

Report of	Meeting	Date
Director (Commercial Services) (Introduced by Executive Member (Resources))	Executive Cabinet	Thursday, 14 July 2022

## Approval to go out to tender for remedial repairs to Brinscall Pool concrete floors

Is this report confidential?	No
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Is this decision key?	Yes
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<b>Savings or expenditure amounting to greater than £100,000</b>	Significant impact on 2 or more council wards
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### Purpose of the Report

1. To seek approval to procure urgent, essential, structural repair works through competitive tendering via open chest portal.
2. To seek approval to delegate authority for the Executive Member (Resources) to award the contract under an EMD.

### Recommendations to Executive Cabinet

3. Approval to utilise part of the approved Leisure Centre Improvements budget to enable essential structural repair works to be carried out to Brinscall Swimming Pool, work to include repairing structural floors and tank walls. This option would require the closure of the pool for approximately 6 months.
4. Approval to undertake a competitive tender for urgent refurbishment works to Brinscall Pool through the open Chest portal in accordance with procurement procedures.
5. To delegate authority to the Executive Member (Resource) to award the contract to undertake refurbishment works following completion of tender process.

### Reasons for recommendations

6. Due to the ongoing degradation of structural steel reinforcement and concrete to the main pool area floors, the integrity of the pool structure has now reached a point where extreme failure of the structure could occur.
7. Failure to repair the defective concrete floor will render the facility not safe for use in the very near future, requiring the closure of the pool.

8. Temporary propping has been carried out over the last 12 years to enable the building to remain open, however the temporary propping is no longer adequate to ensure the safe operation of the building. A longer-term solution is now urgently needed to ensure the ongoing usability of the pool.

### Other options considered and rejected

9. The introduction of permanent propping of floors has been considered, and detailed structural designs have been sought. Appendix D shows the extend of propping which would be required to secure the floors to enable the facility to remain open in the short to medium term. It was estimated that the propping proposed could extend the life of the pool for 2 – 3 years before remedial works would be unavoidable. The costs to undertake this work would be considerable therefore it is considered that these funds would be better spent on delivering the long term solution.
10. Carry out full structural repair works requiring the stripping out of the existing floors and recasting new structural member and floors. Works will require the complete refurbishment of changing room areas and tiling of the pool deck & tank. Significant additional cost would be incurred to undertake these works and would require closure of pool for 12 months. This could extend the pool structure life up to an additional 50 years.
11. The final option to consider would be the closure of the pool and the possible redevelopment of the existing site. This option was considered not to be appropriate at this time.

### Corporate priorities

12. The report relates to the following corporate priorities:

Involving residents in improving their local area and equality of access for all	A strong local economy
<b>Clean, safe and healthy communities</b>	<b>An ambitious council that does more to meet the needs of residents and the local area</b>

### Background to the report

13. Brinscall swimming pool structural concrete floors and pool supports have been degrading over a number of years, the structural concrete to the ground floors is spalling due to the corrosion the steel reinforcement. Over the last 12 years temporary propping has been introduced to reinforce the floors. This degrading is now approaching a critical stage which could result in localised failure of the floor and potentially have an impact on the pool tank. Remedial action is needed urgently to prevent any health and safety risks.
14. Due to the extent of degradation of the concrete reinforcement and spalling of the structural concrete the building is now reaching a position that major repair works or permanent closure will be required in the near future. Recent observations have noted that structural defects are becoming more apparent.

15. A recent follow up structural engineers' observation indicated that (see appendix A email from structural engineer) the structure is worsening and now needs additional short term and long term rectification works
16. Following the last structural engineers report, regular monitoring of the pool has been undertaken by a Property Service building surveyors. Some further additional cracking and spalling has been noted since the most recent engineers survey in March 2022 indicating the structural degradation of the concrete is worsening.
17. The engineers have recommended that more permanent structural propping should be employed in their report on 24/3/22, subsequent design and pricing of the required propping has been undertaken and full details can be seen in appendix D.
18. The additional temporary propping of floors in accordance with engineer's design is essential if no repair works are undertaken soon, this should allow the pool to remain open for an extended period to enable more detailed analysis of options for Brinscall Pool site to be examined. It is estimated that these propping works could extend the life of the pool for 2 – 3 years before remedial works would be unavoidable.
19. Previous structural engineer who were engaged in October 2021 to review the extent of the concrete degradation and outlines possible options for repairing the property. Appendix B shows the extract of the report's conclusions (a full pdf version of the report is available on request)
20. The report undertaken outlined that the possible repair options:
21. Undertake concrete repairs to the existing structure, works to include breaking out defective concrete, exposing reinforcement, treatment of reinforcement and replacement as required and reinstatement of structural concrete. Budget cost for undertaking repairs would be in the region of £600,000 and provide a 20 year warranty (Please see restoration report in appendix 3). This option would require the closure of the pool for approximately 6 months.
22. Carry out full structural repair works requiring the stripping out of the existing floors and recasting new structural member and floors. Works will require the complete refurbishment of changing room areas. Budget cost of repairs would be £1,200,000 and would require closure of pool for 12 months. This could extend the pool structure life up to an additional 50 years.
23. The final option to consider would be the closure of the pool and the possible redevelopment of the existing site.
24. CBC will need to consult with Chorley Leisure Ltd to clarify to them the extent of the works required and how this will impact on the pool usage and determine a strategy to minimise any potential losses to CLL's revenue and assess any reputational impact.

### **Climate change and air quality**

25. The work noted in this report does not impact the climate change and sustainability targets of the Councils Green Agenda and all environmental considerations are in place.

### **Equality and diversity**

26. Any requirements will be identified and undertaken if appropriate.

## **Risk**

27. If no short term measures are taken then the concrete pool structure could fail catastrophically with continued use. Whilst there is minor risk to users of the pool there is a more substantial risk to staff who are required to access plant beneath the pool on a regular basis. They already wear hard hats to enter this area for falling debris.
28. If the pool fails then the short term propping option to extend life is not available and then more extensive works would need to be undertaken due to the potential damage sustained by the failure.
29. If short term structural propping of the floors is undertaken this will not prevent further degradation of the pool structure but will prevent catastrophic collapse. Possible pool closure may still occur if the pool tank leaks get any worse.

## **Comments of the Statutory Finance Officer**

30. The costs can be met from the approved capital budget for Leisure Centre Improvements although this may mean in future further approval of budget is required to meet all of the objectives of this capital scheme.
31. There will be costs to Chorley Leisure Limited of the closure of the pool. While work will be taken to minimise this loss it is likely that some costs are not able to be avoided e.g. existing staffing in place and fixed overheads. The Council will work to understand the nature of the net costs and whether the company may need additional financial support during this time.

## **Comments of the Monitoring Officer**

32. The risks of failure of the pool structure are highlighted in the report and the proposal is to properly repair the defects and protect against future risks.

## **Appendices**

Appendix A : Structural Statement

Appendix B : Extract from structural engineers report 6/10/2021.

Appendix C : Restoration report

Appendix D: Temporary propping design.

Report Author:	Email:	Telephone:	Date:
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## **Appendix A: Structural Statement.**

Hi

Further to our visit to Brinscall Swimming Pool this morning, we have reviewed and note the following:

As you are aware, the building is an aging structure (built in 1911) and as such is well past its design life.

There are many visible defects within the swimming pool retaining walls and surrounding walkway and floor structures.

Previous remedial works have been carried out on the structure. Some of these are understood to be over 12 years old. Many of these have failed and require further attention.

Numerous Acro props have been installed to temporarily prop the structure. Chicken wire has also been installed to the underside of some areas to protect against falling spalling concrete.

We understand that the pool is inspected regularly by Chorley Council to determine any visible signs of further deterioration.

Following the recent installation of a new stair access in to the swimming pool (within the last 18 months), new cracks have appeared within the structure. This suggests that the condition of the structure is worsening.

Given the severity and frequency of the defects, further action is required to prevent localised failure of the structure. We believe these to be as follows:

**Short Term Solution:** Install a more substantial temporary propping scheme to increase the stability and extent of the current propping arrangement which is unbraced and does not cover all defective areas. All areas showing signs of distress to be propped by a formal propping scheme fully designed by a temporary works engineer. The purpose of the

propping scheme is to prevent collapse of the suspended slabs and allow the building to remain operational. Please note, there is a possibility that the suspended walkway slabs to the perimeter of the pool act as a restraint to the head of the swimming pool concrete retaining walls. Failure of the suspended walkway slabs could potentially lead to failure of the swimming pool walls. Further invasive testing of the junction between the head of the wall and end of the slab would be required to confirm this.

Long Term Solution: Temporarily decommission swimming pool and replace all defective elements with appropriate materials.

We trust the above is clear, but should you have any queries or wish to discuss further, please do not hesitate to contact us.

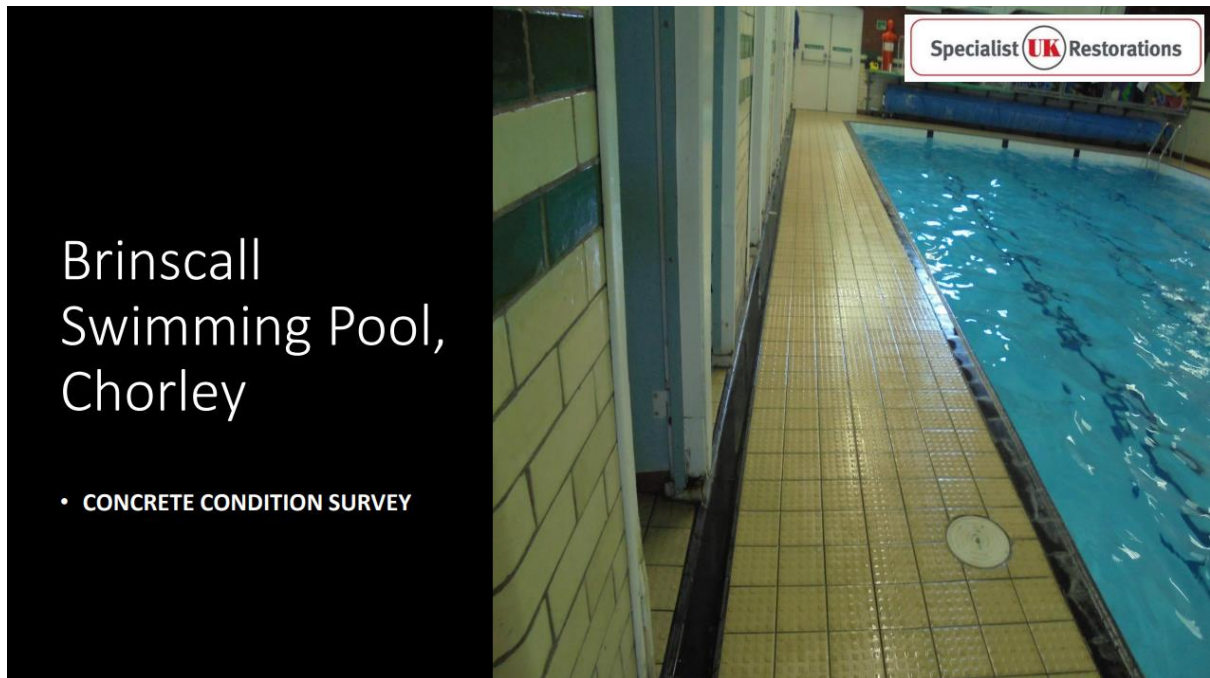
Best Regards

**Consulting Engineers Limited**

## **Appendix B: Consulting Engineers report extract 6/10/21**

**8 Conclusions.** The swimming pool building is approximately 100 years old and has typical defects associated with the type of building and age of construction. The superstructure of the building appears to be in a sound condition with no significant structural defects. The ground floor of the swimming pool including the pool decking and floors over the basement storerooms have significant defects relating to corrosion of reinforcement due to carbonation of the concrete and chloride induced corrosion. We observed significant areas of fractured and spalled concrete to the sides and soffit of reinforced concrete beams and to the soffit of the reinforced concrete floor slabs. The fractures and spalled concrete have been ongoing for a number of years and has been caused by corrosion of reinforcement and the expansion forces induced by corrosion. The damaged beams and floor have been repaired in the past, however, the previous repairs have reached the end of their design life and have failed with damage occurring through previous repairs and ongoing corrosion and spalling of concrete. The proposals provided by Specialist UK Restoration Ltd addresses the current damage that is present and are offering a 20-year design warranty. They have advised that structural design checks will have to be undertaken and strengthening may be required for key elements, where significant corrosion and loss of strength has occurred. As an alternative we consider that the existing floor could be used a shutter and a new reinforced concrete floor cast over. The reinforcement and concrete would have to be designed to suite the atmosphere within the building. The existing floor structure can be tied back to the new slab thus providing support to the floor. Additional support beams would have to be installed over the storeroom to enable the new floor to span over and to support the existing RC floor slab. The new floor slab would be supported on ledger angles bolted to the loadbearing walls and the swimming pool walls. Existing corroded reinforcement would still have to be exposed and treated to reduce the risk of ongoing corrosion, however, the new floor structure would have a design life of up to 50years. Appropriate waterproof details and water bar details would have to be developed over the pool wall and around the perimeter walls to ensure watertight structure. There are some mild steel lintel beams that are corroding, these should be cut out and replaced with equivalent galvanised mild steel lintel beams. We trust that this is all sufficient for your purposes, however, should you have any queries then please do not hesitate to contact us.

**Appendix C: Restoration Report**



Brinscall  
Swimming Pool,  
Chorley

• CONCRETE CONDITION SURVEY



# Concrete Condition Survey

## Chloride Analysis

Dust samples were taken from the reinforced concrete construction in selected areas only for analysis all strictly in accordance with the relevant *Building Research Establishment (BRE)* and *British Standards (BS)* publications to determine the chloride-ion concentration. The samples are to be submitted to an independent *UKAS* testing house. Provision of a test certificate and analysis table in accordance with *BRE* Guidelines to be included in Reporting.

## Carbonation Depth Testing

On-site testing of the underlying reinforced concrete construction at sample locations all strictly in accordance with the relevant *BRE* and *BS* publications using phenolphthalein to determine the extent of the carbonation front and recording of same on an analysis tables for inclusion in Reporting.

## Cover to Embedded Steel

Random cover meter survey to establish and record the location of any embedded steel reinforcement embedded in the concrete construction prior to the intrusive investigations, all strictly in accordance with *BS 1881 Part 204*. Any relevant information obtained as a result of the cover meter survey to be included in Reporting.

Results for all the above have been recorded on table

## Analysis Table

The following table records the results and locations of the chloride ion content analysis, carbonation depth testing, along with summarised readings from the cover meter survey.

Dust Sample Ref Nr	Floor	Location	Component	Average Concrete Cover to steel (mm)	Average Carbonation Depth to Concrete cover (mm)	% Chloride ion content (by weight of sample)	% Chloride ion content (by weight of cement assumed 14%)	Carbonated concrete at reinforcement depth
DS 01	Basement	Side Room	Beam	15-20mm	20mm	0.223	1.59	Yes
DS 02	Basement	Walkway	Soffit	20-25mm	25mm	0.131	0.94	Yes
DS 03	Basement	Walkway	Column	55-60mm	60mm	0.051	0.36	Yes
DS 04	Basement	Walkway	Beam	18-20mm	20mm	0.047	0.34	Yes
DS 05	Basement	Walkway	Soffit	20-25mm	25mm	0.236	1.69	Yes
DS 06	Basement	Walkway	Beam	15-20mm	20mm	0.257	1.84	Yes

## SIKA Fusion T2 100 Standard – Installation

- Please see below for Sika comments regarding 20 year specification
- If the client wants a 20-year design life, then a proper design would be required. That design (via Vector) would be free of charge if the work went ahead within 6 months. But if they provided a design covered by our PI and the work never went ahead, there would be a charge for that design from Vector in the region of £4,500.
- Because this is a hostile environment our design would be based on Fusion T2 100 standard. These anodes would be installed in any location deemed as needing protection. It is likely that the design would require a total blanket cover of an area irrespective of it having a concrete repair or not. Until a design is in place, we estimate that you may require between 3-5 Fusion T2 standard anodes m2.
- To offer a 20-year guarantee based on Ferrogard and XP's in this environment would be inadvisable. Following the outcome of the results, please now lead with Fusion anodes T2-100 and disregard our initial provisional spec.



Pool walkway is not water tight allowing ingress to concrete floor slabs and supporting columns and beams below.



Close up of hairline cracking to walkway tiles which we noted in various areas around pool.



Cracking to below concrete soffit with water droplets appearing on surface, evidence of continuous water ingress.



Further image of cracking to walkway concrete soffit.



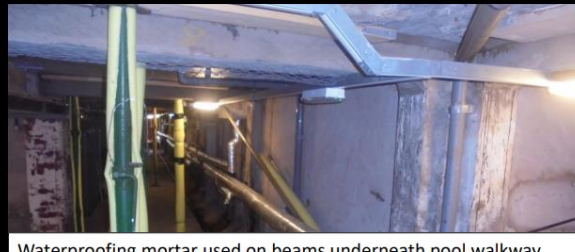
Large area of concrete spalled from structural beams showing eroded steel reinforcements.



Wire mesh used as a safety measure preventing spalled material falling from concrete beams.



Previous repairs on beams have failed due to the continuous rusting and expanding of steel reinforcements.



Waterproofing mortar used on beams underneath pool walkway this is containing water from above accelerating the deterioration of concrete material and steel reinforcements



Hammer test revealed large areas of the concrete soffit which are hollow with evidence of continuous water ingress from above.



Large area of concrete soffit spalled whilst hammer testing. Spalling caused by erosion of steel mesh reinforcement.



Further example of spalled concrete caused by erosion of mesh reinforcement.



Previous repair attempted using sand cement repair which has failed revealing rusted steel reinforcements



Pool walls and columns have been previously tanked but survey has revealed the system has failed with large sections sounding hollow and there is evidence that water is penetrating through.



Services have been fixed into tanked pool wall allowing water to penetrate through in places



Structural column reinforcement has become eroded causing concrete material to spall along with surface render

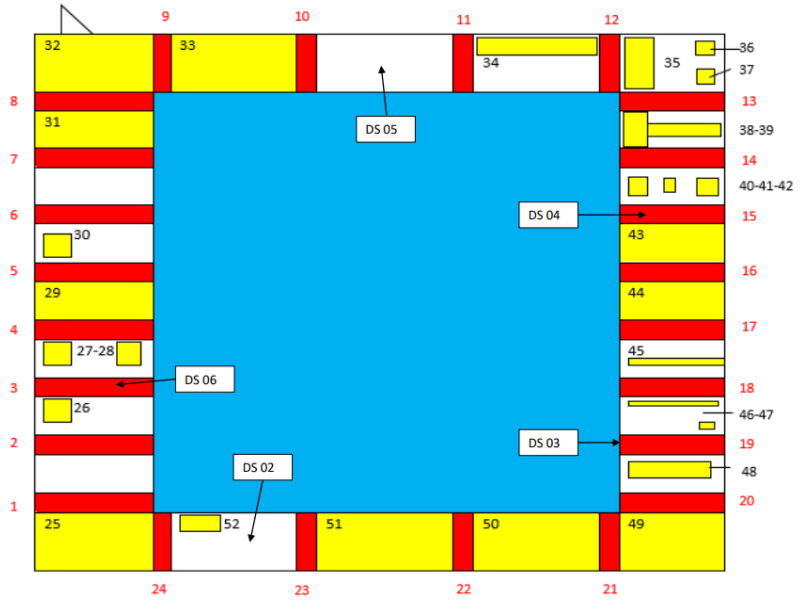


Another example of spalled render to the columns with signs of water penetrating through.

**Basement**  
 Pool Walkway Soffit and Beam  
 Concrete Repairs

Beam Repairs - █  
 Soffit Repairs - █

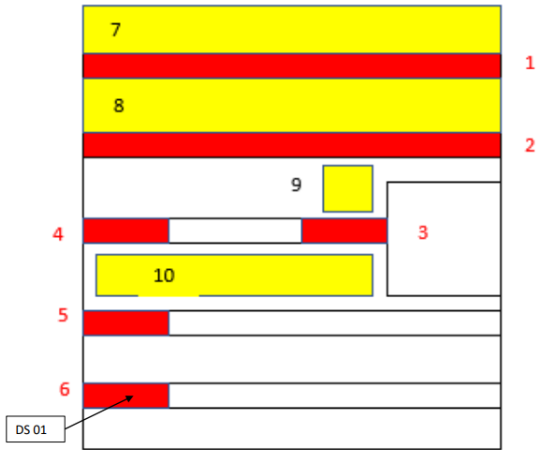
DS 01 – Dust Sample Location



**Basement**  
 Side Room Soffit and Beam  
 Concrete Repairs

Beam Repairs - █  
 Soffit Repairs - █

DS 01 – Dust Sample Location



# Appendix D: Temporary Propping




PHOTO 1




PHOTO 2




PHOTO 3




PHOTO 4




PHOTO 5




PHOTO 6


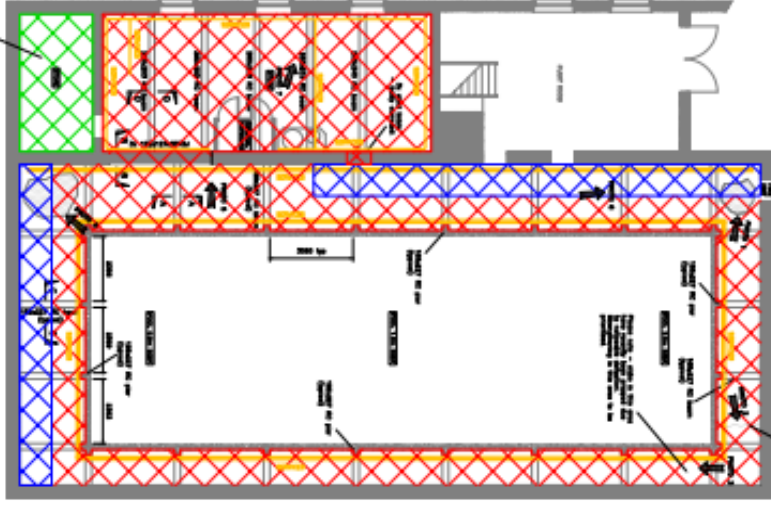
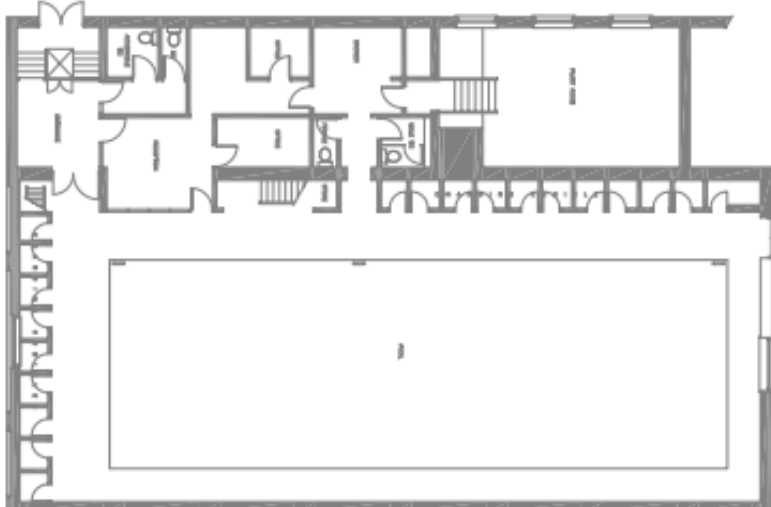


PHOTO 7



**BASEMENT PLAN**

NOTE: THE PROPPING IS TO BE INSTALLED TO SUPPORT THE EXISTING CONCRETE SLAB AND WALLS. THE PROPPING IS TO BE INSTALLED TO SUPPORT THE EXISTING CONCRETE SLAB AND WALLS. THE PROPPING IS TO BE INSTALLED TO SUPPORT THE EXISTING CONCRETE SLAB AND WALLS.

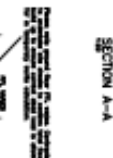


**GROUND FLOOR PLAN**


**LEGEND**

- AREA TO BE PROPPED UP BY THE EXISTING CONCRETE SLAB AND WALLS.
- AREA TO BE PROPPED UP BY THE EXISTING CONCRETE SLAB AND WALLS.
- AREA TO BE PROPPED UP BY THE EXISTING CONCRETE SLAB AND WALLS.


**SECTION A-A**




**SECTION B-B**



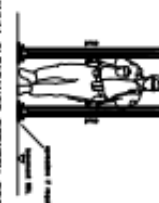
**SECTION C-C**



**SECTION D-D**



**MINIMUM CLEARANCE BETWEEN PROPS**



1. The minimum clearance between props shall be 1.5m.

2. The minimum clearance between props shall be 1.5m.

3. The minimum clearance between props shall be 1.5m.

4. The minimum clearance between props shall be 1.5m.

5. The minimum clearance between props shall be 1.5m.


6. The minimum clearance between props shall be 1.5m.

7. The minimum clearance between props shall be 1.5m.

8. The minimum clearance between props shall be 1.5m.

9. The minimum clearance between props shall be 1.5m.

10. The minimum clearance between props shall be 1.5m.

PROJECT NO.	P1022-020	DATE	01	REV	P1
					
<p><b>RIGBY CONSULTING ENGINEERS</b></p>					
<p>TEMPORARY PROPPING SCHEME</p>					
<p>BRISGALL SWIMMING POOL</p>					
<p>CHORLEY BOROUGH COUNCIL</p>					
<p>DEVELOPING STATICS - INCORPORATION</p>					

