

DATA LABEL: PUBLIC



COUNCIL EXECUTIVE

REINFORCED AUTOCLAVED AERATED CONCRETE ROOFS

REPORT BY HEAD OF FINANCE AND PROPERTY SERVICES

A. PURPOSE OF REPORT

The purpose of this report is to advise Council Executive on the properties within the council's estate that have been confirmed as having roofs planks constructed using Reinforced Autoclaved Aerated Concrete (RAAC).

B. RECOMMENDATION

It is recommended that Council Executive:

1. Notes the approach adopted to the identification of RAAC roofs and recognises the prevalence of the method of construction across the United Kingdom.
2. Notes that nine properties have been identified as having roofs constructed using Reinforced Autoclaved Aerated Concrete (RAAC) roof planks;
3. Notes that stabilisation and over roofing works have been undertaken to three properties;
4. Notes replacement roof works are being progressed for three properties;
5. Notes comprehensive management and regular inspection arrangements are in place for the three remaining properties which have been identified independently as not at risk of immediate failure;
6. Notes that for three properties options are being developed and update reports on proposals will be presented to Council Executive for consideration; and
7. Notes that the Head of Finance and Property Services has delegated authority to undertake urgent or emergency works to stabilise RAAC roofs should issues arise.

C. SUMMARY OF IMPLICATIONS

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|-----------|---|--|
| I | Council Values | Focusing on our customers' needs; being honest, open and accountable; making best use of our resources. |
| II | Policy and Legal (including Strategic Environmental Assessment, Equality | Risk assessments have been undertaken for properties where RAAC roofs may be present and where these have been identified. |

Issues, Health or Risk Assessment)

III	Implications for Scheme of Delegations to Officers	The Head of Finance and Property Services has delegated authority to undertake urgent or emergency works to stabilise RAAC roofs should issues arise.
IV	Impact on performance and performance Indicators	Ensuring property assets are safe (compliance), are in satisfactory condition and available for use (utilisation) are performance measures that will updated accordingly.
V	Relevance to Single Outcome Agreement	We make the most efficient and effective use of resources by minimising our impact on the built and natural environment.
VI	Resources - (Financial, Staffing and Property)	The General Services Capital Programme 2021/22 to 2027/28 contains budget provision for works at Whitburn Community Education Centre, The Lanthorn Community Centre and Balbardie Primary School.
VII	Consideration at PDSP	None.
VIII	Other consultations	Consultations and engagement with Education Services, management committees and other services impacted by the presence of RAAC roofs has been undertaken and will continue.

D TERMS OF REPORT

D1 Reinforced Autoclaved Aerated (RAAC) Roofs

Reinforced Autoclaved Aerated Concrete (RAAC), often referred to as Siporex, is a lightweight construction material that was commonly used in construction between the 1960s and late 1980s. Although, the use of RAAC for construction of new buildings was discontinued on the late 1980s, it is still found in many buildings across the United Kingdom. RAAC was made under high pressure steam curing conditions by introducing gas bubbles into a cement or lime mix. The finished product is a uniform cellular material similar to foamed mortar.

The advantages of RAAC over precast concrete units were that it is relatively lightweight which helped transportation, lifting and handling and reduced the load to supporting structure/foundations. In addition, RAAC had good thermal properties and good fire resistance. The disadvantage of RAAC planks are that they are susceptible to moisture and water ingress which can promote corrosion of the embedded reinforcement. The RAAC does not bond adequately to the reinforcement which results in the planks being more susceptible to deflection or sagging and to the risk of shear failure occurring at the supports. The planks act individually in their load carrying capacity (unlike other forms of "traditional" concrete slabs where these act compositely through keying or composite screed).

In 2019, guidance issued identified the disadvantages outlined with RAAC roofs and warned of potential immediate structural failure in certain circumstances. The guidance further confirmed that roof decks constructed using RAAC planks will have reached the end of their theoretical lifespan and robust management arrangements are required to regularly inspect for deterioration, particularly around plank supports.

The presence of RAAC / Siporex roofs across UK is fairly widespread with it used in schools, community facilities and other public buildings. It is therefore not surprising given the age and extent of the council's portfolio that it is present within a number of properties. The council has already undertaken works to remediate or stabilise roofs where RAAC was known to be present but the circumstances which could lead to failure were only recently recognised by the wider structural engineering and property asset management community.

This report outlines the approach adopted to the identification of RAAC roofs and their condition, sets out remediation and stabilisation works undertaken to date and outlines management arrangements in place for ongoing monitoring. The report also recommends actions to ensure that the risks associated with RAAC in buildings are mitigated.

D2 Identification of RAAC Roofs and Structural Surveys

Following the issuing of the guidance officers implemented a series of investigations to identify buildings where RAAC roofs may be present and where applicable the condition. This was based on the following:

1. Initial review of asset register to identify all buildings constructed between the 1960's and the late 1980's, when RAAC was widely used;
2. A risk based review of construction drawings (where available) and available information on the buildings identified as being constructed in the timeframe when RAAC was used was undertaken;
3. Where RAAC was identified in construction drawings, initial visual inspections were undertaken followed by initial structural surveys. As required immediate initial remedial / stabilisation works were undertaken (i.e. Riverside Primary School);
4. Where drawings were inconclusive or not available, a programme of initial visual inspections were undertaken; and
5. Where from initial visual inspections presence of RAAC could not be determined specialist structural surveys were undertaken.

All properties where RAAC has been identified as potentially being present have now been subject to a full survey and initial appraisal to determine the appropriate management regime, remediation or stabilisation works required.

A number of properties have been identified as having RAAC roofs present and these are set out in the following section.

D3 Properties identified with RAAC Roofs

The properties where RAAC roofs have been identified are as follows:

1. Knightsridge Primary School, Livingston
2. Windyknowe Primary School, Bathgate
3. Riverside Primary School, Livingston
4. Whitburn Community Education Centre, Whitburn
5. The Lanthorn Centre, Livingston
6. Balbardie Primary School, Bathgate
7. Stoneyburn Community Education Centre, Stoneyburn
8. Fauldhouse Partnership Centre, Fauldhouse
9. St Kentigerns Academy, Blackburn

Information on the extent and condition of the RAAC roofs at each of these properties is outlined within the Appendix.

D4 Previous and Current RAAC Projects

A number of the properties where RAAC roofs have been identified have already been subject to remediation works, are proposed to be remediated or have been stabilised. These are as follows:

Property	Remediation / Stabilisation Works
Knightsridge Primary School, Livingston	Over roof installed, RAAC not structural, ongoing monitoring proposed.
Windyknowe Primary School, Bathgate	Over roof installed, RAAC not structural, ongoing monitoring proposed.
Riverside Primary School, Livingston	Stabilisation Works undertaken, ongoing monitoring implemented.
Whitburn Community Centre, Whitburn	Replacement roof works being progressed due for completion 2022.
Lanthorn Community Centre, Livingston	Replacement roof works being progressed due for completion 2023.
Balbardie Primary School, Bathgate	Stabilisation Works Proposed Summer 2021

D5 Ongoing RAAC Management Requirements

It is intended that for those properties where RAAC has been identified and have been confirmed by engineers as not representing an immediate risk of failure that regular inspections and monitoring is undertaken. For all the properties identified inspections at varying frequency depending upon risk and extent of presence will be undertaken and any evidence of movement or changes will be reviewed.

Properties where ongoing management and monitoring will be undertaken are as follows:

Property	Proposed Management Arrangements
Fauldhouse Partnership Centre, Faudhouse	6-monthly Inspections and consideration of future stabilisation options.
St Kentigerns Academy, Blackburn	6-monthly inspections and development of remediation proposal
Stoneyburn Community Centre, Stoneyburn	6-monthly inspections and consideration of future stabilisation options.

In circumstances where issues may arise, the Head of Finance and Property Services has delegated authority to undertake immediate, urgent or emergency works to stabilise the RAAC roofs.

E CONCLUSION

The council has implemented a comprehensive risk based research and structural survey programme in relation to RAAC in council properties. The outcome of the surveys is that RAAC / Siporex roofs is present in nine properties.

Stabilisation and over roofing works have been undertaken to three properties and stabilisation, remedial or replacement roof works are being progressed in three properties. The remaining three properties have been identified independently as not at risk of immediate failure and therefore will be regularly monitored whilst option for their future management of these properties are considered.

F BACKGROUND REFERENCES

The Lanthorn Centre, Livingston - Significant Structural Issues - Report to Council Executive 23 March 2021

Whitburn Community Education Centre - Significant Structural Issues Update – Report to Council Executive 20 April 2021

Appendices/Attachments:

Appendix 1 – Details of RAAC properties and plans of locations.

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Donald Forrest, Head of Finance and Property Services

Date of meeting: 22 June 2021

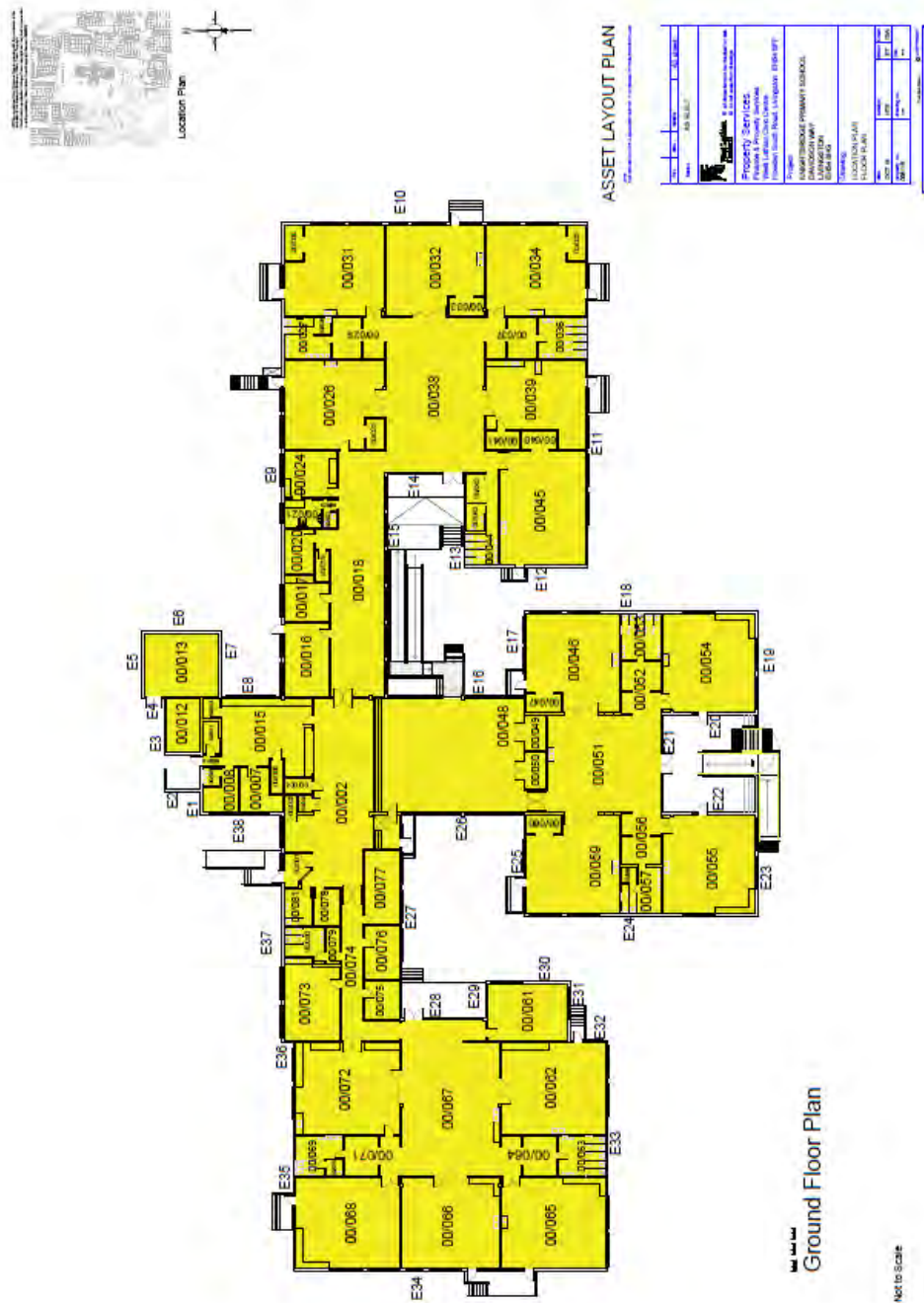
APPENDIX 1 – LIST OF PROPERTIES (RAAC PRESENT)

Knightsridge Primary School, Livingston

RAAC roof planks are present in all roof areas as shown in diagram below. However, the roof over the school was converted to a pitched roof in 2016/17. The RAAC roof planks remained in place but have become structurally redundant as they no longer carry the weight of the roof or any imposed loads such as snow in the winter. The pitched roof above also protects the RAAC planks from water ingress.

Despite this, the RAAC planks will be inspected annually by a qualified structural engineer.

As the roof planks are now structurally redundant due to the pitched roof conversions there is no requirement at this time to consider replacing the RAAC roof planks.

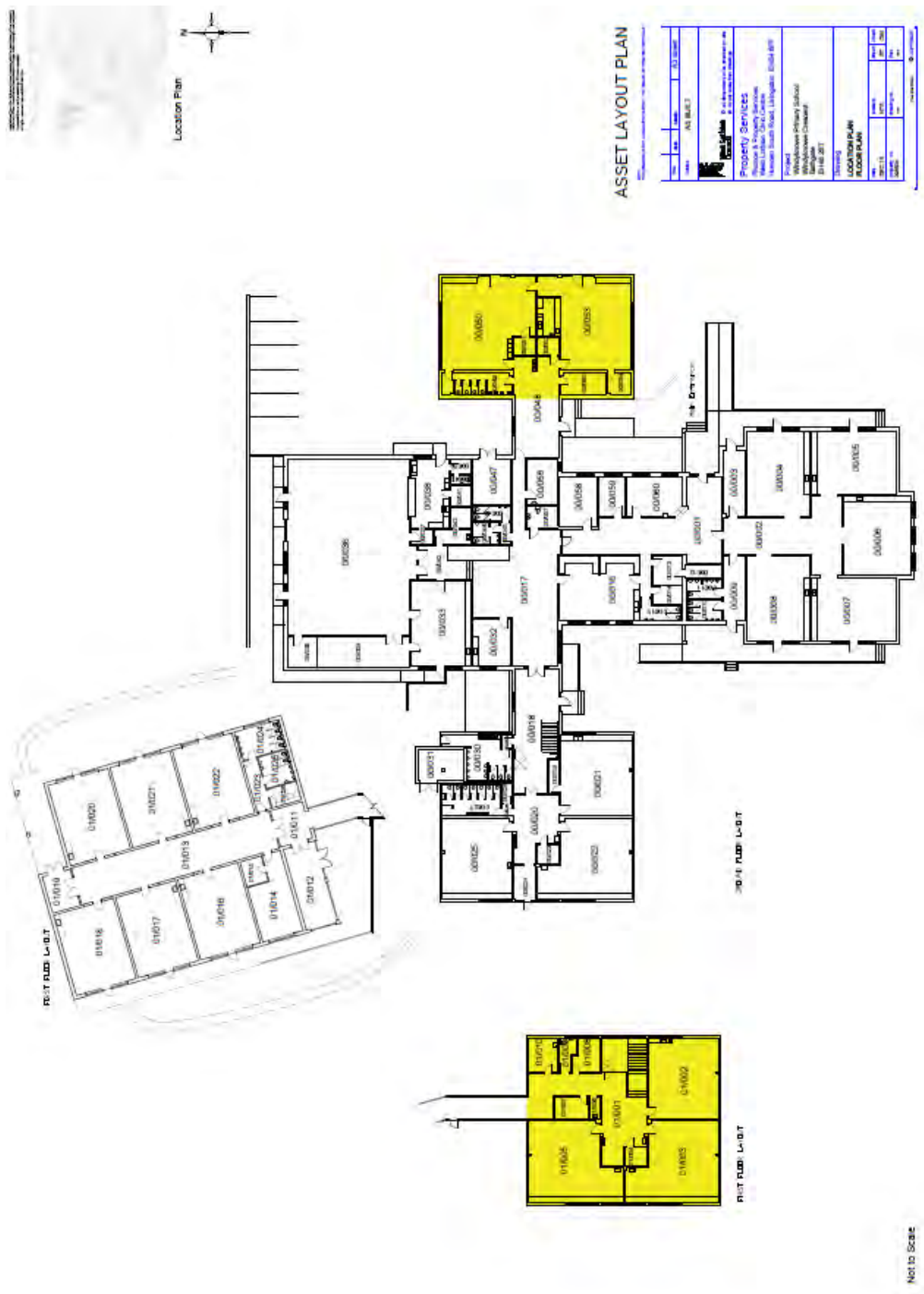


Windyknowe Primary School, Bathgate

RAAC roof planks are present in the Nursery and two storey classroom block as shown in diagram below. These roof planks were found to be in good condition generally but with evidence of historical water staining.

The roofs above the Nursery and two storey classroom block have had a flat to pitched roof conversion as part of previous major refurbishment work. The roof planks are now structurally redundant due to the pitched roof conversions and there is no requirement at this time to consider replacing the RAAC roof planks.

The RAAC planks will be inspected annually by a qualified structural engineer.



Not to Scale

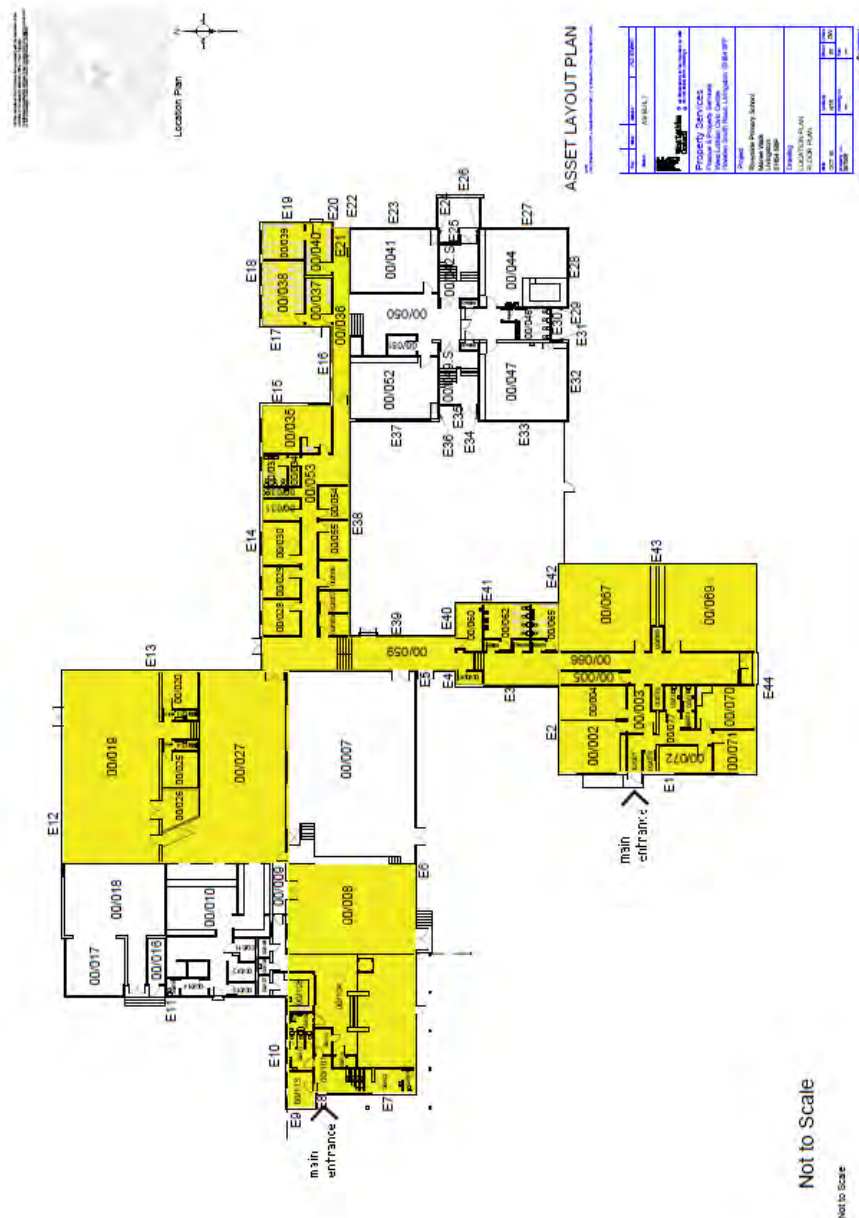
Riverside Primary School, Livingston

RAAC roof planks area present in to all roof areas as shown in diagram below. Structural strengthening and stabilisation works were carried to provide support to the roof planks during the summer of 2019. Strengthening works were carried out to all areas with the exception of the single storey entrance block which is not required by the school is due to be demolished during 2021.

The remedial works carried out summer 2019 has extended the life of the roof deck, however the RAAC planks are still be present. It is recommended that RAAC roof planks should be replaced within 5-10 years.

Due to the wider construction quality of the school, its age and layout officers are now progressing options for its replacement Council Executive on 9 February 2021 instructed officers to progress with detailed options appraisals and business case development for the replacement of the school.

The RAAC planks will be inspected annually by a qualified structural engineer.

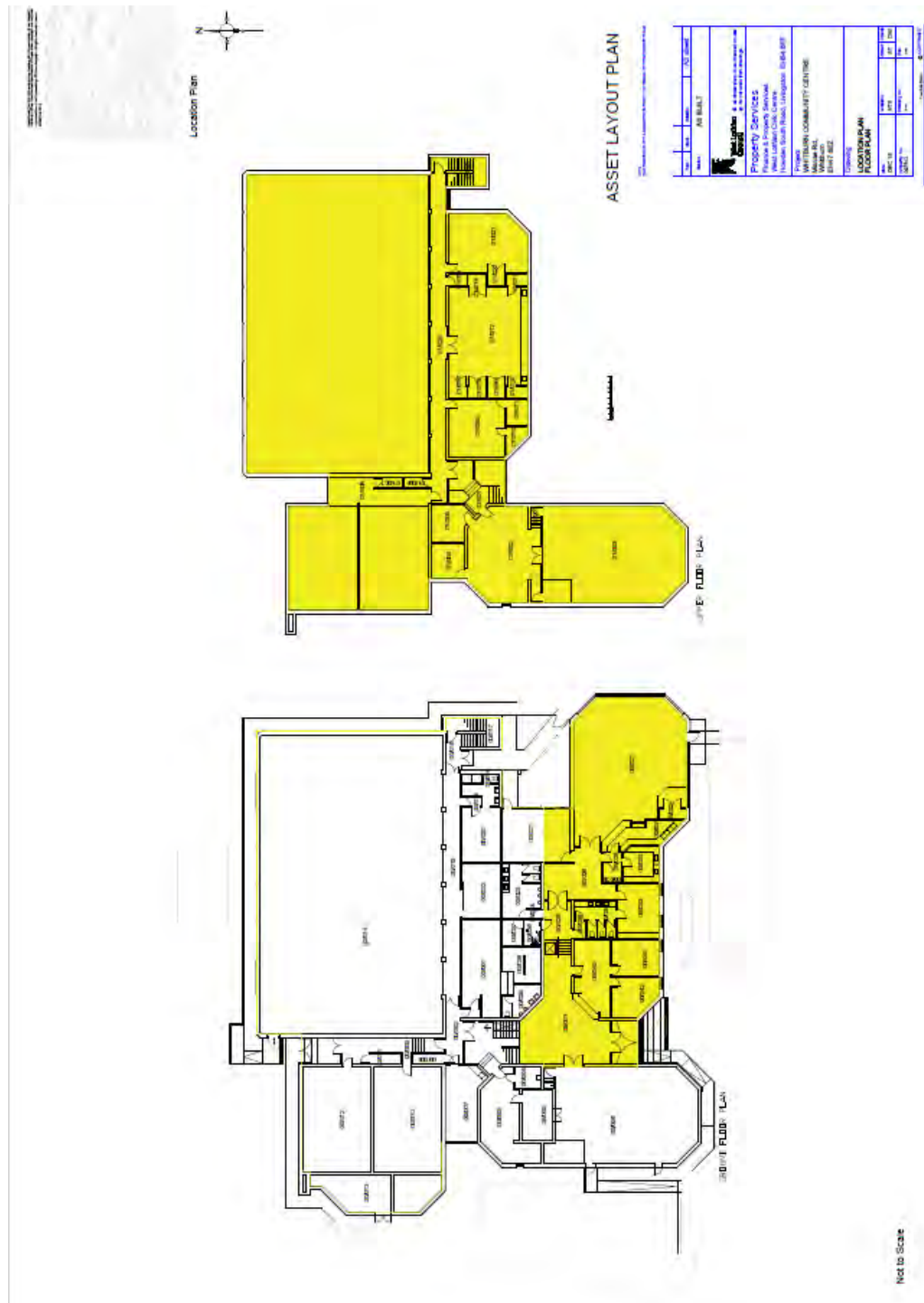


Whitburn Community Education Centre, Whitburn

RAAC roof planks area present in to all roof areas as shown in diagram below. Significant structural issues were identified in the roof planks over the Games Hall.

Council Executive 20 April 2021 instructed offers to progress with the replacement of the roof the Games Hall and first floor meeting rooms. Works are programmed to commence summer / autumn 2021 and be completed March 2022. The costs associated with the works are £1.05 million.

RAAC roof planks in other areas of the building were identified as not being at immediate risk of failure and will be inspected every 6 months by a qualified structural engineer.



The Lanthorn Centre, Livingston

RAAC roof planks are present in all roof areas as shown in diagram below. Council Executive 23 March 2021 due to the structural issues associated with the RAAC roof area agreed to the closure of the property from 2 April 2021. It was noted that officers would progress with design development and investigations and report to finalise a programme of works and that these would be presented to Council Executive for consideration.

Council Executive report on agenda outlines the programme of works to replace the roof with commencement occurring in early 2022 and completion in summer 2023. The estimated cost of the works is £3.15million



Balbardie Primary School, Bathgate

RAAC roof planks area present to the 1960s teaching block as shown in the diagram below.

Structural engineers have identified potential structural issues with the roof planks during an inspection in May 2021. They concluded that the roof planks are safe and that there was no requirement to restrict access at this time. However, they recommended that urgent remedial repairs be carried out during summer 2021 to reduce deterioration of the planks.

On completion of the remedial works, the RAAC planks should be inspected annually by a qualified structural engineer.

The remedial works will extend the life of the roof deck, however the RAAC planks will still be present. It is recommended that RAAC roof planks should be replaced within 5-10 years. Council Executive report on agenda outlines the programme of works to replace the roof.

Estimated cost of the initial stabilisation and replacement roof works is £1.6million

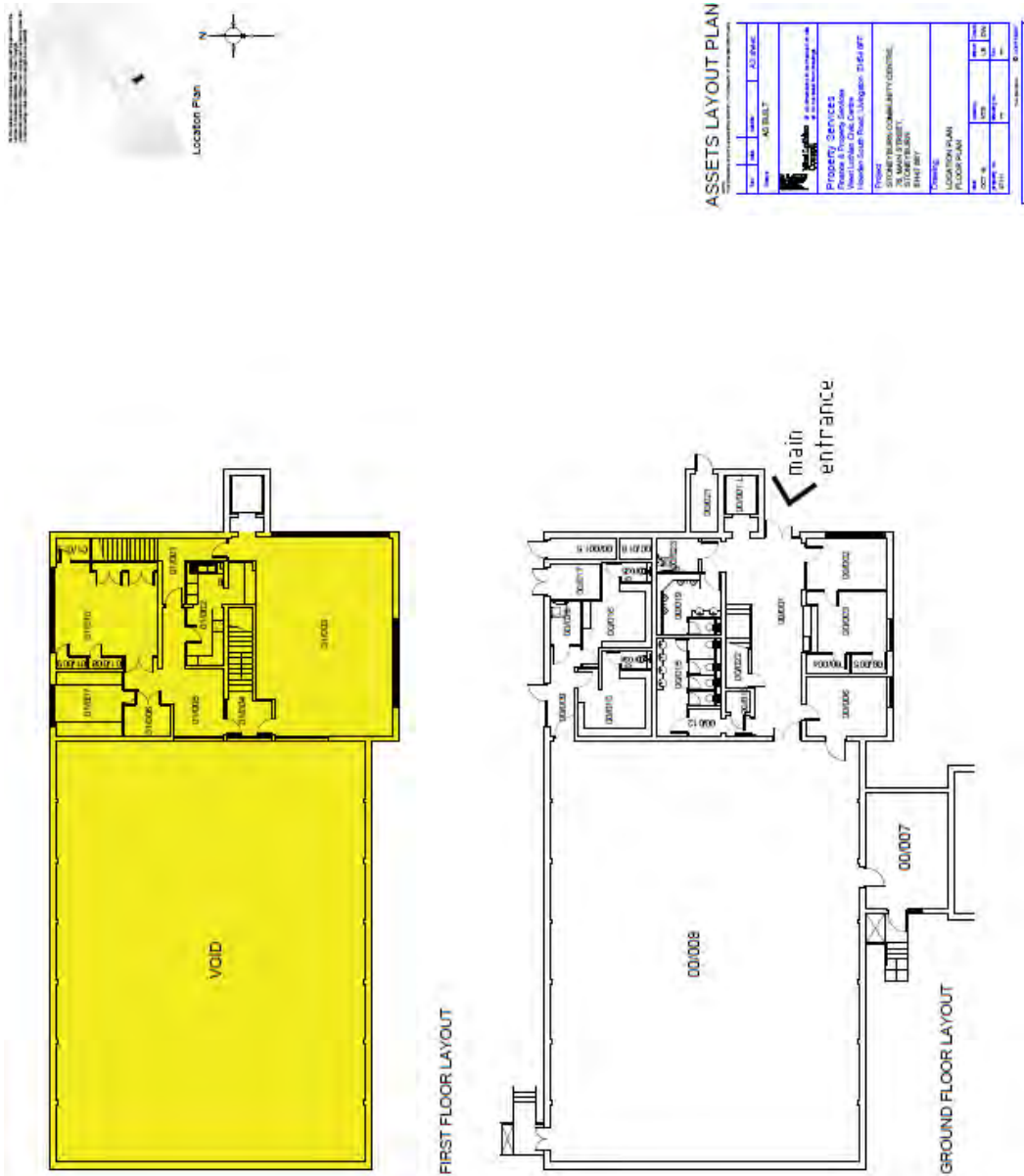


Stoneyburn Community Education Centre, Stoneyburn

RAAC roof planks area present in to all roof areas as shown in the diagram below. The roof planks were found to be in good condition generally when inspected in November 2020. There were signs of historical water ingress were noted throughout the building. As a result, a roof inspection has been carried out and any necessary roof repairs undertaken.

The RAAC planks will be inspected every six months by a qualified structural engineer.

Given the age of the RAAC roof planks and the potential for continuing difficulties with water ingress it is recommended that areas with RAAC roof planks should be replaced within 5 years.



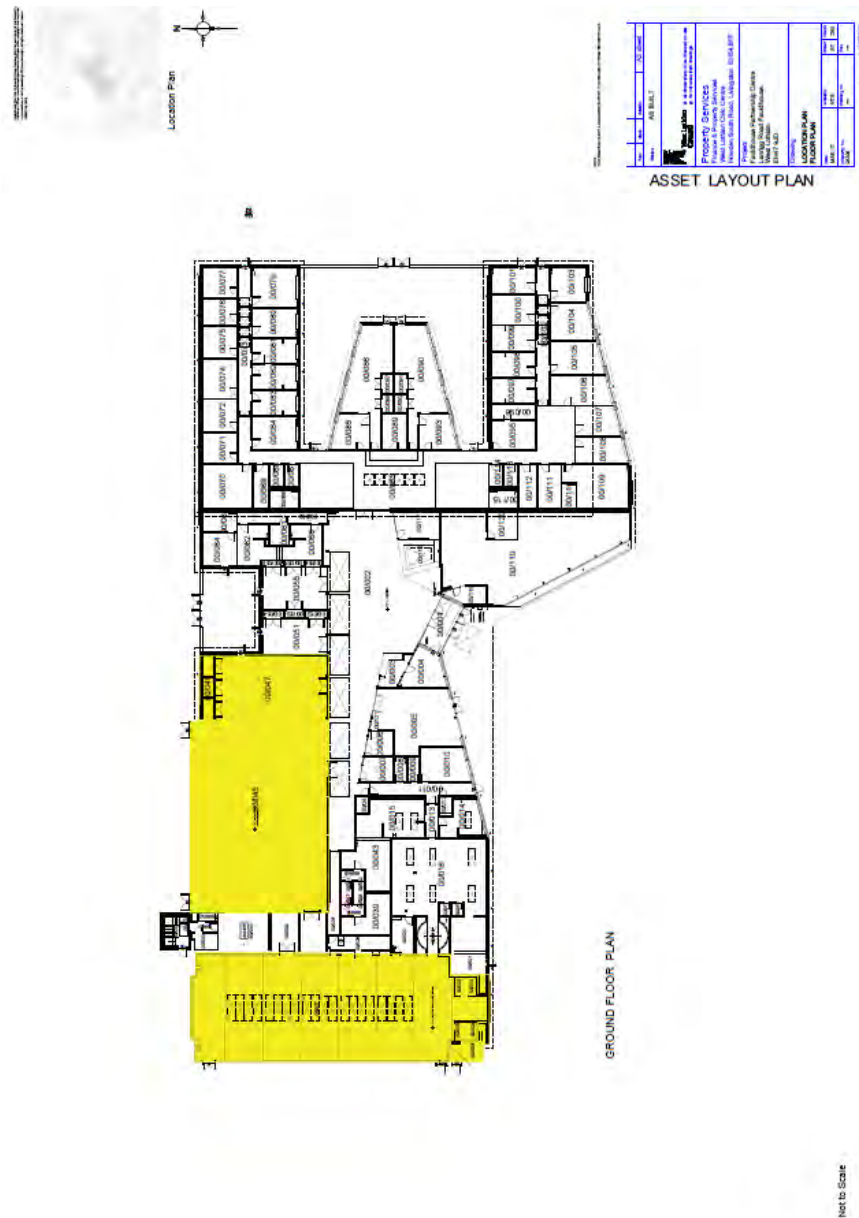
Fauldhouse Partnership Centre, Fauldhouse

RAAC roof planks area present to the Games Hall and the Swimming Pool Hall as shown in the diagram below. Access to the RAAC planks in the Swimming Pool Hall area is not possible due to the presence of a fixed ceiling above the swimming pool.

The roof planks in the Games Hall were found to be in good condition generally when inspected in December 2020. However, signs of water ingress were noted throughout the building. As a result, roof repairs have been carried out and ongoing monitoring and maintenance will take place.

The RAAC planks will be inspected every six months by a qualified structural engineer.

Given the age of the RAAC roof planks and the potential for continuing difficulties with water ingress it is recommended that areas with RAAC roof planks should be replaced within 5 years.



St Kentigerns Academy, Blackburn

RAAC roof planks are present in the original part of the school dating from 1973 as shown in the diagram below. The RAAC planks were found to be in good condition and reflect the age of the building. Remedial repairs were identified to the dining hall and plant room and these works were completed in October 2020.

The RAAC planks will be inspected every six months by a qualified structural engineer.

Given the age of the RAAC roof planks and the continuing difficulties with water ingress it is recommended that areas with RAAC roof planks should be replaced within 5 years.

