

## **Reinforced Autoclaved Aerated Concrete (RAAC) surveys**

**Report by Kevin Anderson, Executive Director, Place**

### **Report for Information**

#### **1 Recommendation**

The Council is recommended to note the management process and actions undertaken to date, based on the approach recommended by UK Government for Reinforced Autoclaved Aerated Concrete (RAAC) in public buildings.

#### **2 Purpose of Report/Executive Summary**

This report advises members of the survey work carried out to understand the process of assessing, investigating and managing any presence of Reinforced Autoclaved Aerated Concrete (RAAC) panels in floors, walls, eaves and roofs (pitched and flat), of council buildings which followed an alert by the UK Government's Department for Education drawing attention to their advice.

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### 3 Background

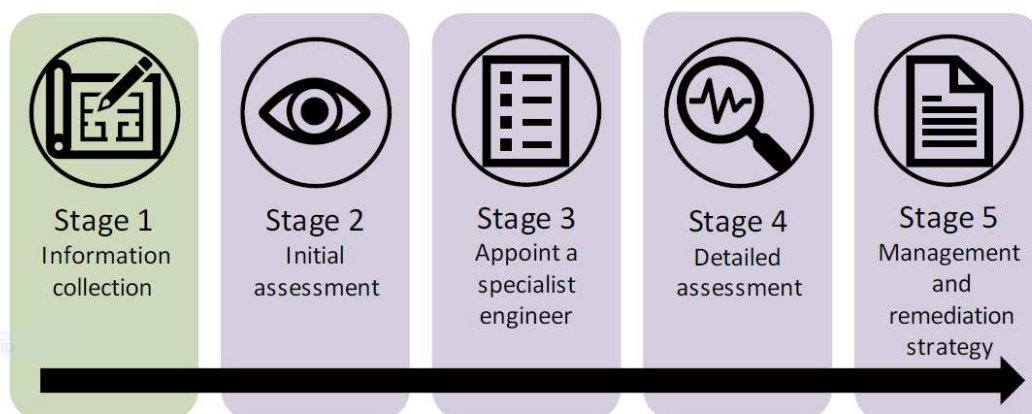
- 3.1 Reinforced Autoclaved Aerated Concrete (RAAC) is a lightweight form of concrete. The Standing Committee on Structural Safety (SCOSS) has noted that: *'Although called "concrete", (RAAC) is very different from traditional concrete and, because of the way in which it was made, much weaker. The useful life of such panels has been estimated to be around 30 years'* (SCOSS Alert, May 2019).
- 3.2 RAAC 'panels' were precast offsite and used for flat and pitched roofs, eaves, floors and walls within building construction. RAAC was used in schools, colleges and other building construction from the 1950s until the mid-1990s and may be found in any educational or ancillary building that was either built or modified in this time period. RAAC panels can span between isolated beam supports (steel or concrete) or onto masonry walls (brickwork or blockwork).
- 3.3 The potential risks from such construction and highlighted the failure of a RAAC panel roof construction within an operational school. This collapse was sudden as RAAC has the following embedded systemic problems:
- Panels have low compressive strength, being around 10-20% of traditional concrete, meaning the shear and bending strength is reduced. This strength is further impacted by water saturation.
  - It is very porous and highly permeable. This means that the steel reinforcement within the panels is less well protected against corrosion 'rusting' than steel reinforcement in traditional concrete.
  - The reinforcement within RAAC panels is less well bonded to the surrounding concrete. The dominant connection is via secondary reinforcement (transverse reinforcement).
  - It is aerated (looks 'bubbly') and contains no 'coarse' aggregate, therefore it is less dense than traditional concrete; being around a third of the weight.
  - RAAC has reduced 'stiffness' characteristics resulting in high displacements, deflections and sagging.
  - The bearing of planks is often insufficient, by comparison to modern standards, which presents a significant risk.
  - There was limited quality control during manufacture and installation meaning there is a high degree of variability between panels.

RAAC panels can span between isolated beam supports or onto masonry walls as depicted in Figure 1.

Figure 1: Images of RAAC panels – not Midlothian



- 3.4 It is recognised that RAAC panels have material and construction deficiencies making them less robust than traditional concrete. This increases the risk of structural failure, which can be gradual or sudden with no warning. Sudden failure of RAAC panels in roofs, eaves, floors, walls and cladding systems would be dangerous, and the consequences could be serious.
- 3.5 In the 1990s, several bodies recognised structural deficiencies apparent in RAAC panels, that the performance was poor with cracking, excessive displacements and durability all being raised as concerns. In the mid-1990s, the Building Research Establishment (BRE) undertook a number of inspections of school roofs, reporting the findings within BRE Information Paper IP10/96. The concerns were also raised within the 1997 Standing Committee on Structural Safety (SCOSS) report. The report recommended that school owners should identify and inspect RAAC panel construction to determine deterioration and put in place management strategies.
- 3.6 The estates team have progressed actions based on guidance from the UKG Department for Education produced to help estates' teams/site managers understand the process of assessing, investigating and managing the presence of Reinforced Autoclaved Aerated Concrete, undertaking the undernoted staged approach.



Stage 1: Information Collection: **Status Completed**

Stage 2: Initial Assessment: **Status Completed**

Stage 3: Appoint a Specialist Engineer: **Status Completed**

Stage 4: Detailed Assessment: **Status Completed**

Stage 5: Management and Remediation Strategy: **TBC (not required as at 03/08/2023)**

#### **4. Report Implications (Resource, Digital and Risk)**

##### **4.1 Resource**

The activities to date have been funded through existing resource.

##### **4.2 Digital**

There are no digital implications related to this report.

##### **4.3 Risk**

It is recognised that RAAC panels have material and construction deficiencies making them less robust than traditional concrete. This increases the risk of structural failure, which can be gradual or sudden with no warning. Sudden failure of RAAC panels in roofs, eaves, floors, walls and cladding systems would be dangerous, and the consequences could be serious.

##### **4.4 Ensuring Equalities**

An equalities impact assessment has not been required in connection with this report.

##### **4.5 Additional Report Implications**

See Appendix A

## Appendix A - Additional Report Implications

### A.1 Key Priorities within the Single Midlothian Plan

Not applicable

### A.2 Key Drivers for Change

Key drivers addressed in this report:

- Holistic Working
- Hub and Spoke
- Modern
- Sustainable
- Transformational
- Preventative
- Asset-based
- Continuous Improvement
- One size fits one
- None of the above

### A.3 Key Delivery Streams

Key delivery streams addressed in this report:

- One Council Working with you, for you
- Preventative and Sustainable
- Efficient and Modern
- Innovative and Ambitious
- None of the above

### A.4 Delivering Best Value

There are no direct implications related to this report.

### A.5 Involving Communities and Other Stakeholders

The report does not directly relate to involving communities at present.

### A.6 Impact on Performance and Outcomes

Not applicable

### A.7 Adopting a Preventative Approach

Not applicable

### A.8 Supporting a Sustainable Development

Not applicable