STRUCTURAL APPRAISAL

Bramcote Leisure Centre

FOR: **Broxtowe Borough Council**

DATE: **22nd December 2023**

REF: **HSP2023-C4554-C&S-SR-2029**

Survey by	[redacted]
Survey date	21st November and 1st December 2023
Author	Matt Stratford
Approved	Howard Pratt
Revision	-
Status	FOR INFORMATION

CONTENTS

1.0 Brief

1.0.1 HSP Consulting Engineers Ltd were instructed by Broxtowe Borough Council to undertake a Structural Appraisal of Bramcote Leisure Centre. The weather during the survey was dry and sunny.

1.0.2 The survey has been undertaken to determine the general form of construction of the various buildings on the site, together with their overall structural condition including potential signs and causes of any structural movement and whether these are recent or historic.

1.0.3 The survey consists of a visual only external / internal site inspection of the buildings with some light intrusive investigations where necessary such as removing suspended ceilings tiles to inspect the floor/roof construction and structural condition.

1.0.4 Where possible discussions were undertaken during the survey with members of the maintenance staff in relation to approximate dates of the original buildings and any extensions or alterations and also to gain information with regards to their knowledge of any obvious damage to the structures through movement or water damage, etc. also any subjective evidence of repairs etc.

1.0.5 Photographic evidence has been taken as a record of the various external elevations, structural elements, and any obvious areas of past repaired or recent damage which may require repair and to aid the descriptions contained in the report.

1.0.6 The survey was undertaken with reference to any Asbestos Survey reports. Intrusive investigations (i.e. within the ceiling voids, etc.) were only be carried out where the reports deemed it is safe to do so.

1.0.7 Recommendations are provided, where necessary, on the form of any remedial works required in order to stabilise the structure.

1.0.8 This is a Stage 1 non-intrusive survey undertaken in order to raise any areas of concern i.e. those areas exhibiting significant structural movement or those requiring further intrusive investigation as part of a Stage 2 survey and also to identify the form of the existing construction in order to determine the scope of any building repairs that may be necessary as part of any refurbishment.

2.0 Limitations of Report

2.0.1 Whilst every effort has been taken to appraise the building fully, we have not been able to inspect those areas, which are covered, unexposed or inaccessible and cannot therefore confirm that any such areas are free from defects.

2.0.2 We have assumed that no materials deleterious towards concrete have been employed in the construction of the building.

2.0.3 We have not inspected the property for timber infestation, or fungal attack and cannot therefore confirm that the building is free from such defects.

2.0.4 Where the report is based on information made available to HSP during the structural appraisal, HSP accepts no liability if the information used is found to be inaccurate or incomplete or if additional information exists or becomes available at a later date.

2.0.5 HSP disclaim any duty to automatically update the report for events taking place after the date on which the final report is delivered.

2.0.6 This report has been prepared solely for the use of Broxtowe Borough Council cannot be assigned to any other party without the express permission of HSP Consulting Engineers Ltd.

2.0.7 All parties to this report do not intend any of the terms of the Contracts (Rights of Third Party) Act 1999 to apply to this report.

2.0.8 Only those sections of the building noted in section 1.01 were inspected during our visit and as such the only these buildings are commented upon in this report.

3.0 Observations

3.0.1 The descriptions are intended only as a guide as to the overall nature and extent to the existing construction. They are not intended to and do not extend the scope or brief of the appraisal beyond that as outlined in Sections 1 or 2. In areas free from asbestos, ceiling tiles were lifted to enable a visual inspection of the underside of the structure above. If we were in doubt as to the presence of any asbestos, the ceiling tiles were left undisturbed.

3.0.2 Bramcote Leisure Centre was built during the 1960's, initially containing a 33m long main swimming pool and a smaller teaching pool, with associated changing facilities. During the 1970s (estimated) the building was extended to the south of the main entrance with the addition of squash courts and more changing facilities. These were later converted with the addition of a new first floor in the squash courts, a gym area at ground floor, and large rooms for leisure activities on the first floor. In 1980 (estimated) the building was extended again with the addition of 2No further squash courts to the southeast corner of the building and joined to the end of the 1970's part of the leisure centre. In more recent years these 1980 squash courts were also converted into further gym space and fitness studios. The main entrance has also been subject to a small infill extension at some point in the history of the building.

The leisure centre is accessed off the A52 Brian Clough Way and has been built on a sloping site. The main car park is to the rear of the building.

Figure 1: Aerial view of Bramcote Leisure Centre.

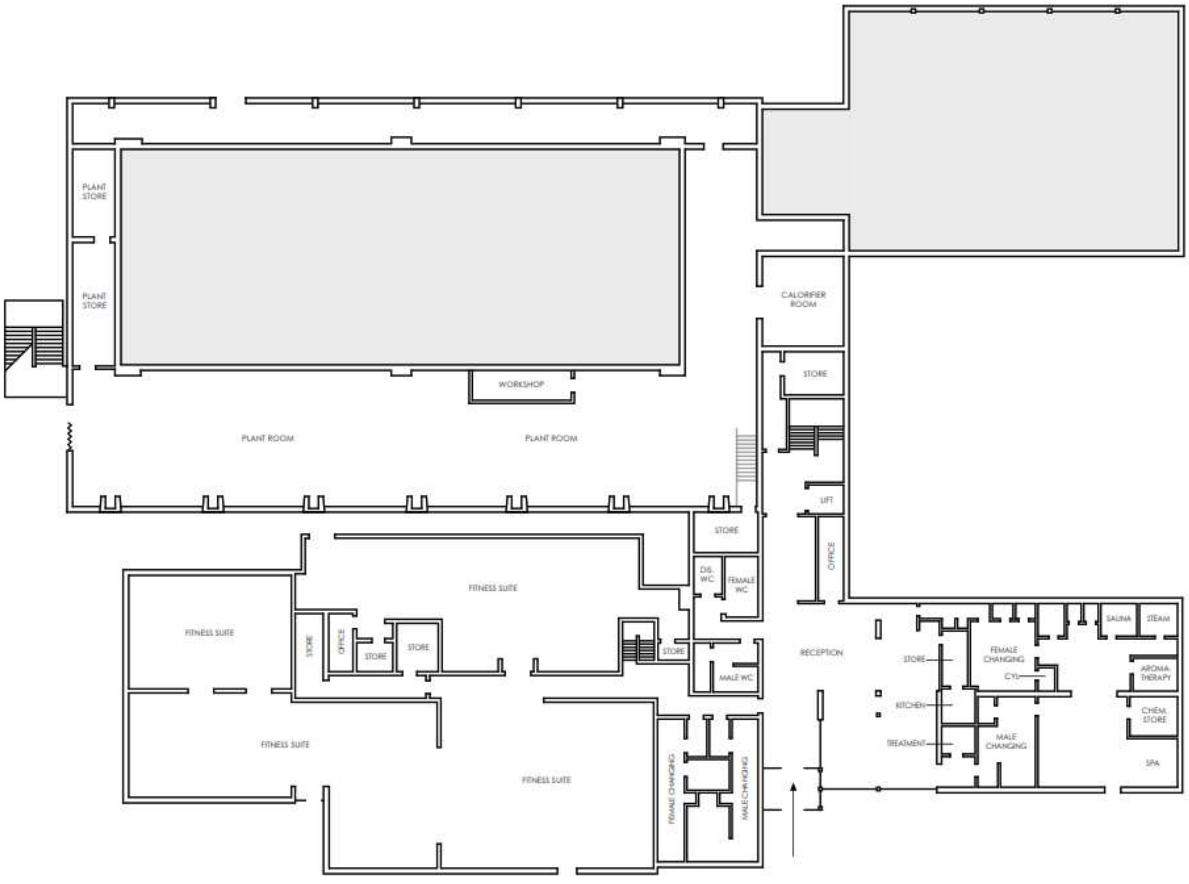


Figure 2: Ground Floor Plan

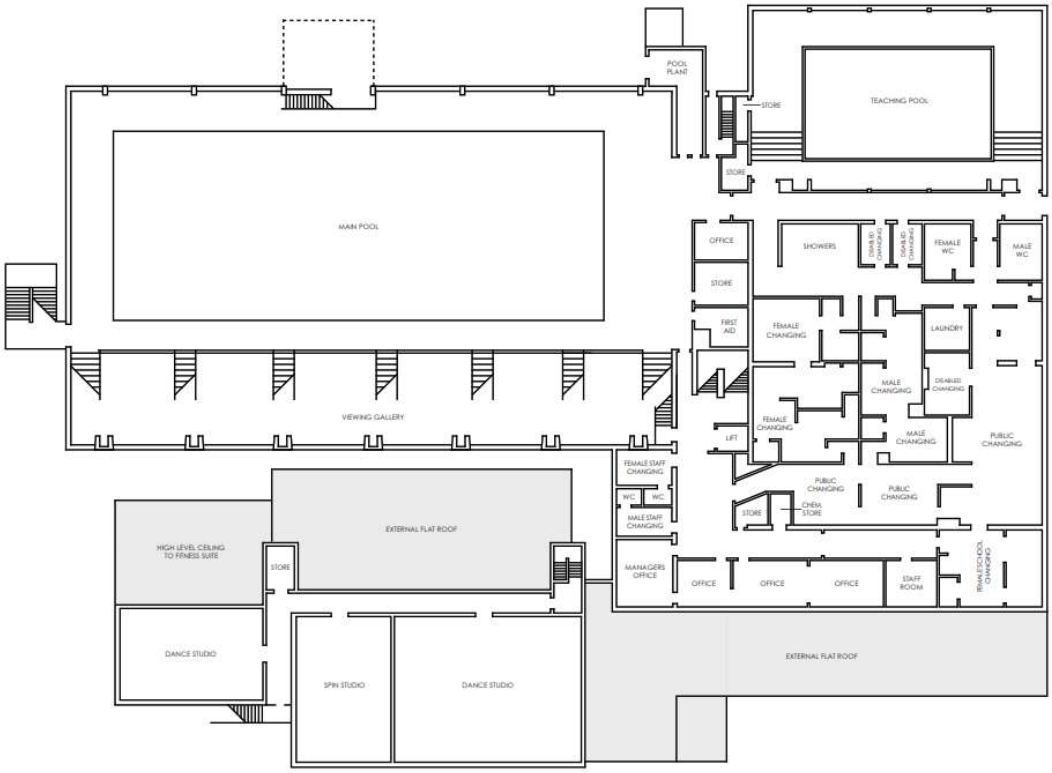


Figure 3: First Floor Plan

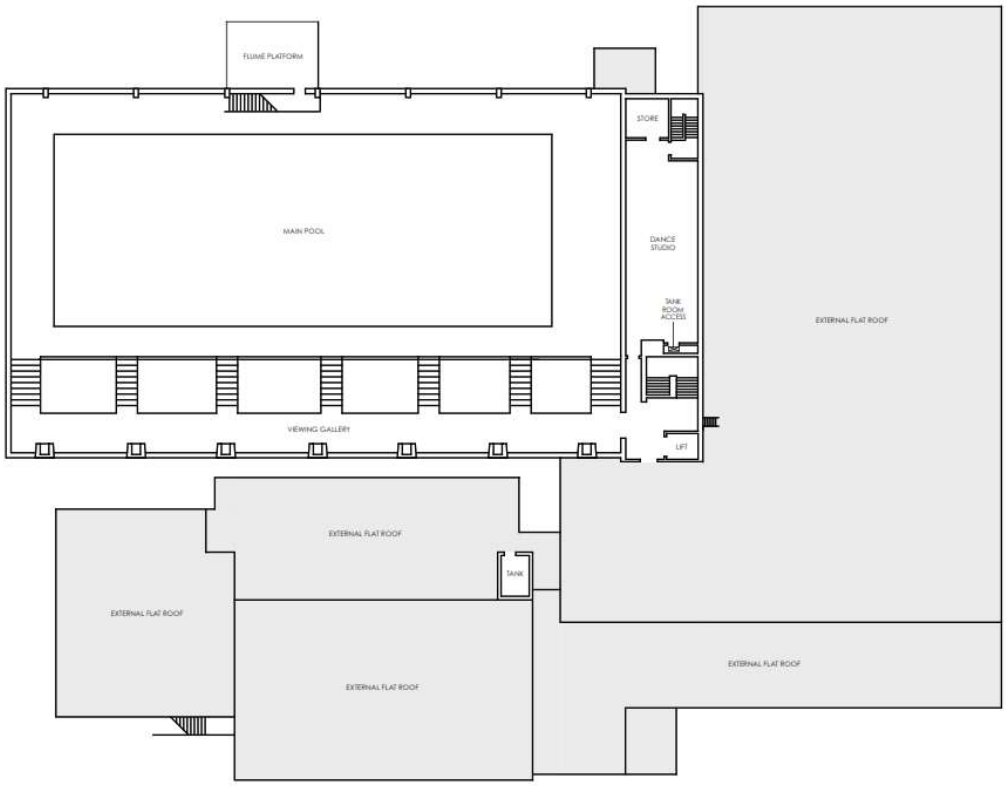


Figure 4: Second Floor Plan

3.0.3 **Building Reference:** Original Building

Approximate Year of Construction: 1960s

Form of Construction: The original swimming baths were built as a reinforced concrete frame with flat slabs supported on a grillage of columns. The building varies in height from single storey to three storeys. Over the swimming pools, which clearly need to be column free, there are long spanning beams supporting the roofs. Over the 33mm pool there is multi-pitched saw-tooth roof with the large beams or trusses hidden behind a sprayed applied coating precluding a visual inspection. Our expectation is this roof structure is a steel frame. Over the small teaching pool the soffit of the ceiling is flat and appears to be a concrete slab, again finished with a sprayed coating. Projecting above the roof externally over the teaching pool are covered roof beams equally spaced that are likely to be either concrete or steelwork. Elsewhere the roofs are predominantly flat and finished in bituminous felt, punctuated by roof lights.

The swimming pool tanks are reinforced concrete. Access is possible to the full perimeter of the 33m long pool tank.

The internal walls are typically solid masonry, but with some areas of non-loadbearing timber stud partitions.

The buildings are clad in a mixture of precast concrete cladding panels, brickwork and original curtain wall glazing with timber framework.

The foundation system is unknown. The ground floor is a ground bearing concrete slab or possibly part of a concrete raft.

General Condition: There is no evidence of any settlement or failure of the foundation system. The superstructure is free from any lateral instability problems or other significant signs of movement, overstressing of members, or overloading of the structure. The masonry elevations are in reasonable condition. There are numerous age-related defects with the fabric of the building that is leading to structural problems.

Structural Defects: The flat roof finishes are in very poor condition and are leaking. They have inadequate drainage falls and failing bituminous felt roof finishes. The water is penetrating deep into the structural fabric of the budling which is causing unseen damage behind solid finishes. The defected roofs require urgent replacement.

The 33m swimming pool tank has numerous hairline cracks present. These appear to be longstanding and not new or progressive. These should be inspected on an annual basis to check they do not get worse. No further immediate action is deemed necessary from a structural perspective.

The concrete columns on the north elevation of the building have experienced significant corrosion near the base due to ingress of moisture and the damp environment. These columns have been repaired in recent years with a high strength mortar. However, this mortar is already starting to fail in places. We would recommend that the Specialist sub-contractor that undertook the repairs is re-engaged to ascertain

their professional opinion. As a minimum the columns where the repairs are coming loose will need to be remediated. The cause of the moisture ingress should also be investigated further and rectified.

There are numerous leaks and signs of corrosion to the underside of the suspended reinforced concrete ground floor slab around the main swimming pool. These leaks need to be properly repaired to prevent further costly structural damage. Where the reinforcement has caused the concrete to spall and fall away, these areas require a high strength mortar repair by a Specialist sub-contractor.

Similar deterioration is happening to the concrete roof of the smaller Teaching Pool. Ingress of water from the failing flat roof finishes is penetrating the concrete slab causing the steel reinforcing bars to corrode and locally spall the concrete, which is a risk to the general public using the pool. The sprayed coating appears to be holding some the failed concrete from falling away. The roof finishes require renewal and any signs of spalled concrete needs to be broken out and repaired.

Much of the original external timber framed curtain wall glazing is in poor condition and requires extensive repair or replacement.

Expected Design Life: In theory it would be possible to achieve a 10+ year design life on the original building. This will require full replacement of the flat roof finishes. It will also require repair of the failing concrete identified above and a full programme of ongoing structural maintenance/inspections to keep on top of the defects.

Photo 1: Northeast elevation. Main entrance. Brickwork in reasonable condition.

Photo 2: Northwest elevation. Brickwork in reasonable condition.

Photo 3: Southwest elevation, Teaching Pool. The timber framed windows are rotten and require replacement.

Photo 4: Close-up photo on the rotten frames.

Photo 5: Southwest elevation, Main Pool. The timber framed windows are rotten and require repair or replacement. The two storey frame to the right of the photo is the access to the water slide that is no longer in use.

Photo 6: Close-up photo on the rotten frames.

Photo 7: Redundant water slide. Supporting steelwork is in reasonable structural condition.

Photo 8: South corner. Stained brickwork, but the cause could not be determined. The swimming pool tank basement area is behind this wall.

Photo 9: South elevation. Concrete escape stairs from Main Pool.

Photo 10: Southeast elevation of Main Pool at basement level.

Photo 11: Internal view of Main Pool.

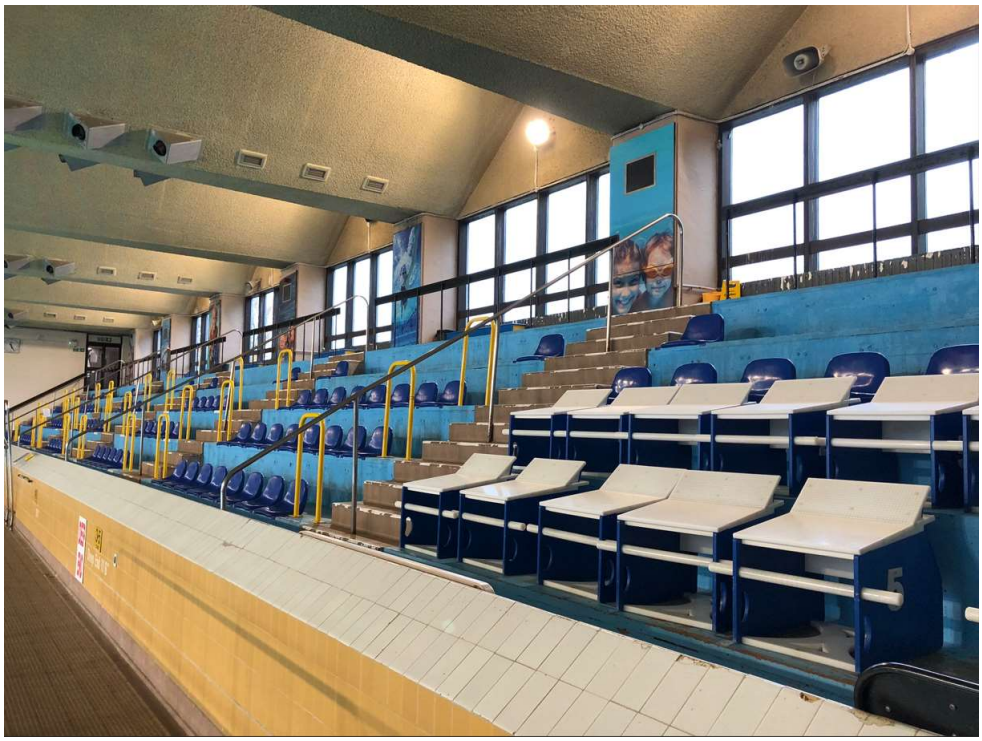


Photo 12: Spectator seating and multi-pitched roof structure above hidden behind boarding with a sprayed coating. Survey access not possible.

Photo 13: Walkway around the end of the Main Pool. Staining present where corrosion is occurring as the floor is no longer watertight due to equipment having been bolted to the floor. Corrosion mirrored to underside of this floor in the pool basement.

Photo 14: Columns and timber frame curtain walling on southwest elevation. These are the (repaired) columns that have corroded in the pool basement below.

Photo 15: Internal view of Teaching Pool.

Photo 16: Repairs to the Teaching Pool tiled surround were being completed at the time of our inspection.

Photo 17: Spalled concrete to the soffit of the Teaching Pool roof. The reinforcement has been coated post-defect to protect it from further corrosion.

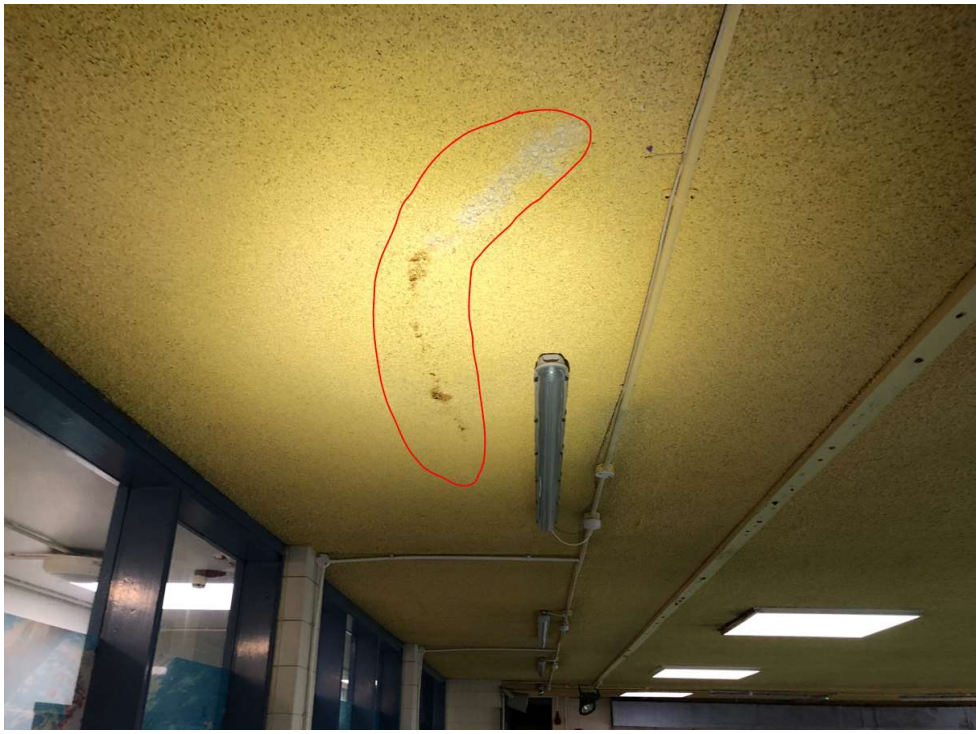


Photo 18: Further signs of reinforcement corrosion to the soffit of the Teaching Pool, staining the sprayed coating (circled in red on the photo).

Photo 19: Roof leak causing damage at the top of an internal Teaching Pool column.

Photo 20: Staining to corridor ceiling due to a leak adjacent to roof light.

Photo 21: Extensive water damage due to the leaking flat roof over the changing rooms.

Photo 22: Typical concrete column on the southwest elevation. This column has been previously repaired but is still visibly damp. A drainage pipe, probably a roof RWP, is cast into the column. If this pipe is leaking, which appears to be the case, water will be penetrating deep into the column causing corrosion of the reinforcement.

Photo 23: Pool basement column repaired with high strength mortar, but the repair has partially failed.

Photo 24: The repair mortar could easily be removed by hand.

Photo 25: Corroding, expanding, steel reinforcement within the column causing the repair to fail.

Photo 26: Underside of floor shown in photo 13. Pool water is penetrating the concrete floor causing corrosion of the reinforcement and staining of the soffit.

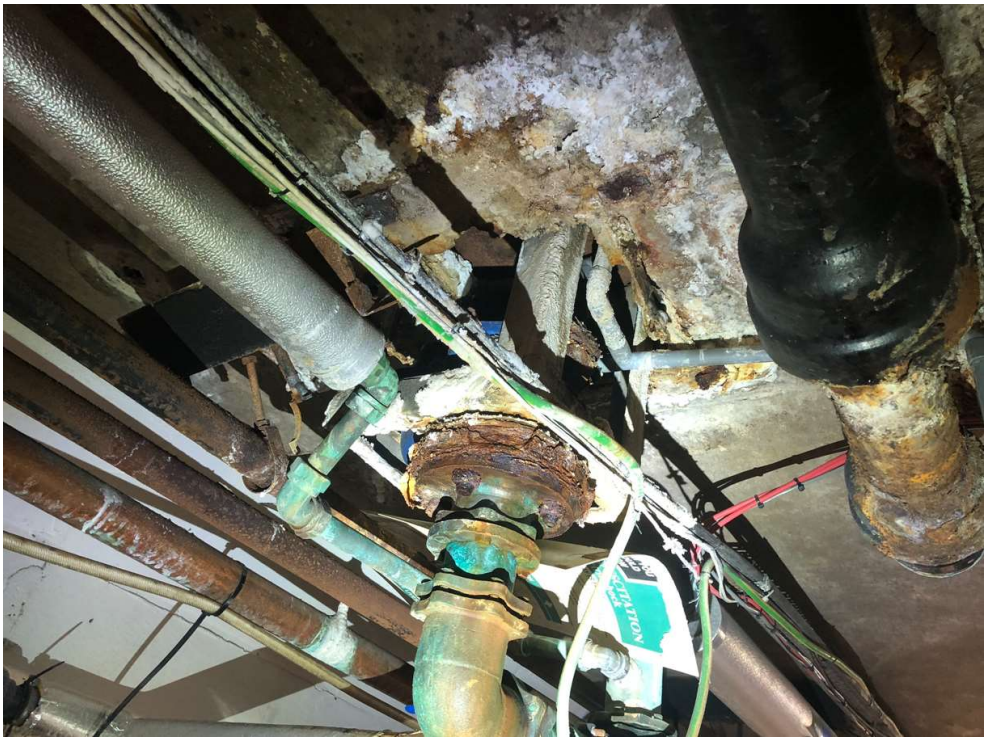


Photo 27: Corroding pipework adjacent to the main swimming pool tank.

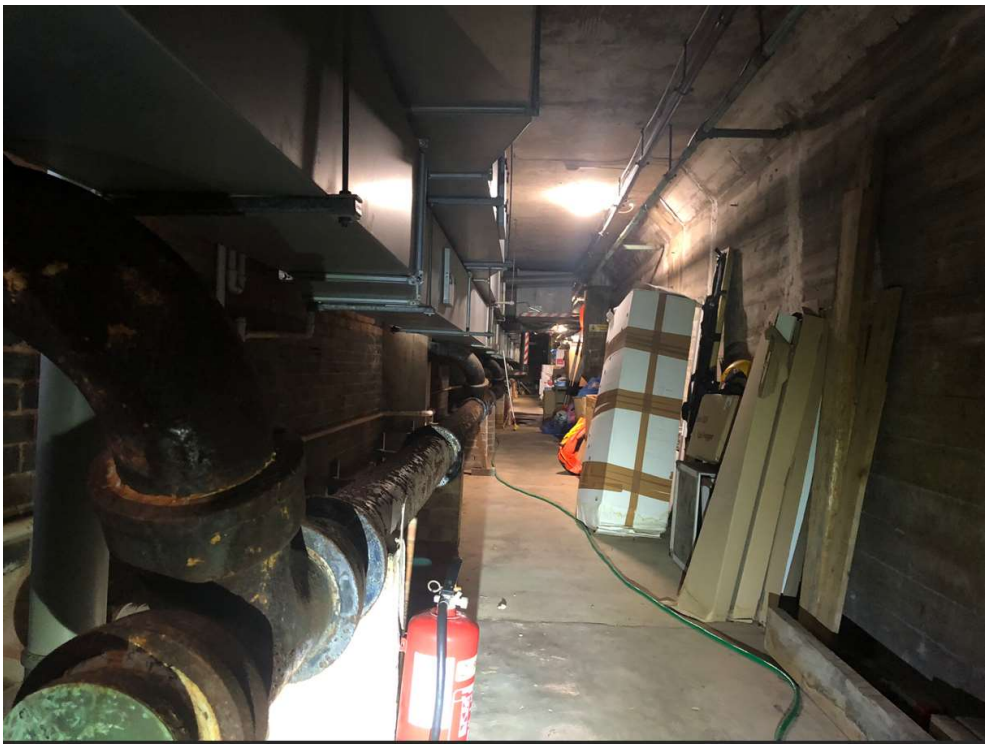


Photo 28: Southwest (repaired) columns on the left with a drainage pipe cast into each one. Reinforced concrete swimming pool tank is on the right of the photo.

Photo 29: Another example of saturated concrete column on the southwest elevation of the Main Pool building.

Photo 30: An interesting way of catching the leaks.

Photo 31: Main Swimming Pool tank. Vertical cracks are present in the walls. These are not considered structurally significant but should by surveyed annually to check their severity does not change.

Photo 32: Example of corrosion to underside of floor slab around the swimming pool.

Photo 33: Underside of spectator seating formed in reinforced concrete.

Photo 34: Hairline cracks are visible in the top and to the underside of the concrete tiered seating at mid-span. This is typical to every bay between supporting columns but is not considered structurally significant.

Photo 35: Underside of concrete roof slab, first floor corridor outside the changing rooms. Staining indicates corroding reinforcement due to leaking flat roof finishes above.

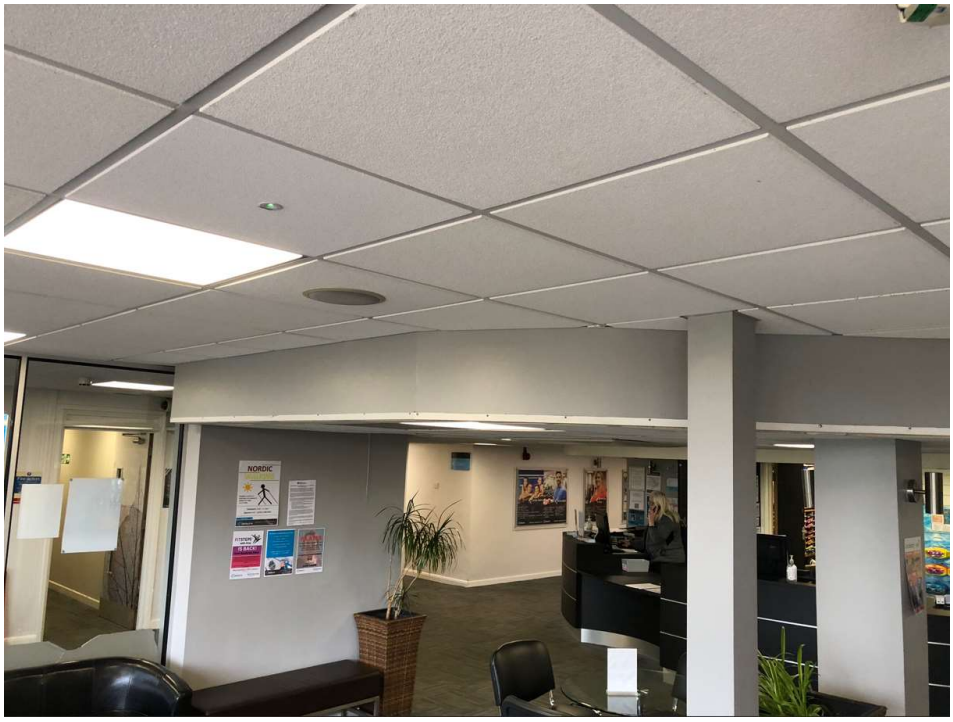


Photo 36: Main reception. The lower area is part of the original building and is a concrete frame. In the foreground, where the ceiling is higher, it is a steel frame extension with a timber joisted flat roof.

Photo 37: Main reception extension. Timber joists supported on a small steel frame.

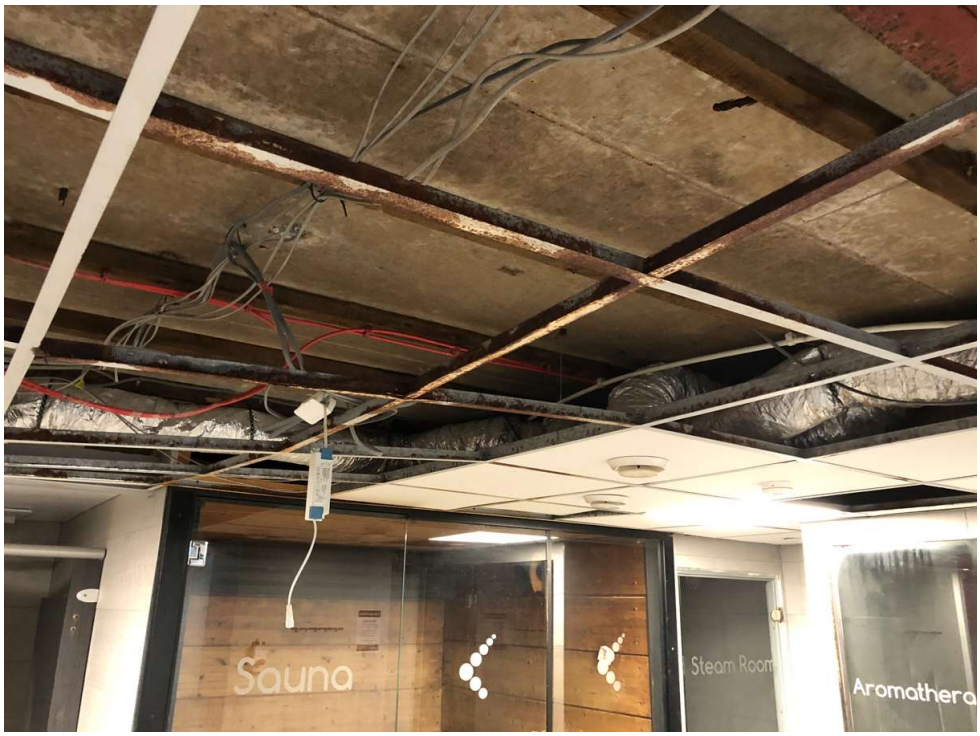


Photo 38: Assumed roof leak in the Spa has caused the suspended ceiling to fail. The roof to the Spa is a concrete flat slab with some supporting steel beams.

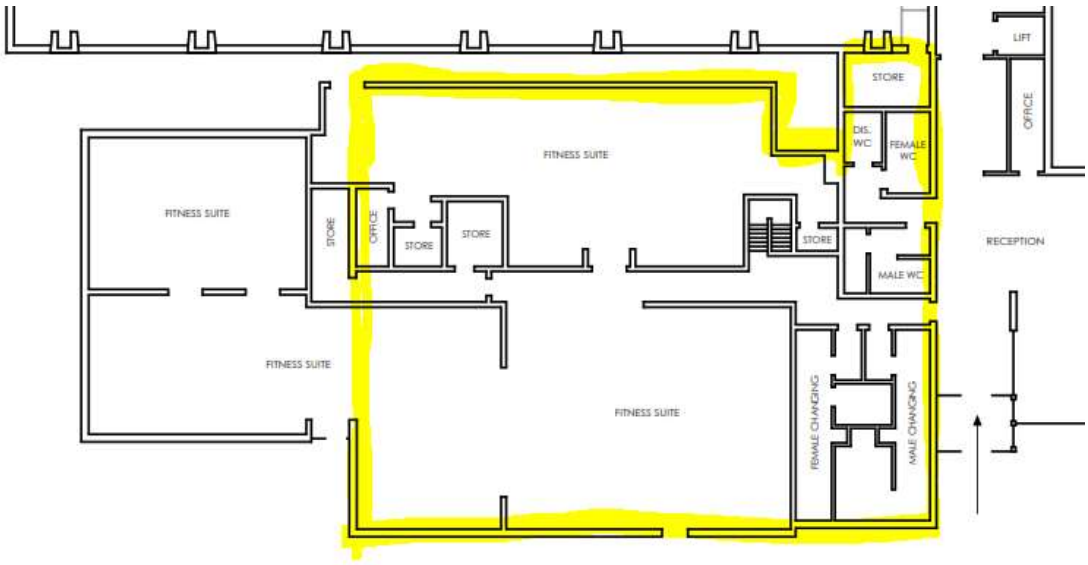
Photo 39: Flat roof over main entrance and Spa area. Heavily vegetated. The felt is in poor condition.

Photo 40: Roof over Teaching Pool. Beams project above.

Photo 41: Failing roof felt and drainage.

Photo 42: Roof over Main Pool. Structure projecting above. Felt looks in reasonable condition to this part of the building.

3.0.4 **Building Reference:** Fitness Suite



Approximate Year of Construction: 1970s

Form of Construction: The highlighted area above was an addition to the original 1960s swimming baths, estimated to have been built in the 1970s. Originally it was built as 3No (double storey) squash courts and a single storey gym area adjacent to the main pool building. The single storey element may have been built later still as the form of construction is slightly different. In more recent years (date unknown) the squash courts were repurposed into a Fitness Suite with a first floor added to provide large activity rooms above.

The external walls are loadbearing masonry and the roofs above the former squash courts are woodwool slabs supported on long-spanning engineered timber joists. Over the single storey gym area the roof is also woodwool slabs but they are supported on lattice steel trusses. The roofs are flat and finished in bituminous felt.

The first floor addition in the former squash courts has been built with a grillage of steel beams supporting timber infill joists.

General Condition: The Fitness suite is generally in reasonable structural condition. There is no evidence of any settlement or failure of the foundation system. The superstructure is free from any obvious lateral instability problems or other signs of movement, overstressing of members, or overloading of the structure. No cracking is present to the walls. The flat roofs are known to have leaked historically which may have saturated the woodwool slabs casing them to become weak.

Structural Defects: Numerous structural alterations have occurred throughout the lifespan of this building. Loadbearing walls have been removed, a floor added, and an extension built. This does make the building more vulnerable to structural problems, but there was no visual evidence of any significant defects during the visual survey.

We recommend the leaking flat roofs are repaired (or renewed) as a priority. The woodwool slabs that support the roof finishes become substantially weaker if continually saturated with water and there is a risk of local failure of the woodwool slabs if not remediated.

Expected Design Life: Subject to completion of the remedial repairs noted above the Fitness Suite is considered to have a 10+ years design life in conjunction with a programme of ‘normal’ ongoing maintenance.

Photo 41: Northeast elevation of fitness suite. Brickwork cavity wall is in reasonable condition.

Photo 42: Main entrance, fitness suite 1970s building in background.

Photo 43: Flat roof over the single storey gym area. The vegetated roof to the left of the photo is above the former squash courts.

Photo 44: Internal view within the converted squash courts. The steel beam is supporting the remainder of the loadbearing masonry wall above. The floor is timber joisted.

Photo 44: Underside of first floor structure.

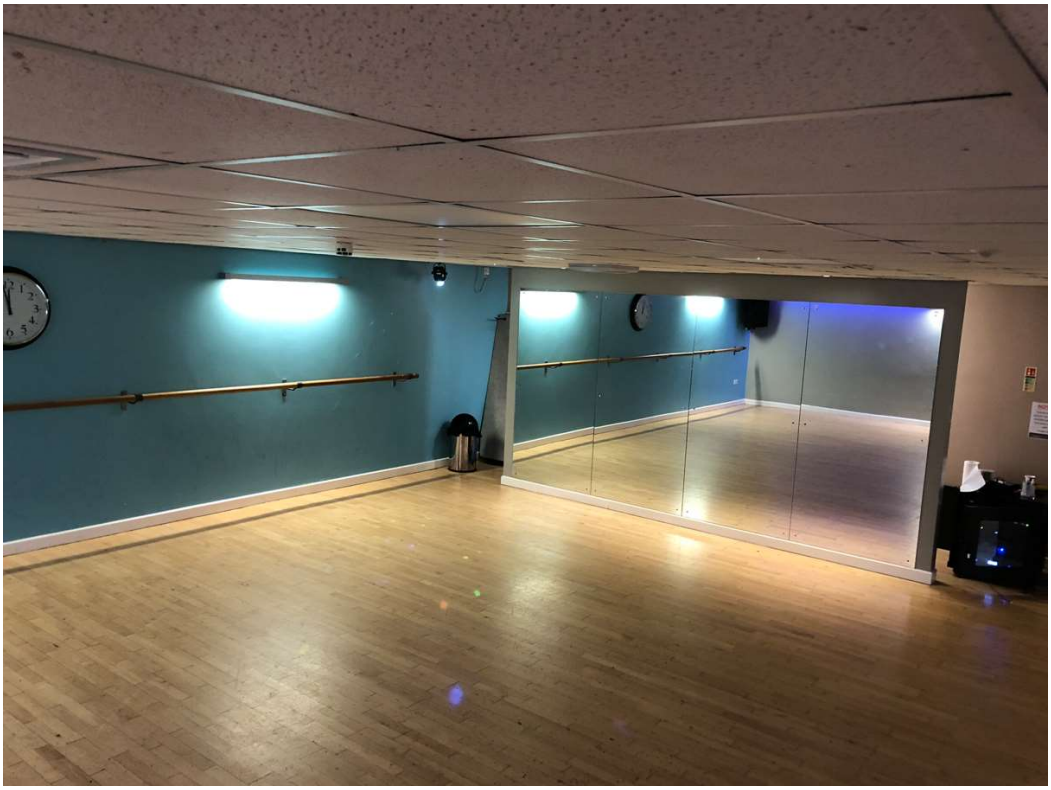
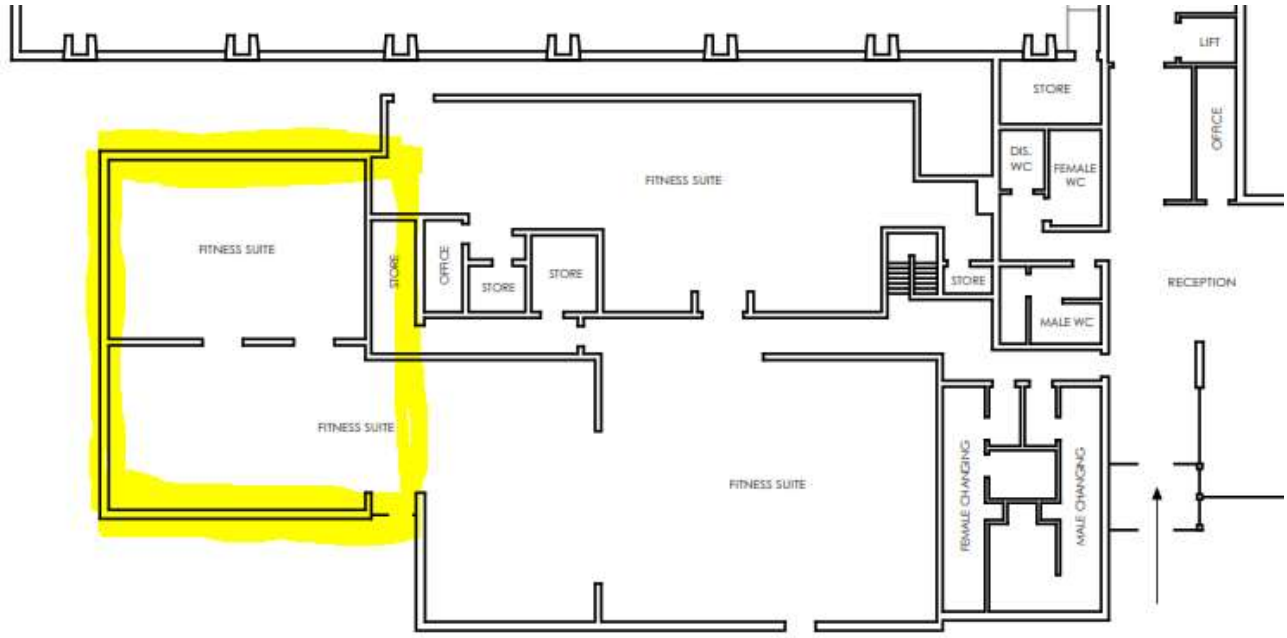


Photo 45: Dance studio above fitness suite.

Photo 46: Woodwool roof slabs, painted white, bearing onto long-spanning engineered timber joists. This is above the former squash courts.

Photo 47: Woodwool roof slabs, bearing onto long-spanning steel lattice trusses. This is above the single storey fitness suite.

3.0.5 **Building Reference:** RAAC Building



Approximate Year of Construction: 1970/80s

Form of Construction: Two additional squash courts were added to the front (south) end of the building in around 1980 and are the 'newest' part of the leisure centre. This building has been constructed using Reinforced Aerated Autoclaved Concrete (RAAC) for the external walls, the internal wall between the two squash courts, and the roof panels. The external walls are cavity construction comprising the RAAC concrete panels on the internal skin, a cavity, and a brick outer skin. The RAAC roof panels are supported on a grillage of steel beams and therefore only span approximately 3m from beam to beam. RAAC roof panels can typically span up to 6m.

RAAC is a reinforced form of lightweight concrete used to form panels or planks. It has no aggregate unlike common concrete. RAAC has proven to be not as durable as

other concrete building materials. It has a variable service life which is influenced by many factors and an arbitrary time, such as the widely and incorrectly reported '30 years' life span, should not be the deciding factor when decision making as it can last longer if the building is well maintained and the original design factors haven't changed, (such as calculated load weights). There is a risk it can fail, particularly if it has been damaged by water ingress from leaking roofs which causes corrosion of the reinforcement, excessive thermal degradation, or if it was not formed correctly when originally made. Poor original installation, cutting the reinforcement bars on-site, can dramatically reduce the end bearing capacity of the planks. It can fail suddenly, hence the recent action by the UK Government.

The RAAC building has been converted, in relatively recent years, from squash courts into an extended fitness suite with a first floor added in one of the courts to provide a dance studio, with access from the first floor corridor of the 1970s building. The RAAC roof panels are obscured from view in the dance studio due to the presence of solid ceiling finishes. The floor construction of the dance studio is also unknown, again due to solid finishes. The underside of the RAAC roof panels are fully visible in the double height fitness suite. A measured survey using a laser instrument has been completed from ground floor slab level in an attempt to ascertain the approximate deflection of the panels. High levels of deflection can indicate panels close to their design capacity.

General Condition: There is no evidence of any settlement or failure of the foundation system. The superstructure is free from any lateral instability problems or other signs of movement, overstressing of members, or overloading of the structure. No cracking

is present to the external brickwork, or the internal RAAC wall panels or roof panels as viewed from the ground floor. The roof has been laid to a fall, there was no standing water and the felt finishes looked in reasonable condition. There was no evidence of water ingress internally such as staining on the roof panels or walls.

Structural Defects: The outcome of the measure soffit survey indicated the majority of panels are not deflecting to any great extent. The exception to this is the 3.2m span panels as shown in figure 5. Some of these panels are deflecting around 30mm which is a ratio of approximately span/100 and therefore guidance suggests they may be working hard. It should be noted that the accuracy of the survey was fairly crude and the findings are only a guide. It is recommended a more accurate laser scan 3D survey is commissioned in due course.

Overall the panels looked in good condition with no signs of damp ingress or cracking (albeit they have been painted white which can disguise cracks).

There is one area that requires remedial works as a matter of urgency. Over the first floor corridor, circled in blue in Figure 4 below, there is a hole in the brickwork wall that previously supported the ends of the RAAC panels (photo 53). The rectangular hole has been formed for electrical services to pass through the wall, but without any support installed above. This hole should now be infilled with brickwork tight to the underside of the RACC planks to reduce the width of the hole and a precast concrete lintel installed (140 wide x 65 deep) to fully reinstate the bearing of the panels. Note – there are some suspicious looking packers in the wall under the RAAC panels that

may be asbestos. Until the remedial works can be arranged, we recommend propping the RAAC panel with 2No Acrow props as a short-term safety measure.

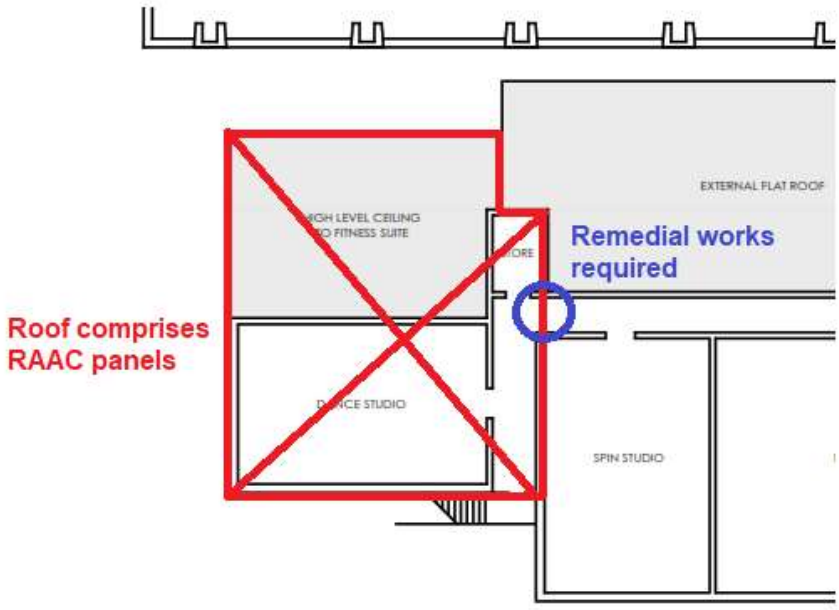
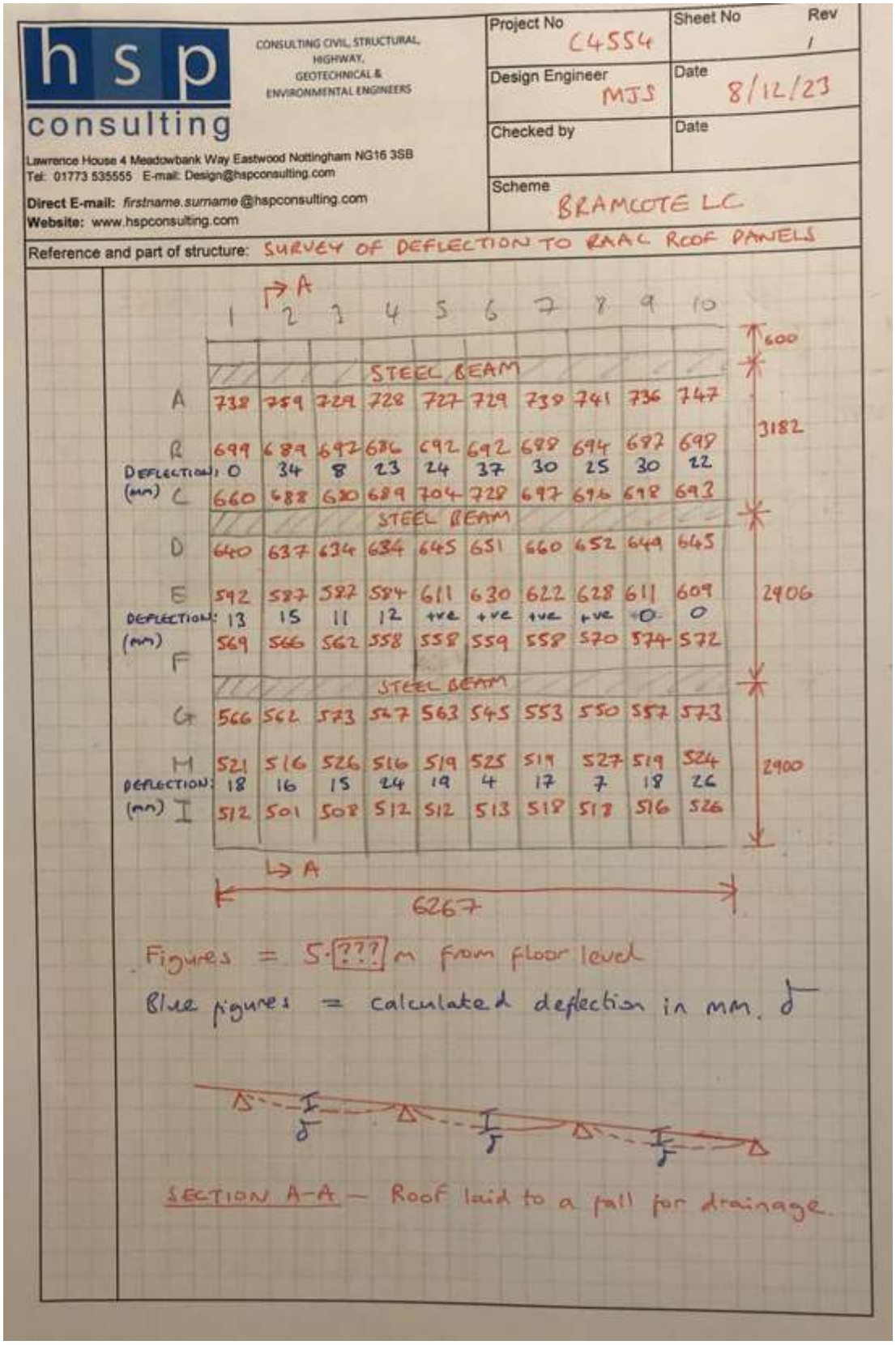


Figure 4: Area requiring urgent remedial works.

In addition to this urgent repair the roof felt should also be thoroughly inspected for defects to ensure it is 100% waterproof. All gutters and downpipes should be checked and cleared. RAAC must be kept dry. RAAC panels are most vulnerable to failure at their bearings. A minimum 75mm bearing must be maintained to reduce the risk of shear failure. At the corridor wall only 40mm bearing was measured.

Expected Design Life: RAAC buildings should not be considered a long-term option and should be assessed on an annual basis. Please refer to the conclusions and recommendations section of this report.



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Project No: C4554 | Sheet No: | Rev: 1
Design Engineer: MJS | Date: 8/12/23
Checked by: | Date:
Scheme: BRAMCOTE LC

Reference and part of structure: SURVEY OF DEFLECTION TO RAAC ROOF PANELS

	1	2	3	4	5	6	7	8	9	10	
				STEEL BEAM							600
A	738	759	729	728	727	729	739	741	736	747	
B	699	689	697	686	692	692	688	694	697	699	3182
DEFLECTION (mm)	0	34	8	23	24	37	30	25	30	22	
C	660	688	680	689	704	728	697	696	698	693	
				STEEL BEAM							
D	640	637	634	634	645	651	660	652	649	645	
E	592	587	582	584	611	630	622	628	611	609	2906
DEFLECTION (mm)	13	15	11	12	+ve	+ve	+ve	+ve	0	0	
F	569	566	562	558	558	559	558	570	574	572	
				STEEL BEAM							
G	566	562	573	547	563	545	553	550	557	573	
H	521	516	526	516	519	525	519	527	519	524	2900
DEFLECTION (mm)	18	16	15	24	19	4	17	7	18	26	
I	512	501	508	512	512	513	518	518	516	526	

A → A: 6267

Figures = 5.??? m from floor level

Blue figures = calculated deflection in mm.

SECTION A-A – Roof laid to a fall for drainage.

Figure 5: Survey of deflection to RAAC roof panels.

Photo 48: South (end) elevation of RAAC building. Brickwork is in good condition. The roof drains to this end and the RWPs are in recesses within the brickwork. Behind the RWPs are RAAC wall panels painted black. The roof has a small parapet.

Photo 49: Side elevation of RAAC building. Brickwork is in good condition.

Photo 50: Roof of RAAC building. Laid to a fall towards the far end. The felt appears to be in reasonable condition. The grey vertical wall panels are RAAC.

Photo 51: View on RAAC roof panels above fitness suite. The panels span up to 3.1m onto intermediate 254mm steel Universal Beams and onto the RAAC walls at the ends.

Photo 52: RAAC roof panels bearing onto RAAC wall panels. Photo taken within storeroom at first floor.

Photo 53: Lack of support to RAAC roof panel above corridor caused when service penetrations were made through the brickwork wall at high level. Urgent remedial is work required to reinstate adequate support and prevent failure of the panel.

Photo 54: View in storeroom. Vertical RAAC wall panels built in circa 1980 abut the earlier brickwork wall of the 1970s building. The area circled in red is where the RAAC panel has insufficient bearing (photo 53).

Photo 55: Internal view of dance studio at first floor. There are RAAC panels above the solid plastered ceiling. Condition of RAAC unknown.

Photo 55: Since our original survey the RAAC panel has been temporarily propped as a short term ‘make safe’ precaution.

4.0 Conclusions & Recommendations

4.0.1 Bramcote Leisure is currently structurally stable, but much of the building fabric is considered life expired and extensive remedial works are required. The key points are noted below and the urgency is presented in a traffic light format: Red = High priority and works are required within 6 months; Orange = Medium priority and works are required within 12 months; Green = Low priority and works are required within 24 months.

4.0.2 Many of the flat roofs are in very poor condition and significant water ingress is penetrating into the building structure causing damage, often unseen until failure occurs. The roofs require renewal, or at least substantial repair, as a matter of urgency. **Timescales:** High priority. Repair works as a minimum are required within the next 6 months to address all the leaks and most significant defects. As part of this works all vegetation is to be removed off the roofs and gutters and gullies cleared. Rooflights to be made watertight. Full renewal works can wait for 24+ months providing ongoing emergency repairs are undertaken as soon as new leaks appear.

4.0.3 The concrete roof to the Teaching pool has areas of spalling concrete due to corroding steel reinforcement caused by leaking roofs. All areas of staining on the sprayed ceiling coating that could indicate corroding reinforcement and potentially spalled concrete should be investigated and repaired. The risk of falling concrete on the general public must be eliminated.

Timescales: High priority. Investigation and repair works are required as soon as possible.

4.0.4 The leaking pipework around the main swimming pool tank should be repaired. The ingress of water is damaging the concrete structure.

Timescales: Medium priority. Leaks to be stemmed and addressed as far as practicable. This is considered an ongoing process as part of the Leisure Centre's programme of maintenance.

4.0.5 The previously repaired concrete columns on the southwest elevation, in the basement pool area, require further investigation. We'd recommend engaging with the original Specialist that repaired these columns. Some of the mortar repairs have come loose and are ineffectual. The columns are still wet and therefore corrosion of the reinforcement will be happening deep inside the columns. The cause of the leaks damaging these columns must be rectified.

Timescales: Medium priority. As a minimum we recommend that repair works are undertaken to the 1No defected column where the concrete has spalled within the next 12 months.

4.0.6 Much of the timber framed original curtain wall glazing is rotten and requires repair or replacement before glass starts to become loose in the frames.

Timescales: Medium priority. Intrusive investigation and repair works to rotten frames are required within 12 months and all glazing to be 'made safe'. Full replacement can probably wait for 24+ months providing the repairs are suitably robust.

The RAAC Building:

4.0.7 Support to the RAAC panels needs to be reinstated where a crude service hole has been cut in the brickwork beneath. A new concrete lintel is required to a structural engineering design and specification.

Timescales: High priority. Repair works are required within the next 6 months. Temporary props to remain in place until works are completed.

4.0.8 The solid ceiling to the first floor dance studio should be removed so full visual access is possible to survey and monitor the condition of the currently hidden RAAC roof panels.

Timescales: High priority. Ceiling to be removed as soon as possible to allow RAAC roof panels to be visible and inspected for defects on a regular basis. Alternatively, the solid ceiling could be left and the room taken out of use for the general public.

4.0.9 Once the ceiling is removed an accurate 3D laser scan survey should be carried out to the entire roof soffit to ascertain the deflections of the panels.

Timescales: High priority. 3D laser scan survey required to RAAC panels above the gym and dance studio. To be undertaken as soon as ceiling is removed. Budget cost for the 3D laser scan survey = £2000+VAT.

4.1.0 In the double height fitness suite a scissor lift or a scaffold tower should be used to allow a closer inspection of the roof panels and connections between the steel roof beams and the RAAC wall panels.

Timescales: High priority. Investigation works are required as soon as possible. Budget cost for the inspection, equipment hire and report = £2800+VAT.

4.1.1 A full inspection of the roof felt over the RAAC building should be undertaken by a flat roof specialist to check it is watertight. RAAC must stay dry.

Timescales: High priority. Investigation works are required as soon as possible. A visual inspection of the roof finishes would suffice at this stage and, subject to the outcome, intrusive cores may be required. The cost for this inspection, and report, is included within the £2800 cost for 4.1.0.

Summary:

4.1.2 Other than the one 'urgent' area described in 4.0.7, at present there are no other signs of imminent structural failure, overloading of the roof, or any water ingress. The RAAC building, in our professional opinion, currently appears structurally stable. However, the remedial works and further investigation should be arranged at the earliest opportunity.

4.1.3 Following the remedial works, removal of the dance studio ceiling and completion of the extra surveys identified, a strategy document will need to be written to outline how this RAAC Building can be safely managed and maintained moving forward.

Timescales: To be produced on completion of the additional investigations and surveys. Budget cost for providing a strategy document = £750+VAT. Our budget cost for ongoing 6 monthly inspections and reporting would be £1000+VAT per visit, but the frequency will be determined in the strategy document.

5.0 Signatory

5.0.1 Signed for and on behalf of HSP Consulting Engineers Limited

Signed: 

M.Eng., M.I.Struct.E.

Date: 22nd December 2023