Agenda Item 5

Maddiston Primary School – Root Cause Analysis

FALKIRK COUNCIL
COMHAIRLE NA H-EAGLAISE BRICE

Executive

21 May 2026

Title: Maddiston Primary School – Root Cause Analysis

Submitted by: Director of Place Services

1. Purpose of Report

1.1 This report outlines the findings of the independent Root Cause Analysis (RCA) undertaken in relation to the significant construction defects identified at Maddiston Primary School.

2. Recommendations

2.1 Executive is asked to:

(1) Note the findings of the Root Cause Analysis particularly in relation to the deficiencies in construction, project management and oversight;

(2) Note the changes in project management approach by the Council since 2007 and potential lessons to be learned;

(3) Note the changes the adoption of a Project Assurance Checklist to strengthen the Council's governance and quality management arrangements for construction projects; and

(4) Note that a future confidential briefing on the legal position will be arranged following further engagement with Graham Construction.

3. Background

3.1 Maddiston Primary School opened in 2007 following a prolonged construction period which included a significant fire event in November 2006 that delayed completion by approximately one year. The school was designed by Falkirk Council's internal architectural service, which sat underneath the then Director of Development Services and the Head of Roads, Design and Transport. Graham Construction were appointed as the main contractor and had responsibility for delivering both construction and contractor design portions. Construction supervision and quality assurance responsibilities at the time were divided between the contractor, its subcontractors, external designers, and the Council's Design Co-Ordinator (DCO) / Architect and Clerk of Works.

3.2 In January 2025, Storm Eowyn caused damage to the school, initially affecting a two-storey gable wall and roof. Subsequent intrusive structural investigations

undertaken by external Chartered Engineers identified extensive underlying construction deficiencies across the building that had been concealed since original construction. These investigations included borescope surveys and inspection holes cut into external walls to enable visual inspections together with material checks.

3.3 Although initial safety measures were put in place, the scale of the defects made continued safe operation of the building impracticable. In February 2025, the decision was taken to close the school and decant pupils.

3.4 As part of the desire to facilitate remobilisation of the school (even in part), the extension was specifically reviewed to understand if it could be put back into use as it was constructed more recently by a different contractor. A review of the newer extension indicated that, with temporary facilities, it could safely accommodate some pupils. P1–P3 and staff relocated there from the start of session 2025/26, alongside use of Maddiston Community Centre for lunches and physical education. Following an operational risk assessment, preparations were undertaken to enable this re-occupation, and the construction works to allow this to happen. A summary of the external advisor's report was included within the appendix of the November report.

3.5 In June 2025, the Executive instructed an independent review to examine:

(a) What went wrong in both the initial construction and subsequent maintenance of the building.

(b) Who within the Council was responsible for decisions and oversight at each stage, including the sign-off of the original build; and

(c) What lessons have been learned and what improvements should be implemented to ensure accountability and prevent recurrence.

3.6 This report provides the findings of the independent review ("Root Cause Analysis") (RCA) including:

- The identification of deficiencies in the management, design, supervision and construction of the school during its original build.
- Consideration of subsequent maintenance arrangements; and
- A review of how construction projects are currently managed internally within the Council and the lessons to be embedded into future practice.

3.7 The RCA does not consider the processes or procedures associated with Graham Construction, their supply chain or professional advisors as information on these was not available to Glenmhor. Investigations continue in terms of any potential liability of external providers and therefore not dealt with in detail as part of this report as it may prejudice parties' positions.

3.8 It should be recognised that the project was delivered over 17 years ago and therefore consideration has been given to standard practices at the time and how deficiencies in these contributed to the issues encountered and how project management approaches have changed in the intervening period.

3.9 The RCA was undertaken by Glenmhor Property Consultants who are specialist property advisors with significant experience in the construction industry and the delivery of school projects. The investigation involved them reviewing all records still held by the Council. It should be noted that in many instances original documents and correspondence no longer exist due to the passage of time and document retention policy. Missing items or gaps in documents include elements of the contractor's Quality Assurance documentation, site inspection records and fire reinstatement records. It may be that as part of the progressing of legal proceedings should these be considered appropriate that relevant records which still exist and held by external parties may be required or considered. If considered necessary, recovery from external parties could be compelled through a formal court order. Legal advice is being sought on this aspect.

3.10 Given the passage of time staff fulfilling key roles in the management, supervision and statutory approval aspects of the construction of the school are mostly no longer employed by the Council. One employee remained at the time of the Glenmhor review but has recently left the Councils employ.

3.11 Glenmhor emphasise that due to the lack of documentation and staff to interview that several conclusions were drawn on the balance of available evidence rather than complete project records.

3.12 On 6 November 2025, Council considered the Building Appraisal Report which confirmed that the original building can be reinstated but requires significant structural and remedial works at a total reinstatement and project cost of approximately £14m. These costs were developed and verified by external specialist building and quantity surveyors.

3.13 As part of the approvals by Council of the Revenue Budget and Financial Strategy 2026/27 on 5 March 2026, and subsequently the General Services Capital Programme 2026-2031 approved on 26 March 2026 funding of up to £14m was agreed to progress the Maddiston Primary reinstatement works. In addition £1.5m (2025/26 to 2027/28) has been allocated for revenue consequences associated with the decant of the school and ancillary costs.

3.14 Whilst not the focus of this report, the project to reinstate the schools continues to progress with HUB East Central appointed as delivery partner together with Ogilvie Construction as the Teir 1 contractor. Initial works have commenced on site with an estimated completion date of August 2027. Given the complexity of the works adjacent a live school site there remain substantial risks that remain associated with the project and these continue to be under review with mitigation actions implemented.

4. Considerations

Root Cause Analysis Overview

4.1 Glenmhor have reviewed how the school's construction was originally managed and the deficiencies of the approach. They have outlined what at the time would have normally been expected by all parties involved in delivering the school (contractors, council staff, and consultants). Finally, they have provided the key elements of

current best practice in the management of construction projects and reviewed the council's current approach.

4.2 The RCA notes that several key project records – including elements of the contractor's QA file, engineering certificates, design approval records and documentation relating to fire reinstatement – are no longer available, which limits the extent to which firm conclusions can be drawn about final sign-off and technical approvals.

4.3 The RCA specifically highlights that continuity in design leadership was compromised by three changes in the Lead Architect/Contract Administrator during the construction period, contributing to late or incomplete design information, reduced coordination, effective project management and governance. A summary of their findings is included within Appendix 2. It should be noted that a summary is provided with the key considerations as the full report may contain elements that could be relied upon as part of any potential legal or commercial dispute that may be progressed. These elements may be considered as having the potential to prejudice the Council, or others position.

4.4 The RCA in summary identified extensive weaknesses in the original construction process, including:

- Incomplete or late design information.
- A high turnover of Council Project Architects/Contract Administrators.
- Late appointment and inadequate supervision of the timber frame subcontractor.
- Quality assurance processes that were insufficient or inconsistently applied.
- Poor contractor documentation, including refusal to issue Non-Conformance Reports.
- Limited effectiveness of the Council's Clerk of Works function.
- Programme pressure exacerbated by site readiness issues and the 2006 fire; and
- Incomplete records of structural sign-off and post-fire remedial works.

The RCA also identified additional issues, including:

- Lack of evidence that structural concerns raised during construction were formally closed out.
- Absence of engineering certificates for key elements.
- Unclear documentation of post-fire remedial works and subcontractor involvement.
- Limited evidence of Design Team inspections at critical construction stages.

- An unusual acceptance by the Council's Contract Administrator of the contractor's refusal to issue Non-Conformance Reports, which is not regarded as normal industry practice.

4.5 The RCA confirms that whilst extensive conclusions can be drawn regarding the original construction phase, the passage of time mean that only a high-level assessment can be formed regarding practices and governance arrangements at the time of the original build.

Responsibility and Governance at the Time (2007 Structure)

4.6 Under Falkirk Council's 2007 management structure, responsibilities were:

- Director of Development Services held overall strategic responsibility for delivery of the project (and other projects), ensuring appropriate corporate governance and prioritisation of resources available to ensure effective and efficient delivery.

- Head of Roads, Design and Transport held senior management responsibility for promoting adoption of effective governance arrangements and ensuring both prioritisation and effective deployment of resources.

- Building Design Manager, held management responsibility for ensuring design management, technical standards, project management resourcing and oversight reflected significance of the project.

- Council Design Co-Ordinator (CDO); Architect and Contract Administrator - reporting to Building Design Manager held day-to-day responsibilities for design coordination, contract administration, certifying payment, assessing Extensions of Time, and certifying Practical Completion.

- Clerk of Works (CoW) reported to the Design Co-Ordinator (CDO) Architect/Contract Administrator and was responsible for monitoring construction quality on site.

- The Director of Education was the client service lead responsible for defining educational requirements and accepting the completed building into operational use, with no involvement in the construction process. The Director of Education was supported by various officers at various stages of the project but none of these had responsibility for design, construction delivery or quality aspects.

4.7 The RCA (and the views of external legal advisors) concludes that deficiencies in the construction of Maddiston Primary School were the primary responsibility with the contractor (Graham Construction) and in turn their subcontractors. It is clear that the terms of the Construction contract and standard construction management practices at the time were not adhered to by Graham Construction, their sub-contractors and technical professionals.

4.8 Whilst the Council's management approach and supervision could have been better, this does not detract from the failings of Graham Construction and their responsibilities. The legal aspects of this will continue to be considered and there

will be continued legal correspondence on this. The Council is being advised on this by external specialist legal advisors. A future confidential briefing will be arranged with elected members on the outcome of the current legal considerations.

4.9 Unfortunately, due to gaps in records from 2007 it is not possible to conclusively identify specific contractor and senior officers "sign off" for key stages of the project, including practical completion or acceptance of the final building. The RCA therefore cannot fully reconstruct records of the original governance or oversight arrangements and decision-making processes.

Building Control/Warrant

4.10 In addition to the project management role for property construction projects the Council also had and continues to have responsibility through Building Standards as a verifier to ensure that properties constructed are compliant with the relevant building regulations. It has been identified that despite engagement across services at the time and the subsequent occupation of the school neither a completion certificate, nor a record of any temporary occupation certificate being requested or issued.

4.11 This specific deficiency associated with the lack of completion certification is unlikely to reoccur for Council projects due to improvements in governance, management systems and better cross service coordination. To further mitigate the potential for this to occur in the future for Council projects, the confirmation of appropriate certification being pursued and issued will form part of the Project Assurance Checklist completion and subsequent post project review processes.

4.12 The lack of the appropriate statutory consents at both project management level and in the Council's statutory duties is a historic failing on the part of the Council corporately. As part of the wider investigations and consideration of this matter it has been identified that across a number of historic projects there are similar occurrences. Whilst many of these are minor in nature, officers from various services with support from Building Standards are prioritising the identification and resolving these to ensure the appropriate statutory certification is issued.

4.13 Officers are now also undertaking a full review of the Council's approach to the management of the Building Standards Completion Certification processes to ensure improvements are made to prevent future similar occurrences.

Summary of Root Cause Findings & Potential Mitigations

4.14 It should be noted that this section is provided for illustrative purposes to outlined the alleged / potential deficiencies that occurred back in 2007 and does not deal with the total liability or responsibility of the parties listed in the middle column of the table. There are clearly further investigations ongoing and therefore more detailed information is not provided to avoid prejudicing parties legal positions. The high-level summary of alleged / potential deficiencies, responsibility and potential mitigations that could have been implemented back in 2007 are provided in the table below.

Deficiency	Responsibility (2007) context)	2007 Potential Mitigations
Late appointment and inadequate oversight of the timber kit subcontractor; missing bracing/fixing details	Contractor; DCO/ Architect/CA; Structural Engineer	Ensure complete design before manufacture; independent structural review; technical submittal approvals; clear programme lead-in
Use of superseded drawings by subcontractors	Contractor (primary); CA (secondary)	Robust document control system; drawing registers; confirmation of latest revisions at toolbox talks
Incomplete / late architectural and engineering information; multiple changes in Project Architect	Falkirk Council BDU Manager / DCO/ Architect/CA; Head of Roads, Design and Transport	Continuity planning; structured handovers; design freeze milestones; strengthened design management
Contractor failure to provide NCR's and not continuously pursued to provide. This created lack of NCRs and gaps in QA documentation	Contractor (primary); DCCA for enforcement	Mandatory QA plan; enforced NCR process; escalation where contractor non-compliance occurs
Clerk of Works not consistently identifying or escalating quality issues	CoW; DCO / Architect (line manager)	Full-time CoW presence; documented inspections; digital audit trails.
Structural concerns not fully resolved in records	Structural Engineer; Contractor; CA	Formal engineering sign-off prior to covering works; retention of certificates; Independent Tester involvement
Inadequate records of post-fire remedial works and subcontractor involvement	Contractor; Insurer; CA	Full documentation of fire damage, repair design, and QA; re-certification of structural integrity
Site readiness issues (incorrect levels; drainage concerns) at contract commencement	Contractor; Council (site handover responsibility)	Joint site readiness inspection and sign-off; pre-start surveys; clear rectification responsibility
Programme pressure leading to quality compromises	Contractor; BDU Manager/ DCO/ CA; Head of Roads, Design and Transport	Realistic programme approval; detailed Extension of Time assessments; escalation where programme risk affects quality

4.15 It is evident from the table above that the main potential deficiencies in the management and delivery of the project back in 2007 were the responsibility of the contractor, their sub-contractors and external advisors. Each of these has been considered together with the potential mitigation that would should have been expected at the time of construction. The full RCA contains further detail relevant to these aspects and may be considered as part of the consideration of potential future legal action. These are therefore not reproduced in full here.

Current Management and Governance Arrangements

4.16 The Council has made substantial changes to how it manages Construction Projects since 2007 with improvements including the following:

- Establishment of the Strategic Asset Modernisation Board which is chaired by the Director of Place Services and attended by senior officers to coordinate the delivery of the capital programme and major projects. This board ensures appropriate governance is in place, regular updates on project progress are provided, risk management and mitigations are considered together with more effective financial monitoring.

- Senior Responsible Officers (Heads of Service and Senior Managers / Asset Lead Officers) are identified for each project and lead on the delivery of significant capital projects. These officers ensure appropriate resources are available, risks are identified and mitigated, key stages of projects delivery are signed off and effective financial monitoring occurs.

- Project Managers have been recruited to deliver major projects and standardised project management framework / guidance is utilised for all projects. Project Management training is also being provided to appropriate staff.

- Adoption of Corporate Property / Landlord approach to centralise and improve the management, maintenance and performance monitoring of property assets.

- For all projects irrespective of procurement approach, improved construction quality (Clerk of Work supervision) processes have been adopted. This includes Senior Clerk of Works reporting directly to the Building Design Manager instead of the Design Coordinator.

4.17 Within the RCA and the wider consideration of the findings there are a key number of issues that have been considered in relation to improvements for the management of projects. The following section outlines that that have been adopted.

Future Council Projects – Strengthened Project Governance and Management Resources

4.18 Glenmhor have provided the current key best practice considerations for the delivery of major construction projects, and these have been initially reviewed by officers and either are already being adopted or are agreed to form part of the improved approach being implemented. In summary the improvement actions and status are as follows:

Topic/area	Improvement Action	Status
Governance and Management	Clear roles and responsibilities (SRO, Project Board, Independent Assessment/Verification, CoW);	Adopted
Contractual strategy and risk allocation	Consider adopting Design & Build forms of contract for future school projects to achieve clearer allocation of design and construction risk to the contractor.	Adopt as appropriate
Design Management	Structured design gateways and sign-off milestones.	Adopted
Design completeness and continuity	Require a defined level of design completeness (including structural and M&E coordination) before main construction works commence.	Adopted
Design completeness and continuity	Introduce formal “design freeze” milestones and ensure structured handovers when key design personnel change.	Adopted
Quality assurance and NCRs	Mandate a project-specific Project Quality Plan, including inspection and test plans and a formal NCR process.	Adopted
Quality assurance and NCRs	Require that all non-conformances are recorded, tracked and closed out, and that refusal to operate an NCR process is not accepted.	Adopted
Site supervision and independent verification	Appoint a full-time Clerk of Works on major projects to systematically monitor quality and maintain photographic records.	Adopted
Site supervision and independent verification	Appoint an Independent Tester to verify that key stages and completion criteria have been met before handover.	Adopted
Use of digital tools	Implement digital systems such as Viewpoint (for document management) and Fieldview (for on-site QA) to create a reliable and time-stamped audit trail of inspections, tests, decisions and changes.	To be adopted – procurement to progress
Governance and documentation	Establish standard governance arrangements for major capital projects (Project Sponsor, Project Board, Client Representative) with clear decision-making gateways.	Adopted
Governance and documentation	Maintain a complete project completion file, including engineering certificates, QA records and a Completion Criteria Tracker.	Will be adopted

4.19 Whilst as noted the majority of the improvement actions are already being adopted / embedded within the Council’s approach to the management of major construction projects, going forward the adoption of a “Project Assurance Checklist” will seek provide an evidential summary and “sign off” approach to mitigate the risk further of

similar issues occurring to those identified at Maddiston in the future. The project assurance checklist will be completed by the Project Manager and "signed off" by the appropriate project board / delivery group that will incorporate the various construction professionals, contractors involved in delivery of the project and Council Officers. This will be a live document throughout the life of the project and concluded upon completion. For all major projects there will also be post project and post occupancy reviews to further enhance lessons learned and drive continuous improvement.

4.20 Training will be provided to all Project Managers, Contract Administrators, Clerks of Works and technical staff as appropriate to ensure that digital tools, QA processes and contract administration duties are consistently applied.

Maintenance Repairs

4.21 Following its opening, Maddiston Primary School has been subject to the Council's normal maintenance regime. The structural and further investigations undertaken after the storm damage concluded that the extensive deficiencies identified whilst originating in the original construction were concealed behind finishes and therefore would not be evident as part of normal maintenance processes.

4.22 Available maintenance records show no indication that these issues were visible or reported previously. Asset Management Plans / Condition surveys undertaken during the building's life have been non-intrusive and would not detect hidden structural defects of the type uncovered by the more intrusive investigations in 2025.

4.23 The RCA did not focus on the maintenance regime since construction and therefore did not undertake a comprehensive review of the historic maintenance arrangements due to the limited availability of documentation.

4.24 Based on the evidence available to officers, there is no indication that maintenance practices contributed to the underlying defects.

Checks on Other Schools

4.25 To ensure that similar issues were not prevalent at other schools, intrusive surveys were undertaken on all similar external walls. Minor issues identified from these have been followed up with appropriate works undertaken.

4.26 It should be noted that as part of the adoption of a Corporate Property/Landlord approach to the management of the council's estate, condition surveys by external building surveyors have been undertaken over the past 18 months to all schools. These are being utilised to prioritise planned maintenance and improvement works and have supported the development of the Councils schools planned improvement programme and will feed into the Learning Estate Review which was approved by the Council on 11 December 2025.

Potential Legal Action

4.27 The Council via external legal advisors has written to Graham Construction, the main contractor who built the school advising of the findings of the Building Appraisal Report (presented to Special Council 6 November 2025). A response has been received and has been reviewed with further correspondence to be issued on the

Councils behalf. Officers will continue to engage the specialist legal advisors in relation to potential legal action. A detailed confidential briefing will be arranged in the future to consider the Councils legal position. This will be confidential to protect the Councils commercial and legal interests.

5. Consultation & Engagement

5.1 All members were provided the opportunity to attend a briefing on the previous report presented to Council on 6 November 2025 where some of the issues outlined in this report were also considered. In addition, all members have been provided the opportunity to attend a specific briefing on the content of this report.

5.2 Former employees of the Council with roles and responsibilities involved in the delivery of the project were provided with an early draft of the report to provide comments. The one existing employee who remained with the Council until recently was also provided a copy of the report for comment.

5.3 Parents, teachers and stakeholders have been kept updated on the arrangements for the school during the decant phase, the partial remobilisation phase and when reports have been presented. In addition, regular updates have been provided periodically.

5.4 External engagement has been limited to Glenmhor in relation to the Root Cause Analysis report.

6. Implications

Council Plan

6.1 The Council Plan can be viewed at Policies and strategies: Council Plan 2022 - 2027 - Falkirk Council.

6.2 The implications arising from this report in relation to the Council Plan Priorities and Enablers are:

Council Plan Priorities	
Supporting Stronger & Healthier Communities Communities that are empowered, inclusive, resilient and safe.	☒
Promoting Opportunities and Educational Attainment and Reducing Inequalities Educational excellence, reduce poverty & inequality, and improve wellbeing.	☒
Supporting a Thriving Economy and Green Transition An economy that is competitive, entrepreneurial, inclusive, and sustainable and an environment that we value, enjoy, protect and enhance.	☐

Council Plan Enablers	
Financial Sustainability	
Strategic	☐
Operational	☐
Transformation and Improvement	☒
Valued Sustainable Workforce	☐

Financial

6.3 The Council has committed £14 million to reinstate Maddiston Primary School. If the Council pursues legal action, there will be costs associated with this which will require to be funded "at risk" from within existing budgets. In addition to the capital costs £1.5m (2025/26 to 2027/28) has been allocated to support revenue consequences associated with the decant of the school and other associated costs.

Resources

6.4 As part of future project management arrangements additional staff and external advisors will be deployed to ensure that construction quality, contractor supervision and project governance arrangements are comprehensive and robust. Whilst these additional arrangements will incur extra costs associated with project budgets, allowances have been made within all existing major projects approved as part of the Councils General Fund Capital Programme (2026/27 to 2030/31).

6.5 Should the Council seek to pursue legal action there will be staff commitments from legal, property and other services. These will be augmented and supported by specialist external advisors as appropriate.

Legal

6.6 Officers are currently engaged with specialist external legal advisors on the implications of the findings of both the building appraisal report and the root cause analysis report. This engagement is considering any potential future legal action that may be applicable against those involved in the original construction of the school.

Risk

6.7 The adoption of a Project Assurance Checklist will significantly strengthen risk management arrangements for major construction projects. Further risks and mitigations are noted as follows:

Risk	Mitigation
Lessons will not be learned, and errors are repeated	Project Assurance Checklist, Staff Training & Post Project Review.

Parents will be alarmed by content of this report	Direct communication has occurred with parents since the issues arose to explain the situation to provide re-assurance.
Parents feel that the Council has failed in its duty of care to their children	Direct communication has occurred with parents since the issues arose to explain the situation to provide re-assurance.
Other educational properties suffer from the same defects	All schools have been subject to a survey and confirmed as safe.

Equalities

6.8 No equality or poverty impact assessment is required for this report.

Sustainability/Environmental Impact

6.9 A sustainability / environmental impact assessment is not required.

Impact on Climate Change Targets

6.10 There are no climate change implications directly relating to the report recommendations.

7. Conclusion

7.1 The Root Cause Analysis concludes that the Graham Construction (and their sub-contractors and their advisors) did not adhere to the terms of the construction contract terms or normal construction management arrangements adopted across the sector back in 2007. The failings in their management of construction quality were the primary factors resulting in the deficiencies subsequently discovered following the storm in 2025.

7.2 Whilst Graham Construction were primarily responsible for the poor construction quality, the Councils governance arrangements and management approach including site supervision, construction quality practices, and overall management (including record keeping) were inadequate,

7.3 Many of the resulting defects could have been avoided had appropriate diligence, robust quality assurance and effective oversight been applied. The RCA also concludes that incomplete project records and the passage of time mean that some responsibilities, including the precise individuals signing off key stages, cannot be definitively identified.

7.4 Officers, supported by external legal advisers, are engaging with Graham Construction and will continue to assess legal action to be taken against parties

involved in the original construction. The legal aspects will be subject to a future confidential briefing.

7.5 The lessons learned from the RCA will be incorporated into a new Project Assurance Checklist, which will apply to all future major construction projects to ensure robust approaches to build quality and improved governance arrangements. Key measures include mandatory Non-Conformance Report processes, digital Quality Assurance systems, design freeze points, deployment of a full-time Clerk of Works and an Independent Tester on major projects and training for staff in modern construction Quality Assurance and effective contract administration.

Director of Place Services

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Date: 5 May 2026

Appendices

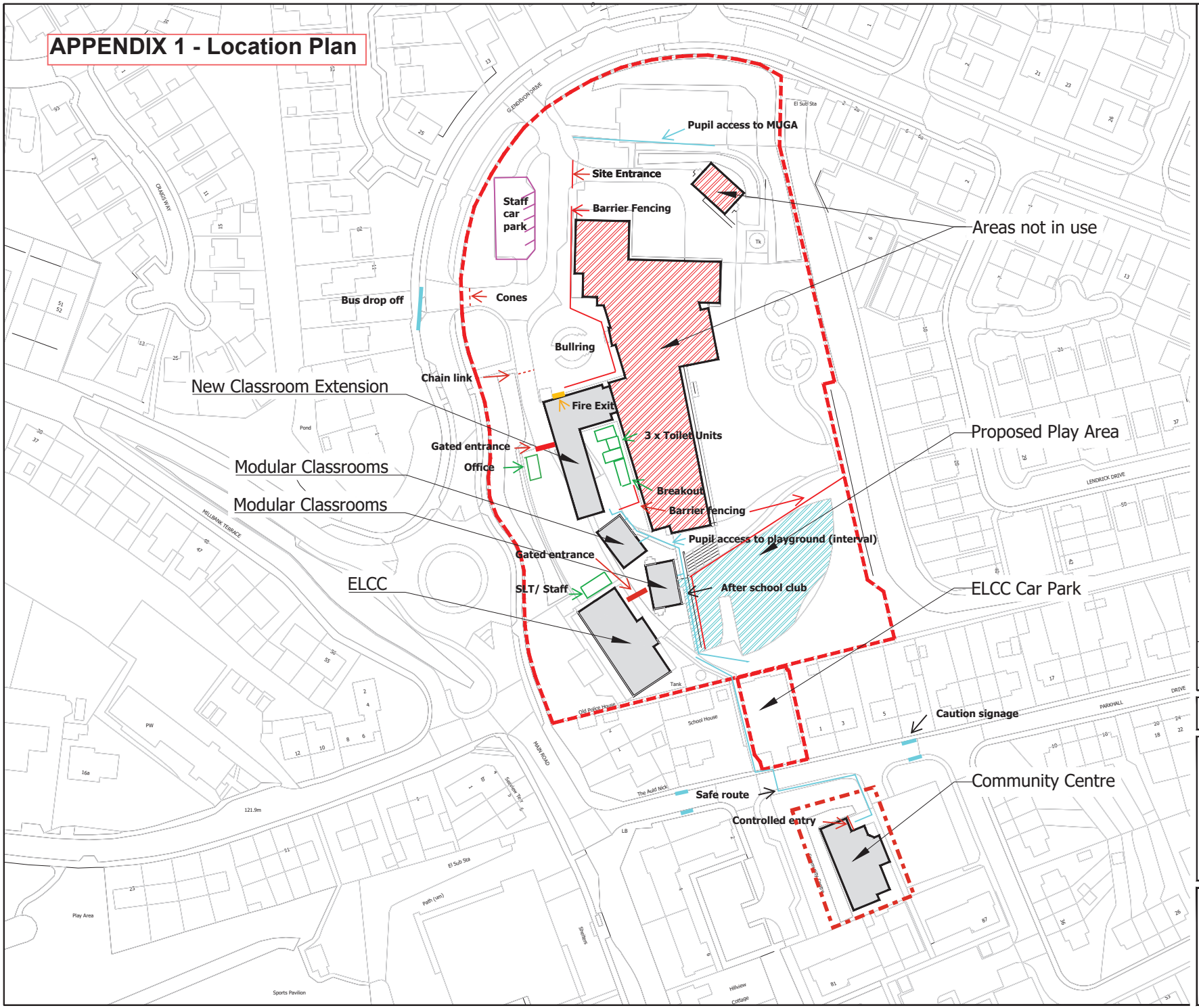
Appendix 1 – Location Plan (areas re-occupied and requiring works)
Appendix 2 – Root Cause analysis summary
Appendix 3 – Table of Key Findings, Responsibility and Mitigations

List of Background Papers

The following papers were relied on in the preparation of this report in terms of the Local Government (Scotland) Act 1973:

- Maddiston Primary School – Prior Consideration and Update Report – Council Executive - 19 June 2025
- Maddiston Primary School - Update – Special Council - 6 November 2025

APPENDIX 1 - Location Plan



Notes:
1. No dimensions to be scaled from this drawing.
2. Contractor to check all sizes on site.
3. All drainage to comply with BS 8301 and to be to the satisfaction of the Building Control Authority.
4. All electrical work to comply with BS7671 and to be to the satisfaction of the Building Control Authority.

REV:	DESCRIPTION:	BY:	CHK:	DATE:
-	-	-	-	xx/xx/xx

STATUS: -

PROJECT: Maddiston Primary School
-

TITLE: Location Plan
-

SCALE AT A3:	DATE:	DRAWN:	CHECKED:
1:1250	May '25	IWB	-

PROJECT NO:	DRAWING NO:	REVISION:
MAD	-	-

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APPENDIX 2 – ROOT CAUSE ANALYSIS SUMMARY

Why was the RCA commissioned?

- In January 2025, Storm Eowyn damaged the school and triggered intrusive structural investigations.
- These investigations revealed widespread hidden construction defects in the original 2006–08 building.
- In June 2025, Council Executive commissioned an independent Root Cause Analysis from Glenmhor Property Consultants to understand:
    - What went wrong in the original build and subsequent years.
    - Who was responsible for decisions and oversight; and
    - What must change to prevent a recurrence.

Scope and Limitations

The Root Cause Analysis (RCA) undertaken by Glenmhor Property Consultants considered:

- Original design, procurement, construction by Graham Construction and fire reinstatement (2006–2008).
- Available documentation relating to inspections, quality assurance and sign-off.
- The discovery of defects following Storm Eowyn in January 2025; and
- Current best practice in construction quality assurance and project governance.

Due to the age of the project and the loss of many original records (including elements of the contractor's QA file, site inspection documentation, engineering certificates and records of fire reinstatement works), several conclusions are drawn on the balance of available evidence rather than complete project records. The RCA cannot definitively identify all individuals who signed off key stages of the project.

The RCA did not focus on the assessment of historic and current maintenance, and this has been separately considered and commented upon from a review of records available by Council Officers.

Summary of Root Causes – Original Construction and Fire Reinstatement

Key underlying issues identified by Glenmhor are:

1. **Programme and procurement pressures**
    - Construction started with unresolved issues on site levels and drainage after third-party filling of the site.
    - The original timber kit subcontractor (Deeside Timber) withdrew; the replacement (OFP Timberframe) was appointed late and given a compressed design and manufacture lead-in period compared to the original 12-week requirement.

- The project was under programme pressure from an early stage, with repeat Extensions of Time, a major fire and a final delay of around 12 months to the original completion date.

2. Design completeness and continuity

- Elements of the structural and architectural design were not fully resolved before work commenced on site (e.g. new column positions, lift shaft dimensions, stair details, balcony structure).

- There were three changes in the Architect/Contract Administrator roles during the construction period, which disrupted continuity and delayed the production and coordination of design information.

- There were recurring issues with M&E drawings not reflecting revised layouts and with the adequacy of timber frame bracing and fixing details.

3. Quality assurance and documentation

- There is no evidence of a robust, project-specific QA plan from the contractor (Graham Construction).

- The contractor not providing Non-Conformance Reports (NCRs), which Glenmhor notes is not normal industry practice.

- Specific test results and structural concerns if identified during construction are not recorded as being discussed and resolved at site meetings. Records on these are incomplete.

- Contractors Site records, photographs and QA documentation provided to the Council or the Councils responsibility are partial or missing, particularly in relation to critical structural elements and remedial works.

4. Site supervision and inspections

- Glenmhor note that the level of presence and recorded intervention by the Clerk of Works in the early stages of the project appears limited relative to the number and seriousness of issues being raised.

- There is limited evidence of Design Team members witnessing key stages (e.g. timber frame erection, balcony installation) before works were covered up.

- Some remedial works (e.g. concrete pours, fire repairs) were not witnessed by the Clerk of Works, and inspection outcomes were not consistently documented.

5. Structural concerns and post-fire works

- The Structural Engineer repeatedly raised concerns about the timber frame bracing, glulam beams, balcony structure, deflecting lintels and rubble walling.

- Glenmhor did not have access to engineering certificates confirming that all these concerns were satisfactorily resolved.

- The fire created a separate, insurer-led repair phase. Documentation about the extent of damage, the scope of reinstatement and the identity and supervision of subcontractors involved is incomplete.

6. Governance and responsibilities

- Based on the management structure at the time, strategic responsibility lay with the Director of Development Services, Senior Management responsibility and oversight was with the Head of Roads, Design and Transport with management sitting with the Building Design Manager. Day-to-day contract administration being the responsibility of the Councils Design Co-ordinator/Architect/Contract Administrator.

- However, gaps in documentation mean that the RCA cannot conclusively identify all senior officers or external parties who signed off Practical Completion or final approvals.

7. Lessons Learned and Recommended Mitigations

Glenmhor identifies the following key lessons and recommended mitigations:

a) <u>Contractual strategy and risk allocation</u>

- Consider adopting Design & Build forms of contract for future school projects to achieve clearer allocation of design and construction risk to the contractor.

b) <u>Design completeness and continuity</u>

- Require a defined level of design completeness (including structural and M&E coordination) before main construction works commence.

- Introduce formal “design freeze” milestones and ensure structured handovers when key design personnel change.

c) <u>Quality assurance and NCRs</u>

- Mandate a project-specific Project Quality Plan, including inspection and test plans and a formal NCR process.

- Require that all non-conformances are recorded, tracked and closed out, and that refusal to operate an NCR process is not accepted.

d) <u>Site supervision and independent verification</u>

- Appoint a full-time Clerk of Works on major projects to systematically monitor quality and maintain photographic records.

- Appoint an Independent Tester to verify that key stages and completion criteria have been met before handover.

e) Use of digital tools

- Implement digital systems such as Viewpoint (for document management) and Fieldview (for on-site QA) to create a reliable and time-stamped audit trail of inspections, tests, decisions and changes.

f) Governance and documentation

- Establish standard governance arrangements for major capital projects (Project Sponsor, Project Board, Client Representative) with clear decision-making gateways.

- Maintain a complete project completion file, including engineering certificates, QA records and a Completion Criteria Tracker.

Overall Glenmhor Conclusion

The RCA concludes that the poor quality of construction by Graham Construction of Maddiston Primary School resulted from a combination of:

- Contractor and sub-contractor performance

- Inadequate design completeness, design management and continuity.

- Programme pressure and late procurement of key subcontractors.

- Weaknesses in quality assurance and site supervision.

- Incomplete documentation of structural approval and fire reinstatement; and

- Governance and record-keeping arrangements that do not clearly evidence how and by whom key decisions were taken.

Maintenance Regime

A separate review by officers in relation to the maintenance arrangements since construction completion identified the following –

- The separate investigations on the issues encountered following the storm in 2025 conclude that the extensive construction defects are consistent with issues originating in the original construction and/or the post-fire reinstatement, rather than the lack of maintenance activities.

- Available maintenance records and condition surveys did not indicate awareness of the latent structural defects, which were concealed behind finishes.

- Condition surveys were non-intrusive and, by their nature, would not have detected the concealed deficiencies revealed by intrusive investigations.

- Due to limited availability of maintenance documentation, the RCA provides only a high-level view of maintenance but found no evidence that maintenance practices contributed to the origin of the defects.

APPENDIX 3 - Table of Key Findings, Responsibility and Mitigations

The following table identifies the deficiency or issue that occurred back in 2007, and how the current approach, best practice mitigations that adopted by the Council.

Deficiency Identified	Responsibility (2007 Structure & Contract Roles)	Mitigation/Best Practice
Late appointment of timber kit subcontractor and inadequate design lead-in period	Contractor (Graham); Council Architect/Contract Administrator (CA); Structural Engineer	Ensure timely procurement; 12-week minimum lead-in; full technical submissions; pre-manufacture design sign-off; escalation where programme risk threatens quality
Use of superseded drawings on site	Contractor (primary responsibility); CA (oversight)	Implement controlled document management; site drawing registers; toolbox briefings to confirm latest revisions; digital Common Data Environment (e.g., Viewpoint)
Incomplete, late or changing architectural and engineering design information	Council Architect/CA; Head of Roads, Design and Transport (line management)	Clear design programme; design freeze milestones; continuity planning for staff changes; technical review before issue; structured handovers between Architects
Multiple changes in Project Architect leading to loss of continuity	Falkirk Council – Architect/CA; Head of Roads, Design and Transport	Succession planning; formal project handover packs; design/decision logs; governance requiring continuity during critical phases
Inadequate supervision of the timber kit subcontractor	Contractor; CA; Structural Engineer	Regular technical meetings; site inspections of critical stages; review and approval of bracing, fixings and glulam details; Independent Tester oversight
Lack of Contractor Non-Conformance Reports (NCRs)	Contractor (non-compliance); CA (should enforce contract)	Mandatory NCR process; clear escalation procedures; requirement to document all non-conformances; withholding certification where compliance is refused
Weaknesses in contractor QA processes (no QA plan, incomplete records)	Contractor; CA (oversight)	Contractor QA Plan compliant with ISO 9001; inspection and test plans; documented concrete tests; digital QA tracking (Fieldview)
Clerk of Works not consistently identifying or escalating issues	Clerk of Works; Architect (line manager); Head of Roads, Design and	Full-time CoW presence on major projects; structured inspection regime; digital photographic evidence;

	Transport (oversight)	escalation policy for unresolved issues
Structural concerns (glulam beams, balcony, lintels, retaining walls) inadequately resolved in records	Structural Engineer; Contractor; CA	Require complete structural sign-off before covering works; retain certificates; pre-closure inspections; Independent Tester involvement
Significant deflection and inadequate support in random rubble gable and lintels	Contractor (construction quality); Structural Engineer (design oversight)	Proper propping and redesign confirmation; recorded remedial actions; approval prior to continuation
Incomplete documentation of post-fire remedial works	Contractor; Contractors Insurer; CA	Full fire damage assessment; documented repair designs; engineering certification; updated O&M records; Building Standards engagement
Programme pressure leading to quality compromises	Contractor; CA; Head of Roads, Design and Transport	Realistic baseline programme; detailed Extension of Time assessments; governance oversight of time-risk; refusal to compress critical design stages
Site levels and drainage not ready at contract start	Council (site handover responsibility); Contractor (verification)	Joint pre-start site readiness inspection; rectification before commencement; proper recording of responsibility and cost
Errors in lift shaft dimensions, balcony details, M&E coordination	Contractor (coordination); Architect/CA; M&E Engineer	Coordination workshops; clash detection; timely issue of revised layouts; structured RFI process
Lack of engineering certificates and incomplete project records	Contractor; CA; Structural Engineer	Retention of full certification; document control system; project completion file; Independent Tester quality gate
Maintenance regime unable to detect latent defects	Latent defect nature (not attributable to maintenance staff)	Planned intrusive inspections at lifecycle intervals; risk-based FM reviews informed by full handover documentation