacturers data plate, the altitude and temperature gauge, the thermal insulation and the leak on the LPHW tube cluster flange. It is believed the asbestos warning notices is applicable to the gaskets.

The secondary HWS flow and return connections to the HWS calorifier.

Both appear to be relatively new in comparison with the age of the calorifier and most probably date from the 2008 refurbishment.

The open vent and cold feed connection to the HWS Calorifier.

Both appear to be relatively new in comparison with the age of the calorifier and most probably date from the 2008 refurbishment.

1	Building	Basement Plant Room	Condition
2	Description	HWS Secondary Circulation Pump	
3	Manufacturer	Grundfos Pumps Ltd	
4	Type	Canned Rotor Single Head Pump	
5	Model	UPS 40-50-FN-250	
6	Serial No	98057242	
7	Date	Not Known	
8	Speed - RPM	Not Known	
9	Duty – m^3/hr (design)	Not Known	
10	Duty - m head (design)	Not Known	
11	Duty – m head (min)	Not Known	
12	Duty – m head (max)	Not Known	
13	Connections - mm	40	
14	Connection - Type	Solid bsp screwed flanges c/w non-return valve	
15	Weight – kG (dry)	Not Known	
16	Power Supply – V/Ph/Hz	240/1/50	
17	Power Rating - kW	0.105	
18	Power Consumption - A	0.46	
19			
20	Operational Condition		
21	Lifecycle Assessment **A**		
22	Lifecycle Assessment **B**		
23	Notes		

No anti-vibration flexible connections

Inlet and outlet altitude gauges not working

Was originally one of two pumps – pump no. 1 removed

1 ½" by pass valve fitted (closed)

The HWS secondary circulation pump showing where the second pump was once installed and the by-pass valve.

The pump plate, the inlet and non-return valve, the outlet and by-pass valves all showing signs of minor leaks on the threaded connections.

The non-operational inlet and outlet pump gauges

1	Building	Basement Plant Room including Vertical Services Riser & Undercroft	Condition
2	Description	Hot & Cold Water Services Pipework, Valves & Gauges	
3	Manufacturer	Various	
4	Type - Pipework	Galvanised Mild Steel and Some Copper	
5	Type - Valves	Cast Iron & Bronze and Ametal	
6	Size - mm	Various for ½" bsp to 2" bsp	
7	Pipe Fittings	Screwed and Welded Flange – Screwed Malleable Iron Threaded	
8	Pipe Jointing	Screwed and Welded Flange – Screwed Malleable Iron Threaded	
9	Pipe Supports	Various – U Cleats on Channel, Munsen Rings, Unistrut Systems	
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19			
20	Operational Condition		**B**
21	Lifecycle Assessment **A**		**C**
22	Lifecycle Assessment **B**		**F**
23	Notes		

The majority of the original pipework requires immediate attention – external condition

Leaks on valves and fittings require early attention

Weeping or leaking glands on most valves require attention

Non-working gauges require replacement

Would recommend replacement of second hws secondary pump as a stand-by









The secondary hot water service pipework that changes from galvanised mild steel to copper and rises to high level before splitting in two directions.

The thermal insulation is in poor condition in the majority of areas and the services are lagged together with the cold water down services making tracing difficult.

Where it exists the identification banding and direction of flow arrows are correct.



The secondary hws flow and return and the cold water down service where they enter the undercroft at the west end of the plantroom.

The undercroft must be considered a confined space and with the high level of dust and dirt must also considered a health hazard.





The hot flow and return pipework and the domestic cold water service at the eastern end of the plantroom where they pass into vertical services riser and pass up to high level ground floor before passing through the wall and into the changing rooms ceiling void.






The hws open vent and cold feed along with the LPHW heating open vent and cold feed enter the vertical services riser together and rise to high level. All these vertical services are uninsulated until the open vent immediately adjacent to the tank room.




The 100 gallon plastic heating feed and expansion tank installed on a crude timber platform above what appears to be a life expired galvanised feed and expansion tank.

The tank has been distorted at some point and the lid does not fit correctly.

The cold feed connection is unsupported.

1	Building	Basement Plant Room including Vertical Services Riser & Undercroft	Condition
2	Description	Hot and Cold Water Service Pipework – Thermal Insulation	
3	Manufacturer	Various	
4	Type - Pipework	Galvanised Mild Steel and Some Copper	
5	Size - mm	Various for ½" bsp to 2" bsp	
6	Thermal Insulation - Old	Rock wool with chicken wire or canvas scrim	
7	Thermal Insulation - New	Glass fibre sectional with foil face or aluminium hammerclad	
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19			
20	Operational Condition		**C**
21	Lifecycle Assessment **A**		**D**
22	Lifecycle Assessment **B**		**F**
23	Notes		

The majority of the original pipework requires immediate attention – thermal insulation missing or in very poor condition

New insulation badly damaged in places

New insulation covered in leaked water in places

Loose or disturbed thermal insulation is creating a dangerous dust hazard in the vertical services riser and the undercroft

Identification banding incorrect direction arrows









The thermal insulation to the hws calorifier and local pipework is damaged. In numerous location the high level insulation has been opened up and not resealed.

At the western end of the plantroom the hot water flow and return pipework has been crudely insulated together with the associated cold water down service and mains cold water service with some pipework just covered with the foil finish and not actually insulated.

The secondary hot water service flow and return along with the associated cold water down service and mains cold water service enter the undercroft initially uninsulated but within the undercroft have a loose covering of rockwool with a chicken wire finish.











The hot and cold water service insulation around the pumps and at high level is in a reasonable condition and correctly identified. Going into the vertical services riser the thermal insulation is non-existent. Rising vertically, some existing pipework has been re-used and the insulation consists of loose rockwool with a chicken wire covering until this finishes although un-installed glass fibre sections appear to have been planned for these pipes.

1	Building	Vertical Services Riser & Tank Room	Condition
2	Description	All Pipework & Ductwork Services	
3	Manufacturer	Various	
4	Type - Pipework	Galvanised Mild Steel and Copper	
5	Type - Ductwork	Galvanised Mild Steel	
6	Type – Thermal Insulation	Mostly loose rockwool with chicken wire coverage	
7	Access	Vertical Steel Ladder	
8	Storage Tanks	3 No Concrete Tanks (part of the building structure)	
9			
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20	Operational Condition		**C**
21	Lifecycle Assessment **A**		**E**
22	Lifecycle Assessment **B**		**F**
23	Notes		

Lots of life expired and dead pipework

Lots of life expired and dead ductwork

Rotted steel walkway to tanks

Tanks do not comply with water regulations – no fixed lids, no manway access to ball valves, no screen overflow pipe, no warning pipe

No access to outlet valves – space beneath walkway full of rubbish and old insulation

Lots of loose rockwool insulation creating dust – a serious health hazard

Restricted access – the whole vertical services riser should be classed as a confined space

No identification of live services – confusion with dead services very likely











The tank room contains three large concrete tanks that are constructed as a part of the building structure.

The access is very unsafe with rotted steel walkways.

The tanks do not comply with water regulations in that they do not have fixed lids with manway access to ball valves and there are no screened overflow pipes. The warning pipes all pass down the vertical services riser to a large tundish in the basement plantroom.

The level of accumulated rubbish is atrocious and the build-up of dust, mainly from the old rockwool insulation is a serious health hazard.

Because of the severely limited access and headroom the tank room must be considered a confined space.

A large circular duct at the top of the vertical services riser has become a rubbish trap. The previously discussed heating feed and expansion tank, note the mains cold water supply to this supported by a piece of red wire and the old galvanised steel feed and expansion tank.

A view down the complete 16.50 metre tall access ladder within the vertical services riser.

There is a large external louvre at the top of the vertical services riser.

Within the vertical services riser are a lot of life expired and redundant pipework and ductwork services as well as a few live ones. Trying to differentiate between these is almost impossible due to lack of identification.

The majority of the pipework is covered in loose rock wool insulation with a chicken wire covering. This insulation is degrading very badly and in breaking down is creating a dust that is a serious health hazard.








Within the vertical services riser are a lot of life expired and redundant pipework and ductwork services as well as a few live ones. Trying to differentiate between these is almost impossible due to lack of identification.

The majority of the pipework is covered in loose rock wool insulation with a chicken wire covering. This insulation is degrading very badly and in breaking down is creating a dust that is a serious health hazard.

1	Building	Basement Plantroom and Other Areas	**Condition**
2	Description	Mains Cold Water Service	
3	Water Meter - Manufacturer	Sensus	
4	Water Meter - Type	Displacement meter with pulse head for remote reading	
5	Water Meter - Model	HRI-Mel-B4	
6	Water Meter - Serial No	24130092	
7	Water Meter Size - mm	110	
8	Check Valve - Manufacturer	Danfoss	
9	Check Valve - Type	2 x steel cased non-return valves	
10	Check Valve - Model	402B	
11	Check Valve – Serial No	Not Known	
12	Check Valve – Size - mm	110	
13	Pipework - Incoming	Cast Iron and ABS	
14	Pipework – Internal	Cast Iron, Galvanised Mild Steel and Copper	
15	Valves-	Cast Iron	
16	Thermal Insulation	Rigid Glass Fibre with Foil Face and Loose Rockwool with Chicken Wire	
17			
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19			
20	Operational Condition		**B**
21	Lifecycle Assessment **A**		**C**
22	Lifecycle Assessment **B**		**F**
23	Notes		

Incoming meter isolation valve supported on bricks

Outgoing meter isolation valve supported by a piece of timber

Double Check Valve installed so tight to underside of concrete slab impossible to access

Denso tape on fittings appear to be to mask a leak

Loose rockwool insulation with chicken wire is a falling apart and a serious health hazard

The incoming mains cold water service in cast iron, ABS, cast iron and mild steel. Note the inlet and outlet valves supported on bricks and timber. The mass of Denso tape appears to be to mask a leak. The inaccessible double check valve, an old non-return valve that should have been removed and an original isolating valve. The mains cold water service pipework on the eastern wall of the plantroom and rising to serve the plantroom sink.






The mains cold water services enters the bio-sulphate room (for water softening) before passing back into the plantroom




The mains cold water into and out of the bio-sulphate room showing the rather crude by-pass arrangement and the simple hand drawn sketch explaining the pipework, valve and tank arrangements. The two mains cold water supplies, one raw water and one softened water, pass along the wall before rising to the tank room.


The two mains cold water supplies, one raw water and one softened water, pass along the wall before rising to the tank room.



The two mains cold water services inside the vertical services riser. They are the two uninsulated pipes on the right of each picture that gain thermal insulation at the very top of the riser.



The two mains cold water supplies where they connect to the ball valves in the tanks.

The rotten walkway, the abandoned and rubbish materials including chemicals. The level of dust and dirt presents a serious health hazard and the area must be considered a confined space.

Within the vertical services riser is a 22mm copper supply taken from the raw water rising main cold water supply. This is insulated with a nitrile rubber type material seen supporting a red cable itself supporting another service.

The service is seen exiting to outside where it can be traced dropping externally from high to low level to connect to a ¾" hose union tap.

The external thermal insulation has suffered very badly from UV degradation and it totally non-effective as insulation.

1	Building	Basement Plantroom and Ground Floor	**Condition**
2	Description	Drainage Services	
3	Pipework - Material	Cast Iron & Copper	
4	Pipework - Size	Various	
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19			
20	Operational Condition		**C**
21	Lifecycle Assessment **A**		**D**
22	Lifecycle Assessment **B**		**F**
23	Notes		

Access to the inspection chamber is severely restricted as it is beneath swimming pool filters 4 and 5

Access must be considered a confined space

All the screed and concrete around the inspection chamber is lifted and broken – Flood Damage..?

The main inspection chamber on the southside of the plantroom is open

The cast iron drain multi-channel is open and has visible soil waste passing through it – an extremely serious health hazard

The two inspection chambers in the southwest corner by the fire escape stairs appear blocked and are in flood

The covers to the two pumped sumps have severely corroded and unsafe covers – one covered with timber and one with a steel plate

The warning pipes from the tank room and the tundish discharge over the floor and not into the pumped sump



The main drainage inspection chamber located beneath swimming pool filter units 4 and 5 against the south wall of the basement plantroom. The air-tight lid and support frame to the inspection chamber has been removed most probably because of the flood damage to the screed and concrete floor and are seen stood against the far wall. Also visible is the ¼" plate now used to cover the opening but which is too heavy an is never replaced.


Closer inspection reveals the bottom of the inspection chamber is covered with bits of loose concrete and screed and was awash with water and faeces. When viewed from the other direction the cast iron inspection chamber can be seen with it bolted down air-tight cover removed. There was no sign of the nuts for the bolts which themselves appeared heavily corroded.

Soil waste and paper were observed passing through the inspection chamber.

This inspection chamber is a serious hazard to health and requires immediate, remedial attention.

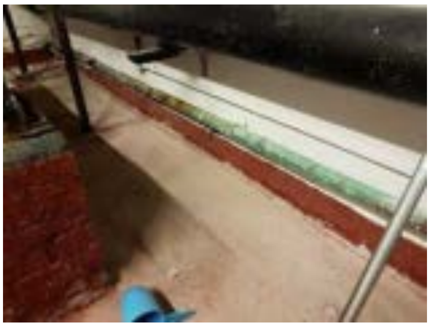
Follow Up – July 2021

The deplorable state of this manhole and access chamber remains exactly the same as in September 2019. This is a public health hazard requiring immediate attention.






At the western end of the basement plantroom a 6" cast iron pipe passes through the on the left hand side before emerging into the actual plantroom. There is an cleaning access door on the bend as the pipe turns and falls behind the sink unit before passing through the chlorine room and then passes behind the main swimming pool pumps before dropping into the concrete slab.


The 40mm copper drain from the sink in the basement plantroom passes through the chlorine room before turning adjacent to the main pool pumps and connecting into a 3" cast iron spigot at floor level.


There are two inspection chambers at the foot of the fire escape stairs and adjacent to the main pool pump. Both chambers appear to be in flood and it was not possible to raise the covers for further investigation.





There are a number of other 3" cast iron sockets in the floor of the basement plantroom. These are in the bio-sulphate room (with poor fitting timber cover), in front of the old chiller (perforated stainless steel cover moved aside), near the main pool heat exchangers, adjacent to the teaching pool pumps and in the chlorine room where the overflow pipes from the dosing pumps discharge.





The warning pipes from the roof tanks all drop into a copper tundish at the base of the vertical services riser that itself discharges into the pumped sump. Note the corroded and lifted cover of the sump and the ¼” steel plate cover.


There are two steel chequer plate covers in front of the boilers believed to give access to an inspection chamber serving the east side of the building but it was not possible to lift these to prove that.





There is a pumped sump in front of the pool heat transfer equipment. The fitted cover plate is loose and has been over covered with a thin sheet of plywood which itself is protected with a step-over block.

It is of note that the concrete floor between this sump and the chiller base is very badly broken and raised similar to the main inspection chamber and is suspected of being flood damage.


In a storage cupboard off the ground floor corridor to the western aspect of the building there is a cast iron soil and vent pipe that drops from above into the concrete slab. This has a connection from the wc's & wash hand basins in the old laundry area meeting rooms toilets.

This soil and vent pipe is believed to connect into the 6" cast iron pipe located within basement undercroft.



At the western end of the ground floor staff corridor are the semi-derelict male staff toilets. The wc pan, wash hand basin and urinal have drains that discharge into the concrete floor and there is an inspection port cover adjacent to the urinal.

These soil, vent and waste pipes are believed to connect into the 6” cast iron pipe located within basement undercroft.


Adjacent to the semi-derelict male staff toilet are the female staff toilets. The wc pan and wash hand basin have drains that discharge into the concrete floor.

These soil, vent and waste pipes are believed to connect into the 6” cast iron pipe located within basement undercroft.

Further along the staff corridor is the staff room where a sink unit has a drain that passes down into the concrete floor.

This waste pipe is believed to connect into the 6” cast iron pipe located within basement undercroft.

1	Building	Building - All Areas	**Condition**
2	Description	Low Pressure Hot Water Heating	
3	Radiators - Manufacturer	Not Known	
4	Radiators - Type	Steel Panel	
5	Rad Valves - Manufacturer	Not Known	
6	Rad Valves - Type	TRV (Flow) & LSV (Return)	
7	Pipework - Manufacturer	Not Known	
8	Pipework - Type	Mild Steel	
9	Pipework - Jointing	Screwed and Threaded	
10	Pipework – Heating Coils	Mild Steel	
11	Heating Coil Size - mm	75	
12			
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18			
19			
20	Operational Condition		**B + C**
21	Lifecycle Assessment **A**		**C**
22	Lifecycle Assessment **B**		**F**
23	Notes		

Radiators in Fitness Suite noted as "usually cold" – Poor circulation? Dirty Radiators?

TRV heads removed

TRV & LSV heads painted over and inoperable

Radiators Corroding

High Level Tubular Heating Coils in Teaching Pool corroding very badly

Life expire natural convectors in ground floor staff areas










The pressed mild steel radiators in the first floor fitness suite. There are at least four removed radiators as evidence the large gap where plugged tees still exist at the actual radiator locations.

The thermostatic radiator valves and the lock shield valves have been removed, damaged or painted over so as to be inoperable.

Corrosion is evident on the convector fins to nearly all the radiators.

The source of the heating flow and return pipework is not obvious but is believed to originate from the uninsulated heating services at high level in the bio-sulphate room and across the top of the duty managers office.






The tubular heating coil at the east end of the teaching pool and the leg that sits at high level on the east wall. The corrosion of this heating coil is very bad.




The tubular heating coil at the east end of the teaching pool and the leg that sits at high level on the north wall. The corrosion of this heating coil is starting to appear.







The natural convectors in the staff room and the adjacent store-room and the radiator in the general manager's office.

All these radiators are fed from a ¾" bsp flow and return that rise from the 2" flow and return as they head into the undercroft. Without any thermal insulation and running a long distance with no obvious venting arrangements most probably account for the fact that these convectors and radiators are reported as "never getting hot".

There is a steel panel radiator at the foot of the connection stairs from the teaching pool up to the main pool. This radiator is severely corroded and is, in our opinion, very close to complete failure.



In what appears to have once been a staff toilet next to the duty managers office off the ground floor corridor a heating flow and return drop from the ceiling void to low level before passing through a wall and connecting to a steel panel radiator in the duty managers office.

The radiator is fitted with manual wheel head and lock shield valves.

The source of this heating flow and return is believed to be the uninsulated heating pipework observed at high level in the bio-sulphate room.

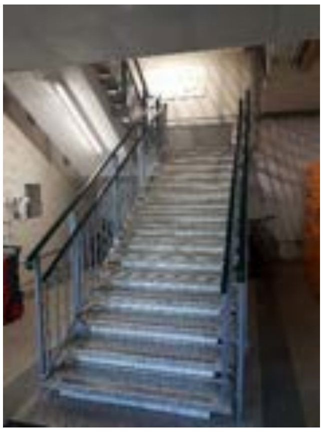
In the public entrance space is a wall mounted fan convector.

The source of the heating flow and return is not established but it is believed to be the uninsulated heating pipework observed at high level in the bio-sulphate room.




On the lower roof a 1½" bsp heating flow and return pass out from the vertical services riser and drop to low level to eventually pass up into the roof plantroom.

The thermal insulation is in poor condition having suffered from UV degradation.







There are steel panel radiators on the public stairs at ground to first landing, first to second landing and second to third landing. The radiators are generally sound although at first to second the paint in peeling very badly. The radiators are fitted with thermostatic valves but these appear to be seized and are inoperable. The pipework starts from a connection in the basement plantroom near the bio-sulphate room and is exposed in the stairwell. The pipework appears sound and in a reasonable condition.

1	Building	Basement Plantroom	**Condition**
2	Description	Main Pool – Plate Heat Exchanger, Pipework & Pump	
3	Manufacturer	UK Exchangers Ltd	
4	Model	UK 1.3	
5	Serial No	C-9707-B	
6	Year	2009	
7	No.Plates	61	
8	Volume - litre	7	
9	Design Temp - °C	100	
10			
11			
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19			
20	Operational Condition		**B + D**
21	Lifecycle Assessment **A**		**C + E**
22	Lifecycle Assessment **B**		**E**
23	Notes		

Some evidence of leaks
Interconnecting pipework in very poor condition – near to complete failure
Valves in poor condition and leaking
Pump in poor condition and covered in leaked material
No access for pump details
Pumps wired to 13A socket – manually controlled to control temperature

The plate heat exchanger installed as a replacement for the two large shell and tube heat exchangers for the main pool.

The pump installed on the primary LPHW circuit is 240 volt single phase installed on a trailing lead to a 13 amp socket adjacent to the main pool circulation pumps that is manually operated by staff; when the pool water is too cold the pump is turned on and when the pool water is too warm the pump is turned off – crude in the extreme and so wasteful of valuable energy.

It was not possible to gather information of the primary circuit pump because A) it is inaccessible beneath the old shell & tube heat exchanger and B) it is totally obscured by debris from a leak on the secondary pipework above it.

The leak is caused by breakdown of the mild steel pipe, that has been very crudely installed at an angle, carrying chlorinated water that is causing the pipework and valves to breakdown and leak. In our opinion this pipe is close to failure and requires immediate attention.

It is of note there is only a single plate heat exchanger, in comparison to two shell and tube heat exchangers, so, in the event of a failure there is no back-up heat source for the main pool water.

Follow Up – July 2021

Despite being turned off the previously observed leak on the 2” secondary pipework has deteriorated further to the point where the water is escaping through the rust from the corrosion.

Follow Up – July 2021

Despite the fact that all plant is now turned off and isolated, the corrosion to the 2" secondary pipework has deteriorated further to the point where water is escaping through the previous rust patch indication that the pipe has corroded through in total.

1	Building	Basement Plantroom	**Condition**
2	Description	Teaching Pool – Plate Heat Exchanger, Pipework & Pump	
3	Manufacturer	Alfa Laval Ltd	
4	Model	M3-FG	
5	Serial No	30106-29500	
6	Year	2008	
7	No.Plates	Not Known	
8	Volume - litre	2.40	
9	Design Temp - °C	85	
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19			
20	Operational Condition		**B + C**
21	Lifecycle Assessment **A**		**C + E**
22	Lifecycle Assessment **B**		**E**
23	Notes		

LPHW pipework is installed in a very crude manner between mild steel & copper

Evidence of leaks on plate exchanger plates

Bad leaks on isolating valves






The plate heat exchanger to the teaching pool. Both the primary and secondary heating pipework has been very crudely installed and there is a very bad leak on the isolation valves.

The original Staefa 3 port control valve is still connected but is believed to be inoperable.

1	Building	Building – Ground and First Floor Changing Rooms and Toilets	**Condition**
2	Description	Domestic Hot & Cold Water Services	
3	Pipework - Type	Copper	
4	Pipework – Manufacturer	Not Known	
5	Pipework – Size mm	15 to 28	
6	Pipework - Jointing	Soldered and Mechanical	
7	Valves - Type	Gate Valves and 90° Turn Service Valves	
8	Shower Valves - Type	Thermostatic Surface Exposed and Concealed	
9	Shower Valves - Manufacturer	Not Known	
10			
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18			
19			
20	Operational Condition		**B**
21	Lifecycle Assessment **A**		**C**
22	Lifecycle Assessment **B**		**F**
23	Notes		


The only open areas of ceiling tiles enabling observation of hot water service flow and return pipework in the ceiling void. All insulated with loose rockwool with a chicken wire finish.









A selection of the showers around the various changing rooms and toilets. In the majority of cases the showers are on non-concussive push action valves and, presumably a common thermostatic mixer valve somewhere in the ceiling void. However, in some areas, mainly disabled showers, the thermostatic mixing valves are installed as surface fixed at the point of use. We were unable to establish how the thermostatic valves were accessed in order to undertake statutory TMV tests.

We picked up apocryphal evidence of poor performance of the showers but looking at number of showers installed and the volume of hot water available we are reasonably satisfied that the volume of water available is sufficient for the maximum demand of the showers and that the problem most probably revolves around undersized hot water service flow and return pipework.




A selection of domestic hot and cold water services installation around the building. In all observed examples the services are installed in copper pipe with a chrome finish.

However, in all cases observed the chrome finish has deteriorated very badly, admittedly an aesthetic over an operational issue and representative of a poor quality material used in the original installation.

We were unable to observe any thermostatic mixing valves and were establish how the thermostatic valves were accessed in order to undertake statutory TMV tests.

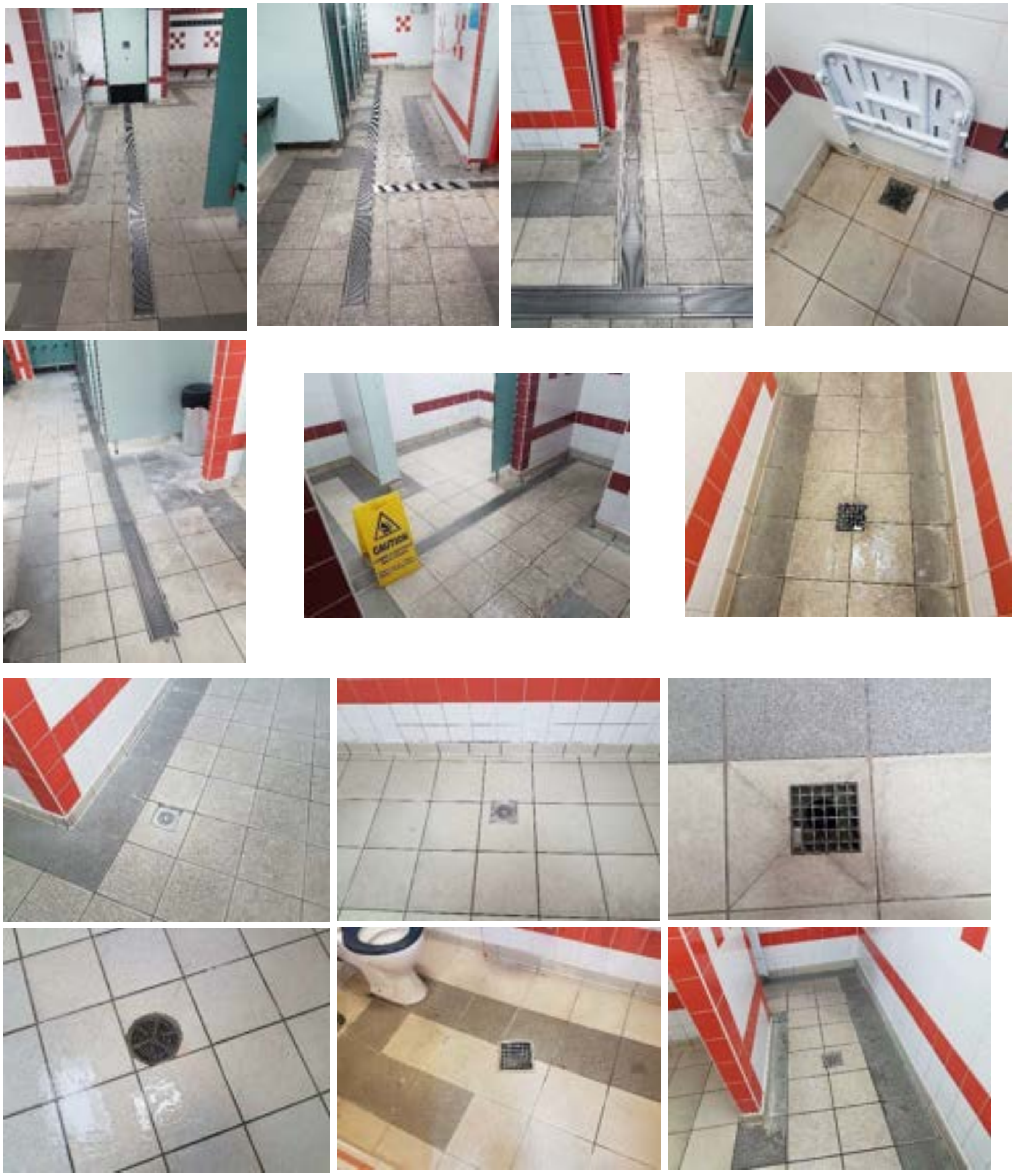
1	Building	Ground, First and Second Floor and Roof	**Condition**
2	Description	Drainage Services	
3	Pipework - Material	Cast Iron, Copper and uPVC	
4	Pipework - Size	Various	
5	Pipe Jointing – Cast Iron	Timesaver and Caulked	
6	Pipe Jointing - Copper	Soldered and Mechanical	
7	Pipe Jointing - uPVC	Solvent Welded and Mechanical	
8	Floor Channel - Material	Cast Iron	
9	Channel Grate - Material	Stainless Steel	
10	Floor Gully – Material	Cast Iron	
11	Gully Grate - Material	Stainless Steel	
12			
13			
14			
15			
16			
17			
18			
19			
20	Operational Condition		**C**
21	Lifecycle Assessment **A**		**C**
22	Lifecycle Assessment **B**		**F**
23	Notes		

Cast Iron drainage generally in fair to poor condition

Corrosion of cast iron pipework

Failure of mechanical joints

Leaking joints on all materials



A selection of the floor channel's and gullies around the various changing rooms and toilets. None of these show any sign of having been opened for cleaning and looking inside them (too difficult to photograph) the build-up of debris and dirt is significant.

A selection of wc pans and wash hand basins drain connections showing a few leaks and generally tired.

There are a number of locations where we fear the 4" soil and vent pipe has been overloaded. The wash hand basins and the wc pan along with three more wc pans and wash hand basins connect into the same stack. It is also of note that the stack appears to be fitted with undersized vents and there is a disused stack with an old, smaller branch connection still installed but not sealed.

Also of note is the rainwater pipe in the far left hand corner of the riser.


The disabled toilet in the teaching pool hall is a typical example of a mixture of cast iron, plastic and copper pipework where joint leaks are in evidence.







The floor channels and gullies in the male changing rooms and toilets pass through the concrete slab and appear at high level above the teaching pool.

The pipework is all in cast iron with Timesaver mechanical joints and is, frankly, in a mess. The paint is flaking off all the pipework, some of the joints are not correctly aligned (this will eventually cause the joints to leak) and there is major seepage where they pass through the concrete slab.

None of the joints appear to be leaking but the seeping water is most probably from washing down the changing rooms floor above and means this dirty water is finding its way into the teaching pool.

This matter is completely unacceptable and requires urgent attention






The cast iron drainage at high level falls back to connect to a falling horizontal drainage run within the bulkhead to the north side of the teaching pool hall. This horizontal run not only picks up the exposed pipework runs but also other drainage services through the concrete slab. The pipework is in an appalling condition with leaks and broken joints in evidence.




The horizontal drainage run enters a storage room at high level before turning to enter a services riser. The making good to the pipework in non-existent and the broken cleaning point cover is of note.

Within the riser there is another drain that enters from above and drops to low level. The pipe is in an atrocious conditioning and de-laminating and it is our considered opinion it is near the point of complete failure.

It is believed the copper pipe in the corner is another undersized vent pipe from the adjacent service location.

1	Building	Basement, Ground, First and Second Floor and Roof	**Condition**
2	Description	Rainwater Drainage Services	
3	Pipework - Material	Cast Iron, Copper and uPVC	
4	Pipework - Size	Various	
5	Pipe Jointing – Cast Iron	Timesaver and Caulked	
6	Pipe Jointing - Copper	Soldered and Mechanical	
7	Pipe Jointing - uPVC	Solvent Welded and Mechanical	
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20	Operational Condition		**B**
21	Lifecycle Assessment **A**		**B**
22	Lifecycle Assessment **B**		**F**
23	Notes		

Cast Iron drainage generally in fair to poor condition

Corrosion of cast iron pipework

Leaking joints on all materials

Limited access for cleaning in basement plant room

Broken and/or blocked roof outlets



At the top of the vertical services riser are two cast iron rainwater pipes that drain the flat roof of the tank room and which combine to form a single pipe that drops down the vertical services riser before eventually passing into the teaching pool ceiling void and, most probably, connecting into the rainwater pipe observed in the services riser seen in the centre of the picture.

There is a rainwater pipe observed in the far left hand corner of services void behind the main pool female toilets.



At high level above the fire escape stairs in the southwest corner of the ground floor and basement there is a system of cast iron pipework with branches at every structural column and that starts in the western corridor adjacent to some life expired and corroded ductwork. The branches appear to be the rainwater drains from the southern edge of the main roof built into the concrete columns.

The cast iron drops to low level just before the door into the basement plantroom.

Generally, the cast iron pipework is in good condition although there are a couple of branches where there are substantial leaks that actually appear to be from the concrete structure and not the pipework.

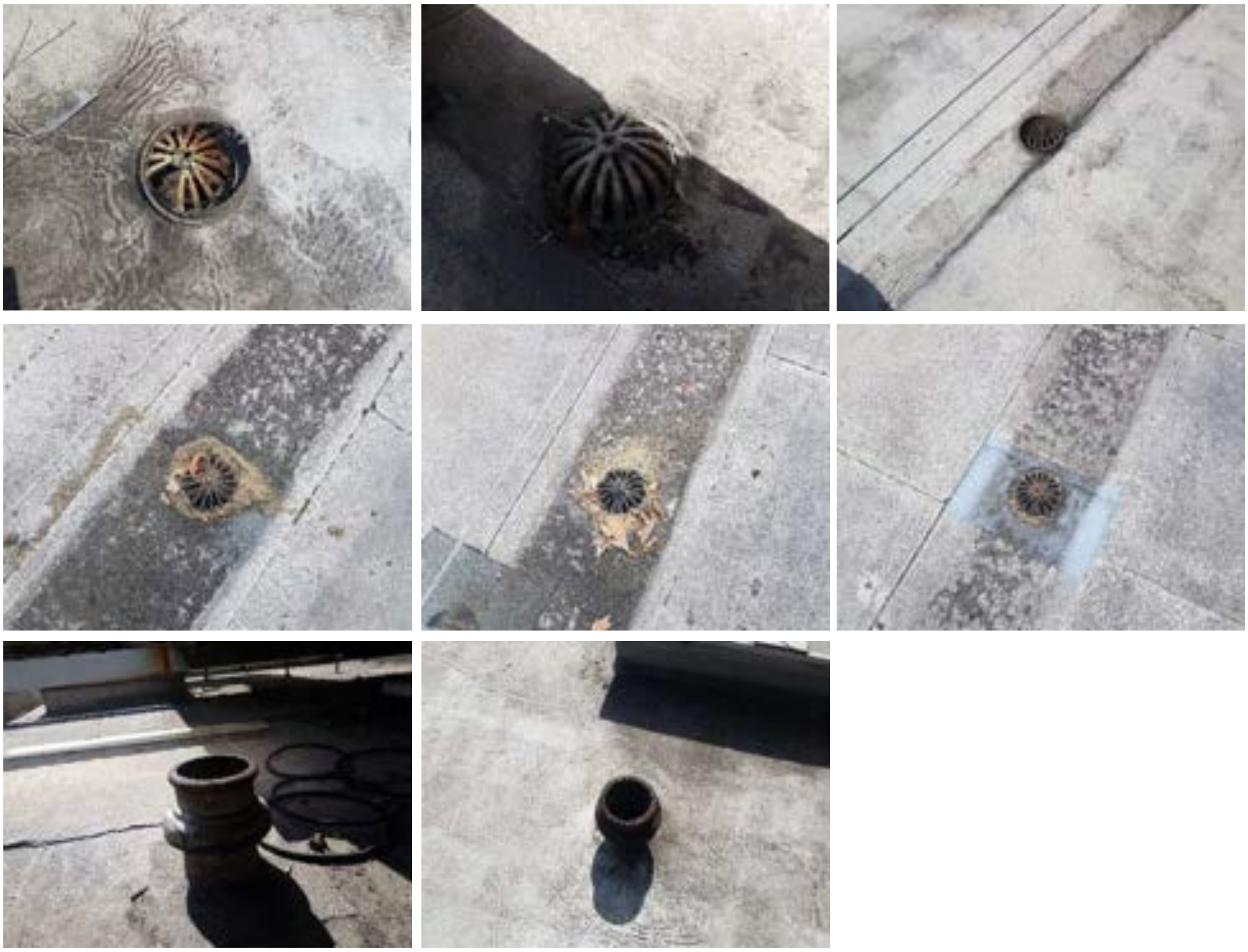
On entering the basement plantroom the cast iron rainwater drainage turns horizontal and then through 90° to pass on a fall all the way along the south wall of the plantroom to a discharge point just to the east of the previously discussed main inspection chamber.

The pipework is installed at low level beneath the edge beam and picks up rainwater connections that exit from each of the columns passed. The branches appear to be the rainwater drains from the southern edge of the main roof built into the concrete columns.

There are cleaning points along the route but the extremely restricted access to the pipework means these appear never to have been accessed.

Beyond the access point there is another branch that joins from the east direction under the mains cold water incoming main.

In a storage room off the western staff corridor at ground level there is a cast iron rainwater pipe that appears to be a rainwater drain for the flat roof identified on the drawings as the Sun Terrace.



A selection of the rainwater outlets on the roof over the teaching pool showing broken and partially blocked covers. Also two soil and vent outlets neither fitted with a balloon cage to protect debris entering and blocking them.

1	Building	New Plantroom	**Condition**
2	Description	Ventilation – Main Pool Hall Heat Recovery Air Handling Unit	
3	Manufacturer	Calorex Heat Pumps Ltd	
4	Type	Packed Heat Recovery & Dehumidification Air Handling Unit	
5	Model	HRD30B	
6	Serial No	91730G01	
7	Filters (No. x size)	9 x 560 x 320 x 15 panel	
8	Fans (Type)	Belt driven centrifugal	
9	Unit - Voltage x Phase x Hz	415/50/3	
10	Unit Full Load Current - Amp	119	
11	Unit Fused Supply - Amp	160	
12	Refrigerant	407C	
13	Supply Fan - Model	Not Known	
14	Supply Fan Motor- Model	Koncar 1749196	
15	Supply Fan Motor – S/No	882409 – 02/19	
16	Supply Fan Motor - kW	11.00	
17	Supply Fan Motor - Amps	22.00	
18	Supply Fan Motor - RPM	1450	
19	Extract Fan - Model	Not Known	
20	Extract Fan Motor- Model	ABB M2-AA-160-L-4	
21	Extract Fan Motor – S/No	3GAA-162-102-ADA	
22	Extract Fan Motor - kW	15.00	
23	Extract Fan Motor - Amps	28.00	
24	Extract Fan Motor - RPM	1460	
25	2 x Compressor - Model	York – H75G144DBEE + H2NG244GPEF	
26	2 x Compressor – S/No	00401088263 + 28999019137	

27	2 x Compressor - Voltage	415/3/50	
28	2 x Compressor – L.R.A	132 - 188	
29			
30	Return Air – mm x mm	1000 x 700	
31	Return Air – integrity	Flex connection to ahu - sound	
32	Supply Air – mm x mm	800 x 870	
33	Supply Air – integrity	Flex connection to ahu - torn	
34	Exhaust Air – mm x mm	1000 x 700	
35	Exhaust Air - integrity	Motorised VCD inoperative - Flex connection to ahu – sound	
36	Fresh Air – mm x mm	800 x 850	
37	Fresh Air - integrity	Motorised VCD inoperative - Flex connection to ahu – sound	
38	Operational Condition		**C**
39	Lifecycle Assessment **A**		**D**
40	Lifecycle Assessment **B**		**F**
41	Notes		

Access panels all loose and captive locks damaged or missing
Supply fan very dirty
Extract fan very dirty
LPHW heating coil highly corroded
Recovered heat heating coil highly corroded
Refrigeration/Dehumidification equipment not working
Refrigeration/Dehumidification section highly corroded
Recovered heat heating coil highly corroded
Refrigeration/Dehumidification coil highly corroded
Packed casing highly corroded
Heating 3 port diverting valve – actuator disconnected
Heating pipework and valves within unit are highly corroded
Recovered heating pipework and valves within unit are highly corroded
Fresh air inlet ductwork damper – actuator disconnected – fully open
Extracted air exhaust ductwork damper – actuator disconnected – fully open
Supply air flexible connection to ductwork torn
Control panel dangerous – exposed wiring
Control Panel – LCD display inoperative

Heating pumps control panel turned off

New inverters fitted..?

Filters – relatively new & clean

Fan belts – relatively new & sound



The Calorex manufacturers data plate, the view on entering the new plantroom, the view from the north side clearly showing how the new plantroom is an extension built around the old external columns and a view of the supply air connection off to the main pool hall.







A selection of the access panels to the air handling unit showing the level of damage and missing turn-screws and damaged panels.

The panel seals are in a poor condition and leaking and in one instance rotted away completely.




The return air/exhaust fan. There is a high level of surface corrosion and the fan impeller is very dirty and appears never to have been cleaned. The fan belts appear to be relatively new and are in a sound condition.



The motor to the return air/exhaust fan, the manufacturers plate and the fan belts.






The supply air/fresh air fan illustrating the corrosion around the fan and casing and the general casing of the air handling unit. The fan impeller is very dirty and appears never to have been cleaned.

The fan motor is mounted above the fan and appears to be in a good condition and the fan belts are relatively new and in a sound condition.


The supply air/fresh air fan motor and manufacturers motor plate

The non-operational refrigeration/de-humidification section. There is a high level of corrosion to both the casing and the equipment & wiring.

The de-humidification coil is very heavily corroded and the internal condensate drain channel was blocked.


The lower recovered heat re-heat coil is very dirty and highly corroded. The coil has unlikely ever been cleaned and the accumulated level of dirt and dust mixed with the condensation has created a highly corrosive covering to the coil.



The upper heat recovery coil is very dirty and highly corroded. The coil has unlikely ever been cleaned and the accumulated level of dirt and dust mixed with the condensation has created a highly corrosive covering to the coil.




The reheated and recycled air is drawn by the supply air/fresh air fan through simple gravity non-return dampers. These dampers are operational but very dirty as is the mesh grille protecting them on the exhaust fan side.



There is a bank of 9 fresh air panel filters at 560mm x 320mm x 15mm.

The filters look to be relatively new and are extremely clean.



The lower re-heat coil is very dirty and highly corroded. The coil has unlikely ever been cleaned and the accumulated level of dirt and dust mixed with the condensation has created a highly corrosive covering to the coil. The coil is in two parts, the larger section is fed from the recovered pool water whilst the smaller is fed from the LPHW heating system.


The upper reheat coil is fed from the LPHW heating system and is very dirty and heavily corroded. The coil has unlikely ever been cleaned and the accumulated level of dirt and dust mixed with the condensation has created a highly corrosive covering to the coil.






The heating controls to the LPHW re-heat coil. Note the actuator removed from the three port valve; it is our understanding that the staff manually reset the level of this valve depending on whether the pool hall is too hot or too cold. Also note the level of corrosion on the valve from leaks and the exposed wiring.




The manufacturers control panel. The liquid crystal display is non-operational but the circuits are live. There is no wiring diagram and the panel appears to have been heavily modified and there is a hand-written notice on the access panel to the controls regarding the operation of the air handling unit and the valves.

The supply and the extract fans have recently been fitted with inverter drives.

It is believed the fitting of these is to enable some level of control over the level of heating to the main pool hall to compensate for the lack of control over the heating by the three port valve.

This seems an awfully expensive approach over actually getting the heating control valve to operate correctly. It will also be detrimental to the conditions in the main pool hall because it changes the level of ventilation required purely on the basis of temperature and not the overall conditions or personnel.

There is a small control panel on the south wall of the new plantroom that appears was designed to control the heating pumps, the recovered heat pumps and the recirculation fan. The panel is switched off and offering no control the air handling unit and the associated pumps.






The recovered heating and the LPHW heating circuit pipework where they enter the new plantroom from the old fresh air plenum in the basement plantroom. The larger pipes are the recovered heating circuit whilst the smaller pipes are the LPHW circuit. The pipework enters the air handling unit from above and drops to connect with the 3 port control valves and the heating coils. These heating circuits are installed in mild steel tube with lever operated isolating valves which are clean and thermal insulation with a foil faced vapour sealed finish with correct identification and direction arrows.



The linked fresh air inlet and exhaust air outlet dampers.

Although linked, necessary in order to maintain balanced conditions, these dampers are inoperative partly because of seizure and partly because there is nothing driving the actuator.

GDN
Support Services



There is a manual volume control damper on the supply air ductwork to the pool hall installed in an unconventional vertical arrangement. Also note the damage to the flexible connection and the large diameter attenuator installed on an angle.

The return air duct from the main pool hall is well insulated where it enters the new plantroom through the flat roof and the connection is dry indicating it is weathertight.

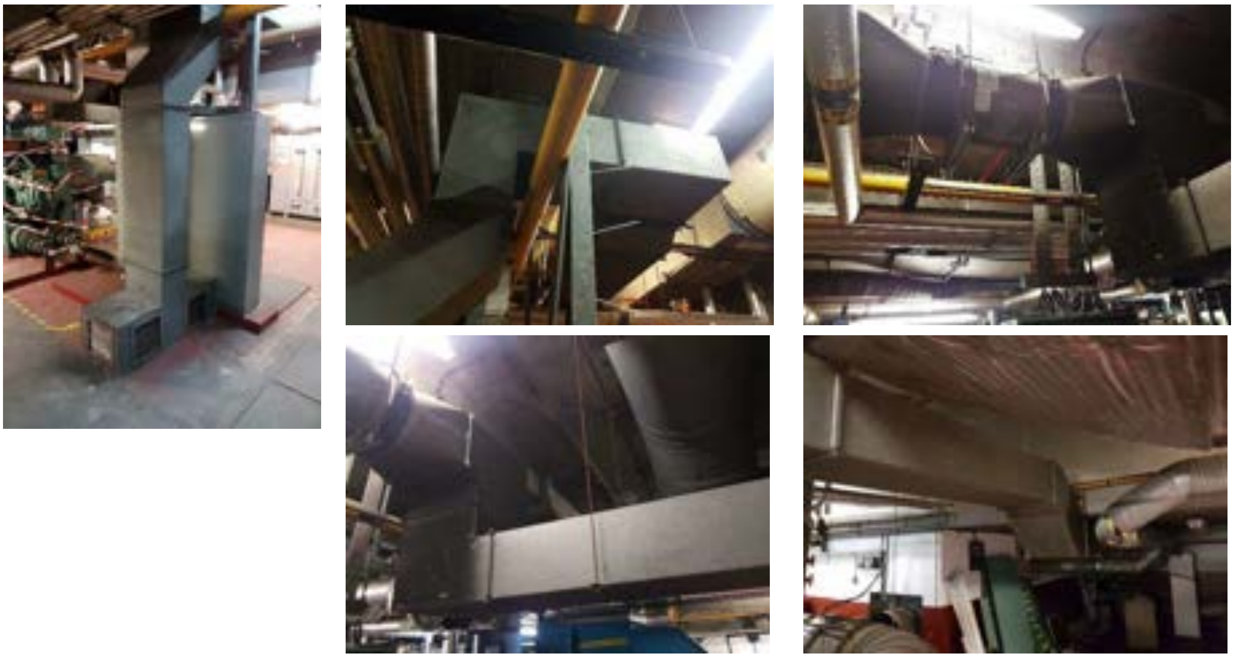



The fresh air intake and extracted air exhaust connections at either end of the new plantroom along with the respective external louvres at either end of the new plantroom.

1	Building	Basement Plantroom and New Plantroom	**Condition**
2	Description	Ventilation – Combustion Boiler Supply and Extract Fans	
3	Supply Fan - Manufacturer	Elta Select	
4	Supply Fan - Type	Galvanised Steel Cased Axial	
5	Supply Fan – Date	17/11/1999	
6	Supply Fan – Size mm	400	
7	Supply Fan - Model	SLC400/4-2	
8	Supply Fan – Power Supply	240/1/50	
9	Supply Fan – Power kW	0.37	
10	Supply Fan – Current SC - A	7.00	
11	Supply Fan – Current FLC - A	2.20	
12	Supply Fan – Speed RPM	1350	
13	Extract Fan - Manufacturer	Elta Select	
14	Extract Fan - Type	Galvanised Steel Cased Axial	
15	Extract Fan – Date	08/12/1999	
16	Extract Fan – Size mm	315	
17	Extract Fan - Model	SLC315/4-2	
18	Extract Fan – Power Supply	240/1/50	
19	Extract Fan – Power kW	.12	
20	Extract Fan – Current SC - A	2.24	
21	Extract Fan – Current FLC - A	1.02	
22	Extract Fan – Speed RPM	1300	
23	Operational Condition		**B**
24	Lifecycle Assessment **A**		**C**
25	Lifecycle Assessment **B**		**F**
26	Notes		
Single only – no back up facility, failure would isolate boilers			

Not proved controls interface to boilers – boilers must be isolated if fans fail to run

1	Building	Basement Plantroom and New Plantroom	**Condition**
2	Description	Ventilation – Combustion Boiler Supply and Extract Ductwork	
3	Supply Air System	450 x 300 Rectangular Galvanised Sheet Steel Ductwork	
4	Extract Air System	250 dia Circular Galvanised Sheet Steel Ductwork	
5	Supply Air Grilles – No x mm	3 x 280 x 280	
6	Extract Air Grilles – No x mm	3 x 170 x 170	
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20	Operational Condition		**B**
21	Lifecycle Assessment **A**		**C**
22	Lifecycle Assessment **B**		**F**
23	Notes		
Boiler combustion air supply & extract ventilation system requires validation Boiler combustion air supply & extract system requires proof of safety interlock to boilers			



The boiler combustion supply air system showing the 3 no. grilles the ductwork at high level, the single case axial supply fan and where the system enters the old fresh air plenum.

The boiler combustion air extract system showing the 3 no. grilles above the boilers, the ductwork at high level, the cased axial extract fan located above the main electrical distribution for the building and where the system enters the old fresh air plenum.


The manufacturers data plates on both the boiler combustion air supply and extract fans.



The boiler combustion supply and extract ventilation ductwork must rise in the old fresh air plenum as they appear through the south wall of the new plantroom and rise to high level in there. The supply air duct turns towards the west wall whilst the extract duct turns and heads towards the east wall.




The boiler combustion supply and extract air connections to the external walls within the new plantroom and the respective external louvres on the exterior of the building.

Both the louvres are dirty and require a good clean which is most probably applicable to the ductwork systems as well.

Also note the absence of any fire dampers or fire protection to the ductwork required because the boiler combustion supply and extract ductwork cross through different fire compartments.

1	Building	Main Pool Hall and External	**Condition**
2	Description	Ventilation – Supply Ductwork & Grilles	
3	Supply Air - Ductwork	Flat Oval Galvanised Sheet Steel	
4	Main Duct– External mm	1000 dia	
5	Duct Gnd to 1st – mm	1200 x 500 Flat Oval	
6	1st Floor Duct - Main	800 x 400 Flat Oval + VCD	
7	1st Floor Duct - Branch	400 x 200 Flat Oval + VCD	
8	1st Floor Grilles – No x mm	27 @ 380 x 170 double deflection	
9	Duct – 1st to 2nd Floor	1000 x 500 Flat Oval	
10	2nd Floor Duct	1000 x 500 Flat Oval	
11	2nd Floor Duct - East	900 x 450 Flat Oval + VCD	
12	2nd Floor Duct - West	800 x 500 + VCD	
13	2nd Floor Grilles – No x mm	20 @ 1250 x 200 + 7 @ 380 x 130	
14	Duct – Gnd to 3rd Floor	800 x 400 Flat Oval	
15	3rd Floor Duct	800 x 400 Flat Oval	
16	3rd Floor Duct - East	600 x 300 Flat Oval + VCD	
17	3rd Floor Duct - West	600 x 300 Flat Oval + VCD	
18	3rd Floor Grilles – No x mm	19 @ 1250 x 150 + 43 @ 380 x 130	
19			
20	Operational Condition		**C**
21	Lifecycle Assessment **A**		**B**
22	Lifecycle Assessment **B**		**F**
23	Notes		

External ductwork damaged

Ventilation to 2nd and 3rd floors are installed as a continuous loop so no fixed static pressure against the fan

Ventilation to 2nd and 3rd floors require changing to two individual branches to create fixed static pressure for the fans

All volume control dampers are fully open


The main pool hall supply air duct where it exits the new plantroom and rises to serve the first and second floors and where it continues and rises to serve the third floor.



The main pool supply air ductwork as viewed from the car park to the north of the building. The duct has been impacted by a number of high vehicles in the past. It is not possible to establish if this has damaged to ductwork beyond the thermal insulation but it has certainly damaged the integrity of the insulation protection and let in water which will have compromised the quality of the thermal insulation.



The point where the first floor supply air duct enters from external to the building and splits into two branches, one to the east with just a single grille and the other to the west where the duct covers the part of the north face and the complete west and south face of the main pool hall.

Also note the absence of any fire dampers.

The supply air ductwork around the 1st floor level of the main pool hall. The dirty grilles are most probably a reflection of the interior of the ductwork as well and all need cleaning.









Our attention was drawn to the windows on the south face of the building at first floor main pool hall level. The windows are double glazed sealed units most probably installed as a part of the 2008 refurbishment. The windows are aluminium frames supporting the sealed units. The gap between the aluminium frames have been filled with a mastic sealant that we presume should expand or shrink to accommodate the expansion or contraction of the metal window frames.

It appears these mastic sealant joints are failing as we observed gaps of between 2mm & 4mm in various areas as well as a couple of areas where the mastic sealant is in the process of failing but hasn't completely failed.

It is also apparent where these joints are failing the wall coverings below are starting to lift and become detached from the wall.

The airflow through these gaps in the window frames were obvious and is creating a further heat loss to the building.



The point where the second floor supply air duct enters from external to the building and splits into two branches, one to the east and the other to the west. These two branches are both fitted with volume control dampers which are both fully open. Also note the absence of any fire dampers.











The supply air ductwork around the second floor viewing gallery. The ductwork is installed as a continuous loop from the entry point therefore there is no static pressure point for the fan. Of note is an open electrical junction box that appears to be live.

There is also a louvre into the vertical riser that appears to have been the previous return air path and where fresh air and heat is still being lost and wasted.

The dirty grilles are most probably a reflection of the interior of the ductwork as well and all need cleaning and there is no fire damper.









The supply air ductwork around the third floor viewing gallery. The ductwork is installed as a continuous loop from the entry point therefore there is no static pressure point for the fan.

The dirty grilles are most probably a reflection of the interior of the ductwork as well and all need cleaning.

Also note the absence of any fire dampers.

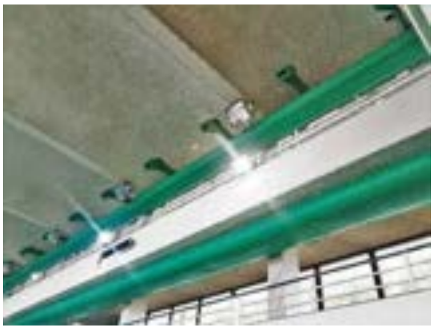













Of interest at third floor level is the original supply air distribution system comprising a circular duct that commenced in the vertical services riser and passed as a continuous loop around the complete pool hall and which appears to have served high velocity nozzles located all around the main pool hall at high level through individual branches each fitted with an iris style volume control damper. It is also interesting that these high velocity nozzles have been painted the same colour as the operational ductwork.

Whilst this system is out of use, the connections into the vertical services riser still exist and account for the smell of chlorinated air within the riser. This movement of air is wasting valuable energy and needs to be removed.







On 18 October 2019 the level of condensation at third floor viewing gallery level was particularly bad and it was apparent that this was c=occurring in the areas where the plaster finish to the walls had previously become detached

Follow Up – July 2021

The level of condensation on the windows, particularly in the 3rd Floor Viewing Gallery has deteriorated seriously and cause heavy corrosion to the window frames as well.


1	Building	Main Pool Hall and External	**Condition**
2	Description	Ventilation – Extract Ductwork & Grilles	
3	Extract Louvre – No. x mm	Vertical Fixed Blade Louvre - 2 x 1200w x 1400h = 2400w x 1400h	
4	Extract Louvre - Location	2nd Floor Public Gallery North Wall	
5	Extract Duct - mm	1000 x 700	
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20	Operational Condition		**C**
21	Lifecycle Assessment **A**		**B**
22	Lifecycle Assessment **B**		**F**
23	Notes		
Extract louvre is very dirty – most probably applicable to ductwork as well			






The large extract/return air louvre on the north wall of the second floor public viewing gallery. The position of the return air duct through the flat roof into the first floor fitness suite and then the new plantroom.

The location of the return air louvre is easy to identify on the north side of the second floor visitor's gallery.

Of note is the absence of any fire damper behind the louvre.

1	Building	Basement Plantroom	**Condition**
2	Description	Ventilation – Changing Rooms Supply Air Fan & Inlet Ductwork	
3	Manufacturer	Woods of Colchester	
4	Type	Contra-rotating cased axial fans	
5	Serial No	455613/51K	
6	Filters (No. x size)	4 No 600mm x 600mm x 150mm bag	
7	Fans (Model)	Not known	
8	Fans (Type)	Cased Axial	
9	Motor (Model)	Not known	
10	Motor (Type)	Direct Drive	
11	Motor (Voltage x Phase x Hz)	415/3/50	
12	Motor (Power) - kW	2.50	
13	Motor (Current - A)	5.70	
14	Motor speed - RPM	1450	
15	Fan Controller	D.O.L. from control panel	
16	Fan Changeover	N/A	
17	Duct Connections (Size) mm	760	
18	Duct Connections (Integrity)	Flexible	
19			
20	Operational Condition		**C**
21	Lifecycle Assessment **A**		**D**
22	Lifecycle Assessment **B**		**F**
23	Notes		

External louvre very dirty and in need of a heavy clean

Inlet filters absolutely disgusting and rotten, a severe health hazard

Corrosion of filter housing from water extracted and trapped by filter bank

Fans quite noisy

Manual control of valves to heating coil










The supply air to the changing rooms originates at a weather louvre at ground level on the north wall of the building and to the west of the new plantroom. The louvre, along with two smaller louvres that provide natural ventilation to the basement plantroom, are installed in an opening that has the appearance of having previously been a doorway.

A 760mm diameter circular galvanised steel duct extends from this louvre to eventually connect to a twin-bank of bag filters. These filters are in a disgusting, rotten state and haven't been touched in years and present a severe health hazard. There is evidence of corrosion and a water leak from the filter housing most probably the result of the blocked filters.

The duct connects, via a flexible connection, to a contra-rotating galvanised steel case axial fan.

The filters have a pressure loss manometer fitted across them but this without any flui

The supply air fans are noisier than we would have expected but are relatively clean, most probably because of the blocked filters. The lack of airflow may also be the cause of the noise.

The manufacturers fan data plates.

The supply air duct rises to high level and turns to connect to a twin bank heating coil. We believe the heating coil is contemporary with a previous ventilation scheme as it, and the following attenuator connect to reused existing ductwork.

The flow and return to the heating coil have previously been discussed but the Staefa 3 port diverting valve is non-operational as witness the manual procedure labels on the local isolating valves.







After the heating coil and attenuator it appears that the original ductwork installation has been re-employed. There is a volume control damper at high level after which the ductwork splits with the main run continuing into the vertical services riser whilst the smaller branch turns and passes through a volume control damper and into the vertical services riser.

It is of note that this ductwork installation has previously been stripped of all thermal insulation and had an adhesive mixture applied to seal the surface and remains uninsulated, a major energy loss. There is some polystyrene insulation on the smaller branch duct but this in no way meets modern requirements for energy efficiency.

The style of construction of this duct is old fashioned using mild steel angle to form the joints, a method that has not been regularly used for more that 40 years and provides evidence that is a part of the original installation.

The supply air ducts are difficult to access within the vertical services riser but both leave the riser by passing through the wall approximately in the area of the first floor changing rooms.

Also of note is the absence of any fire dampers in the wall.

1	Building	First Floor Roof	**Condition**
2	Description	Ventilation – Ground Floor Changing Rooms Extract Air Fan & Exhaust Ductwork	
3	Manufacturer	Woods of Colchester	
4	Type	Contra-rotating cased axial fans	
5	Serial No	426540/56R & 457467/52N	
6	Fan Size - mm	600	
7	Motor (Type)	Direct Drive	
8	Motor (Voltage x Phase x Hz)	415/3/50	
9	Motor (Power) - kW	2.50	
10	Motor (Current - A)	5.70	
11	Motor speed - RPM	1440	
12	Fan Controller	D.O.L. from control panel	
13	Fan Changeover	N/A	
14	1st Stage Pitch Angle – deg ^{O}	26	
15	2nd Stage Pitch Angle – deg ^{O}	23	
16	Duct Connections (Size) mm	600	
17	Duct Connections (Integrity)	Flexible connection	
18			
19			
20	Operational Condition		**C**
21	Lifecycle Assessment **A**		**D**
22	Lifecycle Assessment **B**		**F**
23	Notes		

Inlet flexible badly twisted and torn

1st stage fan operational

2nd stage fan non-operational

Fans are not matched for duty

Fans very dirty and mesh covering to fan outlet corroded away






The changing rooms extract fans at first floor roof level are the lower, circular fans. The upper, rectangular outlet is believed to be the previous main pool extract/exhaust duct outlet and is out of use.

The extract fans are very dirty which will be a serious impediment to their performance and the 2^{nd} stage fan is non-operational even though the isolator is turned on.

The bird mesh protection to the front of the fan outlet is corroded away.

The contra rotating extract fans are reasonably well supported with anti-vibration mounts although these are showing signs of UV degradation.

The manufacturers fan data plates. It is interesting to note the fans are not equally matched in duty the first having a blade pitch angle of 26^{o} whilst stage two is 23^{o}.

1	Building	First Floor Roof	**Condition**
2	Description	Ventilation – First Floor Changing Rooms Extract Air Fan	
3	Manufacturer	Powercat	
4	Type	Roof Curb Mounted Centrifugal Twin Extract Fan	
5	Serial No	PAD-1507	
6	Fan Size - mm	Not Known	
7	Motor (Type)	Direct Drive	
8	Motor (Voltage x Phase x Hz)	204/1/50	
9	Motor (Power) - kW	Not Known	
10	Motor (Current - A)	5.50	
11	Motor speed - RPM	Not Known	
12	Fan Controller	D.O.L. from control panel	
13	Fan Changeover	Not Known	
14	Duct Connections (Size) mm	Not Known	
15	Duct Connections (Integrity)	Not Known	
16			
17			
18			
19			
20	Operational Condition		**C**
21	Lifecycle Assessment **A**		**E**
22	Lifecycle Assessment **B**		**F**
23	Notes		

Curb mounted twin extract fan

Fan not operational

Casing corrosion evident



The curb mounted twin extract fan believed to be the extract from the first floor changing rooms.

The fan is non-operational and requires replacement.

1	Building	Ground & First Floor Changing Rooms	**Condition**
2	Description	Ventilation – Supply & Extract Grilles & Diffusers	
3	Manufacturer	Various – Not Known	
4	Type	Various – 4 Way Diffusers, Egg Crate & Double Deflection Grilles and Air Valves	
5	Sizes - mm	Various	
6			
7			
8			
9			
10			
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18			
19			
20	Operational Condition		**B & C**
21	Lifecycle Assessment **A**		**C & D**
22	Lifecycle Assessment **B**		**E**
23	Notes		

No consistency with grille & diffuser selection

Grilles & diffusers reasonably dirty

No access to ceiling void to survey route of branch ductwork

Grille & diffuser performance not validated













A selection of the various grilles, diffusers and valves around the changing rooms and toilets.

Just how the double deflection grilles have become so damaged we cannot explain.

It is of note just how dirty a lot of the grilles and valves are in particular.

There is very little rhyme or reason as to what are supply and what are extract terminals as we detected supply and extract air-flows through all types.






A further selection of grilles and valves around the various changing rooms and toilets.

Because of difficulty in gaining access to the ceiling voids whilst the building was open to the public we cannot say which are supply air and which are extract although a reasonable assumption would be the extract devices are considerably dirtier than the supply ones mainly because of the lack of supply air flow due to blocked filters.



Within changing rooms where there are roof lights, these are fitted with hit & miss type sliding aluminium type closures to regulate the air flow. In all instances we observed these sliding dampers were heavily corroded in the open position and therefore wasting heat and valuable energy.

1	Building	Roof Plantroom and Ductwork	**Condition**
2	Description	Ventilation – Teaching Pool Hall Heat Recovery Air Handling Unit	
3	Manufacturer	Calorex Heat Pumps Ltd	
4	Type	Packed Heat Recovery & Dehumidification Air Handling Unit	
5	Model	DT12B	
6	Serial No	99683D02	
7	Filters (No. x size)	2 No. 610 x 760 x 47	
8	Fans (Type)	Belt driven centrifugal	
9	Unit - Voltage x Phase x Hz	415/50/3	
10	Unit Full Load Current - Amp	19	
11	Unit Fused Supply - Amp	300	
12	Refrigerant	407C	
13	Supply Fan - Model	Not Known	
14	Supply Fan Motor- Model	S2.20KG2ER	
15	Supply Fan Motor – S/No	IVG 10361	
16	Supply Fan Motor - kW	2.20	
17	Supply Fan Motor - Amps	4.79	
18	Supply Fan Motor - RPM	2850	
19	Extract Fan - Model	Not Known	
20	Extract Fan Motor- Model	1.143TECAB3-80-S2	
21	Extract Fan Motor – S/No	1509-0891527	
22	Extract Fan Motor - kW	1.10	
23	Extract Fan Motor - Amps	2.67	
24	Extract Fan Motor - RPM	1.390	
25	1 x Compressor - Model	Danfoss Maneurop MTZ 80 HP 4 AVE	
26	1 x Compressor – S/No	MA103182621	
27	1 x Compressor - Voltage	415/3/50	
28	1 x Compressor – L.R.A	80	
29			

30	Return Air – mm x mm	500 x 500	
31	Return Air – integrity	Flex connection - Sound	
32	Supply Air – mm x mm	500 x 500	
33	Supply Air – integrity	Flex connection - Sound	
34	Exhaust Air – mm x mm	520 x 340	
35	Exhaust Air - integrity	Solid connection	
36	Fresh Air – mm x mm	520 x 340	
37	Fresh Air - integrity	Solid connection	
38	Operational Condition		**D**
39	Lifecycle Assessment **A**		**E**
40	Lifecycle Assessment **B**		**F**
41	Notes		

Poor access to roof plantroom

Only a single filter installed – heavily soiled and damaged and unremovable

Supply fan very dirty

Supply fan belts incorrect, very loose and breaking up

Extract fan very dirty

Extract fan belts new but too tight, bearing noise

LPHW heating coil highly corroded

Refrigeration/Dehumidification equipment not working

Refrigeration/Dehumidification section highly corroded

Refrigeration/Dehumidification coil highly corroded

Package casing highly corroded

Heating 3 port diverting valve – actuator disconnected

Heating pipework and valves within unit are highly corroded

Temperature controlled by manually opening and closing the isolating gate valves

Fresh air inlet ductwork damper – actuator disconnected – fully open

Extracted air exhaust ductwork damper – actuator disconnected – fully open

Control panel dangerous – exposed wiring

Control Panel – LCD display inoperative





The roof plantroom is located on the first floor roof over the teaching pool to the east of the building. The plantroom comprises an uninsulated GRP housing containing a heat recovery air handling unit. The GRP housing and the heat recovery air handling unit are supported on galvanised mild steel beams themselves supported off the roof deck on structural columns.

The GRP housing has a single supply duct and a single return air duct connecting into it as well as a fresh air intake duct and extracted air exhaust duct the penetrate the room and terminate as angled-off mesh covered ducts.

The access to the air handling unit is not satisfactory in that personnel have to climb onto and stand on one of the two steel beams whilst undoing four no. stainless steel nuts in order to lift off the GRP access panels and then carefully get off the steelwork to put the access panel in a place of safety.


A view of the heat recovery air handling unit inside the roof plantroom illustrating the extremely limited personnel space available.

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The supply air fan and motor. The fan belts are both different and neither are correct. The belts are so loose they are continually slipping leading to shredding that is leaving a heavy residue of rubber particles on the floor of the air handling unit casing and, more importantly, the motor creating a serious fire hazard.

The supply fan impellers are quite dirty.

The unit manufacturers motor data plate, the supply fan and extract fan motor data plates.

The LPHW heating coil showing heavy corrosion and damage to the front face and the nearly completely blocked intake face.


The upper filter chamber with no filter installed.

The lower filter chamber showing the heavily soiled and damaged filter which was unremovable.



The extract/exhaust fan and motor and the fan belt. The fan belt is very tight fractured in two places indicating it is the incorrect belt and will soon fail. The extract fan impellers are very dirty and corroded.



The refrigeration/dehumidification section of the heat recovery air handling unit illustrating the high level of corrosion and exposed wiring.



The LPHW heating circuit where this enters the roof plantroom and connects to the heating coil in heat recovery air handling unit. None of the pipework is insulated and the three port diverting valve is seized in the full flow position with the heat being manually controlled by operating the isolating gate valves.






The control panel and electrics within the unit are in a disgraceful state with unidentified and bare, open ended pipework all over the place. This is a serious health and safety danger and need urgent remedial attention.

The fresh air intake damper and the extract air exhaust damper. These dampers are designed to work in unison in order to match the level of fresh air against the level of exhausted air. The dampers are both seized fully open and the damper actuator disconnected. The recovered heat by-pass is a simple mechanical flap damper but one of the flaps is missing.

The general level of corrosion inside the heat recovery air handling unit is some of the worst we have ever seen and is mainly the result of warm, wet return air meeting the cold GRP plantroom housing.






The supply and extract ductwork to the teaching pool on the first floor flat roof. There is a single entry point and a single exit point on both these ductwork systems.




A selection of pictures that illustrate how badly deteriorated the thermal insulation has become on the roof particularly on the supply ductwork, the longest run.

This type of damage is usually started by birds pecking at the insulation creating holes that then fill with water and hence the whole installation becomes water logged and of no thermal performance at all.

1	Building	Ground Floor Teaching Pool	**Condition**
2	Description	Ventilation – Supply & Extract Grilles	
3	Manufacturer	Various – Not Known	
4	Type	Wall Mounted Double Deflection	
5	Sizes - mm	Not Known	
6			
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18			
19			
20	Operational Condition		**B & C**
21	Lifecycle Assessment **A**		**C & D**
22	Lifecycle Assessment **B**		**E**
23	Notes		

No apparent balance between supply and extract grilles

Grilles & diffusers reasonably dirty

No access to ceiling void to survey route of branch ductwork

Grille & diffuser performance not validated



The single supply air grille to the teaching pool in the space between the concrete beams. The grilles in the bulkhead below the concrete beams appear to be the original supply air installation and the ductwork they are connected to is corroded through and falling apart. The supply air double deflection grille is typical of the extract air grilles as well.



The return air grilles are located on the south side of the teaching pool hall and located between the concrete beams. There are four return air grilles and we cannot explain why there is a higher provision for return air over supply. The bulk head contains what appears to be the return air duct from the previous installation.


At the foot of the stairs that rise from the teaching pool hall to the main pool hall is what is believed to be the original return duct from the teaching pool hall rising to join with the main pool hall return air duct and make their way to the vertical services riser where they drop back to the basement plantroom. The condition of this duct is the same as observed in the bulkheads on either side of the teaching pool.

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1	Building	Basement Plantroom and Vertical Services Riser	**Condition**
2	Description	Ventilation – Chlorine Room Extract Ventilation	
3	Extract Fan - Manufacturer	Elta Select	
4	Extract Fan - Type	Short Steel Cased Axial	
5	Extract Fan – Duty	Not Known	
6	Extract Fan – Size mm	300	
7	Extract Fan - Model	Not Known	
8	Extract Fan – Power Supply	240/1/50	
9	Extract Fan – Power kW	Not Known	
10	Extract Fan – Current SC - A	Not Known	
11	Extract Fan – Current FLC - A	Not Known	
12	Extract Fan – Speed RPM	Not Known	
13			
14			
15			
16			
17			
18			
19			
20	Operational Condition		**B**
21	Lifecycle Assessment **A**		**C**
22	Lifecycle Assessment **B**		**E**
23	Notes		
Single fan only – no back up facility, failure would restrict use of chlorine room Chlorine Room extract ventilation rate not validated			












The chlorine room extract ventilation. The system operates continually through a single short cased axial fan. There is no standby facility in the event of fan failure. The LEV (Local Exhaust Ventilation) certification appears to be up to date. The chlorine room ventilation terminates out of the vertical services riser just visible above the original pool hall extract ventilation outlet.

1	Building	First Floor Fitness Suite	**Condition**
2	Description	Extract Ventilation	
3	Extract Fan - Manufacturer	Vent Axia	
4	Extract Fan - Type	Roof Curb Mounted Axial	
5	Extract Fan – Duty	Not Known	
6	Extract Fan – Size mm	400	
7	Extract Fan - Model	Not Known	
8	Extract Fan – Power Supply	240/1/50	
9	Extract Fan – Power kW	Not Known	
10	Extract Fan – Current SC - A	Not Known	
11	Extract Fan – Current FLC - A	Not Known	
12	Extract Fan – Speed RPM	Not Known	
13	Extract Fan - Control	Manual Wall Mounted	
14			
15			
16			
17			
18			
19			
20	Operational Condition		**C**
21	Lifecycle Assessment **A**		**E**
22	Lifecycle Assessment **B**		**E**
23	Notes		
Single fan – non-operational Grilles very dirty			










There are six ceiling mounted extract grilles in the first floor fitness suite. These grilles appear to be powered by a curb mounted extract fan located on the first floor flat roof.

The fan has a manual controller located at high level on the wall near the entrance to the fitness suite

The extract fan is non-operational and the extract grilles are very dirty.

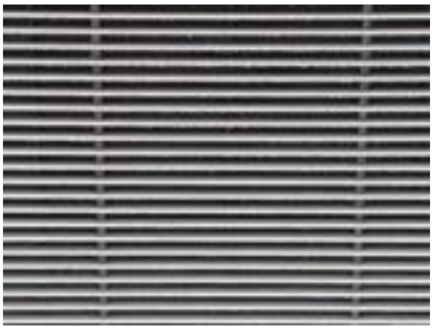
1	Building	Ground Floor Reception & Car Park	**Condition**
2	Description	Comfort Cooling	
3	Manufacturer	Mitsubishi Electric Ltd	
4	Manufacturer - Year	October 2010	
5	Internal - No x Type	2 x Mounted Cassette	
6	Internal – Serial Number	Not Known	
7	Internal – Model	PLA RP100BA	
8	Internal – Duty (kW Cooling)	9.20	
9	Internal – Duty (kW Heating)	11.20	
10	External - Model	PUHZ-P200-YHA3	
11	External – Serial No.	1XU02956	
12	External – Duty (Cooling)	19.00	
13	External – Duty (Heating)	22.00	
14	External – Power Supply	415/3/50	
15	External – Current Amp Max	19.00	
16	External – Current Amp Run	9.88	
17	Refrigerant	R410A	
18			
19			
20	Operational Condition		**B**
21	Lifecycle Assessment **A**		**C**
22	Lifecycle Assessment **B**		**F**
23	Notes		

Internal cassettes very dirty

External heat pump very dirty





The two internal cassette units both displaying dirty grilles. The level of surface dust suggests dirty interiors and coils, one of the known biggest single cause of high head pressures and failure of external unit compressors and controls.



The external heat pump installed beneath the first floor overhang on the north face of the building overlooking the car park. The unit is extremely dirty and this is an indication that the coil will be partially blocked, one of the known biggest single cause of high head pressures and failure of external unit compressors and controls.

The external heat pump is fitted with a pump to remove the condensate created during the heating cycle.

The manufacturers data plate on the external heat pump.

The remote controller for the two internal cassette units located in the light switch cupboard behind the reception desk and is fully operational.

1	Building	Ground Floor – Old Laundry/Dance Studio Area	**Condition**
2	Description	Heating & Public Health	
3	Heating	Electric Convectors	
4	Duty	Not Known	
5	Manufacturer	Not Known	
6	Control - Overall	Single switch activated contactor circuit – Timed activation period	
7	Control - Temperature	Self-contained to each convector heater	
8			
9			
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19			
20	Operational Condition		**B**
21	Lifecycle Assessment **A**		**B**
22	Lifecycle Assessment **B**		**E**
23	Notes		

Electric convector heaters all working

Electric convector heater relatively clean


The old laundry now dance studio area is accessed from the car ark as well as having an entrance off the ground floor staff corridor to the west of the building.


There is a large lobby area on entering the dance studio area that gives access to a male toilet. The toilet is relatively modern and in good condition.


There is a large lobby area on entering the dance studio area that gives access to a female and disabled toilet. The toilet is relatively modern and in good condition.


There is a large lobby area on entering the dance studio area that gives access to a room on the south face of the building used as an equipment storage area

Looking straight ahead to the west wall in the lobby area there are a pair of doors that eventually give access to an external courtyard and next to them an open plan area again used for equipment storage.

Through the double doors to the north of the lobby area gives access to the main dance studio area. Heating is provided by 8 No electric convector heaters and ventilation from 4 No openable windows on the north face of the building

In the northeast corner of the dance studio are a pair of double doors that give access to a small lobby area. In the northeast corner of the lobby area are two fire escape doors that exit onto the car park to the north of the building which when out of public use are protected by a roller shutter door.

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To the south of the small lobby area a single door provides access to a meeting room. This meeting room is fitted with 3 electric convector heaters that are operational and relatively clean.

At the southwest end of this meeting room are another pair of double doors that lead back into the main dance studio.

1	Building	Basement Plantroom	**Condition**
2	Description	Automatic Control Panel	
3	Manufacturer	Kennet Environmental Services Ltd	
4	Type	Kennet Heat Reclaim System	
5	Major Components	Staefa Controls System	
6	Field Controls	Staefa Controls System	
7			
8			
9			
10			
11			
12			
13			
14			
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16			
17			
18			
19			
20	Operational Condition		**C**
21	Lifecycle Assessment **A**		**D**
22	Lifecycle Assessment **B**		**F**
23	Notes		

There are no control panel wiring diagrams

There is no control strategy description

We have found no operational controls at all

Wiring inside panel is haphazard and unidentified

Working on the panel is a serious health & safety risk

See Appendix Report from ControlCare Ltd

A selection of pictures of the original control panel gathered with assistance from ControlCare Ltd.

The panel would appear to be aged from the late 1970's/early 1980's when Staefa Control Systems were most probably the best available on the market.

The company has since disappeared into Landis & Staefa Systems (a coming together of Landis & Gyr & Staefa) which itself is now all a part of Siemens Building Automation Ltd.

It has been a very long time since Staefa Controls were supported in the UK marketplace.

See the Appendix report from ControlCare Ltd for further details.





There is another small control panel on the north wall of the plantroom referencing heating to the seating areas. This appears to be completely out of use but internal inspection shows the power supply for the single head heating pump serving the teaching pool heat recovery air handling unit where the motor starter is located on a concrete column behind the boilers facing the heating pump.

1	Building	Basement Plantroom and Ground Floor	**Condition**
2	Description	General Access	
3			
4			
5			
6			
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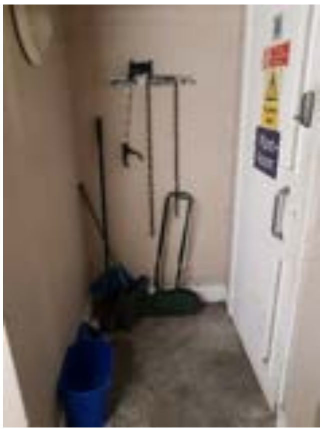
14			
15			
16			
17			
18			
19			
20	Operational Condition		**B**
21	Lifecycle Assessment **A**		**C**
22	Lifecycle Assessment **B**		**F**
23	Notes		

All access to the basement plantroom is suitable only for personnel and small parts/equipment

No access is available for large parts and equipment

There is a lifting beam that carries no certification and is corroding

Basement plantroom has never been rationalised after previous refurbishment works






The main access to the basement plantroom from the ground floor staff corridor illustrating the cluttered access and stairs. Whilst these comply with building regulations regarding size they are not suitable for the import of large items of plant and equipment. On entry to the basement plantroom there is a lot of space to manoeuvre around.












There is a fire escape stair in the southwest corner of the basement plantroom with stairs up to ground floor level and the staff corridor. The fire escape door opens into an enclosed courtyard with two pedestrian access points onto the highway.

The courtyard is basically only personnel wide and consists of ramps and steps and is considered unsuitable for manoeuvring anything other than the smallest plant or equipment.

Note the roller shutter door at the end of the building.









Off the ground floor staff corridor to the west of the building there is an entrance corridor and door that opens into what is described on the drawings as the laundry. This area now consists of a large and small hall and a storage area along with a male/female and disabled toilet.

The corridor continues through a double door into a left handed corridor and two fire escape doors that themselves open into what can be best described as an industrial type reception area more than likely planned for handling goods in and out of the original laundry. The area has a roller shutter door that opens onto the previously described courtyard with access onto The Highway.

The access from the roller shutter doors consists of six steps down to the pavement on The Highway and is not suited for manoeuvring anything other than the smallest plant or equipment.



There is a lifting beam that appears to have been installed to assist in manoeuvring plant and equipment from the ground floor corridor level down to basement plantroom level.

It is believed this lifting beam is a later addition to the building dating from, most probably the early 1980's refurbishment and it is noted that the beam carries no certification of date of inspection or next inspection.

It is also noted that there is corrosion of base of the columns located on the ground floor landing to the top of the stairs. The other side of the lifting beam is supported directly off the south wall of the building


There are two supporting columns to the lifting beam located in the southwest corner of the basement plantroom.

These two columns have been exposed to the previously noted flooding of this part of the plantroom and fairly heavy corrosion is in evidence.

1	Building	Ground and First Floor	**Condition**
2	Description	Access Platform Lift	
3	Manufacturer	Movement Management	
4	Type	Internal traction cable platform lift	
5	Power – volt x phase x hz	240/1/50	
6	Power - kW	Not known	
7	Power – Fuse Amp	Not known	
8	Model	Not known	
9	Capacity - kG	400	
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20	Operational Condition		**D**
21	Lifecycle Assessment **A**		**D**
22	Lifecycle Assessment **B**		**F**
23	Notes		

Lift closed by insurance assessors

Water damage to traction cables

Water damage to controls & wiring

Corrosion of structural casing

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The platform lift housing at ground floor level showing the alleged water ingress damage and resultant corrosion. By all accounts there is serious water damage to the controls mechanism hence the removed panel that hasn't been replaced but we were unable to confirm this as we were prevented from entering the lift by the General Manager because "the insurance assessors have said it is not safe", not a particularly helpful stance for an engineer engaged to prepare a condition report.

It is alleged that the water damage is the result of excessive condensation build-up on the single glazing that forms the north wall of the reception area. We observed a wet patch on the floor and heavy moisture on the internal window bars whilst the exterior of the window bars were observed as being dry.



The platform lift is currently parked at first floor level.

6 Commentary on the Installations

In providing a commentary on the HVAC installation we shall try to follow the structure and order of detailed condition survey but by the very nature of the building and installation this may not always be possible.

As highlighted in Section 3, Description of Sites & Services, the original building dates from 1965 and appears to have been refurbished in the early 1980's and again in 2008. There are various aspects of the building that are original to the 1965 opening and some from the 1980's refurbishment that are still in use and form part of the 2008 refurbishment.

We shall start with the boilers as the warmth of the building and the two pool halls rely on these. Apart from boiler no 1, the old UR style boiler that dates from the very early 1980's, the Wessex boilers2 to 6 are more modern and appear to date from 2008 refurbishment.

The writer has experience of both these Hamworthy boiler models both from the 1980's and the 2008 refurbishment.

We cannot understand why, as a part of the 2008 refurbishment boiler no. 1 was left in situ as the maintenance records show it was still operational until 2011 and most probably required to meet the overall heating load. Having said that, the Boilers 2 to 6 are all in an operational condition and the efficiency print-outs on each boiler are within the tolerances expected of modern boilers. The boilers are burning cleanly and there are no signs of corrosion with any of them. It is also observable that boilers 2 to 6 appear to be able to handle the heating load of the pool water and the pool hall heating albeit as observed in summer. We have our suspicions that the 5 no. working boilers would be working at maximum load during the winter and with little if any back-up resilience offered by boiler no. 1.

The boilers are installed on two common flue systems, boiler 1 to 3 on one system whilst boilers 4 to 6 are on the other. These common flue systems have an individual flue from each boiler rise and connect into a common header that then passes horizontally to the vertical services riser

Each of the two horizontal flue installations are fitted with a galvanised steel bifurcated fan creating a flue dilution system. Once within the vertical services riser, the two horizontal flues turn and pass into a brick chimney and are lost to view.

The boiler flues are in a reasonably sound condition as are the two flue dilution fans which are operational and free from vibration.

We have been unable to see within the vertical chimney space or the flue terminations at roof level and so cannot comment on these.

The boilers rely on a ducted fresh air supply system for combustion. The combustion fresh air system draws in air via a system of ductwork originating in the new plantroom. The combustion fresh air system is powered by a single galvanised steel cased axial fan located at high level in the basement plantroom.

The installation is just a single cased axial fan and so raises concerns regarding it potential failure as this would inhibit use of the boilers without a suitable combustion fresh air supply. The combustion fresh air system terminates as a box at floor level fitted with 3 no. double deflection type grilles. Although we have not validated the airflows the face velocity of the supply grilles appears quite high.

Similarly, the boilers have an extract air system based around a ductwork system that originates as a horizontal run across the rear of the boilers fitted with three double deflection type grilles. The ductwork system is powered by a single galvanised steel cased axial fan located at high level in the basement plantroom. The extract air ductwork system off the fan rises into the new plantroom where it is exhausted to atmosphere through an external weather louvre.

As the basement plantroom is a cavernous and well-ventilated space with air entering from a large external louvre in the area of the old fresh air plenum and also from the vertical services riser we cannot quite understand the need for the system especially as the space will be generally ventilated by the fans on the flue dilution system. The extract system may help to keep the ambient temperature down in the area of the boiler's but it needs to be finely balanced with the combustion air supply in order that products of combustion are not removed from the boiler and flue system.

Although we have not validated the combustion extract air system the face velocity of the extract grilles is certainly lower than the supply air grilles.

The gas supply to boilers originates at a BK-G65M gas meter located on the south wall of the basement plantroom. The meter is relatively modern and dates from 2015 whilst the gas installation appears to originate from the 2008 refurbishment. This is because there is the remaining gas pipework from a previous installation around on the walls and floor in the area of the old fresh air plenum on the north side of the basement plantroom.

Apart from the gas safety solenoid valve being installed in an inaccessible location at high level above the gas meter near the fire escape stairs in the southwest corner of the basement plantroom, the gas pipework system appears to be in a reasonable condition.

Before the gas services connects to each of the boilers it passes through a lever and weights operated mechanical gas safety valve. There is a mechanical wire installed across the top front of all 6 no. boilers with a bi-metallic links in front of each boiler. This wire then passes to high level before dropping to a mechanical knock-off button by the entrance door and then rising again and finally connecting to the mechanical lever and weights valve.

On the route from the knock-off button to the mechanical gas safety valve, the wire rubs on the aluminium covering to one of the boiler flues and a concrete column. This will lead to damage both of the wire, possibly premature failure and therefore failure of the boilers. Such a mechanical safety system is archaic in this day and age, is easily damaged where installed in front of the boilers and notoriously unreliable in the bi-metallic links to fail and activate the system.

It is of note that there is a modern, gas safety solenoid valve installed near to the gas meter and it is presumed that this is linked to some safety circuit in the event of an emergency. It is certainly powered open as there is a gas supply to all the boilers which there wouldn't be if the valve was not powered.

It is presumed that the mechanical gas safety system dates from the 1980's refurbishment and it is, in our opinion, no longer a necessary safety feature and could be removed.

The Hamworthy boiler installation requires a primary heating loop off which all operational heating circuits are installed. This is very clear from the manufacturers system design guides and the writer is aware of the damage that can be caused to boilers installed without such a primary circuit. There is no obvious such primary heating circuit on this installation but the boilers show no obvious detrimental defects because of this. We suspect this is because the heating of the pool water and thepool halls creates enough heat loss and therefore heating load, to maintain the minimum flow rate through the boilers.

The DAB heating system primary pumps are in a reasonable condition although there are signs of leakage on the glands of the local inlet and outlet isolating valves. The duty of the primary heating pump suggests that it is satisfactory in meeting the minimum flow rates through all 6 no. boilers.

There is a strainer on the common return to the boiler although looking at the paintwork it would appear this has never been opened and cleaned.

We have noted that there is no dosing pot installed on the heating circuit and therefore no way of monitoring or controlling the condition of the heating water in the system. This is a major concern that will become more evident during our discussion on the services installation.

All the heating pipework around the boilers appears to be in a reasonably good condition and is believed to date from the 2008 refurbishment. The thermal insulation is in a reasonable condition at high level but is badly damaged at low level particularly behind the boilers.

At high level the heating pipework is very closely bunched together with other piped services and is not particularly well identified. From our tracing of the pipework routes, the first flow and return branch off the heating main is one that passes back behind the boilers before passing through a single head circulation pump and entering the vertical services riser. Within the vertical services riser the flow and return rise to first floor roof level and eventually connect to the Teaching Pool heat recovery air handling unit in the roof plantroom.

All the pipework for this route both in the basement plantroom, vertical services riser and the first-floor flat roof is installed in heavy grade mild steel pipe with screwed fittings. The thermal insulation is in a reasonable condition although the finishing on the external pipework is de-laminating through UV degradation and requires replacement.

Why this circuit only has a single head circulation pump when every other circuit has a twin head pump offering a run and standby facility we cannot explain.

The next circuit off the heating mains are for the main and teaching pool heat transfer equipment. These loads were originally handled by cast iron shall and tube calorifiers, two large ones for the main pool and a smaller one for the teaching pool. These shell and tube calorifiers are still in existence but connections have been made to them to connect plate heat exchangers, a large one for the main pool and a small one for the teaching pool.

The original primary heating connection to the shell and tube calorifiers were fitted with a Staefa 3 port diverting valves. It appears that these have ceased to function and a 2” bsp connection has been taken from the calorifier, through a single head circulation pump and connected to the large plate heat exchanger. There are isolating gate valves on the flow and return circuits to each shell and tube calorifier that all have bad leaks on the packing gland to the valve spindle. These are encrusted with dirt and debris from the water and are all causing further corrosion.

The single head pump on the primary heating circuit is powered by a trailing lead plugged into a 13 amp socket on the wall of the chlorine room. When the pool water is too cold the staff manually turn the pump on and when it gets too warm they manually turn it off. This extremely crude level of control is because of failures of the control Staefa 3 port control valves on the original connection to shell and tube calorifiers.

The single head circulation pump is in a very poor condition and it is not possible to read the manufacturers data plate but we recognise it as of Grundfos manufacture, quite possibly from the TP range. The pump is covered in dirt and debris from a leak on the pool water pipework above it.

The new pipework installation has been very poorly installed with no appreciation of standards with the secondary water connection to the plate heat exchanger with an angled pipe from the calorifier.

This pipe has been installed in heavy grade mild steel tube but because it is handling pool water treated with chlorine, the valve is leaking very badly and the residue of this leak has been siting on thepipe itself causing heavy corrosion to a point where the pipe is close to complete failure and it is this leak that is settling on and damaging the primary pool water pump.

The primary heating connection to the small plate heat exchanger for the teaching pool is installed partly in mild steel pipe and partly in copper pipe in an atrocious manner with no reference to standards and is all over the place and out of square.

None of the primary heating pipework to either the main pool or teaching pool plate heat exchangers is insulated.

The next circuit off the heating mains connects to a large, two-part heating coil in the fresh air duct identified as being the changing rooms supply air. It is noted that there is no circulation pump on this branch and so it may be that it acts as a bypass and provides a constant flow around the boiler's although we cannot prove this. Again, the Staefa 3 port diverting appears not to be working and with the valves under manual controls, this circuit being a primary circuit for the boilers seems unlikely. The isolating valves to this circuit have hand written paper labels attached instructing which valves toopen and which valves to close to effect changes between summer and winter conditions.

The next circuit off the heating mains is located immediately next to the heating coil circuit and is the branch that serves to main pool hall heat recovery air handling unit located at ground floor level in the new plantroom. This circuit passes at high level to the north wall of the basement plantroom where it turns to travel along the north wall before entering the old fresh air plenum chamber and rising to the new plantroom.

This circuit is fitted with a twin head circulation pump at high level on the north wall. This pump is in a deplorable state. There are leaks on both heads with the leak on the lower head now completely encasing it. There are also leaks on both the inlet and outlet isolating valves and the automatic air vents and all the thermal insulation in the area of these leaks is ruined.

The next circuit off the primary heating mains is the primary heating supply to the hws calorifier. This circuit is fitted with a twin head circulation pump which appears to be in a reasonably condition. However, the inlet and outlet isolating valves are in a poor condition with leaks on both of them that is encrusting the spindle of the valve and leading to further corrosion. There is also an in-line strainer on the inlet to the pumps which shows evidence of having been opened and cleaned in the relatively recent past.

The primary heating flow and return to the hws calorifier is fitted with a Staefa 3 port diverting valve. This valve appears to be seized in the fully open position and is non-operational. The failure of this valve begs the question as to how the temperature of the secondary hot water is controlled and our suspicion is that it is not.

The primary heating connects to the hws calorifier through a tube bundle with a flanged connection to the calorifier body. There is a serious leak on one side and the bottom of the flanged connections to the calorifier most probably from when the tube bundle has been removed for maintenance and/or cleaning.

In the centre of the basement plantroom where the branches for the changing rooms and main pool air handling unit connect at high level there are at least two large (4" bsp) flanged gate valves where the leakage around the glands are so bad the valves are completely encrusted with dirt and debris that has spilled out and now completely covers the aluminium sheet covering to the thermal insulation. And it is impossible to establish whether the valves are open or closed.

As well as these traceable branches to the heating system there are at least three other branches that appear to re-use some of the heating pipework from the 1980's, or earlier refurbishments.

The first of these is at the western end of the basement plantroom where the heating mains continue at high level before eventually dropping and entering the undercroft in the vicinity of the old fresh air plenum.

This heating flow and return are installed in mild steel pipe with flanged joints but is totally without thermal insulation and the pipework is very rusty on the surface. The style of flange used suggests this pipework formed a part of the original installation.

Immediately before entering the undercroft a ¾" bsp flow and return rise and pass through the wall into the General Managers office at Ground Floor level and continue at low level to connect to a radiator in that office as well as natural convectors in the adjacent Store Room and the Staff Room. There is a complaint that these radiators and natural convectors never get hot in winter and we suspect the complete heating flow and return into the undercroft may be isolated back at the previously identified high level valves that are suffering from bad leaks.

The Fitness Suite at first floor level is heated by a system of low pressure hot water steel panel radiators. The LPHW supplies to these radiators enter the Fitness Suite through the skirting at floor level and distribute in both directions at low level. The radiators are fitted with thermostatic valves on the flow connections and lockshield valve on the return. The majority of the thermostatic valves have broken or missing heads whilst a couple have had the head completely painted over as is the case with all the lockshield valve rendering them unusable.

The heating flow and returns to the Fitness Suite appear to enter in the vicinity of the New Plantroom but there is no evidence of them in there. Working back from the New Plantroom locates us in the area of the old fresh air plenum in the Basement Plantroom and there is nothing obvious regarding this flow and return there.

We are told that the radiators in the Fitness Suite actually work so there must be a connection somewhere but we were unable to identify it.

There is a working single, steel panel radiator in the Duty Managers office on the Ground Floor. The heating flow and return to this pass down from the ceiling void above but where these connect into the main heating system we have been unable to identify.

It is a similar case with the three radiators on the public stairs. There is a radiator on the Ground to First half landing, the First to Second half landing and the Second to Third half landing. These radiators are generally sound, although the one on the First to Second Floor half landing has badly peeling paint, but the thermostatic radiator valves have damaged or missing heads and there is evidence of leaking on the lockshield valves on the return connections.

The radiators are fed from a heating flow and return in the Basement Plantroom that rise and pass through the wall immediately above the bio-sulphate room. However, because of the mass of old ductwork and pipework then encountered it is not possible to trace where these pipes are actually connected to the main heating system although we are told the radiators get warm in the winter.

There are two heating coils in the northeast corner of the Teaching Pool and the radiator at the foot of the stairs from the Teaching Pool up to the Main Pool neither of which get warm and, we suspect, are not actually connected to the main heating system.

The only other heating circuit of note is the Recovered Heat circuit from the main pool hall return water circuit that passes at high level through the Basement Plantroom before meeting with the LPHW circuit and rising in the area of the old fresh air plenum up to the New Plantroom and the main pool heat recovery air handling unit.

This heating circuit is fitted with a twin head circulation pump at high level in the Basement Plantroom along with an in-line strainer on the inlet connection and isolating valves. We believe the pump is operational but there are signs of leakage on the motor screw and the flanged connections as well as on the glands of the isolating valves. The majority of the thermal insulation is sound.

The hot water service calorifier is displaying signs of leakage on the flange to the LPHW heating tube bundle. We suspect that this originates from the tube bundle having been removed at some point and returned without due care and attention, possible re-using the original gasket that has not seated properly and leaked.

As previously observed, the three port diverting valve on the primary heating to the hws calorifier is non-operational and because of this we suspect the inside of the calorifier is scaled-up thereby severely reducing the performance and the temperature and quality of the secondary hot water.

The secondary hot water leaves the calorifier installed in galvanised mild steel pipework and passes through a single hws secondary circulation pump. There appears to originally have been two secondary hws circulation pumps but the upper one has been removed and not replaced thereby rendering the secondary hot water service as inoperable should the single pump fail. It is noted that there is a manual by-pass installed complete with a non-return valve but it is our opinion that this would never offer a satisfactory circulation of the secondary hot water system. It is noted that the pump isolation valves are of gunmetal and so offer some resistance to de-zincification between dissimilar metals.

The secondary hws flow rises to high level along with a secondary hot water service return that connects into the rear of the hws calorifier. The hws flow and return are installed in with the heating flow and return pipework but appear to be installed in copper pipe but because of such restricted access it isn't totally clear what is actually going on at this point.

The hot water service flow and return split into two circuits at high level.

The first of these circuits, installed as a 1" bsp flow and ¾" bsp return, passes at high level to the west end of the basement plantroom where it turns a couple of times before finally dropping and entering the undercroft. On the way to this point a branch comes off the hws flow to connect to the hot tap at the plantroom sink.

Whilst the first part of this hot water services installation appears to be installed in relatively modern pipework, most probably as a part of the 2008 refurbishment, the pipework within the undercroft appears to be from the early 1980's refurbishment as evidence the loose rockwool insulation installed.

The routing of the hws pipework through the undercroft is not known as the area, because of the restricted space and the high level of loose rockwool thermal insulation material, it is considered a confined space and a serious health and safety hazard.

The hot water service flow and return have patchy areas of loose rockwool insulation but further in become uninsulated. It is believed these services go on to feed hot water to the wash hand basins in the derelict male toilet and the female toilet at the northwest end of the ground floor staff corridor as well as the wash hand basins in the male and disabled toilets in the old laundry meeting rooms area. This is because operating the hot taps in these areas eventually drew hot water, after a period of 3 to 4 minutes and re-examination of the hot water service pipes in the vicinity of the entrance to the undercroft showed these were hot at the same time.

The time delay in getting hot water to these hot taps is in contravention of the requirements of the water regulations and is extremely wasteful of both water and energy.

In the other direction from where the two hot water service branches commence, there is a 1½” bsp flow and a 1” bsp return that head to the east end of the Basement Plantroom. These hot water services eventually enter the vertical services riser and it is presumed go on to connect to the wash hand basins and showers in the various toilets and changing rooms.

Whilst the first part of this hot water services installation appears to be installed in relatively modern pipework, most probably as a part of the 2008 refurbishment, the pipework with the vertical services riser and, from a couple of observations in the ceiling void, appears to be from the early 1980’s refurbishment as evidence the loose rockwool insulation installed.

We have heard of problems with the performance of the hot water at the wash and basins and showers. We believe the problems are two-fold. We believe there is scaling up of the hws calorifier both on the primary heating circuit and also on the secondary heating side and there is potentially some scaling of the distribution pipework particularly where old, 80’s origin pipework has been re-used. Secondly, we feel the distribution pipework is slightly undersized in relation to the peak demand of the showers and wash hand basins.

There may also be a problem with the build-up of scale in the thermostatic mixing valves to the showers and with the shower heads. We were told that the shower heads receive regular de-scaling and sterilisation but we have seen no evidence of thermostatic mixing valve maintenance and therefore believe this is a potential problem.

The incoming mains cold water service is relatively modern although there are signs of leakage round some of the flanged joints that appear to have been addressed using Denso tape.

The first part of the mains cold water distribution passes through the basement plantroom installed in galvanised steel pipe but we have also observed copper pipe installed as well particularly near the basement plantroom sink and into the undercroft. Certainly, the mains cold water, along with the hot water services, in the ground floor staff toilets and staff room are all installed in copper pipe with a chrome finish that has deteriorated very badly.

The mains cold water service at the beginning of the undercroft is insulated with loose rockwool material with a chicken wire finish but is also visibly uninsulated for a lot of its length. The undercroft, along with the basement plantroom, is a warm area and the lack of thermal insulation will only lead to the cold water getting warm and un-palatable to the end user.

This is also the case in the vertical services riser where it appears some pipework from the 1980’s refurbishment has been re-used along with the rather poor or even missing rockwool and chicken wire thermal insulation.

Before the mains cold water service enters the vertical services riser it splits into two branches, one entering the bio-sulphate room where it is softened whilst the other branch remains as raw mains cold water.

These two services enter the vertical services riser where they rise side by side to eventually connect to the tanks at roof level.

The cold water storage tanks are in a diabolical state. There are three tanks in total, each constructed from concreter as a part of top of the vertical services riser. The three concrete cold water storage tanks, two for raw mains cold water and one for softened water, appear to have some sort of water-proof lining installed but from the evidence of the ceiling at the third floor level of the public stairs, this appears to be failing as evidence of the large damp patches visible and the patch repairs undertaken.

The three cold water storage tanks have loose, sheet metal lids that are not fixed down and which have been pushed to one side. The lids to the tanks are not sealed to the tanks or fitted with a screened vent all as required by the water regulations.

The pipework connection to the ball valves appears to be installed with heavy duty flanges more applicable to the style of fitting used when the pool was constructed in the mid 1960's.

There is some thermal insulation to some of this pipework albeit it loose rockwool with a chicken wire covering but this, where it hasn't fallen off, is deteriorating very badly and siting on the floor of the tank room.

There is a steel walkway in front of the tanks but this has rotted through and rendered practical access impossible. There is evidence of leakage on all the mains cold water valves to the tanks along with the same on some of the pipework joints and there are also dumped, life expired materials such as old ball valves and isolating valves.

The cold water storage tanks are fitted with warning pipes and overflow pipes but none of these appear to be fitted with bird or rodent screens as required by the water regulations. The warning pipes discharge into a large, copper tundish at the base of the vertical services riser in the basement plantroom.

The level of dust as you ascend the 16.50 metre vertical ladder of the services riser, increases the higher you get and is very bad at the very top. Some of this dust is airborne from the atmosphere as the vertical services riser has a large louvre at the top as a part of the basement ventilation but the majority emanates from the loose rockwool thermal insulation that is deteriorating badly. There have been wrings about the potential carcinogenic properties of rockwool for many years and this, along with all the used and redundant services in the riser make to area a serious health and safety hazard.

At the very minimum, the whole riser should be cleaned and the access walkway to the tanks repaired to enable on-going maintenance.

As with other water services previously described, the cold water down services, certainly at tank room level as well as descending down the vertical services riser, are installed in pipework from at least the 1980's refurbishment and fitted with loose, rockwool insulation with a chicken wire covering.

The 2" bsp cold feed to the hws calorifier is installed from the tank room all the way down to the calorifier and is not insulated. This is not a major problem as it will pick-up heat from the vertical services riser and basement plantroom before connecting to the calorifier reducing, albeit only fractionally, the energy needed to heat the secondary hot water service.

It is possible, just about, to observe the cold water down service enter the ceiling voids of the first and ground floor changing rooms and toilets and none of these services were insulated. Where the cold water down services crosses the basement plantroom at high level it is located in the grouping of pipework with the various heating and hot water services and is difficult to trace individually. It can be identified where it enters the undercroft at the west end of the basement plantroom and, like other services, is only insulated at the entrance with only patchy insulation as it proceeds through the undercroft.

When observed at the wash hand basins in the male and female toilets at the western end of the ground floor staff corridor, the cold water is noticeably warmer than would be expected.

The drainage services are, for the most part in a reasonable condition. The majority of the soil and waste installation is installed in cast iron with caulked socket and spigot joints that would appear to be contemporary with the original building. The exception is the cast iron drainage associated with the changing rooms and toilets that is installed in spun cast iron with Timesaver mechanical joints.

In a number of observable instances the bolts on the mechanical Timesaver joints have failed. This is a classic problem when the joints have been poorly installed and the bolts overtightened. The manufacturer clearly states that all joints should be made with a torque wrench and gives the settings but we have seen it so many times when this instruction has been ignored resulting in bolt breakages such as observed around the site.

Were the drainage from the floor channels in the changing rooms have been installed at high level above the teaching pool is a concern. We have observed a lot of surface corrosion to these pipes and the painted finish is flaking off very badly. There is also a lot of evidence of water leakage around each of these penetrations through the concrete slab.

We do not believe this water penetration is leaking joints on the cast iron drainage system but more to do with the water used to wash the floors in the changing rooms above leaking around the cast iron pipes in the concrete slab and leaching the salts out of the concrete hence the calcite type stalactites observed developing off the concrete slab. It is an indication that the cast iron pipes were not correctly sealed in the openings in the first place or that the sealing has failed. This is a potential health hazard to users of the teaching pool and requires immediate attention.

There are numerable cleaning access points on the drainage system but none of these show any signs of having been opened and the associated drain cleaned out. This may be because the drains are relatively clean internally but we suspect that is not the case. Observation of the floor gullies in the various changing rooms and toilets revealed these were mostly very dirty with accumulated dirt. This accumulated dirt will have found its way into the drainage system and will create the ideal conditions to start blockages with soil, paper and waste deposits accumulating around them.

The evidence that this has previously happened is the main inspection chamber in the basement plantroom.

The location of this inspection chamber is appalling in the first place located, as it is, between the main pool filter units 4 and 5 meaning there is severely restricted height access to the inspection chamber. When examining the inspection chamber, which is nearly 1.00 metre deep, it is obvious this has severely flooded in the past as the sealed lid and support frame have been pushed off resulting in very serious damage to the surrounding screed finish that has also been lifted in excess of 150mm.

Inside the concrete inspection chamber is a large cast iron branch channel with a bolted lid. The lid has been removed, presumably for cleaning at some point and has not been replaced but is siting resting up against the concrete wall of the inspection chamber. The mild steel studs that hold the lid in place are severely corroded indicating this lid has been removed for quite a while and the overspillof soil and waste-water has built up around the studs and created ideal conditions for corrosion. Thereis further evidence this is still happening, or has happened fairly recently, as witness water and de- composing soil waste in the bottom of the inspection chamber.

The outlet from the cast iron branch chamber passes to the south through the wall of the building and most probably connects into the respective sewer pipe in The Highway.

Quite how such a condition has been able to develop and be left untouched is not clear but this inspection chamber is a very serious health hazard and requires immediate attention.

There is further evidence of damage to the underground drainage in the vicinity of the old redundant chiller where a large portion of the concrete and screed floor has lifted by approximately 100mm on an alignment to a drainage sump.

There are, in fact two (possibly three) sumps in the basement plantroom.

The first sump is in the vicinity of the vertical services riser and is where the warning pipes from the tank room discharge through a large copper tundish. This sump is covered with a steel plate that has corroded through and collapsed and has been covered over with another, thinner steel plate that flexes by at least 25mm when you walk on it.

The second sump is in the vicinity of the original shell and tube calorifiers for the main pool and across from the redundant liquid chiller. This sump appears to have an underground drain connection that is lifting the concrete as described above. Again, the sump has a steel plate that has corroded through and collapsed and has been covered over with a relatively thin sheet of plywood that flexes so much when walked upon that is has been further protected by having a raised walkway platform located over it.

There is potentially a third sump as witness the two steel plates in front of the gas boilers. The steel plates are in a good and sound condition and we were unable to lift them to confirm what was beneath.

The two inspection pits at the foot of the fire escape stair in the southwest corner of the plantroom are of concern. All the time we were on site undertaking our survey these were in flood with a fair amount of water collecting on the floor and the sealed covers partly lifting.

We suspect this inspection chamber is associated with the 6” cast iron drain that falls all the way from the undercroft until it enter the basement plantroom floor about 2.5m to the west of the inspection chamber.

We suspect that the inspection chambers below these covers are blocked but we were unable to lift the covers to prove anything. The flooding from these inspection chambers is damaging the floor and the structural walls and has been occurring for a long time as witness the corrosion to the base of the lifting beam. This again is a serious problem that requires urgent attention and correction.

There are a few other drainage outlets in the floor of the basement plantroom that have various unfitted covers all of which are dirty and have rough concrete edges that are trapping further dirt and debris which will block the drains. These all need a thorough inspection and cleaning out.

The rainwater drainage is primarily installed in cast iron pipework with socket and spigot caulked joints which indicates that it is most probably contemporary with the original building. Where observable, which is mainly the first floor flat roof, the outlets to the roof are circular and all originally had wire mesh balloon covers all but one of which are now missing. In general, the rainwater outlets at roof level are fairly dirty with a lot of accumulated dirt and waste visible inside them. It is more than likely this dirt and waste is inside the rainwater pipework as well.

We haven’t been able to observe any of the rainwater outlets on the roof over the main pool hall but experience tells us they will be in a similar condition.

The rainwater outlets from the roof over the main pool hall appear to drop to the basement plantroom encased in the structural concrete columns of the building and it is these that are observable in the basement plantroom where they exit each column and connect into a long, falling horizontal run located at low level on the south wall of the building. This rainwater run drops into the concrete floor of the basement plantroom about 1.50m to the east of the soil and waste inspection chamber and most probably connects into the respective sewer or rainwater pipe in The Highway.

Above the fire escape stairs in the southwest corner of the basement plantroom the rainwater pipe can be observed above the lifting beam. This pipe has two exists from this area, one presumably into the most south westerly column of the building and one from the flat roof over the old laundry area. It was observed during our survey, following a rainy day, that there was a lot of water over the ground floor landing at the top of the fire escape stairs. Water could be seen dripping heavily from the concrete beam in the vicinity of the cast iron rainwater pipe.

It may be that the cast iron pipe is damaged within the concrete column or beam but we believe that is unlikely. We believe it is far more likely that the concrete around the rainwater outlet is damaged and has become unsealed and that rainwater is seeping down between the edge of the cast iron pipe and the concrete. Which ever it is this water is severely damaging the building structure and requires further investigation and correction.

The ventilation to the main pool hall is based around a large heat recovery air handling unit located in the new plantroom at ground floor level. The new plantroom is a post opening addition that is believed to originate from the 2008 refurbishment as evidence the tiled columns, the same as on the external north face of the building that are actually located within the plantroom.

The condition of the heat recovery air handling unit is deplorable. Not one of the access panels fit correctly and have the turnbuckle fixing devices are missing, in some cases replaced by ill-fitting self-tapping screws.

Within the heat recovery air handling unit, the fresh air intake/supply and the extract/exhaust air fans are filthy and have not been cleaned in a very long time. The motors and drive belts are in fair condition only with the belts showing early signs of wear.

There are three coils within the air handling unit, a heating coil fed from the main building LPHW system, a larger heating coil fed from the recovered pool water system and a refrigeration based cooling coil. All these coils are in a highly corroded condition primarily caused by an accumulated build-up of dust and dirt that has become saturated and created perfect conditions for the onset of corrosion.

The saturation of the air is caused by the fact that the refrigeration section of the air handling unit is non-operational and has been for a very long time. The refrigeration section and cooling coil are necessary in order to de-humidify the return air from the main pool hall. Without the cooling coil working, the saturated nature of the extract air from the main pool hall condensates on the warm face of the heating coils and if these have not been cleaned, creates a corrosive mixture that attacks the aluminium fins of the coils. The longer this is left the worse the corrosion will become and from the visual condition of the coils this has been the case for a very long time.

This condensation has also settled in the internal surfaces of the air handling unit where the visible level of corrosion is again very high.

The filtration of the incoming fresh air is achieved by a bank of 9 No panel filters. These filters were observed as being very clean and, therefore, relatively new and were in stark contrast to the rest of the unit.

The fresh air inlet and the exhaust air dampers are linked to a single actuator with a common activation mechanism across both dampers in order to ensure a balance between air exhausted from the unit and fresh air drawn in by the unit. These dampers were observed as being disconnected and we were unable to move either damper manually. The dampers appear to be seized in the fully open position.

The fresh air intake and the exhaust air outlet are connected to external weather louvres located at either end of the new plantroom. These louvres are extremely dirty and most probably the root cause of the build-up of dust and dirt within the air handling unit.

The controls and electrics to the air handling unit are in an awful condition with ill fitting access panels and a high level of corrosion on the various components. There are a lot of loose wires taped together and no labelling as to their use. As previously described, the refrigeration based de-humidification section in non-operational but is was also observed that the 3 port control valve to the LPHW heating coil was non-operational as the actuator has been removed from the valve, possibly broken off from the look of the plastic fixings.

We understand that the main pool hall temperature is controlled by staff entering this section of the heat recovery air handling unit and manually adjusting the 3 port valve. This is an extremely dangerous practice and should be immediately stopped. It was further noted that there was a very high level of leakage from the various valves within this section of the air handling unit and again raises the question of how the quality of the LPHW water is monitored and maintained.

The supply and the extract fans have recently been fitted with inverter drives.

It is believed the fitting of these is to enable some level of control over the level of heating to the main pool hall to compensate for the lack of control over the heating by the three port valve.

This seems an awfully expensive approach over actually getting the heating control valve to operate correctly. It will also be detrimental to the conditions in the main pool hall because it changes the level of ventilation required purely on the basis of temperature and not the overall conditions or personnel.

The supply air to the pool hall is achieved by two ducts on the external north face of the building believed to have been installed as a part of the 2008 refurbishment. The first duct enters the pool hall at both first and second floor level. At first floor, main pool level, the supply air duct serves a single grille on the east side of the pool hall whilst the branch to the west serves the west and south face of the pool hall. At second floor level the duct branches both east and west and forms a continuous circuit around all four faces of the pool hall.

It is similar with the second duct that rises at the western end of the external face of the building and rises to enter the main pool hall at third floor level. This duct again branches both east and west and forms a continuous circuit around all four faces of the pool hall.

Our concern with the main pool hall supply air system is the continuous circuit at both second and third floor level. Because the ducts have no stop point the two airflows generally will get lost into each other and the fan will have no point against which an accurate fan pressure loss can be calculated. The whole installation seems quite hit-and miss to us particularly as all the manually operated volume control dampers were observed as being fully open reflecting the fact that the continuous circuit of ductwork is most probably un-balanceable.

The extract air system to the main pool hall is achieved through a large louvre built into the wall at second floor level. The louvre is connected to a duct that passes directly down to the heat recovery air handling unit passing through the fitness suite at first floor level. It was noted that the louvre was extremely dirty all over and therefore a major contributor to the collected dust and dirt inside the air handling unit.

Our concern with the main pool hall extract air system is the unbalanced nature in that it extracts from just a single point in the centre of the second floor thereby failing to collect air from the full length of the pool hall and most probably primarily just short circuiting the supply air delivered immediately above it. There was no evidence of how the extracted air could be balanced.

Of interest regarding the main pool hall supply and extract ventilation were remnants of the originally installed systems both at second and at third floor level.

At second floor level on the east face of the building is a large louvre built into the side of the vertical services riser. This louvre connects to a system of ductwork within the vertical services riser that pass back to basement plantroom level and originally connected with the old centrifugal extract fan. The ductwork has an open end following the partial strip out, presumably at the 2008 refurbishment, and is therefore creating an uncontrolled loss of energy to the main pool hall.

The other feature is what appears to be the original supply air system at third floor level. A circular duct can be observed leaving the vertical services riser and splitting into two branches. The first branch passes around part of the east, the south and part of the west face of the building. The second branch passes around part of the east, the north and part of the west face of the building. These two branches do not form a continuous circuit. They are, however, open ended and again connect back int a ductwork system in the vertical services riser and is therefore creating an uncontrolled loss of energy to the main pool hall. It is also interesting to note that the original, but inoperative, high velocity supply air nozzles remain insitu and have been decorated in the same green colour as the supply air ductwork system.

Whilst discussing the main pool hall ventilation systems it is worth noting the glazing to the first floor pool hall that we believe originates from the 2008 refurbishment. There are gaps between the aluminium glazing panels that appeared to have been filled with a mastic type sealant. There is a lot of evidence of the failure of these mastic seals and we have observed gaps of between 2mm and 4mm between the glazing panels that are exposing the building to both excessive heat loss and further water damage from the potential ingress of rain.

The supply air system to the changing rooms and toilets appears to be based around the original ventilation system, certainly from the 1980’s refurbishment and possibly contemporary with the original installation.

Fresh air is drawn in from a weather louvre installed at ground floor level on the north face of the building overlooking the car park. The louvre is full height in construction and located in an “alcove” frequented by rough sleepers. From this louvre a galvanised sheet steel duct drops to floor level within the basement plantroom in the area of the old fresh air plenum. A circular galvanised sheet steel duct then passes around at floor level before connecting to a filter section. This section contains 4 No 600mm x 600mm bag filters.

The filters, at the time of our inspection, can only be described as rotten. They are fully impregnated with dust which has become wet through water carryover and therefore totally impassable to any airflow. There is a manometer connected across these filters but this is without any fluid, most probably having been sucked out by the fans creating a negative pressure because of the blocked filters.

These filters are a severe health hazard require immediate replacement along with the filter housing cleaning out. There is also corrosion within the filter chamber from the entrapment of moisture and as evidence the large puddle stan on the floor beneath the filter housing.

After the filter housing the ductwork transforms back to circular and connects to 2 No. contra-rotating axial fans. There is an inspection hatch prior to the supply air fans and the internal ductwork was noted as being reasonably clean, possibly because of the blocked filters. The fans were both operational but noticeably noisier than would have been expected possibly, again, because of the large negative pressure created by the blocked filters.

From the fans the circular ductwork rises to high level in the basement plantroom before turning to connect to a large, two part heating coil followed by an attenuator. It is at this point, we believe, the new, circular supply air ductwork connects to the original system of rectangular ductwork.

This rectangular ductwork passes through the basement plantroom at high level before splitting into two branches each of which enter the vertical services riser. Both the larger and smaller branch are fitted with volume control dampers both noted as being fully open. Within the vertical services the smaller of the two branches rises until the level of the ground floor changing rooms ceiling void where it turns and passes through the wall. The larger branch continues to rise up to the level of the first floor changing rooms ceiling void where it turns and passes through the wall.

It is noted that none of the changing rooms supply air ductwork has any thermal insulation installed and therefore is a very large energy heat loss.

We have not been unable to survey within the changing room ceiling voids but we have been able to observe the mixture of supply and extract grilles installed within the false ceilings in all areas. It is presumed there are branch ducts with flexible connections onto these grilles and diffusers

At first floor roof level there are two contra-rotating axial extract fans that we believe are the primary extract ventilation to the ground and first floor changing rooms and toilets. The fans are connected to a galvanised steel duct installed in the vertical services riser. It proved impossible to trace the origin of this ductwork because of the extremely poor access within the vertical services riser and the preponderance of life expired pipework and ductwork services but it certainly seems to have disappeared around the area of the ceiling void to the ground floor changing rooms.

It is also of note that we have observed no evidence of any fire dampers on any of the changing rooms supply and extract ventilation systems.

Of the two contra-rotating axial fans, only the first stage fan is operational and the impellor of the second stage fan was observed as not moving even with the first stage fan pushing air through it so it is presumed to be seized. It was also noted that the bird mesh covering to the outlet of the duct has completely corroded away thereby removing a safety feature preventing personnel or animals from entering and experiencing injury.

There is another, curb mounted twin centrifugal extract fan on the southern end of the first floor flat roof. This fan is located above the male changing rooms and showers and may be installed to serve these areas but as the fan was non-operational further surveys were not possible.

The roof plantroom is constructed from a single 6mm glass reinforced plastic (GRP) skin and contains a small heat recovery air handling unit that serves the ground floor teaching pool. The air handling units is in an absolutely atrocious condition. Not a single access panel fits, more than half the turnbuckle fixings are missing and the level of internal corrosion is some of the worst we have ever seen.

The unit has a LPHW heating coil and a refrigeration based cooling coil. Both coils are corroding to the point where just brushing a hand over the surface leads to large parts of the rotted coil face falling away.

The fresh air/supply air fan is extremely dirty and has never been cleaned. The motor appears in a reasonable condition but the two fan belts as fitted are the incorrect type and size and are so loose the two inner faces can be pushed together. These belts are both shredding in use as evidence the large pile of rubbery dust on the floor of the casing and on the motor.

This latter issue is creating a severe fire hazard.

The refrigeration section is non-operational. The refrigeration section powers a cooling coil designed to de-humidify the extracted air. As a consequence, the interior of the air handling unit and the thin GRP walls of the roof plantroom create very cold surfaces on which the saturated air condensates and creates further condensation.

The level of this condensation is best observed when looking at the aluminium electrical boxes within the air handling unit have more or less completely rotted away. A similar situation exists with the drip tray designed to capture and drain away excess condensate.

The fresh air inlet and the exhaust ducts that pass through the roof of the roof plantroom are fitted with air dampers that are linked to a single actuator with a common activation mechanism across both dampers in order to ensure a balance between air exhausted from the unit and fresh air drawn in by the unit. The damper actuator is in parts and the dampers were observed as being disconnected and we were unable to move either damper manually. The dampers appear to be seized in the fully open position.

The previously discussed heating flow and return that enter the roof plantroom immediately pass through a three port diverting valve. This three port valve has had the actuator removed and, as with the heat recovery air handling unit in the new plantroom, the valve is operated manually by the staff depending on the conditions within the teaching pool hall. Not only is this action extremely dangerous, it does nothing for the energy conservation of the building.

The electrical and control panel are extremely dangerous as there are numerous unidentified bare wires and corroding components protected only by a metal access panel held in place by one of four turnbuckle fastenings. The LCD display on the integral controller is non-existent but the controller is live if the indication lights are to be believed.

The supply and extract ducts pass along the first floor flat roof. The ducts appear to be in a reasonable condition but the same cannot be said for the thermal insulation. The thermal insulation consists of a loose glass fibre material overcovered with a roofing felt type material with a foil face finish. As we have observed many times in the past, this insulation has been attacked by birds and the glass fibre infill exposed leading to the ingress of water. This ingress of water has led to the insulation becoming water-logged and to start to fall away from the ductwork thereby rendering its purpose as a thermal insulation non-existent.

Within the teaching pool hall it appears there is a single supply air grille and four return air grilles relatively easy to identify as they are painted in the same green colour as the main pool ventilation system.

We cannot explain the imbalance between the number of supply air grilles over the extract air grilles.

There is an extract ventilation system installed in the chlorine room. The extract system commences at a hood installed over the complete chlorine measuring and injection area. From this extract hood a 200mm dia galvanised sheet steel circular duct extends at high level through the basement plantroom. Along this run there is a single 315mm dia short cased axial fan before the 20mm dia duct continues into the vertical services riser. Once within the riser the chlorine extract duct rises to high level before discharging through a ductwork cowl installed above the changing room extract fans.

The inside of the extract hood is painted to protect the surface from the potentially corrosive effects of any chlorine fumes. The single short cased axial fan is operational and the ductwork appears to be in a sound condition throughout. We are rather surprised it is only a single extract fan as this offers no resilience against a fan failure which would restrict the use of the chlorine equipment.

In the ground floor public reception area there are two direct expansion heat pump cassettes. These units are connected to single external heat pump installed on the north wall overlooking the car park.

The complete comfort conditioning system is operational but the internal cassettes are noted as being relatively dirty on the return grille whilst the external heat pump is extremely dirty

The condition of this equipment, which dates from the 2008 refurbishment, is worrying as the collection of dust and dirt, particularly on the external equipment, is the single most experienced problem leading to component failure due to the creation of high head pressures on the refrigeration gas circuits and the overheating and eventual failure.

This type of equipment is relatively easy to maintain and keep clean and there is no real excuse for it being in this condition.

The old laundry has been converted to a dance studio and a meeting room. The dance studio and meeting room appear relatively modern fit-outs and are clean and tidy. The dance studio and meeting room are heated by electric convectors that all appear to be operational and clean.

There are two toilets, a female/disabled and a male, with good access off the large lobby area to the south of the dance studio and meeting room.

To the south of this large lobby area is a smaller room used for equipment storage whilst an area to the west of the large lobby is also used for equipment storage.

There is a public platform lift installed between the ground floor reception area and the first floor landing to the changing rooms and toilets and the fitness suite. The lift equipment has reportedly suffered severe water damage but we were not allowed inside to survey and inspect the reported damage. There is certainly evidence of laying water external to the lift but we cannot comment as to whether this is the cause of the internal damage.

The level of automatic control offered by the existing control panel appears to be minimal and it appears it is primarily a source of power supplies for the HVAC equipment. We refer the reader to the controls system report as provided by ControlCare Ltd.

There are a lot of concerns regrading the swimming pool equipment. There are numerous leaks evident on the original shell and tube heat transfer calorifiers as well as on the later replacement plateheat exchangers.

There are some bearing noises evident on the main pool swimming pool water circulation pumps and these appear to be contemporary with the original installation. We refer the reader to the swimming pools equipment system report as provided by Hydrospec Ltd.

Follow Up – July 2021

Looking around the site very little has changed from our survey in Autumn 2019.

It is noted that the Main Pool AHU pumps heads have been changed but that appears tobe expedient only to get some heat onto the Calorex AHU for the main pool during the winter 2019/2020.

The pumps bases were not changed and still show signs of heavy external corrosion whichwe suspect will also be evident on the internal surfaces as well. In such a case the pumps will not last long before failing again through heavy leakage.

The changing of the associated automatic air vent is also suspected of being expedient toget some heat to the Calorex AHU for the main pool during the winter 2019/2020.

We realise that with the onset of Covid-19 from March 2020 predicting how long restrictions would remain in place were hard to predict but we feel the pool should have been drained in the first month or two as the seriousness of the pandemic became clearer.It has now sat full of water but with no circulation or chemical treatment for 15 months and as a consequence the main pool and all the associated equipment have probably suffered serious and significant damage.

We have never seen such algae growth on internal water sources before and we have concerns regarding the three cold water storage tanks in the roof. Although these are notaffected by direct sunlight they are in the hottest part of the building and so will likely have succumbed to a similar state.

7 Conclusions

This has been an interesting, if complicated survey and a challenging report to compile.

The pools and associated HVAC and pool equipment have had a long and varied career and the building is now 55 years old.

We think it is a compliment to the staff that the pools are running at all because of the level of personnel involvement in starting & stopping plant, opening and closing valves and generally adjusting temperatures manually. As we have seen, some of these operations are being carried out inside operational plant or on difficult to access high level services and these practices must be curtailed with immediate effect as they contravene just about every Health and Safety Regulation and Guidance known.

Of the actual installed plant, only the boilers can be said to be in a fair to reasonable condition, but these are now in excess of 10 years old and well over halfway through their useful life and far more energy efficient plant is now available.

The heating pumps are generally in a fair to poor condition with a lot of evidence of leaks.

The heating pipework and valves are in a poor to very poor condition and the majority requires replacement in the next 5 years at best.

During the 2008 refurbishment it appears that the staff areas were, for some reason, left disconnected from the heating system.

We have concerns in how the primary heating pipework is configured and we feel the potential future damage to the boilers is unavoidable.

The thermal insulation to the majority of the heating pipework within the basement plantroom is reasonably good but away from these areas is atrocious and in need of immediate attention from an energy conservation point of view.

The hws calorifier needs replacement in the next 5 years at best as does the majority of the hot water secondary distribution pipework.

It is a similar case with the mains cold water and cold water down service pipework. It would appear that as a part of the 2008 refurbishment a lot of existing pipework was reused.

The cold water storage tanks do not comply with any current legislation and are dangerous both to maintenance operatives and the public in that the stored water is accessible to birds and rodents.

The two main air handling units are in a deplorable condition and have received scant maintenance over the years. The idea of fitting the main pool air handling unit with inverter drives to the fan motors as an alternative to getting the controls operating correctly is a perfect illustration of the lack of attention to maintenance and short term fixes that has pervaded this building for very many years.

The ventilation to the main pool hall, installed in two continuous circuits, will never work successfully as the fans have no static pressure point to be balanced to.

The ventilation to the changing rooms and toilets is archaic in using axial fans and a duct mounted heating battery.

The controls system to the plant and equipment is approaching 40 years old and is well past its sell-by date. Very little if anything of the controls system is operational and one of the biggest single problems with the building.

The other major problem with the building is the lack of de-humidification on the two major air handling units. The dehumidification plant is there but has been allowed to fall into disrepair with the consequence that highly saturated air is circulating around the building. This is evidenced by the extremely high level of condensation encountered on the glazing of the main pool hall and in the ground floor reception area. It may well be condensation in this latter area that has so severely damaged to lift. It is also responsible for the serious damage occurring to the building fabric particularly in the main pool hall.

The drainage to the building presents some problems. In general, the majority of the original drainage system, apart from in the basement plantroom, is in a reasonable condition with the exception of the modern, mechanically jointed systems presumably installed as a part of the 2008 refurbishment where failing joints need immediate attention.

Also, the thought of installing cast iron drainage above the teaching pool beggars belief. Whilst we are reasonably satisfied this is not dripping soil waste into the teaching pool we do believe this is dirty, waste-water and as such presents a serious health hazard to pool users.

Within the basement plantroom the soil and waste drainage there are serious problems with the soil and waste drainage.

Chief amongst these is the large inspection chamber located on the south wall that is open and visibly passing raw sewage. This is a major health hazard that is totally unacceptable and requires immediate attention.

The other major problem are the two inspection chambers at the foot of the fire escape stairs where flooding has been observed and where the covers are visibly lifting. These inspection chambers are potentially creating a health hazard and require immediate attention.

The rainwater systems are generally sound although the apparent rainwater ingress at the top of the fire escape stairs is worrying and requires further investigation in order to establish the cause.

The areas of concern regarding personnel are the vertical services riser and the undercroft. Both these areas are heavily impregnated with loose rockwool dust from the deteriorating thermal insulation. Rockwool dust has been identified as a carcinogenic material for more than 30 years and so how these build-ups have been allowed to accumulate in hard to understand.

Also, both these areas are extremely congested with redundant services as to render them confined spaces in our opinion.

The basement plantroom is actually extremely spacious but comes across as cluttered because of the large amount of redundant equipment left disconnected in there. Chief amongst these are the old air cooled liquid chiller and the centrifugal supply and extract fans. Also, there is a lot of redundant pipework and ductwork that in itself is preventing maintenance access to services currently in use.

It is our opinion that that 2008 refurbishment was undertaken “on the cheap” by evidence of the apparent re-use of existing services, the mess left behind and the design issue problems now having to be addressed. To compound these issues, poor to non-existent maintenance has only exacerbated the problem.

The majority of the problem has been created because of the very poor access to the basement plantroom and the creation of inaccessible spaces such as the vertical services riser and the undercroft.

The access to the basement plantroom exists primarily for personnel. There is no way the majority of the pool equipment could now be removed, and it would be impossible to install new. We can only assume that the original building was constructed around this equipment.

In thinking forward, there is no re-usable HVAC equipment and so a total replacement is required.

In thinking about that scenario, much improved access is required, and it is our belief this could be achieved by using area of the new plantroom and the redundant fresh air intake chamber. It is appreciated this requires major construction works and changes to other services, but it appears achievable.

A new location for the main pool air handling unit is required and we believe this could be achieved using the roof of the dance studio.

The existing main pool hall air distribution needs redesigning so as to create a balanced supply and extract system, but this would most probably end up being in a similar layout to the existing around the perimeter of the pool hall public galleries. The new air handling unit would need to be of external quality and with a louvred screen to avoid the need for a plastic plantroom.

The teaching pool and the changing rooms and toilets ventilation would most probably be best served by the use of heat recovery air handling plant. The best location for this would be the first floor flat roof to the east of the building and using external quality equipment and a louvred screen to avoid the need for a plastic plantroom.

All existing and original ductwork requires removal so as to create space for the new layouts.

The problem of the cold water storage tanks is best addressed through the use of cold water boost sets and water storage tanks located in the basement plantroom.

The gas boilers would remain in the basement plantroom and use a similar route to the existing for the flues. The boilers would have a new pressurisation unit and expansion vessel to avoid the use of a feed and expansion tank

The hws calorifier would likewise remain in the basement plantroom. This would be supplied from a cold water boost set in order to ensure balanced hot and cold water pressures.

Because of the need to create much improved access we feel the staff offices and facilities are relocated to somewhere in the dance studio area. These areas could well be served by a DX type heat pump providing heating and comfort cooling.

A new controls system, based around the councils BMS system, would be required along with all new field controls, power and control wiring and we defer to the ControlCare Ltd report for these works and the detailed proposals.

The swimming pool equipment likewise requires complete replacement and we defer to the Hydrospec Ltd report for these works and the detailed proposals.

Follow Up – July 2021

At that time of our original survey in August/September 2019, it was our opinion that every aspect of the plant, equipment and services required total removal and complete replacement.

We found no evidence of any planned preventative maintenance which is highlighted in the deplorable state of the two Calorex heat recovery air handling units serving the main and teaching pools. The filters and internal dirtiness in these air handling units are in just as poor a condition as when we surveyed them in Autumn 2019.

The replacement of the two pump heads and automatic air valve on the heating circuit to the main pool Calorex unit was done purely as a reactive measure in order to get some heating to the unit for the winter 2019/2020 and, as evidenced by the reuse of the existing and damaged pump bodies, was purely the simplest expedient to solve an immediate problem.

The building appears to have survived on purely reactive responses for far too long and is now way beyond benefiting from a proper planned preventative maintenance programme.

The state the main pool has been left in as a result of not being drained is unfortunate. As previously stated, when the pandemic struck in March 2020 it quickly, in our opinion, became obvious that some form of social distancing and closure of mass used spaces was going to become the norm for at least a year if not longer and so the pool should have been drained within the first month or two.

The resultant damage and contamination to the specialist pool equipment is very serious and only goes to support our previous observations that the pool plant, equipment and services required full and complete replacement.

Of particular concern is the fact that the final manhole and inspection chamber connecting the drainage in the building to the public sewer is still open and presents a major health hazard to the building. This matter was addressed as requiring urgent and immediate attention on our 2019 report and the fact it was still the same over a year and a half later demonstrate a complete lack of understanding of public health safety issues.

What we cannot comment upon is the required duties of the replacement plant. This factor will require very careful and detailed designs to be undertaken taking into account modern thermal modelling and fluid flow analysis. One imagines that the quality of the construction will need to be improved to significantly in order to satisfy current Planning and Building Regulations and these factors may have a dramatic impact on the design of the replacement plant, equipment and services.

With the scope of the plant replacements needed our single biggest concern is the access required. The existing plant rooms and tank rooms were created as an overall part of the original construction. The door openings are a standard 900mm or so throughout the building but much of the plant and swimming pool equipment requires much larger spacing than this.

To refurbish this building will require, in our opinion, some fundamental changes to the layout in order to provide the necessary access. We made some suggestions in our original 2019 report and we stand by those as requiring further investigation.

8 Cost Plan

St Georges Swimming Pool [REDACTED - COMMERCIALLY CONFIDENTIAL]

List of proposed new equipment & Budget Costs

Reference 21012-101
Date 06 July 2021

Description	**Location**	**Budget Costs**	**Carried Forward**	**Commentary**
Demolitions & Clean Up		£		
Heat Recovery Air Handling Unit - Main Pool Hall	New Plant Room	£		
Supply Fan				
Extract Fan				
Inlet Filters - Panel				
Inlet Filters - Bag				
Extract Filters				
Recovered Heat Coil				
LPHW Heating Coil				
Thermal Wheel				
Dehumidifier (Refrigerant)				
Damper (Fresh Air Inlet)				
Damper (Exhaust Air Outlet)				
Structural Support to AHU	External	£		
Acoustic Housing	External	£		
New Ductwork Systems	External	£		
Modifications to Existing Ductwork	Internal	£		
Heat Recovery Air Handling Unit - Teaching Pool Hall	Proposed Roof Plant Room	£		
Supply Fan				
Extract Fan				
Inlet Filters - Panel				
Inlet Filters - Bag				
Extract Filters				
Recovered Heat Coil				
LPHW Heating Coil				
Thermal Wheel				
Dehumidifier (Refrigerant)				
Damper (Fresh Air Inlet)				
Damper (Exhaust Air Outlet)				
Structural Support to AHU	External	£		
Acoustic Housing	External	£		
New Ductwork Systems & Grilles	External & Internal	£		
Heat Recovery Air Handling Unit - Changing Rooms	Proposed Roof Plant Room	£		
Supply Fan				
Extract Fan				
Inlet Filters - Panel				
Inlet Filters - Bag				
Extract Filters				
LPHW Heating Coil				
Thermal Wheel				
Dehumidifier (Refrigerant)				
Damper (Fresh Air Inlet)				
Damper (Exhaust Air Outlet)				
Structural Support to AHU	External	£		
Acoustic Housing	External	£		
New Ductwork Systems	External & Internal	£		
Supply Air Handling Unit - Male & Female Toilets	Proposed Roof Plant Room	£		
Supply Fan				
Inlet Filters - Panel				
LPHW Heating Coil				
Damper (Fresh Air Inlet)				
Structural Support to AHU	External	£		
Acoustic Housing	External	£		
New Ductwork Systems	External & Internal	£		
Toilet Extract Fan - Male & Female Toilets	Proposed Roof Plant Room	£		
Extract Fan 1				
Extract Fan 2				
Auto Fan Changeover				
Damper (Exhaust Air Outlet)				
Structural Support to AHU	External	£		
Acoustic Housing	External	£		
New Ductwork Systems	External & Internal	£		
Supply Air Fan - Boilers	Basement Plant Room	£		
Supply Fan 1				
Supply Fan 2				
Inlet Filters - Panel		£		
Damper (Fresh Air Inlet)		£		
New Ductwork Systems	Internal & External	£		
Extract Air Fan - Boilers	Basement Plant Room	£		
Extract Fan 1				
Extract Fan 2				
Damper (Exhaust Air Outlet)		£		
New Ductwork Systems	Internal & External	£		

Chlorine Room Extract Fan					
Extract Fan 1	Basement Plant Room	£			
Extract Fan 2	Basement Plant Room				
Damper (Exhaust Air Outlet)					
New Ductwork Systems	Internal & External	£			
Boilers					
Boiler 1	Basement Plant Room	£			
Boiler 2	Basement Plant Room	£			
Boiler 3	Basement Plant Room	£			
Boiler 4	Basement Plant Room	£			
Boiler 5	Basement Plant Room	£			
Boiler 6	Basement Plant Room	£			
Boiler Accessories	Basement Plantroom	£			
Gas Services to Boilers	Basement Plantroom	£			
Boiler Flue System					
Boiler Flue System	Basement Plantroom & External	£			
Flue Dilution Fans - Boilers					
Flue Dilution Fan 1	Basement Plant Room	£	-		Excluded Flue Dilution System - does not satisfy
Flue Dilution Fan 2	Basement Plant Room	£	-	-	current Building and Gas Regulations.
Pressurisation Unit					
Heating System	Basement Plant Room	£			
Heating Pipework & Valves					
Heating Pipework and Valves	Throughout	£			
Thermal Insulation	Throughout	£			
Flushing	Throughout	£			
Water Treatment	Throughout	£			
Cold Water Boost Set					
Domestic Hot & Cold water	Basement Plant Room	£			
Swimming Pool	Basement Plant Room	£			
Cold Water Storage Tank					
Break Tank for Hot & Cold Water	Basement Plant Room	£			
Break Tank for Swimming Pool	Basement Plant Room	£			
Mains Cold Water Softener					
For Pool Water Systems	Basement Plant Room	£			
Pumps					
Boiler Primmary 1	Basement Plant Room	£			
Boiler Primmary 2	Basement Plant Room	£			
Main Pool Calorifier 1	Basement Plant Room	£			
Main Pool Calorifier 2	Basement Plant Room	£			
Teaching Pool Calorifier 1	Basement Plant Room	£			
Teaching Pool Calorifier 2	Basement Plant Room	£			
HWS Calorifier Primary Heating 1	Basement Plant Room	£			
HWS Calorifier Primary Heating 2	Basement Plant Room	£			
HWS Secondary Circulation 1	Basement Plant Room	£			
HWS Secondary Circulation 2	Basement Plant Room	£			
Main Pool AHU Heating Coil 1	New Plant Room	£			
Main Pool AHU Heating Coil 2	New Plant Room	£			
Main Pool AHU Recovered Heating Coil 1	New Plant Room	£			
Main Pool AHU Recovered Heating Coil 2	New Plant Room	£			
Teaching Pool AHU Heating Coil 1	Proposed Roof Plant Room	£			
Teaching Pool AHU Heating Coil 2	Proposed Roof Plant Room	£			
Teaching Pool AHU Recovered Heating Coil 1	Proposed Roof Plant Room	£			
Teaching Pool AHU Recovered Heating Coil 2	Proposed Roof Plant Room	£			
Changing Rooms & Toilets AHU 1	Proposed Roof Plant Room	£			
Changing Rooms & Toilets AHU 2	Proposed Roof Plant Room	£			
Pump Accessories	Basement Plantroom	£			
Drainage Sump Pump 1	Basement Plant Room	£			
Drainage Sump Pump 2	Basement Plant Room	£			
Pump Accessories	Basement Plantroom	£			
HWS Calorifier					
HWS Calorifier	Basement Plantroom	£			
Calorifier Accessorises	Basement Plantroom	£			
Secondary Hot Water Pipework & Valves					
Secondary Hot Water Pipework and Valves	Throughout	£			
Shower Mixers & Heads	Throughout	£			
Thermal Insulation	Throughout	£			
Flushing & Sterilisation	Throughout	£			
Water Treatment	Throughout	£			
Boosted Cold Water Pipework & Valves					
Boosted Cold Water Pipework & Valves	Throughout	£			
Thermal Insulation	Throughout	£			
Flushing & Sterilisation	Throughout	£			
Water Treatment	Throughout	£			

Mains Cold Water Pipework & Valves			
Mains Cold Water Pipework & Valves	Throughout	£	
Thermal Insulation	Throughout	£	
Flushing & Sterilisation	Throughout	£	
Water Treatment	Throughout	£	
Air Conditioning - VRF System		£	
Main Reception Area 1			
Main Reception Area 2			
Duty Managers Office			
Staff Room			
Fitness Suite 1			
Fitness Suite 2			
Fitness Suite 3			
Fitness Suite 4			
Structural Support to Heat Pumps	External	£	
Acoustic Housing	External	£	
Controls General - Not Confirmed			
Monitor & Report Power Supplies	*Overall*		
Monitor & Report Power Supplies	*Lighting*		
Monitor & Report Energy Consumption	*Main Pool*		
Monitor & Report Energy Consumption	*Teaching Pool*		
Monitor & Report Energy Consumption	*Changing Rooms and Toilets*		
Monitor & Report Energy Consumption	*Gas Supply*		
Monitor & Report Energy Consumption	*Mains Cold Water Supply*		
Monitor & Report Energy Consumption	*Cold water Down Service*		
Monitor & Report Energy Consumption	*HWS Secondary Supply*		
Controls - Main Swimming Pool Equipment - Not Confirmed			
Main Pool Calorifier 1	*Basement Plant Room*		
Main Pool Calorifier 2	*Basement Plant Room*		
Teaching Pool Calorifier 1	*Basement Plant Room*		
Teaching Pool Calorifier 2	*Basement Plant Room*		
Main Pool Pump 1	*Basement Plant Room*		
Main Pool Pump 2	*Basement Plant Room*		
Main Pool Pump 3	*Basement Plant Room*		
Teaching Pool Pump 1	*Basement Plant Room*		
Teaching Pool Pump 2	*Basement Plant Room*		
General Reporting & Monitoring Systems yet to be advised	*Basement Plant Room*		
Automatic & BMS Controls (as above structure)			
Automatic & BMS Controls	ControlCare Ltd	£	
Power Supplies		£	
Swimming Pool Equipment			
Main Pool Equipment	Hydrospec Ltd		
New Circulation Pumps		£	
New Pump Strainer		£	
New Flow Meter		£	
New Filter Vessels & Face Pipework		£	
System Valves, Pipework & Supports		£	
New Heat Exchangers		£	
Teaching Pool Equipment	Hydrospec Ltd		
New Circulation Pumps		£	
New Pump Strainer		£	
New Flow Meter		£	
New Filter Vessels & Face Pipework		£	
System Valves, Pipework & Supports		£	
New Heat Exchangers		£	
Common Items	Hydrospec Ltd		
Address Gravity Feed to Controllers		£	
New Chlorine Day Tank		£	
New Flocculant Lines		£	
New Chlorine Controllers		£	
New Chlorine Dosing Equipment		£	
Other Recommended Items	Hydrospec Ltd		
Medium Pressure UV System		£	
Dedicated Pool Equipment Control Panels		£	
Automatic Backwash Equipment		£	
Deep Clean All Areas		£	
Camera Survey - All Concealed Pipework		£	
Pool Equipment Demolitions and Disposal		£	
General Items			
Contractors Costs - Prelims, Site Establishment etc.		£	
O&M's and As Installed Drawings		£	
Testing & Commissioning - Water HVAC		£	
Testing & Commissioning - Pool Systems		£	
		Total	£

Figures Exclude

- Architects Fees
- M&E Consultants Fees
- Structural Engineers Fees
- Planning & Building Regulations
- Construction Costs
- Electrical Services Demolitions and Construction
- Assumes BREEAM Rating = Good

9 Appendices

9.10	Electrical Services Condition Survey & Report
9.20	Hydrospec Ltd Condition Survey & Report
9.30	ControlCare Ltd Condition Survey & Report
9.40	Structural - Condition Survey Report

9.10 Electrical Services Condition Survey & Report

ELECTRICAL REPORT – GENERAL OBSEVATIONS & OVERVIEW

For: St George`s Leisure Centre, 221 The Highway, London, E1W 3DD

London Borough of Tower Hamlets - Technical Services - Facilities Management - 2nd Floor (Annex) - Town Hall - Mulberry Place - London E142BG

Item	Subject	Details	Comments
1	276 kVA DNO Network Connection	The existing 276kVA DNO, UKPN, service cut-our is non-maintainable. Item can be reported as obsolete with limitation on any future repair No access to fuse links to confirm amperage rating *See image 1*	Provide new a DNO network connection subject to re-equating the ADMD
2	Utility Metering	The existing CoP5 HH metering is non-compliant due to the following: • Metallic enclosure • Floating CT`s • Non-approved enclosure type Metering is currently AMR The CT ratio could not be confirmed when accessing the meter data output *See image 1*	A new integrated all insulated heavy-duty service cut-out would now incorporate the 5/*** current transformers leaving the just the meter as an auxiliary component

Item	Subject	Details	Comments
3	Main Switchboard	The existing main switchboard by Mardix Group is now obsolete, with a limitation of future repairs and spares The current switchboard is a composition of incorporating components from multiple manufacturers No access at the time of survey to confirm correct form of internal separation for LV switchgear See image 2	Install new LV main switchboard to the latest BS EN standards through a single source point manufacturer, i.e. Schneider Electric
4	Main Earth Terminal	The current MET has undergone a non-approved modification that has invalidated the associated manufacturer's warranty The existing MET has no test link facility *See image 3*	Install new MET
5	SPD	There is no SPD, Class I, II and III visible at the time of survey	Provide surge protection throughout

Item	Subject	Details	Comments
6	Final Circuit Distribution Boards	The existing final circuit distribution boards are obsolete and consequently non-maintainable A number of these boards do not meet current IP standards and are non-maintainable There are instances of cross population of OPD`s from various manufacturers which invalidates any manufacturer’s warranty Limited RCD protection on socket outlets *See image 4*	Provide new final circuit distribution boards throughout, typically from Schneider Electric Isobar PoN

Item	Subject	Details	Comments
7	Wiring Systems	The existing installation is comprised of various wiring systems some of which are redundant due to varying levels of corrosion resulting from environmental conditions, these include: • Galvanized steel trunking • Galvanized steel conduits Wiring systems comprised of stainless steel would be more suitable for the current external environmental influences than the wiring systems presently installed See image 5 The installation of more recent wiring systems typically non-metallic have been incorrectly installed resulting in further non-compliance *See image 6*	Provide new wiring systems throughout in accordance with IET 7671
8	Distribution Circuits	There are various distribution circuits in service, with some recent additions The integrity of these connections has potentially been affected by the combination of various external environmental influences	Rewire all non-compliant distribution circuits
9	Final Circuits	There are various standard final circuits present. However, they appear non-compliant due to additions and modifications The integrity of these connections has potentially been affected by the combination of various external environmental influences	Re-wire all non-compliant final standard circuits

Item	Subject	Details	Comments
10	Light Fittings including emergency lighting	There is mixture of original and replacement luminaires throughout. All fitting present constructed from light weight cast alloy have not been etch primed and are corroding beneath the paintwork requiring complete replacement *See images 8, 9, 10 and 11* In several public facing areas, the existing luminaires have been discarded and replaced with alternate fittings with no consideration of design to ensure correct lux levels, therefore, compromising health and safety at pool side in particular *See image 12 and 13* There is a combination of both self-contained maintained / non-maintained emergency luminaires and central battery back-up emergency luminaires. The overall condition is unsatisfactory Recent replacement luminaires do not offer longevity due to low cost units and have not been installed in accordance with manufacturer's instructions *See image 14* The integrity of the associated internal connections and associated control gear has potentially been affected by the combination of various external environmental influences	Provide all new energy efficient LED lighting system, complete with addressable self-contained emergency lighting, typically Thorlux, Thorlux SmartScan

Item	Subject	Details	Comments
11	Wiring Accessories	Wring accessories comprise of both new and original components, the general condition of these is unsatisfactory due to deterioration *See image 15* The integrity of these associated connections has potentially been affected by the combination of various external environmental influences	Replace all defective wiring accessories throughout

Item	Subject	Details	Comments
12	General	The general condition of the installation is unsatisfactory due to a combination of non-compliance and defective equipment. This is further exacerbated since a significant element of the existing switchgear, wiring accessories and luminaires are now obsolete The impact of the related external environmental influences, including Ambient temperature, Humidity and Water have caused significant deterioration to the entire electrical installation requiring significant replacement The existing incoming service cut-out and associated metering require upgrading to ensure third party compliance and minimal downtime in the event of any subsequent failure The selection of replacement luminaires and wiring accessories have been identified as low-cost budget products in general, lacking reliability and longevity	*A high-level budget estimate of £[redacted] million including associated builders works, approximately, would be required to essentially provide a new compliant satisfactory installation throughout*

Images

Item	Subject	Details	Comments
		1 	2 

Item	Subject	Details	Comments
		3 	4 

Item	Subject	Details	Comments
		5 	6 

		7 	8 
		9 	10 

11

12

13

14

Item	Subject	Details	Comments
			

Item	Subject	Details	Comments
		15 	

9.20 Hydrospec Ltd - Condition Survey & Report

Follow Up -July 2021

Due to the short notice nature of the follow up survey and report we have not been able to include a follow up survey, report and commentary from Hydrospec Ltd.

Our Ref: JWC/sls/GDNS-STG-004

23 October 2019

HYDROSPEC
SWIMMING POOL ENGINEERS
UNIT 1, 41 TALLON ROAD
HUTTON INDUSTRIAL ESTATE
BRENTWOOD, ESSEX CM13 1TG
TEL: +44 (0) 1277 225416
FAX: +44 (0) 1277 224761
Email: info@hydrospec.co.uk
Web: www.hydrospec.co.uk

GDN Support Services Ltd
17 Belmore Park
Ashford
Kent
TN24 8UW

For attention of: Mr S Godden - Director

Dear Sir,

St George's Leisure Centre, Wapping – Condition Survey Report

We were commissioned to undertake and produce the following condition survey report to the swimming pools at the above site to establish the condition of the pools and their dedicated plant, repair criteria and the estimated costings for required and future repairs over the span of the next 5 years. This does not include standard consumable spares for items of plant.

Main Pool

Pool Size:	33.3m long x 15m wide pool with 6 No racing lanes	
Pool Water Depths:	1.0m – 1.8m constant slope –	19.5m long
	1.8m – 3.8m steep transition –	4.0m long
	3.8m – constant flat area –	9.8m long
Pool Capacity:	1135m³ (249,700 gallons)	
Required Turnover Rate:	Current Standards – 3 to 4 hours	
O&M Information:	Not Available	
Recorded Flow Rate:	358m³/hr (79,000 Gallons/hr) on two pumps	
Inverter Settings:	1@50 Hz & 1@ 80% = 3.17 hour turnover	

<u>Circulation and Pipework</u>

Circulation Type:	Scum Channel
Main Drains:	2 No floor outlets – 6" Cast Iron pipework (NB150mm or less) connecting to 10" (NB250 or less) *Each main drain outlet pipework will only support a maximum flow rate of 92m^3/hr @ 1.5m/s, 124m^3/hr @ 2.0m/s* *10" 260m^3/hr @ 1.5m/s, 350m^3/hr @ 2.0m/s.* *Grill velocities require to be checked*
Suction pipework:	Main drain – 10" (250NB) Cast Iron pipework Scum Channel – 12" (300NB) Manifold – 12" (300NB) *Max 370m^3/hr @ 1.5m/s, 470m^3/hr @ 2.0m/s.*
Return Pipework:	12" (300NB) *Max 620m^3/hr @ 2.5m/s* Splits to 2 x 8" into pool floor and slope Inlet channel to pool floor, excluding steep slope
Flow Rate:	358m^3/hr (according to flow meter)
VSD Settings:	Varies – See Below
Circulation Pumps: x 3	Worthington Simpson Monobloc 15HP 11kW 4 Pole motors
Performance Data:	Unknown
Date of Manufacture:	Unknown
Condition:	Grade B-C Fair to Poor
Noted Issues:	Pump No 2 out of action, runs out of balance and judders pipework. Pump No 3 Bearing noise and corrosion to casing.
Repair Priority:	Priority 1 – Urgent to Pump No 2.
Future Costs:	
Years 1-5:	Pumps obsolete replace pumps and header pipework.
Delay Consequence:	No standby pump. In event of failure of other pumps, pool turnover reduced and not compliant. Closure of facility for public use.
Pump VSD's:	Parker SSD Drives 650 Series – 80% - Pump No 1 Parker 650 Series – 90% - Pump No 2 Parker AC10 Series – 50Hz - Pump No 3
Date of Manufacture:	Unknown
Condition:	Grade A – Good
Future Costs:	
Years 1-5:	N/A

Pump Strainers:	Aquatherm 12" x 1
Date of Manufacture:	Unknown
Condition:	Grade B – Fair
Noted Issues:	Lid "O" ring needs replacement
Repair Priority:	None

Future Costs:
Years 1-5: Replacement strainer basket. Replacement strainer.

Delay Consequence: N/A

Main Pool Flow Meter

Flow meter:	Unknown
Readings	Approximately 79,000 Gallons/hr (358m³/hr) With Pump No1 and Pump No3 running
Date of Manufacture:	Unknown
Condition:	Grade B – Fair
Noted Issues:	Tubing and valves aged
Repair Priority:	None

Future Costs:
Years 1-5: Replacement Flow Meter (tapped into cast iron pipework)

Filter Vessels and Face Pipework

Steel Vessels:	2.44mØ x 2.3m high x 6
Filter Area:	4.6m² each = 27.6m²
Manufacturer:	Bell Brothers (Assumed)
Performance Data:	358m³/hr @ approx 13m³/hr/m²
Date of Manufacture:	Unknown
Condition:	Grade C - Poor
Noted Issues:	Excessive corrosion to internal lining of vessels External corrosion on tapping's Lid bolts need replacement due to corrosion Automatic air vent to Filter No1 blocked (only on F1) New Lid "O" Rings fitted to Filter 1 & 6 Media saturated with rust Cast pipework has external corrosion Corrosion on tapping's and flanges and leakages on most Externally painted to fair appearance
Repair Priority:	Priority 1 – Urgent and required

Future Costs:

Years 1-5:	Extensive Refurbishment including new media Alternative – Replace Filters as Filter Vessel shell thickness unknown Replace all cast iron / steel pipework

Notes/Recommendations

These filters were refurbished in 2012 and based on the rust evident and condition of the internal lining it was not a three coat epoxy system. The media is in poor condition probably due to backwashing flow rates and using cold water to backwash plus the amount of corrosion in the system.
The filters have well exceeded their useful life expectancy and require replacement.

Face pipework and fitting have evidence of many repairs and replacement of odd and various manufacturer valves and made up PVC stubs and stool pieces to the old cast iron pipework that still mainly exists. The pipework is in poor condition and the fact that all the repairs have undertaken to date makes it obvious that this will become ongoing and not acceptable.

Filter Pressure Gauges

Manufacturer:	Bell Brothers	
Performance Data:	0-40 psi / 0-90 ft/h	
Date of Manufacture:	Unknown	
	IN	OUT
Readings	F1 – 13psi	10psi
	F2 – 14psi	14psi
	F3 – 13psi	11psi
	F4 – 16psi	11psi
	F5 – 14psi	11psi
	F6 – 14psi	11psi
Condition:	Grade B – Fair	
Noted Issues:	Tubing and valves aged	
Repair Priority:	None	

Future Costs:

Years 1-5:	Replacement of gauges and tubing (tapped into cast iron pipework)

System Valves, Pipework and Pipework Supports

Manufacturer:	Hattersley & Woulter Witzel
Date of Manufacture:	Unknown
Condition:	Grade C – Hattersley Gate Valves – Poor Grade A to B – Woulter Witzel Wafer Valves – Good to Fair
Noted Issues:	All of Hattersley gate valves are seized or do not seal 9” and 10” Valves on the return need to work to ensure isolation of the pool tank and replacement/maintenance of the chlorine injector. Woulter Witzel wafer type gear wheel/lever operated working. Support posts appear in good order. Pipework and valves are mainly cast iron, most of the cast iron valves are gate valves and no longer in use with wheel head and various level type valve fitted throughout the system. Existing cast iron calorifiers have been converted to form system headers on the bypass system and plate heat exchangers fitted. It is confusing, not accessible in many places and not acceptable under CDM regulations and requires completely removing, redesigned and new plant installed.
Repair Priority:	Priority 2 – Required
Delay Consequence:	If isolation of the pool returns needed. Not possible. Risk of flooding
Future Costs:	
Years 1-5:	Replace all defective valves. Needs pool to be isolated/empty to enable. This all requires replacement to a simpler and user-friendly valve operation. Replace all cast pipework and remove all redundant pipework.

Plate Heat Exchanger, Booster Pump and Pipework

Manufacturer:	UK Heat Exchangers – Plate Type
Performance Data:	770kW 61 plates. 72°C Flow, 55°C Return
Model:	UKE-3
Booster Pump:	Grundfos - Unknown
Date of Manufacture:	2009
Condition:	Grade B-C – Fair to Poor
Noted Issues:	Gaskets need replacement Delivery pipework leaking/corroded Booster pump in poor condition Heating controlled only by turning the booster pump on/off via a insertion/removal of standard 3 pin plug

Repair Priority:	Priority 1 – Urgent Repair to carbon steel pipework as severely corroded, could collapse at any time and cause flooding.
Future Costs: Years 1-5:	 Replace with shell and tube heat exchangers. (See below notes)

Notes/Recommendations

The use of plate exchangers on swimming pool water is not ideal, recommended or good practice. The waterways are very fine and easily liable to collect debris especially media that may have passed through the filter. They are extremely efficient in the transfer of heat but this is not required on a swimming pool as slow heat up time is essential from cold to avoid thermal shock and also to reheat. They are also liable to scaling and therefore it is essential that good water balance is always maintained.

They are also expensive to repair as each plate is gasketed and therefore requires a complete strip down and re-gasket to repair a leak. It is our recommendation to change to a shell and tube type heat exchanger, which requires no ongoing regular maintenance, eliminating these costs, plus there is no requirement for a dedicated circulation pump, saving energy costs also.

Teaching Pool

Pool Size:	12.6m long x 6.1m wide
Pool Water Depths:	0.70m – 1.06mm constant slope
Pool Capacity:	69m³ (15180 Gallons)
Required Turnover Rate:	Current Standards – between 30-90 minutes
O&M Information:	Not Available
Recorded Flow Rate:	35m³/hr (7,700 Gallons/hr) on one pump
Inverter Settings:	1@50 Hz = 1.97 hour turnover

Circulation and Pipework

Circulation Type:	Scum Channel	
Main Drains:	1 No floor outlet – unknown Single 5" (125NB) suction line into the plant room appears to draw from buffer tank. *Suction pipework will only support a maximum flow rate of 70m³/hr @ 1.5m/s, 90m³/hr @ 2.0m/s*	
Suction pipework:	Main drain –	Unknown
	Scum Channel –	Unknown
	Manifold –	5" (125NB) *Max 70m³/hr @ 1.5m/s, 90m³/hr @ 2.0m/s.*

Return Pipework: 5" (125NB) *Max 120m³/hr @ 2.5m/s*
Inlets on deep end wall

Flow Rate: 35m³/hr (according to flow meter)
VSD Settings: 50Hz – Pump No2 – see below
Circulation Pumps: Worthington Simpson Monobloc 4HP 3kW 2 Pole motors x 3
Performance Data: Unknown
Date of Manufacture: Unknown
Condition: Grade B-C Fair to Poor
Noted Issues: Pump No 1 Suction valve seized and inverter bypassed

Repair Priority: Priority 1 – Urgent to Pump No 1

Future Costs:
Years 1-5: Repair pumps for bearings, mechanical seal replacement and overhaul. Replace pumps.
Replace suction valves
Buffer tank needs cleaning out

Delay Consequence: No standby pump. In event of failure to Pump No 2. Closure of facility for public use.

Pump VSD's: Parker 650 Series – Pump No 1
Invertek Eco Opti-Drive – 50Hz - Pump No 2

Date of Manufacture: Unknown
Condition: Grade C – Unknown/Poor – Pump No 1
Grade A – Good – Pump No 2

Future Costs:
Years 1-5: Investigate inverter bypass/operations. May be because pump cannot be operated.

Pump Strainer: Bell Brothers 5" x 1
Date of Manufacture: Unknown
Condition: Grade C – Poor
Noted Issues: Needs replacement. Strainer not been opened by operator for years. Very poor condition. Basket corroded in.
Replaced "Lid" gasket.
Repair Priority: Priority 1 - Urgent

Future Costs:
Years 1-5: Replacement strainer. Needs pool to be isolated/empty to enable.

Delay Consequence: Closure of facility for public use.

Teaching Pool Flow Meter

Flow meter:	Unknown
Readings	Approximately 7,700 Gallons/hr (35m³/hr) With Pump No 2 running
Date of Manufacture:	Unknown
Condition:	Grade B – Fair
Noted Issues:	Tubing and valves aged
Repair Priority:	None
Future Costs:	
Years 1-5:	Replacement Flow Meter (tapped into cast iron pipework)

Filter Vessels and Face Pipework

GRP Vessels:	2.44mØ x 2.3m high x 2
Filter Area:	4.6m² each = 9.2m²
Manufacturer:	Bell Brothers (Assumed)
Performance Data:	35m³/hr @ approx 3.8m³/hr/m² - Extremely low – is this correct? as we have never seen one as low as this.
Date of Manufacture:	Unknown
Condition:	Grade C - Poor
Noted Issues:	Excessive corrosion to internal lining of vessels External corrosion on tapping's Lid bolts need replacement due to corrosion Media saturated with rust Cast pipework showing has some external corrosion Corrosion on tapping's and flanges Externally painted to fair appearance
Repair Priority:	Priority 1 – Urgent and required
Future Costs:	
Years 1-5:	Extensive Refurbishment including new media Alternative – Replace Filters as Filter Vessel shell thickness unknown Replace all cast iron / steel pipework

Notes/Recommendations

As Main Pool notes.

Filter Pressure Gauges

Manufacturer:	Bell Brothers	
Performance Data:	0-40 psi / 0-90 ft/h	
Date of Manufacture:	Unknown	
	IN	OUT
Readings	F1 – 10psi	8psi
	F2 – 10psi	8psi
Condition:	Grade B – Fair	
Noted Issues:	Tubing and valves aged	
Repair Priority:	None	
Future Costs:		
Years 1-5:	Replacement of gauges and tubing (tapped into cast iron pipework)	

System Valves, Pipework and Pipework Supports

Manufacturer:	Hattersley & Woulter Witzel
Date of Manufacture:	Unknown
Condition:	Grade C – Hattersley Gate Valves – Poor Grade A to B – Woulter Witzel Wafer Valves – Good to Fair
Noted Issues:	Majority of Hattersley 5" and 3" Gate Valves operate but do not fully seal. Gate valves between filters seized. Woulter Witzel wafer type lever operated working ok. Support posts appear in good order. Pipework and valves are mainly cast iron, most of the cast iron valves are gate valves with wheel head and various lever type valve fitted throughout the system.
Repair Priority:	Priority 2 – Required
Delay Consequence:	N/A
Future Costs:	
Years 1-5:	Replace all defective valves. Replace all cast pipework.

Plate Heat Exchanger and Pipework

Manufacturer:	Alfa Laval – Plate Type
Performance Data:	20kW
Model:	M3-FG
Date of Manufacture:	2008
Condition:	Grade B – Fair
Noted Issues:	Gaskets need replacement Secondary pipework in Copper – Replacement required Heating is controlled by thermostats
Repair Priority:	Priority 2 – Required
Future Costs:	
Years 1-5:	Replace with shell and tube heat exchangers. (See below notes)

Notes/Recommendations

The use of plate exchangers on swimming pool water is not ideal, recommended or good practice. The waterways are very fine and easily liable to collect debris especially media that may have passed through the filter. They are extremely efficient in the transfer of heat but this is not required on a swimming pool as slow heat up time is essential from cold to avoid thermal shock and also to reheat. They are also liable to scaling and therefore it is essential that good water balance is always maintained.

They are also expensive to repair as each plate is gasketed and therefore requires a complete strip down and re-gasket to repair a leak. It is our recommendation to change to a shell and tube type heat exchanger, which requires no ongoing regular maintenance, eliminating these costs, plus there is no requirement for a dedicated circulation pump, saving energy costs also.

Common Items

Backwash System Components

Circulation Type:	Supply Holding Tank – 12.0m x 3.0m x 1.5m – Approx
Suction pipework:	Main Suction – 6” (150NB) To Pumps - 4” (100NB)
Delivery Pipework:	3” (90NB) to 5” (125NB)
Flow Rate:	Unknown – 5.5kW approx 70m^3/hr
VSD Settings:	50Hz – Pump No2 – see below
Circulation Pumps:	Worthington Simpson Monobloc 7.5HP 5.5kW 2 Pole
motors x 2	
Performance Data:	Unknown

Date of Manufacture:	Unknown
Condition:	Grade B-C Fair to Poor
Noted Issues:	Pump No 1 Seized
Repair Priority:	Priority 1 – Urgent to Pump No 1
Future Costs:	
Years 1-5:	Repair pumps for bearings, mechanical seal replacement and overhaul. Replace pumps. Replace suction valves
Delay Consequence:	No standby pump. In event of failure to Pump No 2 will be unable to backwash filters. Closure of facility for public use. No flow meter to indicate flow rate of backwash. Tank is filled manually as float valve not working.

<u>Air Scour/Blower</u>

Manufacturer:	Vacuuane
Performance Data:	4kW
Model:	VSC3015-2ST431-6
Date of Manufacture:	2012
Condition:	Grade A – Good
Noted Issues:	Loop cannot extend above water level of the main pool.
Repair Priority:	N/A
Future Costs:	
Years 1-5:	Replace filter and pressure relief (See below notes)

<u>Chemical Dosing Systems</u>

Controller Manufacturer:	Siemens Ezetrol Plus
Date of Manufacture:	Oct 2011
Condition:	Grade B – Fair
Noted Issue:	High Risk – Flow to controllers is present in no flow situations due to gravity feed. No interlock with circulation pumps.
Repair Priority:	Priority 1 – Urgent – Risk of dosing chemicals in no flow situations need to be removed.
Future Costs:	
Years 1-5:	N/A
Delay Consequence:	Slug dosing chemicals to pools. Chlorine gas mixture in pipework, returning to pool – High Risk to Bathers.

Chlorine Metering Pumps:	Main Pool - motor driven solenoid diaphragm
Manufacturer:	LMI – Milton Roy
Model:	G-Series GA45D472 – 50ltrs/h max
Date of Manufacture:	2015
Condition:	Grade A - Good
Chlorine Metering Pump:	Teaching Pool - solenoid diaphragm
Manufacturer:	LMI – Milton Roy
Model:	B135-360 – 17 ltrs/hr max
Date of Manufacture:	2016
Condition:	Grade A - Good
Chlorine Agitator:	Mechanical Agitator
Manufacturer:	Mixer
Model:	
Date of Manufacture:	Unknown
Condition:	Grade A-B – Good to Fair
Acid Metering Pumps:	Main Pool - solenoid diaphragm
Manufacturer:	LMI – Milton Roy
Model:	B135-360 – 17 ltrs/hr max
Date of Manufacture:	2015
Condition:	Grade A - Good
Acid Metering Pump:	Teaching Pool - solenoid diaphragm
Manufacturer:	LMI – Milton Roy
Model:	P165-360 – 7.6 ltrs/hr max
Date of Manufacture:	2009
Condition:	Grade A - Good
Acid Agitator:	Manual Agitator
Manufacturer:	LMI
Day Tank Manufacturer:	2 No LMI 300ltr
Date of Manufacture:	Unknown
Condition:	Grade C – Poor – Chlorine Grade B – Fair – Acid
Chlorine Bund:	Brick built with lining – Poor but no evident signs of external leakeage
Acid Bunds:	Polypropylene bund tank – half filled with solution. Size of bund must contain 110% volume.
Condition:	Grade B – Fair
Noted Issues:	Injection points/locations – require adaption Main Pool Acid is pre-filter & floc Tapping into cast iron pipework corroding Main Pool chlorine injector corrosion – return valve seized

Future Costs:
Years 1-5: Replace Chlorine day tank. Reline chlorine bunded area Address/relocate injection points.

Delay Consequence: Risk to operators

Flocculant Metering Pumps: Main Pool - Peristaltic
Manufacturer: WDT
Model: FlocDos + 200ml/h max – Set Point 80ml/hr
Date of Manufacture: Mar 2016
Condition: Grade A - Good

Flocculant Metering Pumps: Teaching Pool - Peristaltic
Manufacturer: WDT
Model: FlocDos + 200ml/h max – Set Point 60ml/hr
Date of Manufacture: Mar 2016
Condition: Grade A - Good

Noted Issues: Teaching Pool set flow rate is high
Dosing lines need replacement
No interlock with circulation pumps and no pressure switch

Future Costs:
Years 1-5: Replace dosing lines

Delay Consequence: Without UV systems installed, flocculation dosing is required to be operating at all times.

Notes/Recommendations

The flow through the controllers in the event of no pool water flow, due to gravity feed, must be rectified as a matter of urgency. No safety interlock with circulation pumps.

If dosing systems are not turned off or controller sample line isolated, the metering pumps can continue to operate, pumping acids and chlorine into the return. The main pool injection points are separated by the filters but the teaching pool is 1.4m apart. In any instance, this should be eliminated.

Flocculant injectors are installed after the sample line point to the controllers but in close proximity. Most injectors are at located into the pipework at very high level and also require to be relocated. Chlorine and Acid injectors are recommended to be post filter and after heating tappings.

The site uses Calcium Hypochlorite in tablet form for sanitisation and Sodium Bisulphate for pH correction. The chlorine day tank is in very poor condition.

Spillage of solution in bunded area to Acid day tank and should be removed immediately by the operators.

Other Items

Heating Services

There is a flow and return off the main pool system return pipework to the Calorex AHU. There is a flow meter fitted but hard to read due to clarity.

Electrical Controls

There are no dedicated electrical control panels for the plant.
Items of plant are fed from electrical isolators or drives.
As indicated above the Main Pool heating control needs rectifying.

It is recommended that the controls/electrical installations be checked out by a certified controls/electrical engineer.

Scum Channel Troughs – Both pools have an accessible troughs containing skimming baskets before returning to pool pumps. Both troughs are holding debris and recommend these be cleaned out. We would recommend these be cleaned once per annum along with buffer tanks and backwash supply tank.

Pool Fittings

Pool Perimeter Grab Rails in Scum Channels – Elements of the way these are installed appears to contravene BSEN Standards in relation to openings. We would question why this is in place as the scum channels provide a perimeter handhold.

Pool Inlet Trough, Pool Wall Inlets and Suction Outlet Fittings – All of these are in place and appear acceptable.

Both the Main and Teaching Pool circulatory design is a high percentage over the scum channel. The main drains in the pool floor at 3.8m water depth with two 6" suction lines coming into the plant room.

We understand that the Teaching Pool suction outlet in the floor is a balance line to a buffer tank. If it is a sole suction outlet it should be covered with a 1000mm x 1000mm square anti-vortex type grille. The existing grille is approximately 650mm x 650mm square.

Pool Linings and Pool Surrounds

There are some signs of grout loss in the pools, but generally the tiling is in fair condition based on a pool of its age and some patch repairs have been made.

The pool water tests below show the pool water to be in an aggressive condition and this should be strictly monitored, adjusted and maintained to avoid further grout deterioration.

The pools were not particularly clean with a lot of debris within at the time of our visit. The pool surrounds similarly could benefit from a deep clean.

There is water dripping into the Teaching Pool from the foul drainage penetrating the ceiling above. This must be investigated and rectified by the site team as a matter of urgency.
We would advise the pool be closed until it is certain that the dripping water is not foul water.

Pool Water Tests and Balance

Main Pool		Teaching Pool	
Temperature:	28°C	Temperature:	30°C
pH:	7.25	pH:	7.25
TA:	25mg/l	TA:	55mg/l
CH:	780mg/l	CH:	380mg/l
TDS:	2000mg/l	TDS:	850mg/l
Index Value:	- 0.4	Index Value:	- 0.2

Balance Water Index Value: 0 or a low positive reading is ideal. Based on the above we would still advise site team to ensure Total Alkalinity is monitored and raised to nearer 100mg/l.

There were no available documentation/O&M's to assist/support this survey and information. Limited historic information provided by a member of the site team.

Comments

It was never expected to find the plant to these pools in such poor condition and therefore it is believed that the extent of refurbishments that is required which includes removals of all the redundant and cast iron pipework and valves, removal and replacement of filter vessels, heating and the old Calorifiers is extremely excessive.

The refurbishment of the existing filters is an ongoing item every 8-10 years and this would not be recommended to carry out this again considering the condition since the last refurbishment in 2012.

It is our conclusion that after careful consideration the plant, as is, has well expended it's useful life expectancy. It is in extremely poor condition, difficult to operate and in some areas quite difficult to operate safely. It seems that some of the operational procedures are make do as no other way is possible, this is not acceptable, therefore it is most certainly well overdue for complete replacement.

Credit must be due to the operation staff to keep this pool operating with fairly good quality water with this plant. Methods to backwash other than with fresh cold water needs to be addressed within any proposed works. In addition, able to backwash at a much higher rate is required and have a filters to waste (rinse facility).

The access to the plant-room does not allow for removals of such heavy plant and most certainly for the required new filters. Therefore, external excavations and an access created to enable removals and bring in the required new plant. This could be quite extensive and needs to be properly assessed.

The pool plant is required to be designed to current Standards and Guidelines and CDM regulations. The Electrical controls which have not really been mentioned in this report as they are so makeshift is taken care of by the M&E consultant. All new controls are required.

The chemical dosing plant and equipment requires extensive upgrade or replacement to include all necessary safety interlocks.

All the cast iron pipework requires to be removed and replaced with uPVC pipe.
Some of the cast iron will remain where it is within the pool structure.
This requires to be camera surveyed cleaned to remove scaling etc.
It is recommended that a change of the chlorine donor and pH corrective be considered to a Calcium Hypochlorite granule this will lessen the use of a pH corrective use all of the product producing no waste, although the product is high in calcium in a hard water area maintaining a good water balance will not cause any scaling and protect grouting and lay down a protective layer of calcium in the pipework thus inhibiting further corrosion.
The pH corrective change to Sulphuric acid which uses far less product and is user friendly to mechanical products such a metering pumps dosing lines ect.
Both products can be dosed directly from the manufacturer's containers minimizing manual handling and use all of the products directly from the manufacturers containers.

It is recommended that the filtration systems be automated including automated backwash and rinse facilities.

The pools, which are generally in fair condition, will also require some extensive works. Items such as broken tiles, grout loss, access ladders and handrails required to be addressed, particularly the perimeter handrails that are suspected to have entrapment issues.

Main Pool Budget Costs

Circulation Pumps
Costs – Years 1-5

Replacement Costs – Years 1-5

Remove, existing pumps and fit 3No new 1450rpm pumps, replace header, to suit new pumps and commissioning

Pump Strainer
Costs – Years 1-5

Replacement Costs – Years 5

Remove, existing strainer and fit new 12” stainless steel 316 strainer including basket, gaskets and bolts within existing cast flanges

Flow Meter
Replacement Costs – Years 1-5

Supply and install new orifice type flow meter including calibrated dial gauge and flange set
(Only in conjunction with complete pipework replacement)

Filter Vessels & Face Pipework
Service/Repair Costs – Years 1-5

Extensive refurbishment of 6 x existing filters including ultrasonic testing, removal/replacement of media, upper & lower distribution, concrete beds, external painting. *(NOT RECOMMENDED)*

Replacement Costs – Years 1-5

New design, 4 x quality GRP filters, nozzle plate new media, new face pipework & valves

(Does not include demolitions, removal of existing plant, access for New plant)

System Valves, Pipework and Supports
Replacement Costs – Years 1-5

New system pipework & valves to connect to final cast iron flanges from pools to new design.

(Does not include demolitions, removal of existing plant, access for New plant)

Heat Exchangers
Service/Repair/Replacement Costs – Years 1-5

Supply and install new shell and tube heat exchanger
(Primary connections by others)

23 October 2019

Teaching Pool Budget Costs

Circulation Pumps
Costs – Years 1-5

Replacement Costs – Years 1-5

Remove, existing pumps and fit 2No new 1450rpm pumps, replace header, to suit new pumps and commissioning

Pump Strainer
Costs – Years 1-5

Supply and fit new 6" stainless steel 316 strainer
including basket, gaskets and bolts within existing cast flanges

Flow Meter
Replacement Costs – Years 1-5

Supply and install new orifice type flow meter including calibrated dial gauge and flange set
(Only in conjunction with complete pipework replacement)

Filter Vessels & Face Pipework
Costs – Years 1-5

Replacement Costs – Years 1-5

New design, 1 x GRP filter, new media, new face pipework & valves

(Does not include demolitions, removal of existing plant, access for New plant)

System Valves, Pipework and Supports
Replacement Costs – Years 1-5

New system pipework & valves to connect to final cast iron flanges from pools to new design.

(Does not include demolitions, removal of existing plant, access for New plant)

Heat Exchangers
Replacement Costs – Years 1-5

Supply and install new shell and tube heat exchanger and modify pool pipework to existing flanges.
Primary connections by others

<u>Common Items Budget Costs</u>

<u>Chemical Dosing Systems</u>
<u>Replacement Costs – Years 1-5</u>

Address gravity feeds to controllers

Replace chlorine day tank including disposal of old
and reline chlorine bund with temporary dosing set up

Replace flocculant dosing lines

Remove existing controllers and install 2 No new controllers including
training on basic procedures and operations

Remove existing dosing systems, prepare and install 2 No Granudos
systems including training on basic procedures and operations

<u>Other Recommended Items Budget Costs</u>

<u>Medium Pressure UV Systems</u>

Supply and install medium pressure UV systems to both pools
(Only in conjunction with complete redesign/pipework replacement,
Excludes mains electrical supplies to UV panels)

<u>Pool Electrical Control Panels</u>

Design and install dedicated electrical control panels for both pools
Including pumps, chemical dosing, heating, UV and all associated
Safety interlocks and emergency stops.

<u>Automatic Backwashing Systems</u>

Replace face pipework valves for pneumatically actuated valves,
install air compressor and air lines. Design and manufacture control
panel with logic and sequence mimic.

<u>Poolside Works</u>

Deep clean surrounds, wash out/clean poolside skimmer troughs,
Drain and deep clean pools, address broken tiles, mechanically
Rake out joints where required. Apply new grouting.

When pool empty, camera survey to underfloor pipework from pools.
Replace main drain covers.
Survey to scum channel outlets.
Assessment to scum channel handrails for any entrapment issues.

Site set up, Prelims, CDM, O&Ms

Our Ref: JWC/sls/GDNS-STG-004

23 October 2019

Further surveys design, specification and drawings

<u>Totals</u>

Replacement Pool Plant and Pool Works

Demolitions

Lifting and Access

*Items not included in above totals

The above budget costs are based on individual items during a contract period/closure of the facility. We make no allowance for lifting requirement or access. The above would be subject to contract type, final design and finalised contract programme.

All shown works are costed to be undertaken within normal working hours, Monday to Friday and/or during facility closures unless specifically stated otherwise.

All shown sums are exclusive of V.A.T. at the prevailing rate.

We trust the above meets with your requirements, but in the meantime should you have any queries or require additional information, please do not hesitate to contact us.

Assuring you of our best attention at all times.

Yours faithfully,
HYDROSPEC LTD

John W Cheek FISPE DIP. MRSPH
<u>MANAGING DIRECTOR</u>

9.30 ControlCare Ltd Condition Survey & Report

Site Report

CCL

Controlcare Ltd

Steve Godden

Intelligent Control Solutions for the Building Services Industry
The Barn @ Hurdcott
Cricket Hill Lane
Yateley
Hampshire
GU46 6BB
Tel: 01252873780
Email: Sales@Controlcare.co.uk

Engineer:	Mike Kent	Job Ref: J6440	Date: 02/07/2021
Site:	St George's Swimming Pool		
Site Contact:			
Report For:	GDN support services		
Order Ref:	21012-PO-101		

Description Of Work:

Controls Survey and Condition Report

Pre-Start Site Checks:	☐ Pre-Start Site Checks Required
Site Report:	☑ Site Report Required
Method Statement:	☐ Method Statement Required
Risk Assessment:	☐ Risk Assessment Required
Controls Commissioning Document:	☐ Commissioning Document Required
Completion of Works Certificate:	☐ Completion of Work Certificate Required

Job Sheet Number Ref:

Report

○ Commissioning ○ Service ○ Callout ◉ Other

We at Controlcare have been asked to update the survey carried out in September 2019 on the existing heating and ventilation controls at St Georges Pool, provide a condition report and then budget for replacement controls equipment for the proposed plant list supplied by GDN support services.

Plant Room

The main plant room controls are contained in the double door floor standing Kennet panel as you walk down the stairs. There are also remote panels in the basement plant room for Heated seating and Boiler Ventilation as well as manual starters and plug top supplies for additional pumps.

Kennet double panel

Report

○ Commissioning ○ Service ○ Callout ◉ Other

Auto control is via 3 timeclocks and 6 Staefa controllers controlling the following:
- Boiler Temperature Control
- Boiler Sequence Control
- Main Pool Heating Coil 1 *Valves open and additional pump controlled manually by 13A plug*
- Main Pool Heating Coil 2
- Small Pool Heating Coil *staff adjust controller inside panel as it does not work automatically*
- Changing Room Heating Coil not operational

There is off - auto control for the following items
- 6 Boilers *1 isolated, All in Hand*
- 2 Flue assistance fans (boiler room supply and extract via separate panel)
- Safety circuit - thermal link cable and weighted gas valve
- Changing Room Supply and Extract Fans (Supply in plant room, Extract on 1st floor roof) *Fan 2 not operational*
- Pools Hall Supply and Extract Fan *refurbished and located on ground floor - old ductwork redundant and mostly in place*
- Toilet Extract Fans (located on 1st floor roof)
- Pool Run Around Coil Pump
- Changing Room Run Around Coil Pump
- Pool, Changing Room and Heating Timeswitches *all in manual, time incorrect*
- Main Heating Pumps
- Primary Hot Water Pumps
- Secondary Hot Water Pump
- Pool Water Heating Pumps
- Water Softener *Removed*
- De Ioniser *Removed*
- Learner Pool Dehumid Controls *Removed*
- Learner Pool De Humid 1 *Removed*
- Learner Pool De Humid 2 *Removed*
- Learner Pool De Humid 3 *Removed*
- Learner Pool De Humid 4 *Removed*

<u>Control Sequence</u>

The intended controls logic was simple - If either the Pool, Changing Room or Heating Plant Timeswitch are enabled then the Boiler Temperature Controller and Boiler Sequence Controller would activated to heat the primary heating circuit to setpoint. The Pool timeswitch would enable the (now removed) Pool Ventilation and 2 main pool calorifier actuators and minor pool calorifier actuator to heat the pool water to setpoint. The Changing Room timeswitch would enable the Changing Room Supply and Extract fans and control the supply heating coil to supply air temperature setpoint as well as the toilet ventilation. The Heating Plant timeswitch would enable the main heating pumps for the radiators in the office and gym area. This would also enable the DHWS pumps to heat the DHWS calorifier located in the plant room. However as these automatic controls have failed the plant is only run on manual.

Report

○ Commissioning ○ Service ○ Callout ◉ Other

<u>Remote Panels</u>

Pool Seating Panel (Above) - located in basement plant room
Legacy panel to control the heating of seats around the main pool area. Now only powers small pool run around heating pump.

Boiler Ventilation Panel (Right) - located in basement plant room
Enabled by the Main Kennet panel this enables both supply and extract fans and monitors air flow to interlock boilers for safety

Report

○ Commissioning ○ Service ○ Callout ◉ Other

Remote Panels

Monitoring Panel - located in ground floor office
Monitoring panel of main pool temperatures and main plant faults - temperatures not reading and showing plant fault and fire fault.

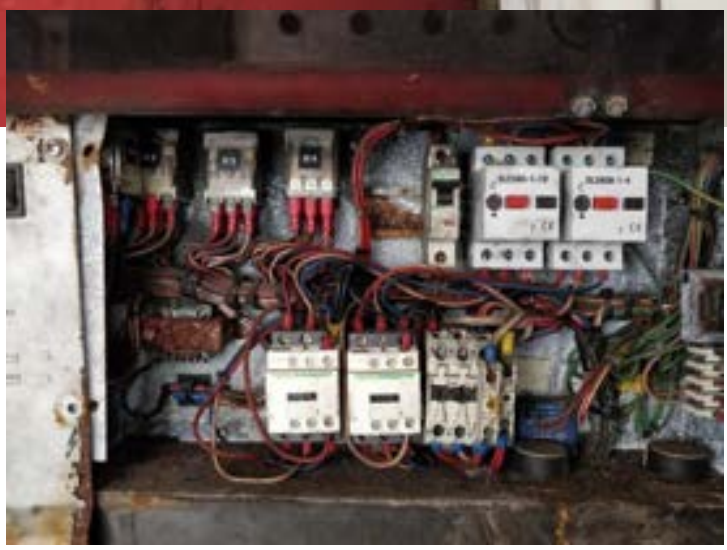
Report

○ Commissioning ○ Service ○ Callout ◉ Other

<u>Calorex Units</u>

There are 2 Calorex units, one for each of the pools ventilation - these have been added in the years following the main controls install and as such are not integrated into the main controls. Due to this the main controls are run in hand so primary heating is available for these units at all

The small Pool Calorex unit located on the first floor roof has independent controls which are in terrible condition - these have been corroded also the heating actuator has been broken off allowing no control



Report

○ Commissioning ○ Service ○ Callout ◉ Other

The main pool Calorex unit located on the ground floor plant room has a remote panel to control heating pumps for the supply air heating coil however the heating actuator does not work in auto so members of staff have to enter the AHU and adjust this manually. The integral controls for the supply inverter have also been bridged as they were holding the fan off in fault.

Report

○ Commissioning ○ Service ○ Callout ◉ Other

Condition Report

Unfortunately the control system has not be maintained properly and as equipment has failed over the years short term temporary fixes have become the permanent standard and so we believe none of the existing control system can be used going forward. We put the age of the control system at approx. 32-37 years old and as the system cannot be run automatically it is beyond it's lifecycle and we would recommend a full replacement.

Update on 2/7/2021

Since the beginning of Covid all the plant has been turned off, we have been instructed not to turn anything on to test so we can only assume the worse with the already dilapidated controls. There is a good chance when the plant is turned on that circuits and mechanical plant will fail and require repair.

However our recommendation is the same that none of the existing controls and wiring can be utilised for a refurbishment and would require full replacement.

£

Budget Cost for Replacement Controls to GDN Spec

- New floor standing control panel in Basement plant room to control and monitor; boilers, heating pumps, basement ventilation, combustion ventilation, CW Booster, CW Storage, Pool Calorifier primary circuits
- High Level interface to communicate with; AC system, Pool Plant Equipment Control
- New control panel for Changing Room AHU
- New control panel for Training Pool AHU
- New control panel for Main Pool AHU
- New control panel for Toilet Ventilation
- Supervisor software and PC setup with graphics and alarm monitoring in Duty Manager's Office

For the above controls installation we would allow a budget cost of £ [redacted]

9.40 Structural - Condition Survey & Report

Structural Assessment Report

of

St Georges Leisure Centre
221 The Highway
London E1W 3BP

For

London Borough of Tower Hamlets
Rev 003

Date: 15/07/2021
Reference No.: 21003
Number of Pages: 36

Chamberlain consulting LLP
consulting structural and civil engineers

1 Bromley Lane
Chislehurst
Kent
BR7 6LH
Tel: 0208 468 1013

ace
consultancy engineering business environment

INDEX

1.0 INSTRUCTIONS & SCOPE

We were instructed by Simon McIntyre of the London borough of Tower Hamlets to attend site and provide a structural assessment on the condition of St Georges Leisure Centre, 221 The Highway, London E1W 3B.

Nick Snow of Chamberlain Consulting LLP attended site on the 5th of July 2021 to carry out a structural condition assessment of the building to enable the original report 18003 St Georges Leisure Centre Structural Assessment Report.pdf to be updated to the current condition.

16088 Report (Dated 20th of April 2017):

The condition report was based on visual observations and together with concrete sampling in several areas which were undertaken on the 21st of August 2018. The external access for the concrete sampling was gained by way of a Cherry Picker. Intrusive investigations were carried out for the internal and external concrete investigations only. Structural internal elements concerning the galleries were viewed from ground level and other accessible vantage points.

18003 Report (Dated 19th of September 2018):

The condition report was based on visual observations and together with concrete sampling in several areas which were undertaken on the 21st of August 2018. The external access for the concrete sampling was gained by way of a Cherry Picker. Intrusive investigations were carried out for the internal and external concrete investigations only. Structural internal elements concerning the galleries were viewed from ground level and other accessible vantage points.

21003 Report Rev 002 (Dated 8th of July 2021):

This condition report is based on visual observations only, no intrusive investigations were carried out. Areas within this report which have been highlighted in Yellow are Structural comments.

2.0 EXECUTIVE SUMMARY

The existing building is an insitu reinforced concrete framed structure built in the late 1960's - early 1970's, and has two swimming pools, the main pool being suspended over the reinforced concrete basement plantroom. The ground floor appears to be solid insitu concrete, and it is assumed that the upper gallery floors around the pool enclosure at 1st and 2nd floor levels are of similar construction.
The roof structures are unknown but in one location steel “Hyrib” type soffit was evident, this being used as a permanent formwork/reinforcement to the perimeter, the main pool roof most probably being a concrete shell.

External elevations have continuous band windows to the main pool hall with reinforced concrete upstand spandrel walls externally faced with mosaic tiles and internally lined with woodwool slabs. The single storey section of the building containing the small pool is brickwork with isolated windows as is the ground floor storey to the main pool block fronting The Highway.

3.0 EXISTING STRUCTURE

The existing building is an insitu reinforced concrete framed structure built in the late 1960's - early 1970's, and has two swimming pools, the main pool being suspended over the reinforced concrete basement plantroom. The ground floor appears to be solid insitu concrete, and it is assumed that the upper gallery floors around the pool enclosure at 1st and 2nd floor levels are of similar construction.
The roof structures are unknown but in one location steel “Hyrib” type soffit was evident, this being used as a permanent formwork/reinforcement to the perimeter, the main pool roof most probably being a concrete shell.

External elevations have continuous band windows to the main pool hall with reinforced concrete upstand spandrel walls externally faced with mosaic tiles and internally lined with woodwool slabs. The single storey section of the building containing the small pool is brickwork with isolated windows as is the ground floor storey to the main pool block fronting The Highway.

Fig 3.1 – The image above shows the Leisure Centre for the purpose of this report.

4.0 INTERNAL ASSESSMENT

4.1 Basement Plantroom below Main Pool

Refer to CCLLP Drawing 21003-S-B01

This area remains the same condition from our previous report issued on the 20th of April 2017 - A copy can be located at the end of this assessment. It is effectively a reinforced concrete box structure with a series of isolated columns supporting the suspended ground floor and main pool structure over. In reviewing the existing it is clear that there is minor seepage of pool water through the original construction joints. The warm and relatively damp environment in the space and the use of aggressive pool chemical treatments, has resulted in spalling of the concrete and rusting of reinforcement, due to the poor control of concrete cover leading to insufficient protection to the embedded steel reinforcement. This is particularly evident to a number of columns where previous poor-quality repairs have be carried out, this also being identified in several of the previous reports.

Fig 4.1.1 – The photo above was taken with the basement area.

Basement - Structural Comment:
Historic water ingress issues evident seeping through the original construction joints.

Fig 4.1.2 – The photo above was taken with the basement area.

Basement - Structural Comment:
Historic water ingress issues evident seeping through the original construction joints.

Fig 4.1.3

Fig 4.1.4

Basement - Structural Comment:
Examples of previous poor-quality concrete repairs to columns.
In the photo on the left (Fig 4.1.1.3) it is clear there is wate ingress coming from ground floor pool hall level, the water following cracking in the previous concrete repair. This column is referenced TA1 in the Martech condition report carried out in 2007.

Fig 4.1.5 – The photo above was taken with the basement area.

Basement - Structural Comment:
Close up view of the top of the column noted above shows no water leakage at the time of the assessment. However, there is evidence of a build-up of salts.

4.2 Ground Floor – Main Pool Hall

Refer to CCLLP Drawing 21003-S-G01

This area has deteriorated excessively from our previous report - 18003 St Georges Leisure Centre Structural Assessment Report.pdf, a copy can been found in appendix B at the end of this report.
The centre was noted as being closed for over 18 months.

This is a large single space with viewing galleries at the first and second floor levels, the later having been closed off for several years due to Health and Safety concerns.

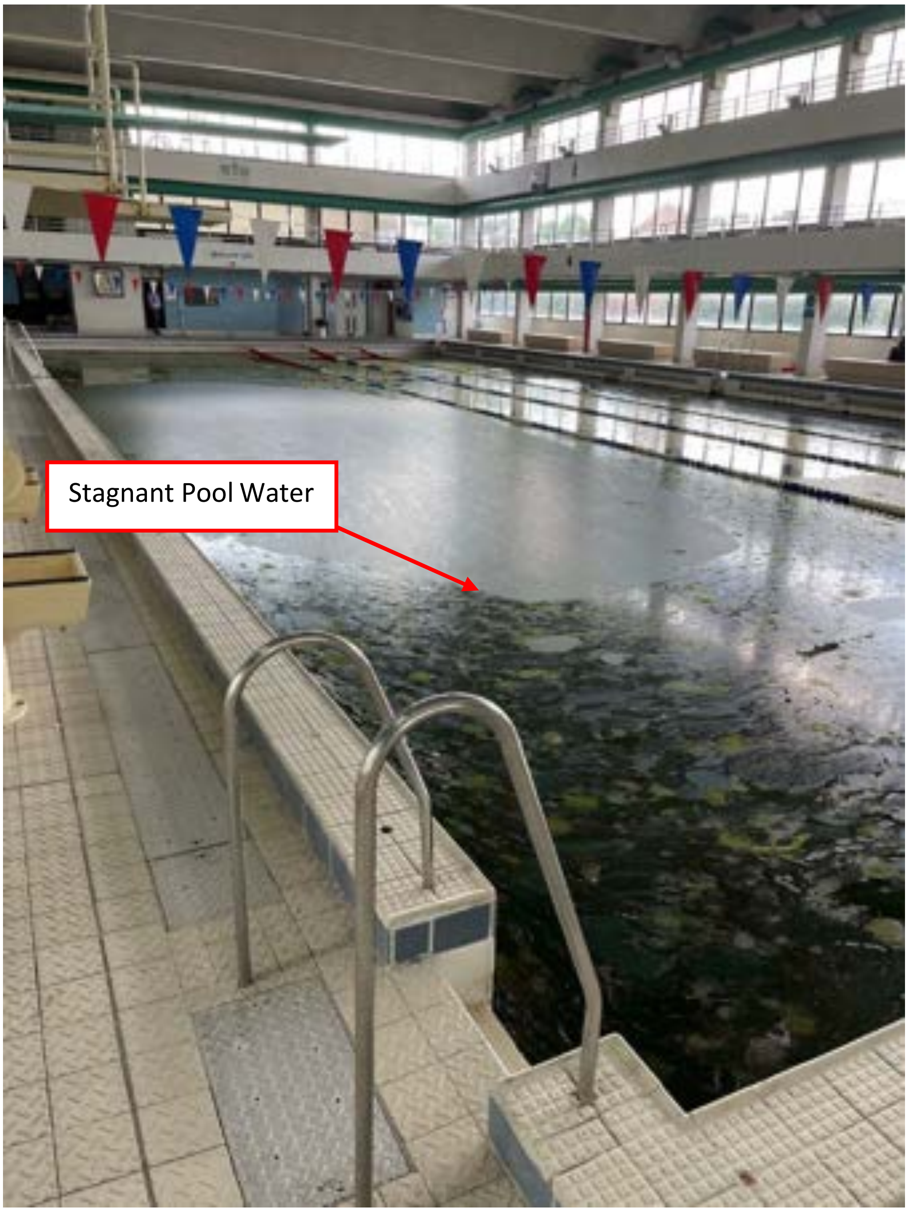


Fig 4.2.1 – The photo above was taken within the main pool area.

Main Pool Area - Structural Comment:
The pool had not been drained and the water is now highly contaminated and poses a potential health and safety risk. Mould was present at the time of the survey.

Fig 4.2.2 – The photo above was taken within the main pool area.

Main Pool Area - Structural Comment:
The pool had not been drained and the water is now highly contaminated and poses a potential health and safety risk. Mould was present at the time of the survey.

Fig 4.2.3 – The photo above was taken within the main pool area.

Main Pool Area - Structural Comment:
Exposed concrete reinforcement due to expansion caused by corrosion due to moisture within the pool area. The reinforcement has blown the concrete cover and remains exposed in serval areas on all levels around the main pool.

4.3 First Floor – Main Pool Hall Viewing Gallery

Refer to CCLLP Drawing 21003-S-201

The first-floor level gallery is in fair condition with the internal faces of the walls lined with a board material and decorated in some areas. There were signs of repair works on the ceilings and evidence of wall boarding being removed as shown below:

Typical views of Main Pool Hall spandrel wall and ceiling on the 1st floor level – See CCLLP Drawing 18003-201-R for locations.

First Floor - Main Pool Area - Structural Comment:

Exposed concrete reinforcement due to expansion caused by corrosion due to moisture within the pool area. The reinforcement has blown the concrete cover and remains exposed in serval areas on all levels around the main pool.

4.4 Second Floor – Main Pool Hall

Refer to CCLLP Drawing 21003-S-301

At the second-floor gallery level - it is possible to see most of the structural elements particularly to the perimeter walls and ceiling as these has been exposed prior to the assessment. At this level all the original plaster wall finishes have been removed exposing wood wool lining to the concrete spandrel walls. This lining was we presume to act as insulation and was placed into the shutter prior to casting the concrete. In places this has been cut away exposing rusting embedded steel fixings, electrical conduits, etc. In addition, the interface at window cill level is exposed.

To the ceiling over the second-floor gallery, large areas are affected by the humid interior environment of the pool hall. See below:

Fig 4.4.1 – The photo above was taken within the main pool area on the second-floor galleries.

Second Floor - Main Pool Area - Structural Comment:

It can be seen that the ceiling “Hyrib” roof slab reinforcement has extreme corrosion (arrowed). We would recommend that these areas are reinforced from below as structural failure is imminent.

Fig 4.4.2 – The photo above was taken within the main pool area on the second-floor galleries.

Second Floor - Main Pool Area - Structural Comment:

Exposed concrete reinforcement due to expansion caused by corrosion due to moisture within the pool area. The reinforcement has blown the concrete cover and remains exposed in serval areas on all levels around the main pool.

Fig 4.4.3 – The photo above was taken within the main pool area on the second-floor galleries.

Fig 4.4.4 – The photo above was taken within the main pool area on the second-floor galleries.

Second Floor - Main Pool Area - Structural Comment:

Exposed and corroded electrical conducts are visible which has resulted from high moisture in the air from the main pool area. Most likely due to existing poor ventilation systems with the main pool area.

Fig 4.4.5 – The photo above was taken within the main pool area on the second-floor galleries.

Fig 4.4.6 – The photo above was taken within the main pool area on the second-floor galleries showing a close-up view on the existing wall to window interface.

Fig 4.4.7 – The photo above was taken within the main pool area on the second-floor galleries showing a close-up view on the existing broken / missing tiles on the gallery parapets.

Refer to CCLLP Drawing 21003-301-R for locations.

30No. concrete test samples were taken at this level – the results are shown below:

St. Georges Leisure Centre									
	Project: 7116	Determined Cement content=30.9%							
	Internal Summary					% Chloride by Mass of Cement		% Sulphate by mass of Cement	
Ref.	Location	Element	Carb depth (mm)	Cover horiz.	Cover vert.	5-30mm	30-55mm	5-30mm	30-55mm
TA1	2nd Floor Gallery	Ext. Wall	30					0.29	0.29
TA2	2nd Floor Gallery	Flr	14	Mesh?	57	0.27	0.18		
TA3	2nd Floor Gallery	Parapet Wall	12	37(20)	31(12)	0.11	0.11		
TA4	2nd Floor Gallery	Column	3	63	59(28)	0.11	0.07		
TA5	2nd Floor Gallery	Ext. Wall	7			0.09	0.05		
TA6	2nd Floor Gallery	Column	4	61	69			0.55	0.27
TA7	2nd Floor Gallery	Ext. Wall	4			0.05	0.05		
TA8	2nd Floor Gallery	Ext. Wall	0			0.12	0.06		
TA9	2nd Floor Gallery	Parapet Wall	2	31(20)	37(32)	0.07	0.02		
TA10	2nd Floor Gallery	Parapet Wall	28	51(20)	56(40)	0.09	<0.02		
TA11	2nd Floor Gallery	Column	14	74	58(40)	0.11	0.09		
TA12	2nd Floor Gallery	Floor	18	68(32)	65(25)			0.50	0.53
TA13	2nd Floor Gallery	Floor	9	63	77	0.15	0.18		
TA14	2nd Floor Gallery	Ext. Wall	2	62	45(12)	0.09	0.08		
TA15	2nd Floor Gallery	Column	2	54(16)	52(32)			0.50	0.52
TA16	2nd Floor Gallery	Ext. Wall	8			0.05	0.05		
TA17	2nd Floor Gallery	Parapet Wall	34	31(14)	41(22)			0.42	0.36
TA18	1st Floor Gallery	Ext. Wall Cill	0			0.05	0.05		
TA19	1st Floor Gallery	Ext. Wall	7					0.43	0.25
TA20	1st Floor Gallery	Floor	8	21	63			0.34	0.54
TA21	1st Floor Gallery	Column	0	50(14)	54(32)	0.11	0.12		

TA22	1st Floor Gallery	Parapet Wall	>55	49(32)	54(40)	0.23	0.05		
TA23	1st Floor Gallery	Floor	3	76	69	0.27	0.17		
TA24	2nd Floor Gallery	Floor	12			0.22	0.23		
TA25	2nd Floor Gallery	Ceiling Upper soffit	3	3 (spalled)				0.17	0.19
TA26	2nd Floor Gallery	Ceiling Upper soffit	16			0.07	0.16		
TA27	2nd Floor Gallery	ceiling Lower soffit	3					0.37	0.36
TA28	2nd Floor Gallery	ceiling Lower soffit	0			0.09	0.02		
TA29	2nd Floor Gallery	Internal wall roof	2	34	41	0.07	0.05		
TA30	2nd Floor Gallery	External wall roof	2	12				0.46	0.45

Fig 4.4.8 – The table above shows the Chloride results which were taken in September 2018.

Main Pool Area - Structural Comment:

There is evidence of Chloride within the walls and slabs which is a result to humidity from the pool area. The level is low – nothing greater than 0.3% which is low risk at the time of the investigation in September 2018. As the pool as been closed, it is unlikely that levels have increased.

5.0 External Assessment

Refer to CCLLP Drawings 21003-S-EL1-El3 & 3D

We carried out an intrusive survey with regards to concrete samples to the exterior of the building to visually assess the condition, cracking and any movement. The external faces are covered with a small mosaic tile which was commonly used as a finish to buildings from this era. This type of external finish is known to suffer from “shelling” of the individual tiles resulting from delamination from the mortar backing, this particularly occurs at joints and corners where thermal and building movements occur.

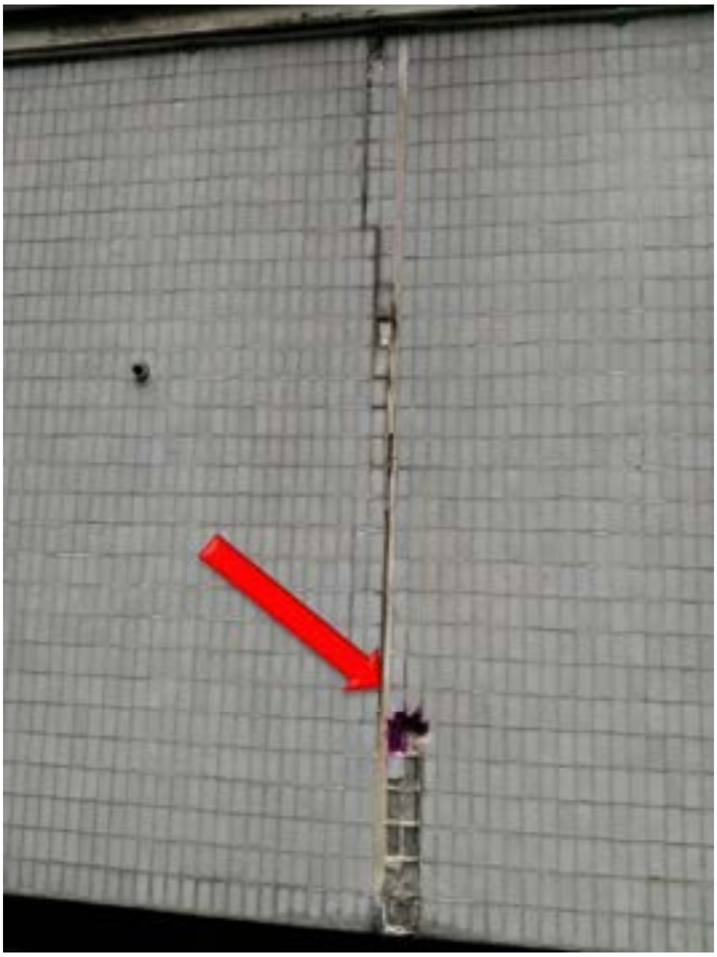


Fig 5.1 – The photo above shows a typical example of potential tile shelling at movement joint in the facade.

External Areas - Structural Comment:

We advise that these areas are high risk to health and safety with regards to falling debris from the elevations and must be either removed and renewed or coned off.

Fig 5.2 – The photo above shows a typical example of potential tile shelling at movement joint in the façade and an historic repair.

External Areas - Structural Comment:

We advise that these areas are high risk to health and safety with regards to falling debris from the elevations and must be either removed and renewed or coned off.

Fig 5.3 – The photo above shows cracking and movement to the rear roof parapet edge together with possible risk of mosaic tiles being shed.

External Areas - Structural Comment:

We advise that these areas are high risk to health and safety with regards to falling debris from the elevations and must be either removed and renewed or coned off.

6.0 REVIEW & CONCLUSIONS

6.1 Concrete Structure:

The purpose of this assessment was to understand the condition of the gallery structures and spandrel wall panels. 30No samples had been taken on the second floor in the main pool hall in 2018 which had shown low levels of Chloride. The humidity within the pool area had deteriorated the existing structure and is now in need of repairs. Previous internal breakouts that have been left open to the environment on the 2nd floor and show very serious loss of section to the steel. This is to be expected in the corrosive environment. The current 2021 condition survey recently carried out has shown the main structure has in fact deteriorated further – internally and externally, even that it was reported the centre has been closed for over 18 months.

All existing polystyrene ceiling tiles on all floors require placing due to excess black mould, and sign of water ingress damage.

The existing tiled walls in the changing rooms also had signs of black mould which is a health and safety concern.

The main pool area is in an extremely poor state, the swimming pool tiles need replacing, the pool water had been left and not drain and has become a health and safety risk to any on site personnel.

We know from industry experience that concrete does deteriorate and particularly in these specific types of environments unless the correct extractor systems are implemented.

Conclusion:

We believe that the existing concrete structure has continued to deteriorate further since previous testing was carried out. The limited nature of the previous testing essentially to the basement areas, did not give an overall picture of the structure as a whole at that time.

We are of the view that action and remedial works should be carried out to maintain the building in a usable condition going forward. Concrete coating and repair systems are now available (anodize protection) that can resist/arrest deterioration of the concrete structure from the effects of carbonation and chloride attack, and a strategy needs to be established to carry out such works in a timely manner.

To determine a strategy, the scope of works, remedial repair and coating systems, timescales and costs, in broad terms we consider that you will need to:

Investigate and determine the product systems to be used to both repair and protect the concrete structure. The repairs should be done with the view of maintaining a safe structure which would be protected from the elements. The main areas of concern are within the basement and the second-floor balconies. Access to the first-floor ceilings was not available at the time of the assessment and further investigation would be recommended to view the condition of the structure at this level.

6.2 External Mosaic Tiling:

LBTH BATS report dated May 2003 identified issues with the external Mosaic tiled finish. The types and extent of defects noted are still present and the condition has continued to deteriorate further, with the potential “shedding” of tiles. This is particularly likely around joints, to soffit areas, to areas affected by thermal movements, and where areas are affected by water penetrating the backing.
The soffit of a southern ground floor spandrel above the window has been spalling onto the pedestrian walkway below.

All these defects exist, this is an industry known condition which should be taken as a serious health and safety issue that requires addressing to prevent potential injury.

Conclusion:

As stated in our previous report in 2017 - we must advise either removal of the tiles or encapsulation by over cladding due to a health and safety issue of falling debris.

6.3 Spandrel Walls:

Walls: Following the structural survey the walls are an insitu concrete cantilever wall structure tied to the floor slabs.
The inside face was cast against wood wool slabs as insulation with eml and plaster finish, the exterior face being rendered with the mosaic tiles applied.

The use of wood wool slabs in formwork is known to cause the loss of fines from the concrete resulting in an open texture with exposed reinforcement. There was evidence that some reinforcement was exposed at the time of the survey.

Conclusion:

The walls are in a poor condition with reinforcement showing signs of further deterioration from 2017. The walls will need to be exposed in full, the reinforcement treated and rendered with a water / mould prevention render.

To determine a strategy, the scope of works, remedial repair and coating systems, timescales, and costs, in broad terms we consider that you will need to:

> Investigate and determine the product systems to be used to both repair and protect the concrete structure. The repairs should be done with the view of maintaining a safe structure which would be protected from the elements.

6.4 Windows:

The existing windows were identified as being in poor condition allowing water to penetrate the building in 2003, and this situation has been allowed to continue through to 2021. Water has penetrated the building around the windows in the past due to poor installation and construction, this potentially adding to the deterioration internally of the spandrel panels which resulted in removal of the linings at 2nd floor gallery level. Removal also needs to take place in the pool level, 1st to 3rd levels.

This water penetration may also be aiding the spandrel wall structure contained behind the wood wool lining to deteriorate further. The Investigation of the window fixings on the 1st to 3rd floors appear to show no apparent issues with mechanical fixing into concrete cills and soffits. The external cill weatherproofing is weathered and is leaking in a number of places – though the fixings have corroded at the cill level internally – it is not extensive, just localised (the galvanising on the steel fixing plates is mostly intact). We noted that there was a window which was cracked, this is indicated on our drawing 21003-EL2.

Conclusion:

There is no change from our previous report in 2018. We would agree with the conclusions drawn in the 2003 report prepared by LBTH BATS that replacement of the windows is required to address both the condition of the window units, and the poor window detailing and installation on all levels.

6.5 Internal Gallery Ceilings:

The pool level, 1st through to the 3rd gallery levels is in poor condition, there is deterioration of the concrete structure, signs of cracks in the concrete and corroded reinforcement affected by the damp conditions.
The “Hyrib” roof slab reinforcement has severe corrosion.
The secondary ceiling support structure is in a poor state and should be removed.

Whilst contained over the gallery we do consider there to be a possible risk of failure which could result in debris falling which would result in a health and safety issue.

Conclusion:

We would advise removal of all secondary ceiling support elements.
The existing “Hyrib” roof slab reinforcement and concrete structure requires repairs and some consideration to protect the structure.

6.6 External Drains:

The drains on the west flat roof were blocked by leaves and pooling was evident on the existing roof.

Conclusion:
We must advise the drains are to be unblocked and a strategy put in place to prevent future debris.

7.0 SUMMARY

We would summarise our conclusions as follows, considering previous reports and test results:

Basement:

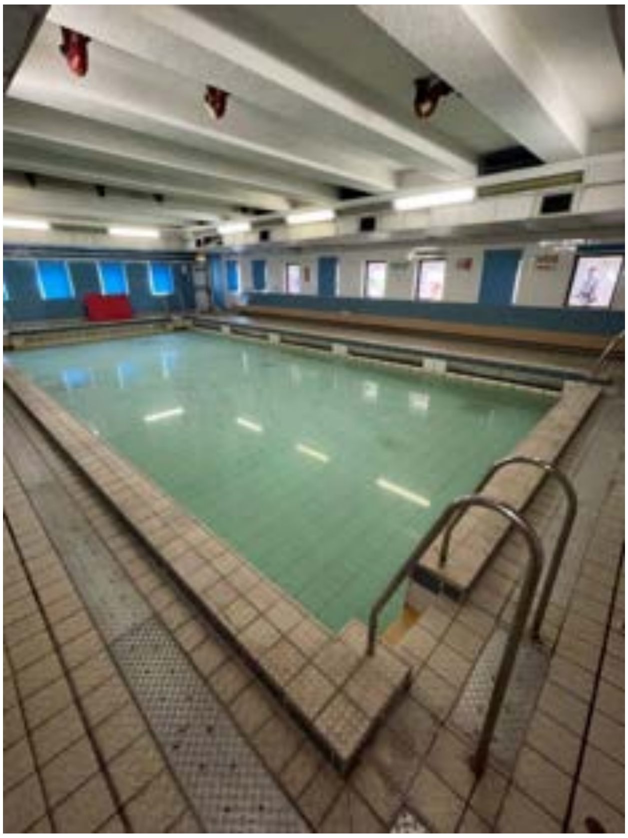
- The concrete soffit is to be fully tanked to ensure no further future water ingress issues occur with a minimum of 20 years warranty.

Ground Level:

- The walls and soffit around the main stairs which provides access to all levels is in a poor condition. There are signs of mould on the walls, cracking on the concrete soffit etc. We recommend that all areas from ground to the third level are treated and repaired.

- Ground level changing rooms – the floors in general our fine but need a deep clean. The tiled walls are also in fair condition, any cracked floor or wall tiles are to be replaced or all floor and walls tiles replaced in full. The ceiling tiles have been damaged by past water ingress and now have block mould. These need to be removed in full and replaced with new to the client's specification.

- Ground level small pool area – the floors in general our fine but need a deep clean. The tiled walls are also in fair condition, any cracked floor or wall tiles are to be replaced or all floor and walls tiles replaced in full. The ceiling has existing services which are suffering from corrosion and are contaminating the pool. We recommend full removal of all high and wall level services in this area and replaced with new. Consideration needs to be given to pool ventilation to prevent moisture in the air.



Ground Floor Main Pool Area:

- The pool has not been drained and has been left for 18 months, the pool water and chemicals have now become a Health and Safety risk and is most likely causing excessive damage to the sides of the pool. Allowance will need to be made for a deep clean and removal all tiles and grout in the main pool area and around the pool including the tiled seating areas. Re-tile to the client's requirements. Prior to this the pool may require tanking to ensure no future water ingress issues within the basement.

First Floor:

- First Floor changing rooms – the floors in general our fine but need a deep clean. The tiled walls are also in fair condition, any cracked floor or wall tiles are to be replaced or all floor and walls tiles replaced in full. The ceiling tiles have been damaged by past water ingress and now have block mould. These need to be removed in full and replaced with new to the client's specification. Within the changing rooms there are existing square roof lights, most of which are suffering from a lack of maintenance, with the surrounds collapsing. Some of the glass roof lights are damaged and crack. These need to be completely replaced with now as they currently pose a risk of falling which is a Health and Safety concern.

First Floor Gallery Around Main Pool:

- All side walls are recommended to be striped and replaced in fall. We would recommend that all windows are removed and replaced with new to ensure no future water ingress issues.
- Consideration needs to be given for the main pool ventilations to reduce the main pool area moisture.
- All ceiling needs to be removed and the existing concrete soffits require repair works to any exposed rebar and blown concrete. We would also recommend tanking the underside of the soffit to help seal the concrete from further damage. Further intrusive investigation may be required to ensure that no additional structural supports are required under the soffit.

Second Floor Gallery Around Main Pool:

- All side walls are recommended to be striped and replaced in fall. We would recommend that all windows are removed and replaced with new to ensure no future water ingress issues.
- Consideration needs to be given for the main pool ventilations to reduce the main pool area moisture.
- All ceiling needs to be removed and the existing concrete soffits require repair works to any exposed rebar and blown concrete. We would also recommend tanking the underside of the soffit to help seal the concrete from further damage. Further intrusive investigation may be required to ensure that no additional structural supports are required under the soffit.

Third Floor Gallery Around Main Pool:

- All side walls are recommended to be striped and replaced in fall. We would recommend that all windows are removed and replaced with new to ensure no future water ingress issues.
- Consideration needs to be given for the main pool ventilations to reduce the main pool area moisture.
- All ceiling needs to be removed and the existing concrete soffits require repair works to any exposed rebar and blown concrete. We would also recommend tanking the underside of the soffit to help seal the concrete from further damage. Further intrusive investigation may be required to ensure that no additional structural supports are required under the soffit.

Internal summary:

• Previous reports established that the concrete structure had defects requiring action which have generally not been acted upon.

• We consider that the structure has continued to deteriorate from previous reports.

• We agree with the previous report findings, and that with an appropriate repairs and remedial works strategy put in place, the building can remain in use. However, we would advise that this should be acted upon as soon as reasonably practical.

• Suspended ceilings to the pool level, 1st to 3rd gallery areas must be removed.

External Flat Roof Areas:

- All external flat roofs show signs of drainage issues, and the coverings appear to be time expired.
- We would recommend a thermal drone investigation undertaken and close inspection.

External Elevations:

The encapsulation or removal of the external mosaic tiling should be carried out to avoid any potential health and safety concerns.
This is a known hazard and was advised in the LBTH BATS report dated May 2003. This is considered as a Health and Safety risk to the public.

• All drains to be cleared from debris to prevent pooling on the flat roofs.

Phased Works Plan:

Immediate Action – Health and Safety Concerns
- External Mosaic Tiling – any loose tiles must be removed to prevent any falling debris. We must advise either removal of the tiles or encapsulation by over cladding. Priority of phasing would be EL1, EL2, EL3 & EL4.   - The Main pool soffit areas must either be netted to prevent falling debris or repaired in fall on all gallery levels (Recommended).   - The main pool is to be fully drain and deep cleaned for a further inspection on the pool tiles to ensure they are not compromised (We are expecting the tiles to be damaged at this time and possibly may require replacing).   - All internal ceiling tiles to all areas to be replaced in fall – the ceiling supports can remain.   - Any water ingress issues on the first floor changing room roof lights to be repaired to prevent further water ingress.   - A thermal survey is to be carried out on all external flat roof areas to determine any water ingress issues – once identified they can be locally repaired.   - The corridors next to the basement areas need to be fully netted at the soffit level to prevent falling debris.   - All public areas to be deep cleaned for public use.   - Consider closing the main pool galleries from the public second and third levels.   - The services over the small pool area are to be removed in fall as badly corroded and replaced with new.   - Consider a full roof investigation by drone to allow for a close inspection of the condition of the roof structure.
Medium Term Action (4-5 Years)
- External Mosaic to be removed in fall to prevent any falling debris. Priority of phasing would be EL1, EL2, EL3 & EL4.   - All internal concrete soffit works are to be carried out with regards to treatment, strengthening and tanking.   - All windows to the 3rd floor to be replaced. Recommend all floors in time   - All external flat roofs are to be overclad and resealed.   - The water ingress issues within the basement will require local repairs to prevent further water ingress issues.   - The corridors next to the basement areas need to be fully repaired at the soffit level – rebar treated and strengthening carried works if required.   - Upgraded ventilation systems to be in place for the main and small pool areas.

Long Term Action (5 Years Plus)
• Windows to the main pool area to be replaced, 3rd floor should have been replaced. • Consider a further water ingress investigation within the basement area – full soffit tanking may be required depending on the level of water ingress if any.

8.0 APPROXIMATE QUANTITES

Internal:

Main Pool Concrete Soffit / floor repair and tanking

(Estimated Area 1,535m2)

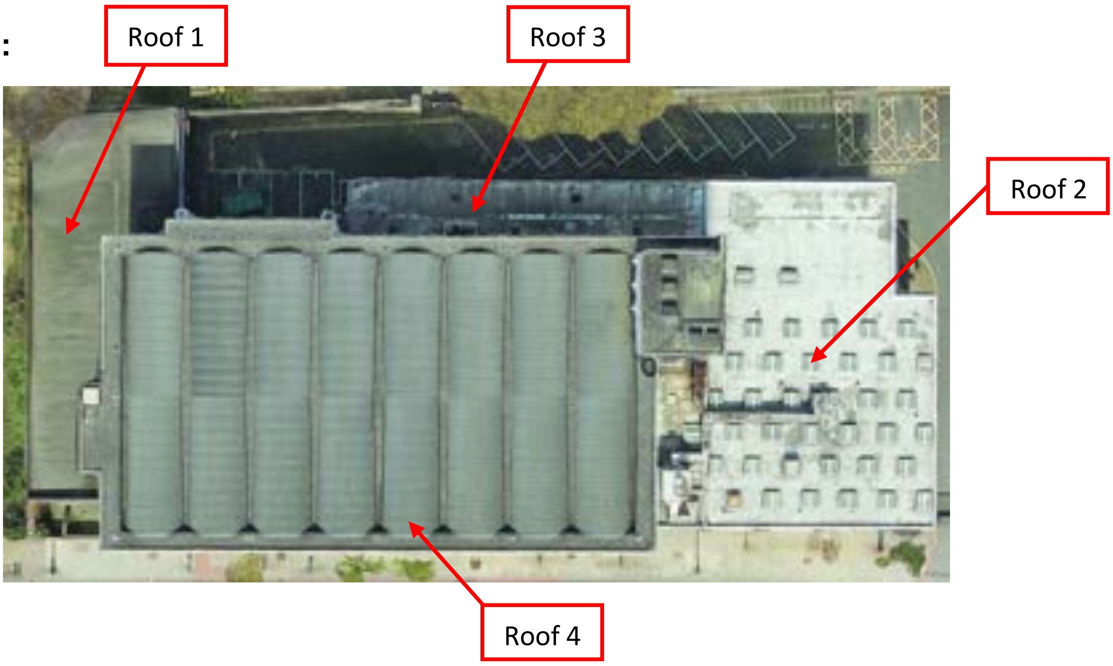
Main Pool Window replacement

(3rd floor 95No Estimated)

Internal Ceiling Tiles

(1,747m2)

External:



Roof 1 – New Roof – Felt

(Estimated Area 429m2)

Roof 2 – New Roof – Felt

(Estimated Area 600m2)

Roof 3 – New Roof – Felt

(Estimated Area 140m2)

Roof 4 – New Roof – Felt

(Estimated Area 1350m2)

Budget Total

External Cladding Repair Works / removal:

Elevation EL1

(Estimated Area 286m2)

Elevation EL2

(Estimated Area 174m2)

Elevation EL3

(Estimated Area 286m2)

Elevation EL4

(Estimated Area 174m2)

Budget Total

External New Cladding:

Elevation EL1

(Estimated Area 286m2)

Elevation EL2

(Estimated Area 174m2)

Elevation EL3

(Estimated Area 286m2)

Elevation EL4

(Estimated Area 174m2)

Budget Total

9.0 LIMITATIONS

This structural condition assessment has been prepared based on a non-intrusive site investigation of the areas noted within this report at the time of the assessment. A full analysis of the building has not been carried out and, therefore, Chamberlain Consulting LLP can accept no liability in respect of defects or issues outside the scope of our appointment.

Report prepared by

Nick Snow

For Chamberlain Consulting LLP

Approved By: Mark Robinson MEng CEng MIStructE MIMechE

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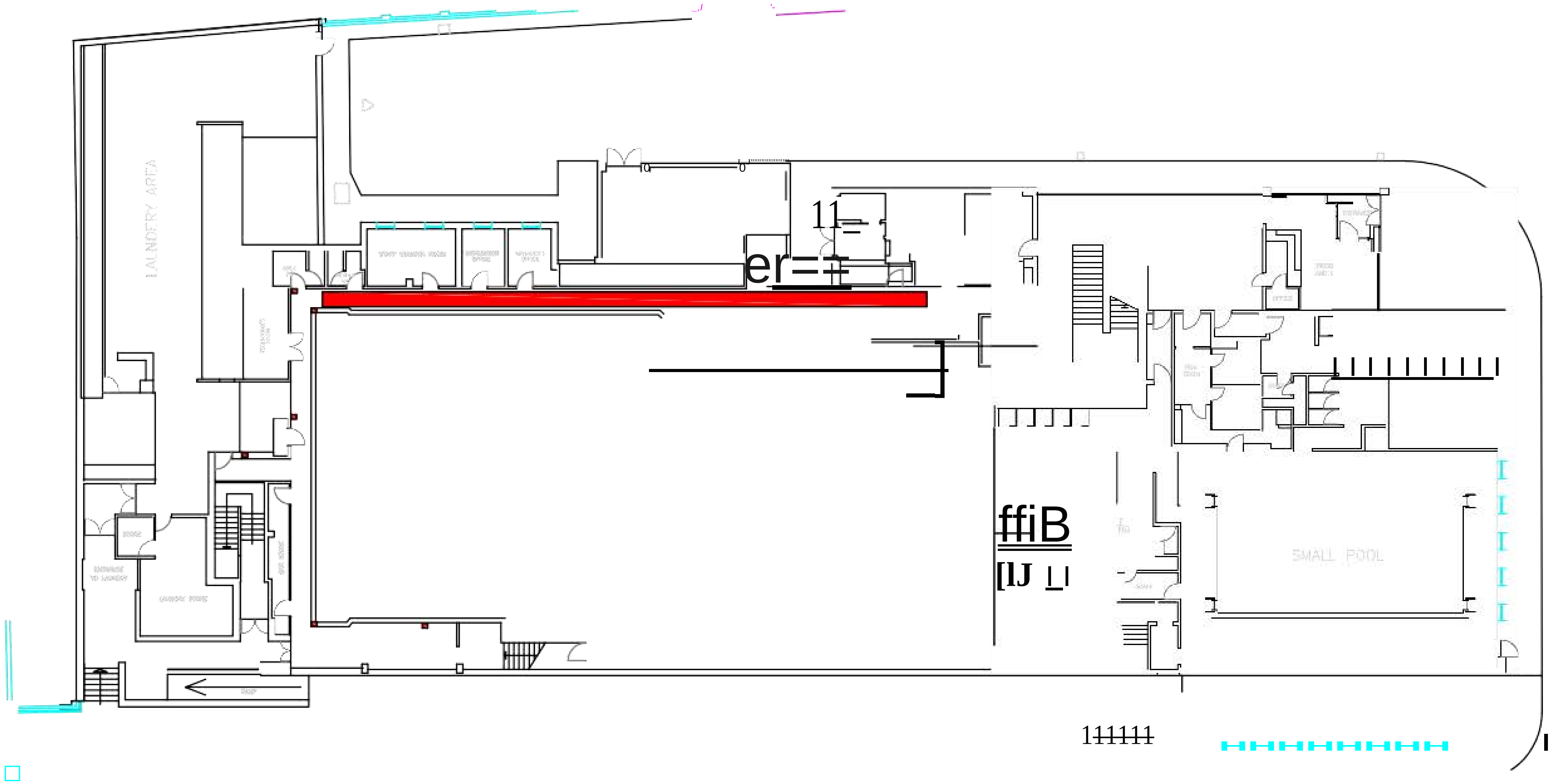

GROUND FLOOR PLAN

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Architect.

Project. St GEORGES POOL THE HIGHWAY LONDON E1

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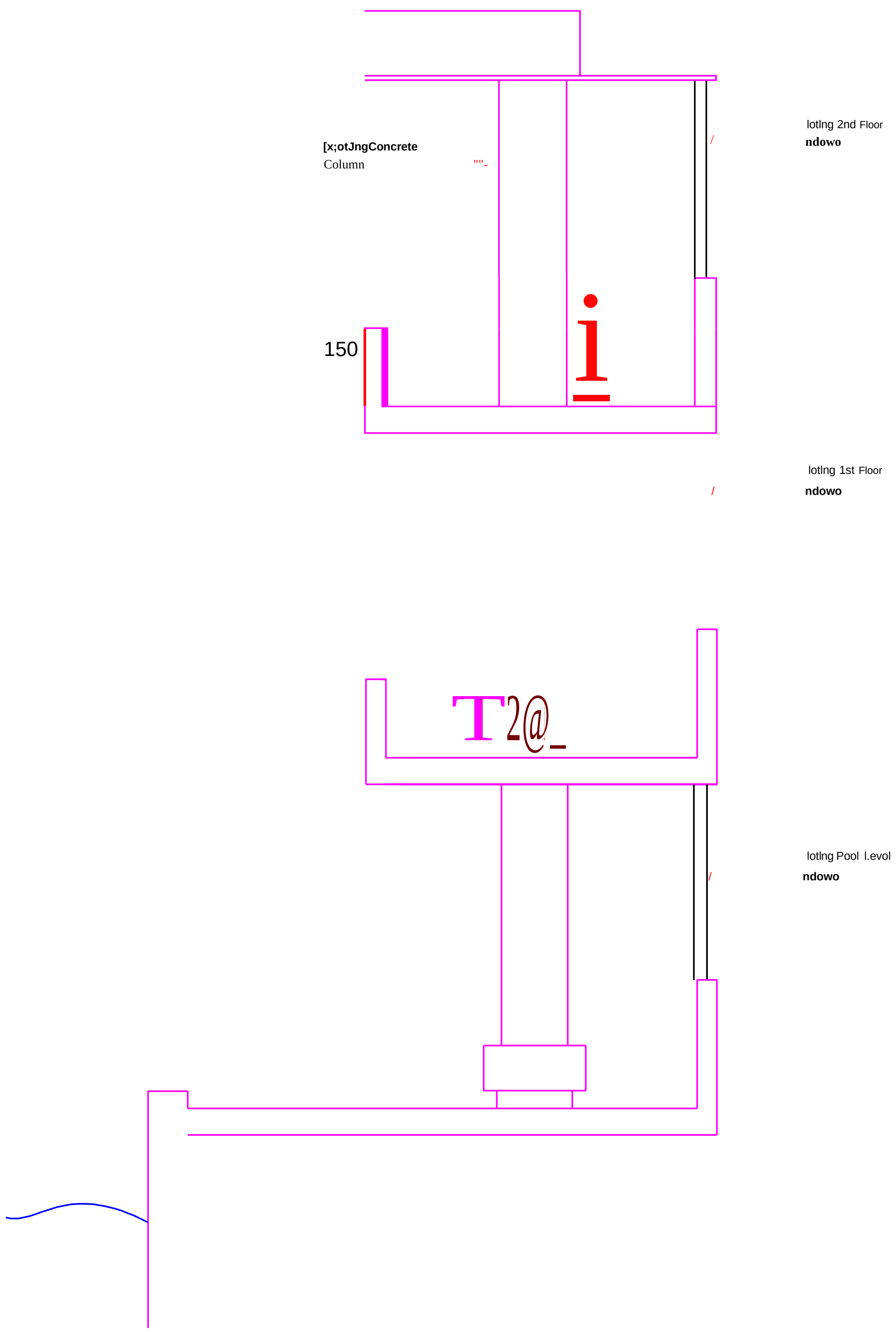

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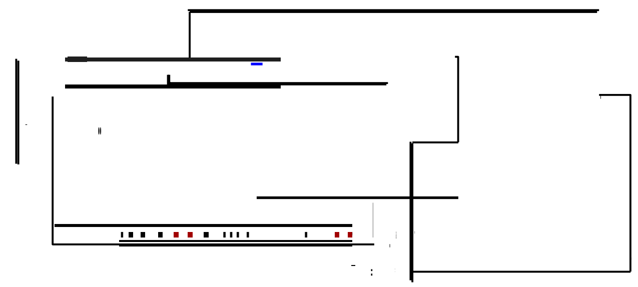

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REAR ELEVATION - EL3

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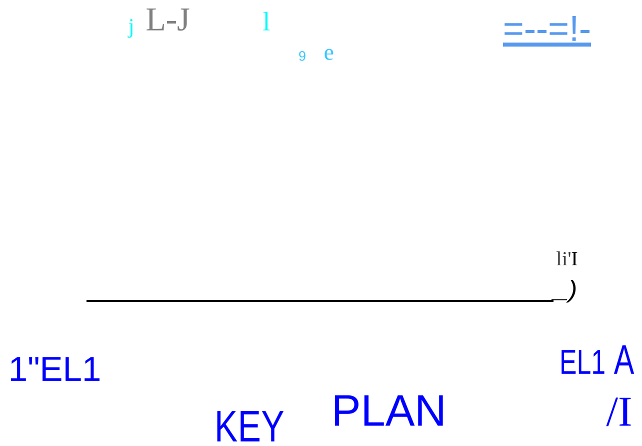

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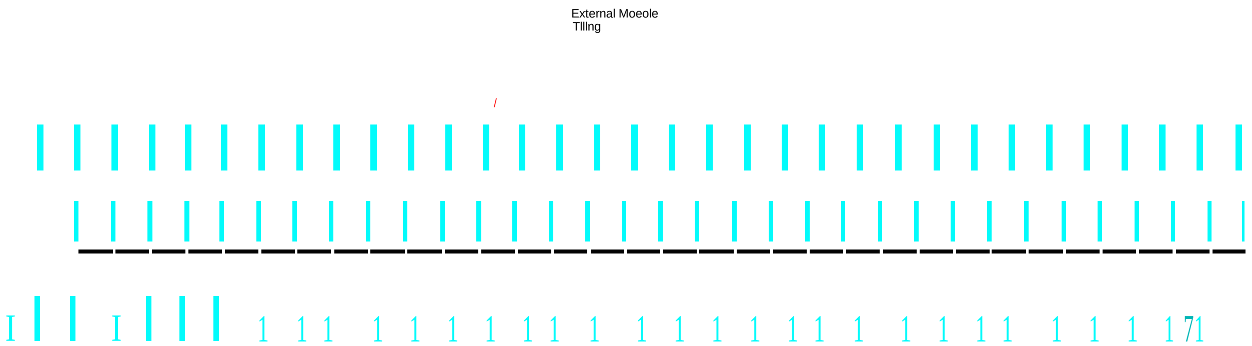

ELEVATION EL1
ROAD ELEVATION

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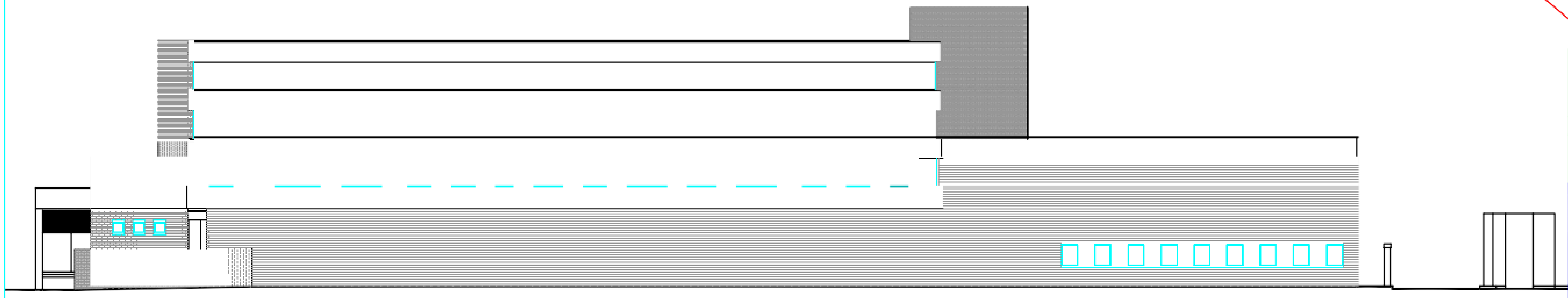

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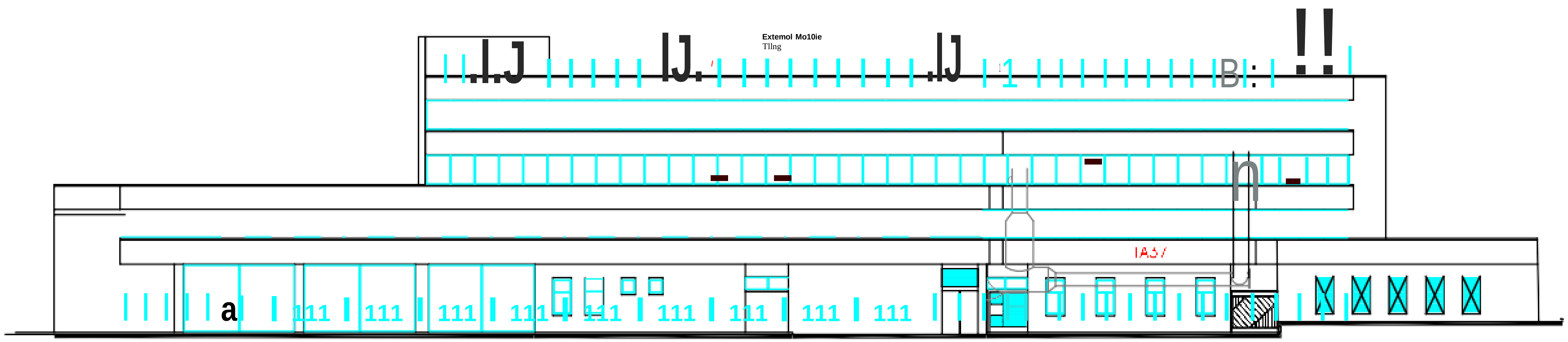

ELEVATION EL3
REAR ELEVATION

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STRUTURAL INVESTIGATION

BASEMENT PLAN

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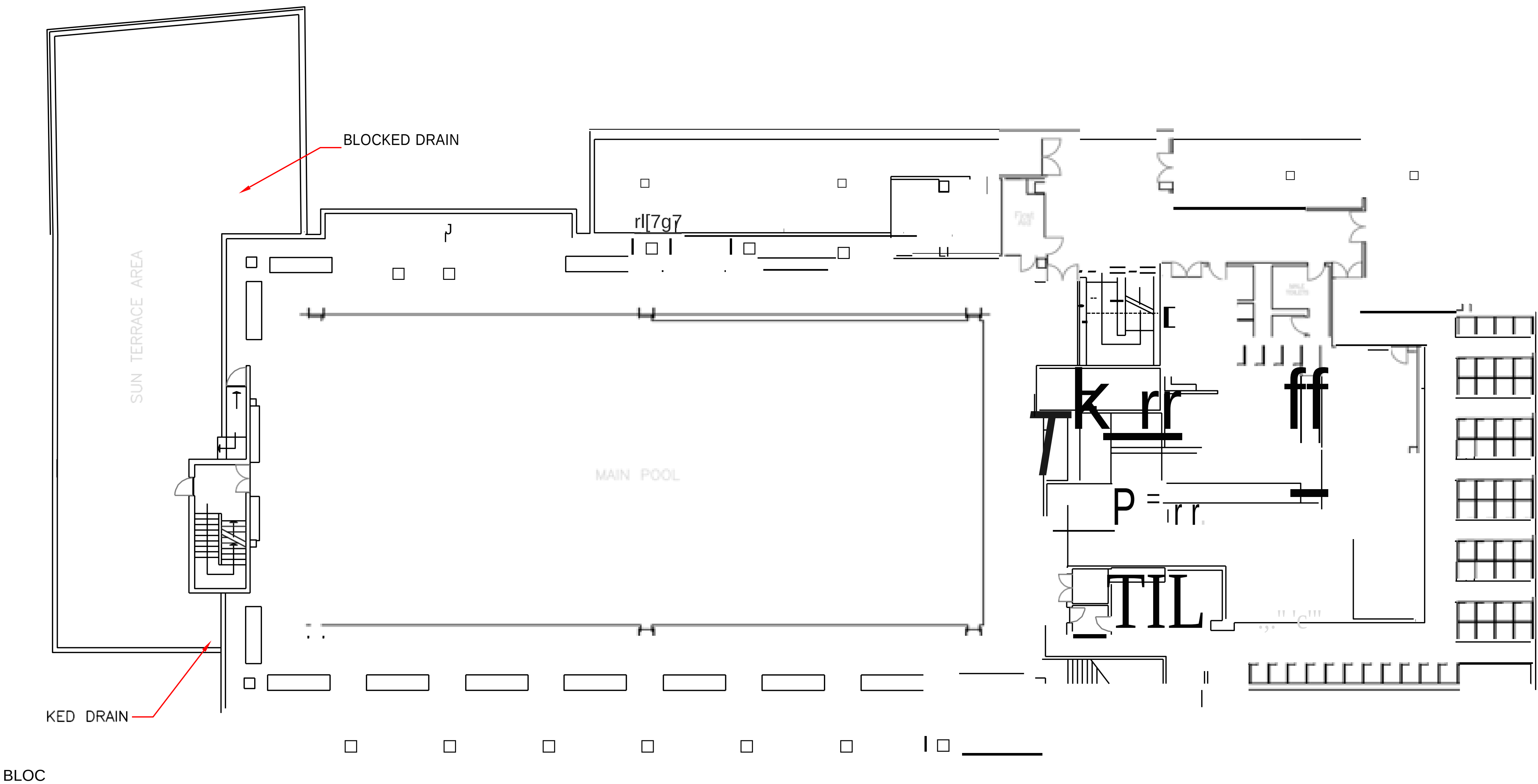

POOL PLAN

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SITE TESTING WORKS TO UNDERSIDE OF EXISTING CONCRETE SLAB OVER.

DENOTES SITE PHOTOGRAPH. SEE DRAWINGS 18003-

DESCRIPTION

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Tel: 0208 468 1013

www.cc-llp.com info@ccukllp.co.uk

Client. L B of TOWER HAMELTS

Architect.

Project. St GEORGES POOL THE HIGHWAY LONDON E1

Drawing Title. STRUTURAL INVESTIGATION POOL PLAN

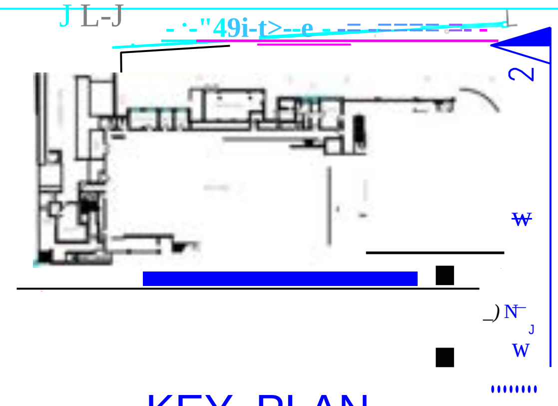
Status. RECORD

Date. July"21 Drawn By. JB

Scale. 1:250 Dwg Size. A1 Checked By. NS

Drawing Number. 21003-S-101 Rev. R

INFORMATION SHOWN ON THIS DRAWING IS A RECORD OF SITE INVESTIGATION & SURVEY CARRIED OUT BY CCLLP IN JULY 2021



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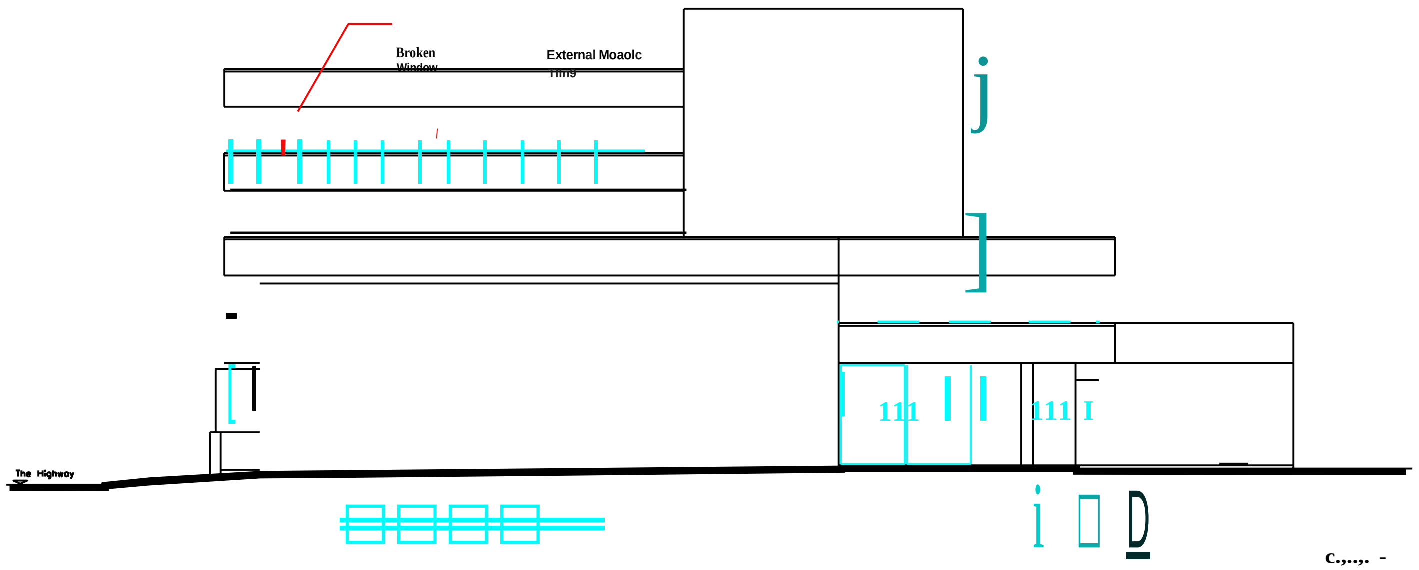
SITE INVESTIGATION KEY

SITE TESTING WORKS TO FACE OF EXISTING CONCRETE WALL OR COLUMN.

SITE TESTING WORKS TO TOP OF EXISTING CONCRETE SLAB.

SITE TESTING WORKS TO UNDERSIDE OF EXISTING CONCRETE SLAB OVER.

DENOTES SITE PHOTOGRAPH. SEE DRAWINGS 18003-



ELEVATION EL2
VEHICLE ACCESS ELEVATION
SCALE APPROX. 1:250@A3

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Client. L B of TOWER HAMELTS

Architect.

Project. St GEORGES POOL THE HIGHWAY LONDON E1

Drawing Title. STRUTURAL INVESTIGATION VEHICLE ACCESS ELEVATION

Drawing Status. RECORD

Date. July 21

Drawing Number. 21003-S-EL2

Rev. R

ale., 1 250 Dw9 Size. Al Drawn By. JB

Cheeked By. NS

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SITE INVESTIGATION KEY

SITE TESTING WORKS TO FACE OF

X EXISTING CONCRETE WALL OR COLUMN.

SITE TESTING WORKS TO TOP OF EXISTING CONCRETE SLAB.

rIL "IP" SITE TESTING WORKS TO UNDERSIDE OF EXISTING CONCRETE SLAB OVER.

DENOTES SITE PHOTOGRAPH. SEE DRAWINGS 18003-

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SECOND FLOOR PLAN

SCALE APPROX. 1:250@A3

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L B of TOWER HAMELTS

Client.

Architect.

St GEORGES POOL
THE HIGHWAY LONDON E1

Project.

STRUTURAL INVESTIGATION
SECOND FLOOR PLAN

INFORMATION SHOWN ON THIS DRAWING IS A RECORD OF SITE INVESTIGATION &

Drawing Title.

Date. July"21 | Drawn By. JB

Scale. 1,250 | Dwg Size. AI | Checked By. NS

LLP

Drawing Status. RECORD

Drawing Number. 21003-S-301 | Rev. R

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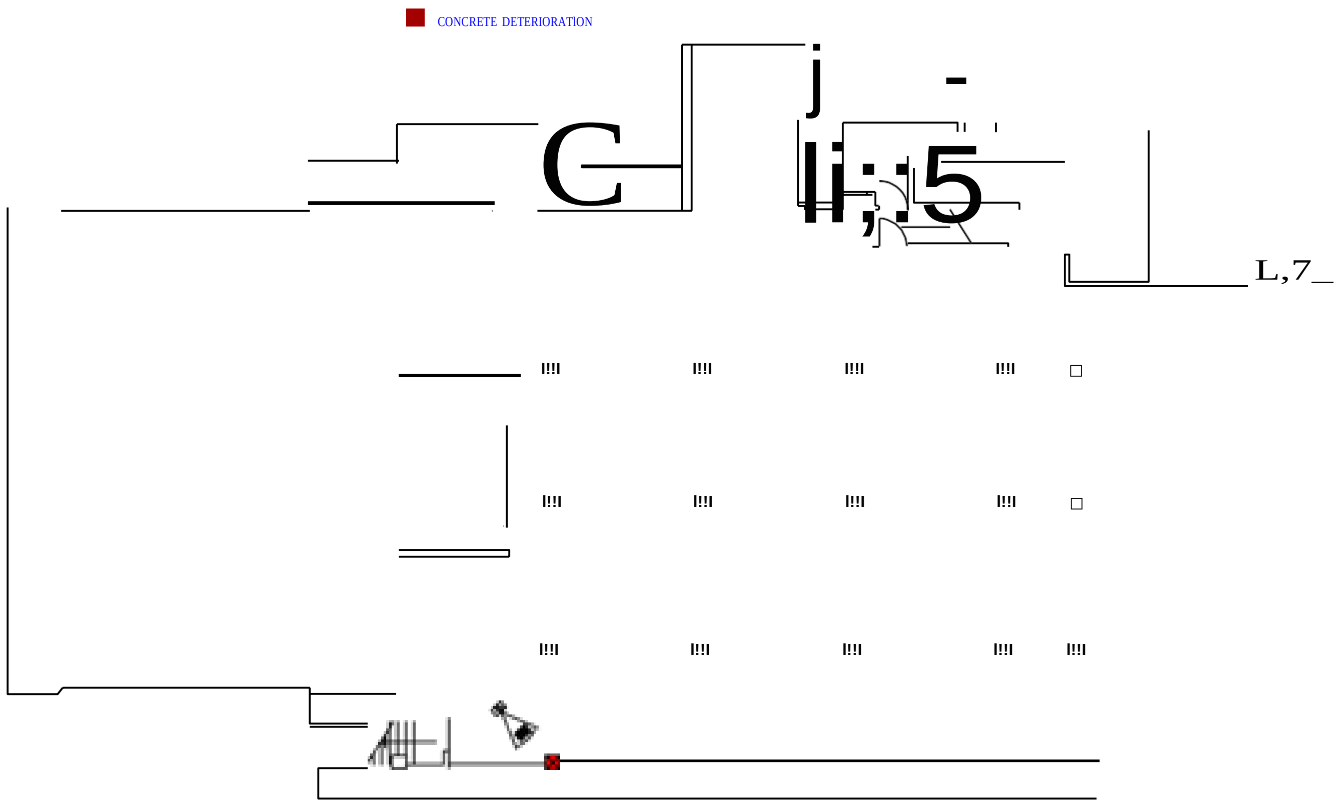

BASEMENT PLAN

SCALE APPROX . 1:250@A3

SITE INVESTIGATION KEY

V SITE TESTING WORKS TO FACE OF EXISTING CONCRETE WALL OR COLUMN.

X SITE TESTING WORKS TO TOP OF EXISTING CONCRETE SLAB.

0 SITE TESTING WORKS TO UNDERSIDE OF EXISTING CONCRETE SLAB OVER.

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Client.	L B of TOWER HAMELTS
Architect.	
Project.	St GEORGES POOL THE HIGHWAY LONDON E1
Drawing Title.	STRUTURAL INVESTIGATION 3D VIEW
Date. July"21	Drawn By. JB
Seale. 1,250 / Dwg Size. Al	Cheeked By. NS
Drawing Status.	RECORD
Drawing Number.	21003-S-B01
Rev.	R

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FIRST FLOOR PLAN

SCALE APPROX. 1:250@A3

SITE INVESTIGATION KEY

√ SITE TESTING WORKS TO FACE OF EXISTING CONCRETE WALL OR COLUMN.

X SITE TESTING WORKS TO TOP OF EXISTING CONCRETE SLAB.

rIL "IP" SITE TESTING WORKS TO UNDERSIDE OF EXISTING CONCRETE SLAB OVER.

DENOTES SITE PHOTOGRAPH.

SEE DRAWINGS 18003-

@

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L B of TOWER HAMELTS

Client.

Architect.

St GEORGES POOL

THE HIGHWAY LONDON E1

Project.

STRUTURAL INVESTIGATION

FIRST FLOOR PLAN

Drawing Title.

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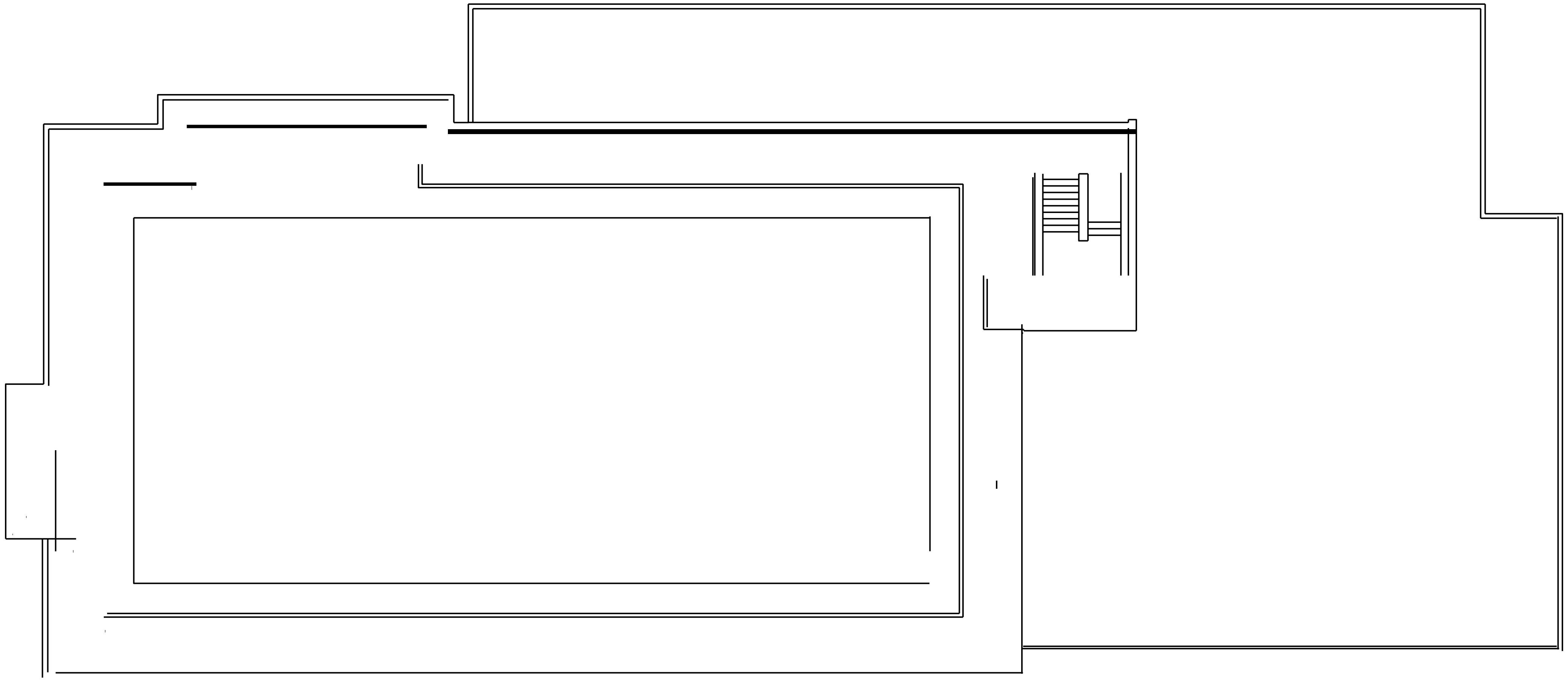
Date. July"21

Seale. 1,250

Dwg Size. Al

Drawn By. JB

Cheeked By. NS



Drawing Status. RECORD

Drawing Number. 21003-S-201

Rev. R