RESEARCH ANALYSIS NO. 5

Cost controls and program delivery framework

Continuous improvement, lasting value

CLADDING SAFETY Victoria

VICTORIA State Government

Aboriginal acknowledgement

Cladding Safety Victoria respectfully acknowledges the Traditional Owners and custodians of the land and water upon which we rely. We pay our respects to their Elders past, present and emerging. We recognise and value the ongoing contribution of Aboriginal people and communities to Victorian life. We embrace the spirit of reconciliation, working towards equality of outcomes and an equal voice.

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Executive Summary

In response to the widespread use of combustible cladding across Victoria, Cladding Safety Victoria (CSV) adopted a risk-based methodology to prioritise and fund cost effective solutions for cladding rectification. The Cladding Risk Prioritisation Model (CRPM), introduced in 2020, provided the first structured, risk-based framework to prioritise funding decisions, while the Protocols for Mitigating Cladding Risk (PMCR), implemented from December 2023, marked a turning point toward proportionate, cost-effective solutions for both lower and high-risk buildings.

The operational landscape in the initial stages of CSV's program delivery was characterised by an unknown problem set, an absence of clear risk thresholds resulting in regulator preference for full removal of cladding risk, complex legal issues with respect to common versus private property and an expected reliance on potentially compromised building practitioners such as fire engineers and building surveyors.

This report evaluates the evolution of CSV's approach, from initial establishment through to the implementation of risk-informed methodologies and internal solutions, highlighting the cost controls and efficiencies achieved as the program matured.

The key findings are:

- As CSV knowledge of cladding risk improved the average rectification costs decreased. The average costs per building decreased from $1.24 million in 2022 to $630,000 in 2023, followed by a further decrease to $540,000 in 2024. These figures represent a 49 per cent and 14 per cent reduction, respectively.
- Full cladding removal, being the predominant remediation approach between 2019 and 2022 (83–100 per cent of projects), shifted significantly toward partial cladding removal after 2023 (75 per cent in 2023 and 80 per cent in 2024). This transition reduced rectification costs from $1.24 million in 2022 to $540,000 in 2024, demonstrating the program's overall increasing efficiency.
- By developing internal capability and centralising the due diligence function, CSV reduced its reliance on external consultants and achieved stronger value outcomes, reducing average due diligence costs from $26,121 per building to $6,214 per building, representing a 76 per cent decrease in overall due diligence costs.

- The introduction of the Linear Regression Model in 2023, developed to predict the cost of cladding rectification projects using data from completed works, has reduced the variance between initial cost plans and final project budgets from 18 per cent in 2022 to 12 per cent in 2023, and just 4 per cent in 2024. Significant costs were also avoided by no longer relying on independent quantity surveyors, allowing CSV greater control in managing its costs and budget outlays.
- To strengthen financial governance and improve cost management CSV developed a suite of contract management frameworks, including the Variations, Budget Management and Contingency Framework (VBMAC). As at July 2025, the VBMAC has contained total construction budget variations to just 1 per cent and CSV-specific variations to 4 per cent.
- The introduction of the Ministerial Guideline 15, the Cladding Risk Mitigation Framework (CRMF) and the Protocols for Mitigating Cladding Risk (PMCR) delivered a 52 per cent reduction in the cost of treating cladding risk.
- The PMCR's targeted measures, which are designed to achieve a risk profile equivalent to that of full cladding removal, meant that only an estimate of 10,730m^2 of cladding material required removal. This was found to be approximately 70 per less than the estimated amount of 37,600m^2 required for full cladding rectification.
- Projects completed post December 2023 were delivered between 37.2 per cent and 45 per cent faster across all building height categories. CSV was able to achieve this significant improvement over the course of the program through its collaborative relationship with the contractors it engaged, such as Independent Project Managers and the Clerk of Works who provided a valuable contribution to the final outcomes.

The program's success highlights that CSV is an organisation which continually applies the lessons learned to improving its processes, and positions Victoria as a leader in cladding rectification. CSV is recommending that the PMCR be adopted as an Australian Standard and cited in the National Construction Code, offering a scalable, transparent model for other jurisdictions to manage large-scale construction programs more effectively.

1. Background

1.1 About the Cladding Rectification Program

Cladding Safety Victoria (CSV) is responsible for delivering the Victorian Government's $600 million Cladding Rectification Program. As of August 2025, CSV has funded cladding rectification work for 450 privately-owned apartment buildings affected by combustible cladding. As at the time of publication, more than 415 buildings with rectification works are complete. This means that approximately 21,000 homes and more than 38,000 Victorians are now safe from the dangers of combustible cladding. CSV has also supported Government departments and agencies to rectify 130 public buildings, of which all are complete.

1.2 The scope of Victoria's cladding issue

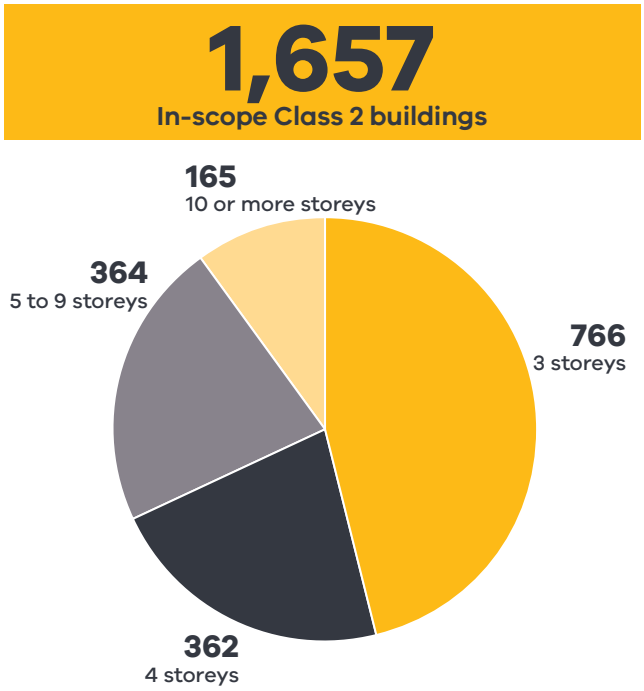
At its commencement in July 2019, CSV's first objective was to develop a process to prioritise funding for rectification works according to a building's combustible cladding risk. CSV encountered two key challenges when designing the prioritisation process. The first challenge related to the increasing program scope and the need to develop a dynamic approach to building prioritisation. The second challenge was the need to develop a more tailored cladding risk assessment tool to ensure funding could be accurately targeted.

Initially, the program scope was unclear and it was estimated that there would be 500 buildings within scope. The scope has increased over the life of the program as buildings continued to be referred to CSV by the then VBA-led Statewide Cladding Audit (SCA), and from 1 December 2020, the CSV establishing legislation provided the power for each of the 79 Victorian Local Government Councils to refer buildings directly to CSV. Subsequently CSV was responsible for the identification of a considerable number of buildings.

CSV ultimately assessed 6750 buildings, including class 2, 3, 9 and government owned buildings. Buildings assessed by CSV to determine if they were in scope included those referred by the SCA, by local councils under section 27 of the CSV Act and through proactive assessment activities undertaken by CSV to ensure all relevant buildings in Victoria had been considered for CSV assistance.

Within Victoria, there are currently 1657 buildings within scope for CSV's residential cladding rectification program

Figure 1. The Victorian problem set broken down by rise in storeys



Victoria is one of the few jurisdictions worldwide to include buildings lower than 18 metres in height within the scope of its cladding program, bringing many low-rise buildings into focus, as illustrated in Figure 1. This decision, made by the Victorian Cladding Taskforce and based on expert advice, recognised that risks were not confined to high-rise structures. The breakdown of Victoria's problem set shows that 68 per cent of affected buildings are only three or four storeys, demonstrating that the majority of remediation effort has been directed toward low-rise buildings that other jurisdictions may have overlooked.

In Victoria, the type of cladding that represents a risk is considered to be both Aluminium Composite Panel (ACP) and expanded polystyrene (EPS). Both ACP and EPS are combustible and are therefore prime products targeted for replacement. The specification and use of these materials is almost always non-compliant, as confirmed by CSV's previous *Research Analysis: Compliance in Building Design* Report. That Report found that in 72 per cent of buildings reviewed, ACP or EPS products had been specified in building design documentation but had not been assessed for compliance as required.

1.3 A risk-prioritisation approach to cladding rectification

In keeping with the recommendations of the Victorian Cladding Taskforce, the Victorian Government required funding to be targeted at buildings facing the highest risk from cladding. By conducting thorough due diligence on referred buildings CSV was able to understand building typologies and ultimately a more comprehensive understanding of cladding risk. This information enabled CSV to develop a dynamic approach to building prioritisation and ultimately the Cladding Risk Prioritisation model (CRPM).

Cladding Risk Prioritisation Framework (CRPM)

To this end, CSV initiated a project to develop a methodology for the assessment of risk for residential apartment buildings to ensure that the buildings with the highest cladding fire risk were subject to funding decisions for rectification works.

Using the advanced risk and data analytics capability of Commonwealth Scientific and Industrial Research Organisation (CSIRO) Data61, together with the building construction and fire safety expertise available to CSV, a Cladding Risk Prioritisation Model (CRPM) was developed.

This process involves measuring the risk posed by in-scope combustible cladding on the façades of all referred buildings and determining the comparable risk of fire spread via cladding on each building. This allows for the early identification of buildings where a worst-case cladding-fuelled fire has a plausible potential to produce a fire of a scale that would be difficult to control and undermine safe evacuation.

The CRPM introduced the Initial Fire Spread Assessment Number (IF-SCAN),[1] which is calculated for each building to estimate the maximum foreseeable fire spread associated with cladding. The IF-SCAN represents an estimate of the apartments that would be directly impacted under a worst-case scenario fire that ignites and spreads via combustible cladding prior to the first suppression response by firefighting agencies.

Using the CRPM, CSV has overcome the challenges posed by the increasing program scope and the need for a specific cladding risk assessment by a third party (e.g. fire safety engineer). CSV now applies its own risk modelling method to evaluate the risk posed specifically by cladding on each building. CSV uses the CRPM to prioritise buildings within scope of the program for rectification based on cladding risk and, in doing so, better aligns the delivery program and budget use to the program purpose.

The CRPM generates a prioritised list of buildings and allows CSV to focus its funding decisions on reducing the riskiest applications of cladding. The primary principles for the CRPM are to:

- Assess actual fire risk based on factors such as cladding type and placement, building height, occupancy, and sprinkler protection.
- Prioritise buildings where cladding could give rise to relatively large facade fires.
- Deprioritise buildings where cladding could give rise to a relatively small facade fire.

The IF-SCAN supports CSV in prioritising buildings for funding and is used to allocate buildings to one of three categories of unacceptable cladding risk, elevated cladding risk and low cladding risk as illustrated in Figure 2.

Figure 2. CRPM risk categories and definitions

1 Cladding Safety Victoria – *Protocols for Mitigating Cladding Risk: Cladding Risk Prioritisation Model Methodology B.01 – Overview/Approach,* 13 March 2024. CSV has also published the results of a series of fire tests on cladding products which are also available on CSV's website.

Determining a building's risk level under the CRPM is carried out in two phases: a desktop review of key documents followed by a field assessment. A quantitative estimate is subsequently made by following three key steps:

1. Identifying the worst-case cladding ignition point.
2. Assessing the plausibility of cladding ignition at the selected location.
3. Estimating the number of apartments directly impacted.

This structured risk assessment ensured buildings categorised as having an Unacceptable Risk were prioritised for remediation and deemed eligible for government funding.

Protocols for Mitigating Cladding Risk

The Protocols for Mitigating Cladding Risk (PMCR) were developed later in the program using a science-led method validated through a peer review process that forms the evidence base for its standards. The original purpose of the PMCR was to offer risk-proportionate remediation solutions for owners of lower-risk buildings not eligible for government funding. These solutions were formalised through Remediation Works Proposals comprised of either:

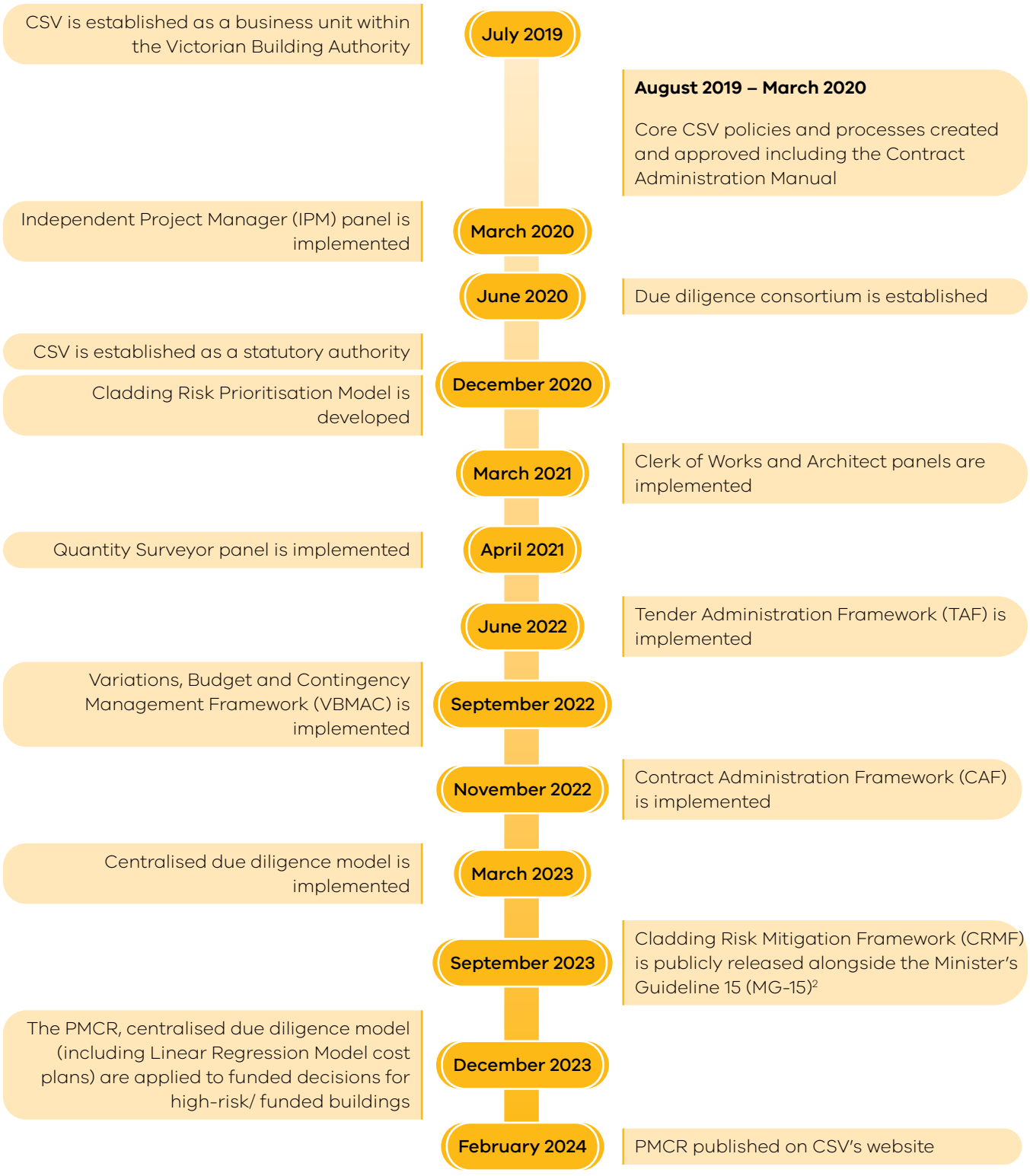
- targeted cladding removal;
- enhanced fire safety upgrades; or
- a combination of both.

It should be noted that in some cases, full-scale removal may still be justifiable based on the assessed level of risk. The PMCR does not exclude this option but provides a risk-proportionate alternative.

This approach has delivered optimal safety outcomes while allowing remediation to be conducted in a cost-effective and efficient manner. Subsequently, it was determined that the PMCR methodology could also be applied to higher-risk buildings. In December 2023, CSV began funding buildings based on PMCR solutions, prompting a significant shift in CSV's overall approach to cladding remediation.

Risk identification and the determination of an appropriate remediation strategy are undertaken during CSV's due diligence phase. This process involves physical inspection, material sampling and building defect analysis, ensuring that each building's specific risks and complexities are considered. During this phase, a cost plan is developed using the Linear Regression Model to estimate the cost of remediation and support the funding approval process (see section 2.2).

Key dates and milestones



2 *MG-15: Remediation Work Proposals for mitigating cladding risk for buildings containing combustible cladding* – this is a guideline issued by the Minister for Planning pursuant to section 188(1)(c) of the *Building Act 1993*. Municipal building surveyors and private building surveyors must have regard to this Guideline pursuant to section 188(7) of the Building Act.

2. Context

2.1 Methodology

The objective of this report is to evaluate the effectiveness of a risk-proportionate approach to cladding rectification and to quantify the value delivered by CSV's cost management solutions. The analysis is based on data sourced from CSV's internal databases which has been systematically collected over the duration of the program.

Quantifying the value of CSV's progress and reforms involved observing data relating to buildings admitted into the Cladding Rectification Program between 2019 and 2024. The analysis was based on the following data.

- cost plan estimates
- project budgets
- actual project costs
- actual due diligence costs
- solution type
- admission date
- building height
- project scope (cladding removed per square metre).

Assumptions

Actual project cost data relates to buildings with major works complete and therefore does not represent all projects delivered under CSV's program, particularly those with ongoing works; however, the relative sample size includes approximately 75 per cent of 448 buildings approved for funding and is therefore considered large enough to sufficiently identify meaningful trends and to reduce the risk of sampling error. This sample is considered representative of the broader program cohort and provides a reasonable basis for evaluating the effectiveness of CSV's risk-prioritisation rectification and cost management strategies.

It should also be noted that the costs described at 'major works complete' reflect the total cost at the time the construction works were finalised. These figures may be subject to minor variation due to outstanding project management fees or final adjustments not yet processed at the time of reporting.

Remediation Work Proposals implemented under the PMCR can include targeted cladding removal, enhanced fire safety upgrades or a combination of both. In the context of this report, 'partial cladding removal' is used as a broad descriptor encompassing all three approaches as each represents an alternative to full cladding removal, while achieving the same risk mitigation objective.

Limitations

This study relies solely on data from internal databases, which introduces a potential margin for human error during the extraction and processing phase. Additionally, the absence of external data sources limits the ability to validate results. As no relevant external data was available for comparison, the findings should be interpreted with an understanding of the constraints on data verification and external validity.

Another limitation of this study is the inability to accurately quantify the cost savings for owners corporations responsible for funding and completing Remediation Work Proposal solutions under the PMCR. This is due to lack of access to the necessary financial data as these projects were not funded by CSV and therefore fall outside its reporting systems. As a result, this report relies on qualitative evidence, with cost-saving benefits illustrated through case studies presented in Section 5 of this document.

2.2 Development of the Linear Regression Model

The Linear Regression Model applies machine learning to identify patterns in historical data and generate a predictive cost formula. It was developed using supervised machine learning, a technique that trains the model on historical data with known outcomes. In this instance, the known outcome was the cost of the completed projects.

The model was built using R, a statistical programming language commonly used for data analysis. The initial version used data from over 200 projects completed by June 2023. As additional projects reached practical completion, the dataset expanded to over 250 entries. With each update, the model's predictive accuracy improves by learning from new information.

In the development of the model, the variables collected included:

- builder
- Independent Project Manager
- construction cost
- Local Government Area
- program duration
- square metres of Aluminium Composite Panel with a polyethylene core (ACP-PE) removed
- square metres of Expanded Polystyrene (EPS) removed
- square metres of timber removed
- building height (number of storeys)
- building typology (e.g., 3 storeys = 1, 4 storeys = 2 etc.)
- building occupancy (number of sole occupancy units).

Through testing, the builder, Independent Project Manager, and Local Government Area did not prove to be significant enough variables to incorporate in the model, however the data collected can prove useful in future endeavours to compare performance. Utilising categorical variables with low statistical significance can lead to overfitting, which reduces the ability of the model to accurately predict costs of new data. However, the data collected can prove useful in future endeavours to compare performance. The program duration variable was also not used in the model to eliminate hindsight bias, as the predicted project duration may change as the project progresses. All other variables collected were utilised in the model as they showed a strong correlation to impacting the final project cost and were therefore regarded as statistically significant.

Importantly, the model allowed CSV to avoid needing to engage with costly external suppliers to provide this service, such as quantity surveyors, and gave CSV greater control over its ability to manage its costs and avoid potential over-quoting for services.[3]

Assumptions of the Linear Regression Model

When comparing the costs of partial and full cladding rectification solutions, partial cladding removal solutions were not solely defined by PMCR application. In projects where fire safety engineering solutions were used, these were also defined as partial cladding removal.

3 Professional indemnity insurers involved in the Cladding Rectification Program declined to cover private quantity surveyors. It is unknown whether this refusal stemmed from a general perception of the discipline's unreliability or the Program's government context.

Limitations of the Linear Regression Model

The model is limited by the use of architectural drawings to quantify the amount of cladding to be replaced. Drawings do not always accurately reflect the amount of cladding on the building due to changes in materials and are dependent on the skill of the user and the software used.

The Linear Regression Model assumes a linear relationship between cost and influencing variables, which may not capture non-linear trends such as market volatility. As project scope is a non-linear variable, the model may be less accurate in predicting costs for projects with dynamic factors that differ substantially from previous projects. For instance, some projects may have unique access challenges, such as rope or cantilevered scaffolding, that is not often used in smaller scale projects, which may cause the model to underestimate costs.

Updates to the model are made periodically rather than in real-time, so it is essential for the data to be updated at regular intervals to ensure the model does not become outdated. The model also relies on historical project data, meaning any inaccuracies in the data can impact estimate reliability.

Despite these limitations, CSV is confident that the Linear Regression Model remains a valuable tool for estimating rectification costs. Prior to its implementation, the model's accuracy was tested using the k-fold cross-validation method (a machine-learning tool for evaluating predictive models). The results indicated that the Linear Regression Model was significantly more accurate in predicting costs than previous methods.

3. Key findings

3.1 Initial program delivery and investment strategy

During the initial stages of the program, the funding amount allocated for each high-risk building's remediation strategy included a contingency component as delivery processes were under development and there was a degree of uncertainty across the program. This contingency was built into each project to avoid delays or funding shortfalls that may arise due to unexpected risk and associated costs.

As the first cohort of buildings (which entered the program between 2019 and mid-2022) began reaching completion, there was a notable difference between the original allocated funding amount, or initial investment, partly informed by quantity surveyors engaged by CSV at the time, and the actual cost of the project once the remediation works were complete. Additionally, as CSV's understanding of cladding risk evolved throughout the program, significant changes were made to remediation approaches which subsequently reduced the average project cost.

Between 2019 and 2024, CSV conducted an analysis of completed high-risk buildings admitted into the program, examining how rectification costs, and the variance between allocated funding and actual expenditure, had changed over time.

Figure 3. Trends for average rectification cost

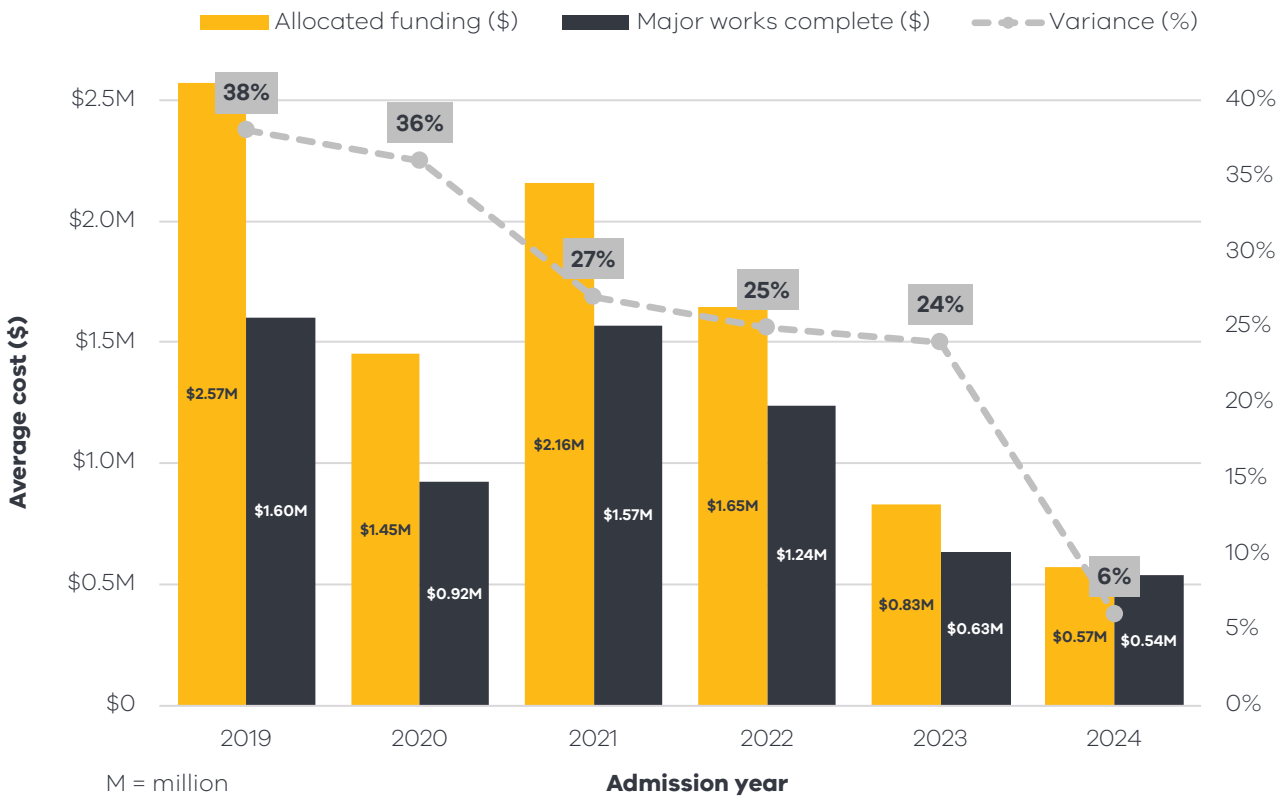


Figure 3 illustrates the average cost of rectification throughout the program, comparing funding allocation with the cost at major works complete, and highlights the percentage variance and its change over time.

Key Finding

As CSV knowledge of cladding risk improved the average rectification costs decreased. The average costs per building decreased from $1.24 million in 2022 to $630,000 in 2023, followed by a further decrease to $540,000 in 2024. These figures represent a 49 per cent and 14 per cent reduction, respectively.

Other findings from this data also show:

- The use of risk-based funding in the early years is captured during the 2019 and 2021 period. In the program's first year, savings between allocated funding and actual completion were 38 per cent per building. Comparable levels of savings were maintained over the next two years as the initial cohort of buildings progressed through the program.
- Improved access to relevant and reliable data allowed for greater precision in cost and risk planning, contributing to a steady decrease in variance between funding allocation and actual costs of work overtime. The most significant reduction occurred in 2024, with the variance decreasing from 24 to 6 per cent, reflecting the impact of the program enhancements implemented in December 2023.

Expert panels

The significant investment savings observed in Figure 3 were not only a result of contingency-based forecasting but also of strategic program and construction management. Ensuring quality in practitioner selection, on-site safety, and workmanship was a critical focus of the Cladding Rectification Program in 2019–20. CSV embedded expert capability in every part of the rectification diagnosis, design and delivery process.

Some of the key roles of CSV program partners are outlined in Table 1.

Table 1. Expert panels in early delivery

Name	Purpose
Due Diligence Team	• Carries out thorough due diligence inspections of each building to assess building safety and inform risk prioritised funding decisions. • Ensures funding is directed toward the highest-risk buildings.
Architects Panel	• Guides the design of optimal rectification solutions compliant with BCA (Building Code of Australia) standards. • Reduces the risk of non-compliant work which would otherwise result in rework, delays or enforcement action.
Quantity Surveyor Panel	• Provides reliable cost plans for each rectification solution prior to funding decisions being made that serve as benchmarks for tendered project prices. • Cost plans establish early financial boundaries guiding procurement, design and delivery decisions. • Supports financial monitoring during the project lifestyle.
Independent Project Manager (IPM)	• Coordinates, monitors and oversees construction works delivery to ensure compliance with the contract between the owners and the builder as well as the funding agreement between CSV and the individual owners corporation for each project. • Provides a structured accountable system where poor performance can be identified using centralised metrics. • IPM performance is incentivised therefore promoting improved delivery outcomes.
Clerk of Works Panel	• To undertake routine site inspections throughout the construction phase to ensure safe work site practices and quality workmanship is evidenced during construction. • The Clerk of Works minimises financial risk by identifying defects and safety issues early, therefore reducing the risk of rework, legal liability or compensation claims.

While the majority of these roles still support the program in 2025, they were most essential in the early stages, given the heightened need to mitigate risk and control costs. This can be demonstrated through the Clerk of Works program, which between 2021-2024 saved an estimated $350,000 per building, totaling approximately $96 million. This equates to a significant potential saving of up to seven times the cost of implementing the Clerk of Works on a per building basis. In the same period, the program identified 1,664 safety hazards that could have resulted in up to $26.2 million in compensation costs if left unaddressed.4

Additionally, various Standard Operating Procedures were established during this period to support the program of works by ensuring consistent best practice across rectification projects and related operational processes. Formalising procedures and establishing standardised models across various disciplines assisted CSV in shifting its delivery from a case-by-case approach to a program-based model.

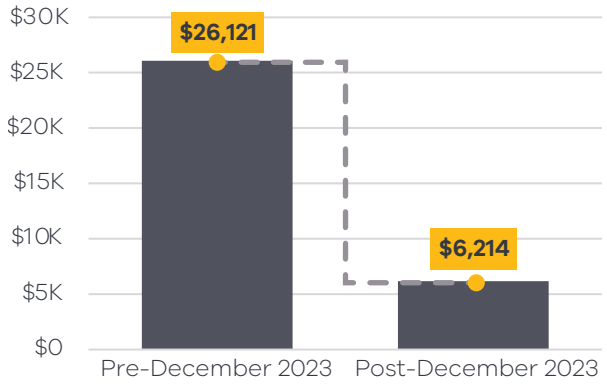
3.2 Developing internal capability and solutions

The insights gained during initial program delivery, combined with the development of internal expertise and resources, have been central to CSV's organisational growth and capability. The following analysis illustrates how this capability has translated into measurable benefits, quantifying the cost efficiencies and improved project outcomes achieved through the revised due diligence model and the Linear Regression Model. In addition, contract management reforms are also highlighted for their role in strengthening governance and boosting efficiency.

Due diligence

An analysis was conducted across two distinct building samples to quantify the value in transitioning the due diligence model into a predominantly internal function. The first sample comprised 281 buildings admitted to CSV's program prior to December 2023, during which the previous due diligence model was still in use. The second sample of buildings consisted of 80 buildings admitted after its implementation, marking the point at which buildings assessed under the new model were considered for funding.

Figure 4. Reduction in average due diligence cost per project



K = thousand

Key finding:

By developing internal capability and centralising the due diligence function, CSV reduced its reliance on external consultants and achieved stronger value outcomes, reducing average due diligence costs from $26,121 per building to $6,214 per building, representing a 76 per cent decrease in overall due diligence costs.

Figure 4 illustrates the difference in due diligence costs for the average project before and after implementation.

- Projects admitted into CSV's program under the previous model incurred an average cost of $26,121 per building.
- In contrast, projects assessed under the current model, recorded a significantly lower average cost of $6,214.
- The change in cost represents a reduction of approximately 76 per cent, or $ 19,910 per project.

4 Cladding Safety Victoria - *Research analysis No. 3 - Clerk of Works: Promoting quality and safety in construction,* January 2025

The significant decrease in cost is due to the reduced reliance on external consultants. Table 2 highlights this change by contrasting external and internal delivery of due diligence activities under the previous and current models.

Table 2. Changes in due diligence delivery

Consultant	Previous model	New model
Due Diligence Lead	✓	CSV
Façade Consultant	✓	✓
Fire Safety Engineer	✓	CSV
Quantity Surveyor	✓	CSV

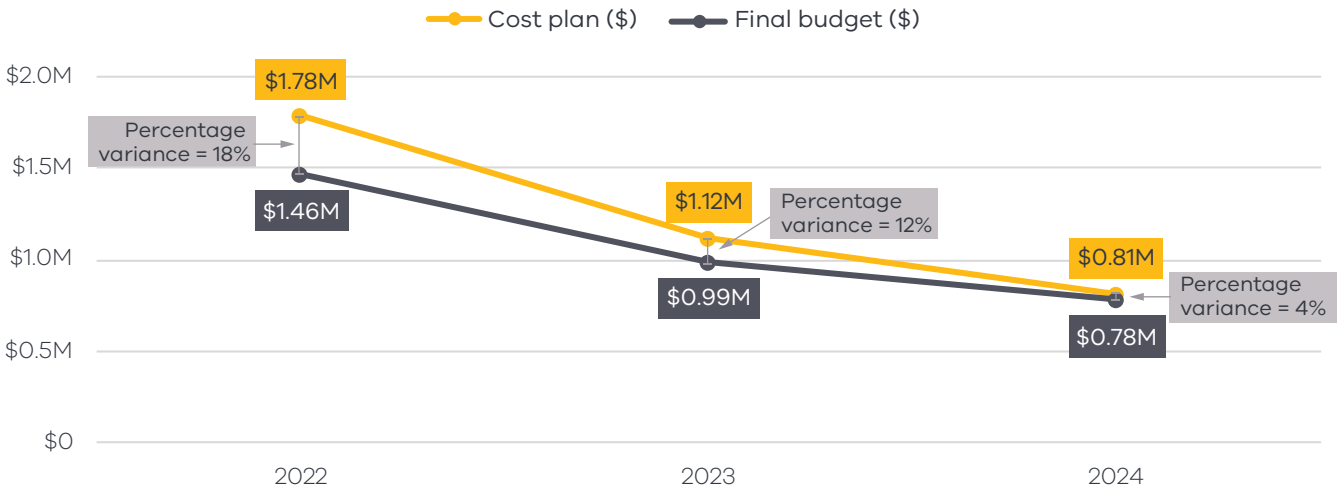
- **Fire Safety Engineer:** The Fire Safety Engineer was responsible for assessing the existing fire safety features of a building and developing a partial rectification solution that enabled the retention of existing cladding where appropriate. While developed with occupant safety in mind, these solutions often adopted a highly conservative approach requiring full cladding removal (nearly always advocating a default position for an unnecessary and costly full-cladding removal approach for the owners) and did not apply a risk-based methodology. In several instances, this led to more extensive cladding removal than was necessary, resulting in increased costs for both CSV and building owners. The introduction of the PMCR provided a standardised, risk-based framework for decision-making, enabling CSV to transition this function in-house. Information on existing fire safety features was gathered by CSV during on-site due diligence inspection. The partial rectification scope was then refined through the development of Remediation Works Proposals and guided by the principals of the PMCR.
- **Quantity Surveyor (QS):** The Quantity Surveyor was initially engaged to prepare cost plans during the early stages of CSV, when limited rectification data was available. As the program evolved and accessibility to reliable data increased, CSV developed the Linear Regression Model. This transition has enhanced the consistency and accuracy of cost estimates as well as increasing the knowledge base of internal staff, subsequently reducing the reliance on external consultants.
- **Due Diligence Lead:** the Due Diligence Lead was the project manager for each building allocated to the consortium of consultants. They oversaw the performance of the consultants and were responsible for the deliverables submitted, as well as the overarching Due Diligence Report which summarised the findings of the reports from all consultants. As the program evolved and the number of external consultants engaged by CSV decreased, the requirement for a dedicated external project manager diminished. With CSV developing the internal capability to conduct site inspections and assess risk, this function was progressively internalised.

The Linear Regression Model

The Linear Regression Model has played a key role in the due diligence initiative outlined above. As well as effectively removing the requirement for external cost assessments, it has also improved precision and accuracy in CSV's project cost planning calculations.

An analysis was conducted to evaluate the model's accuracy by comparing the average initial cost plan with the average project budget. In this instance, the project budget refers to the refined cost plan that is established once construction tenders are finalised. Average costs are examined across three key periods: 2022 (pre-implementation), 2023 (year of implementation) and 2024 (post-implementation).

Figure 5. Improvement in cost planning accuracy from 2022 to 2024



M = million

Key finding:

The introduction of the Linear Regression Model in 2023, developed to predict the cost of cladding rectification projects using data from completed works, has reduced the variance between initial cost plans and final project budgets from 18 per cent in 2022 to 12 per cent in 2023, and just 4 per cent in 2024. Significant costs were also avoided by no longer relying on independent quantity surveyors, allowing CSV greater control in managing its costs and budget outlays.

Figure 5 presents a clear reduction in the variance between initial cost plans and final project budgets across the three-year period. This trend indicates where the gap between the Cost Plan and the Final Budget narrows progressively over time. By 2024, there is a clear convergence, demonstrating the increasing alignment between initial forecast and final project budgets.

This improvement is attributed to the increased availability of reliable project data, which has enabled the Linear Regression Model to generate accurate cost plans. The model achieves this by incorporating a range of project-specific factors, including:

- **Technical scope:** the amount of combustible cladding removed (ACP-PE, EPS) is included, allowing the model to account for difference in material remediation requirements.
- **Structural and design characteristics:** buildings attributes such as height in storeys, typology and number of sole occupancy units are integrated to capture the complexity and scale of each rectification project.
- **Project initiation date:** the date in which the project begins is factored into the model to predict changes due to inflation and seasonal patterns which may impact construction costs.
- **Evidence base:** the model draws on financial data from over 250 completed projects, capturing actual cost, risk, and project-specific variables. As more projects are completed, this dataset expands, continually improving the model's predictive accuracy.

By applying the same methodology to all projects, the model ensures that cost estimates are standardised across the entire program. Its transparent and repeatable structure allows CSV to consistently refine its cost planning model to support its overall strategic planning and decision making.

This development marks a shift from qualitative forecasting to a scalable, data-informed estimation process that continues to mature alongside the program.

Contract management

Alongside the development of internal solutions, CSV enhanced its contract management model to ensure strong financial governance and consistency across all projects. This included:

- Improved project scoping over time as projects proceeded, ensuring early clarity for owners who would have to fund rectification of non-cladding defects.
- The introduction of a Construction Deed providing CSV with an opportunity to step in as required to ensure each project stayed on track and any identified issues could be resolved.
- The opportunity to recover liquidated damages from OCs, given that they did not fund cladding removal and replacement.

By applying insights from earlier delivery, CSV established a suite of frameworks that clearly define roles, processes, and accountability in managing contracts and project costs.

Each framework was designed to clearly define contract and financial processes as outlined in Table 3.

Table 3. CSV's contract frameworks

Name	Purpose
Contract Administration Framework (CAF)	• Provides guidance to IPMs appointed by CSV by clearly detailing the activities they are to perform on behalf of owners corporations. • Outlines expectations to ensure effective management of design and construction frameworks.
Tender Administration Framework (TAF)	• Provide IPMs with guidance about how to procure and engage suppliers for cladding rectification projects. • Outlines the Design & Construction Tender process from planning through to award of contract. • Establishes governance for the tender process and engagement of suppliers to ensure fair allocation of work.
Variations, Budget Management, and Contingency Framework (VBMAC)	• Contains processes around the review, approval and recording of construction variations. • Applies stricter oversight for claims exceeding $50,000, or greater than 20 per cent of the original contract value. • Includes guidance on managing the project budget and use of contingency funds.

The design and operation of key processes and controls in relation to program operating costs is governed through CSV's Variations, Budget Management, and Contingency Framework (VBMAC). This provides high level information about the management of the Cladding Rectification Program (CRP), Design and Construct Contracts and the activities CSV can carry out in terms of project forecasting, use of contingency, and in reviewing, approving and recording variations to funded works.

Key finding:

To strengthen financial governance and improve cost management CSV developed a suite of contract management frameworks, including the Variations, Budget Management and Contingency Framework (VBMAC). As at July 2025, the VBMAC has contained total construction budget variations to just 1 per cent and CSV-specific variations to 4 per cent.

The VBMAC enhances CSV's ability to provide accurate initial estimation of project budget costs to reduce significant variations between project budget and actual costs; this enables effective use of funding across the rectification program.

The VBMAC also provides detailed processes for managing funding for construction contact variations, referring to changes in the agreed scope of works that can subsequently increase costs. The processes around the review, approval and recording of construction contract variations are critical, with variations typically approved by the Superintendent at approximately 60 per cent of their submitted value. As funder, CSV's role is to review variation requests and provide advice on amounts that would be eligible for funding. CSV's program delivery, commercial, and legal teams thoroughly review variation requests to enable CSV to provide high quality advice to inform the performance of the Superintendent's function. Additional scrutiny is applied toward claims exceeding $50,000, or greater than 20 per cent of the original contract value. The Superintendent can consider CSV's advice in the independent assessment of variation requests to ensure decisions are supported by evidence and are appropriately justified.

Oversight of contract variations ensures that only the works necessary and in line with CSV's overall scope of work are carried out, ensuring that government funds are spent appropriately.

Strong financial governance serves as part of the foundation for transparent and responsible decision making regarding the adoption and execution of CSV's plans and strategies. Effective financial and resource management is essential for maximising the value of CSV's delivery outcomes. CSV can ensure efficient allocation and utilisation of its resources, ultimately enhancing the value and impact of its delivery efforts.

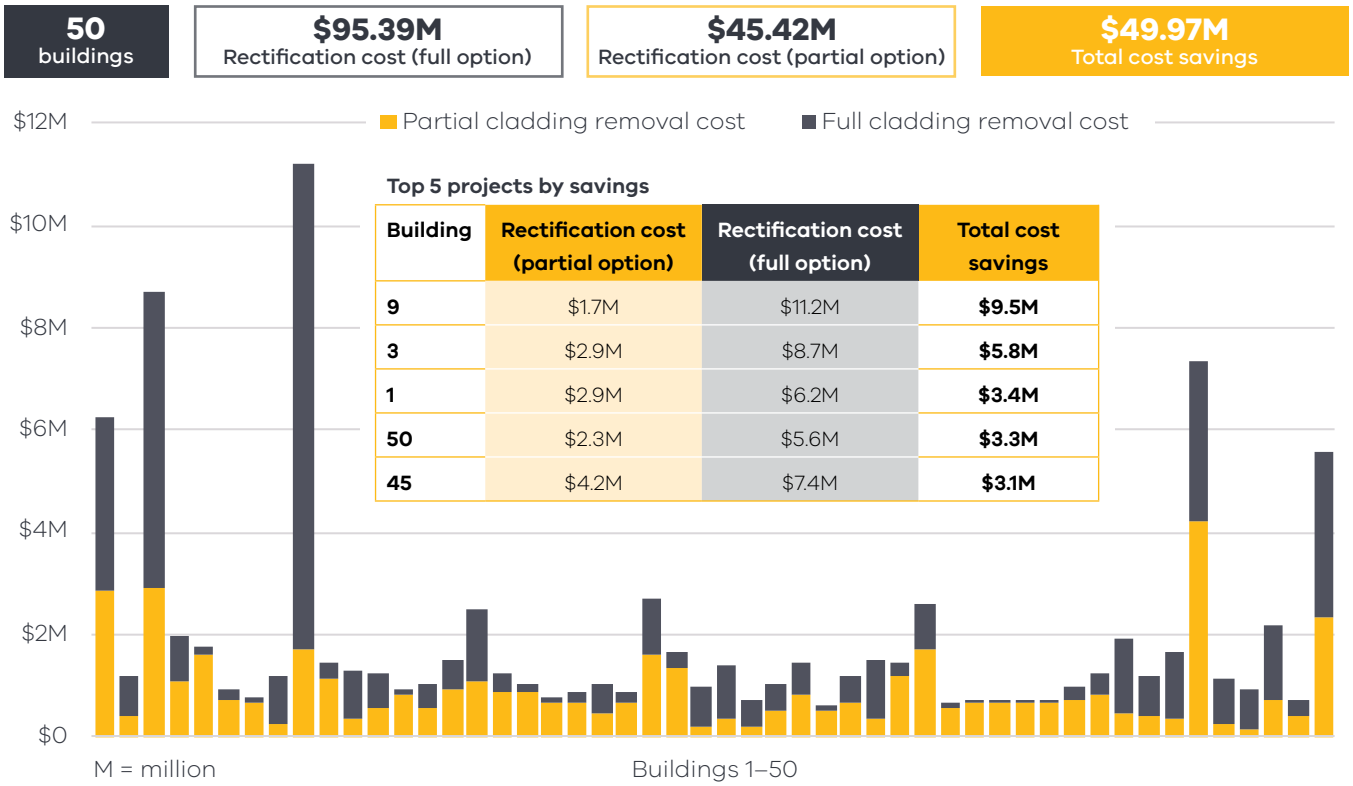
3.3 Risk-informed decision making

As delivery reached a more advanced stage, CSV refined its approach to cladding rectification by demonstrating that, in many cases, complete cladding removal is not necessary to reduce a building's risk profile to an acceptable level in terms of life safety. The development of the PMCR represented a pivotal milestone in CSV's evolution, made possible by the knowledge and expertise accumulated through the program's delivery over time.

Cost and scope efficiencies

To evaluate the efficiencies of the PMCR, CSV analysed a sample of 50 buildings admitted to the program from December 2023 onward. Each building in this sample was approved for partial cladding removal, offering a basis for evaluating the value and optimised project scope achieved, compared to full-scale cladding removal.

Figure 6. Difference in rectification cost for each project comparing full and partial option



Top 5 projects by savings

Building	Rectification cost (partial option)	Rectification cost (full option)	Total cost savings
9	$1.7M	$11.2M	**$9.5M**
3	$2.9M	$8.7M	**$5.8M**
1	$2.9M	$6.2M	**$3.4M**
50	$2.3M	$5.6M	**$3.3M**
45	$4.2M	$7.4M	**$3.1M**

Figure 6 provides a detailed visual summary of the 50 buildings approved for partial cladding removal. Each project was submitted to CSV's program with two proposed cost plans, i.e. full cladding rectification and partial cladding removal. The key findings of this analysis highlights:

- Full cladding rectification across the total sample was estimated at $95.39 million compared to $45.42 million for partial, the risk-proportionate solution ultimately selected for all buildings.
- Adopting the partial cladding removal approach for the cohort generating a net value of $49.97 million.
- The top five projects, typically involving buildings with a higher number of storeys, delivered $25.5 million in value alone, accounting for nearly 50 per cent of the overall benefits realised.

Guided by the PMCR, CSV has refined its approach to partial cladding removal, which has since become the leading solution for addressing high-risk buildings. The findings clearly demonstrate the value that performance-based strategies can deliver when opted over full-scale removal. This approach is especially impactful on larger and complex projects where the savings are more pronounced, enabling buildings to reach an acceptable level of risk in a cost-efficient and proportionate way.

Key finding:

The introduction of the Ministerial Guideline 15, the Cladding Risk Mitigation Framework (CRMF) and the Protocols for Mitigating Cladding Risk (PMCR) delivered a 52 per cent reduction in the cost of treating cladding risk.

Figure 7. Difference in sqm. cladding removal between full and partial rectification options

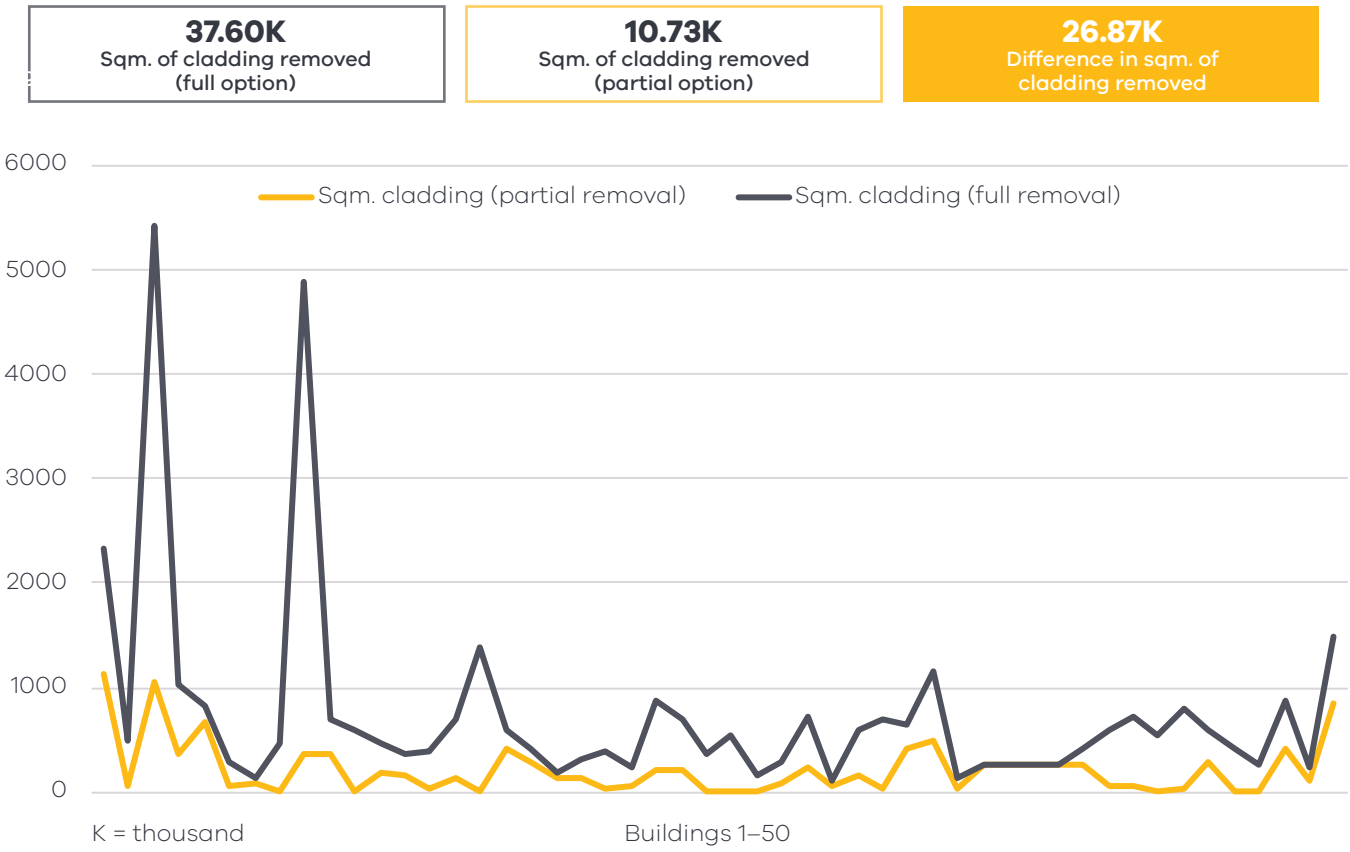


Figure 7 builds on the financial analysis by illustrating the reduced cladding removal scope under partial cladding removal, comparing total removal areas across all 50 projects.

Key finding:

The PMCR's targeted measures, which are designed to achieve a risk profile equivalent to that of full cladding removal, meant that only an estimate of 10,730m^2 of cladding material required removal. This was found to be approximately 70 per less than the estimated amount of 37,600m^2 required for full cladding rectification.

Other results indicate that:

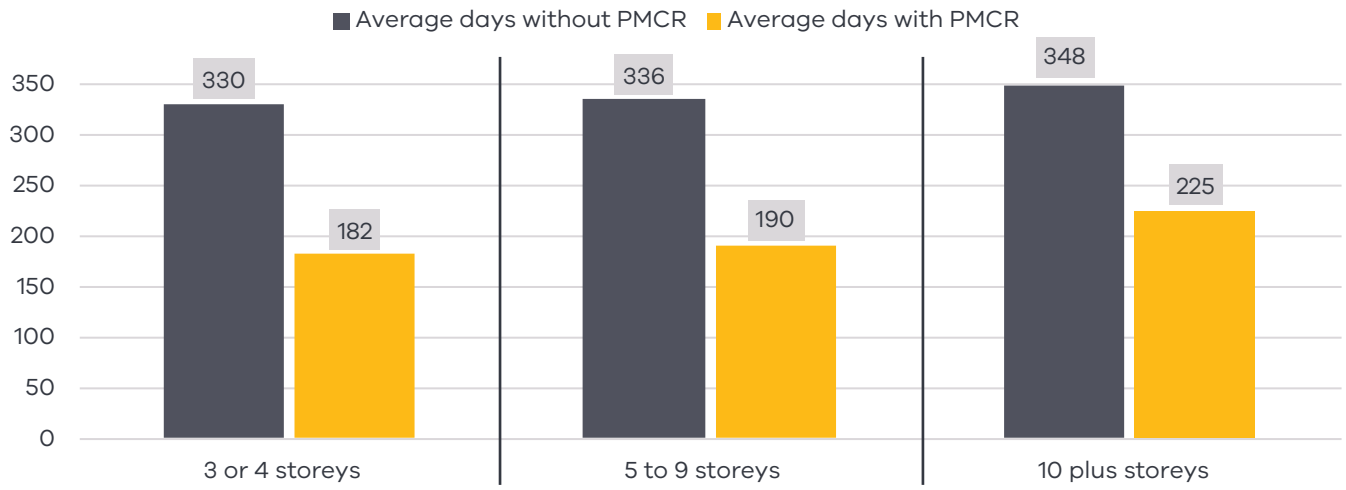
- A total of 10,730m^2 of cladding was removed under partial rectification solutions, compared to 37,600m^2 that would have been required under full removal.
- The reduction equates to 26,870m^2 less cladding removed, around 71 per cent less physical work, and an estimated $49.97 million in cost savings as illustrated in Figure 6.

By limiting intervention to high-risk areas, partial cladding removal avoids unnecessary removal and replacement, reducing both labour and material costs. Additionally, the reduced scope in cladding removal minimises disruption to occupants which enhances public acceptance and satisfaction with the program.

Delivery timeframes

CSV conducted a broader review of time efficiencies achieved through the implementation of the PMCR, observing all buildings with major works completed between 2020 and 2024. Projects were grouped into three categories based on building height, measured by number of storeys. Each project was further categorised by admission date to determine whether it was delivered under the PMCR or prior to its implementation.

Figure 8. Average delivery timeframes by building height



Key finding:

Projects completed post December 2023 were delivered between 37.15 per cent and 44.8 per cent faster across all building height categories. CSV was able to achieve this significant improvement over the course of the program through its collaborative relationship with the contractors it engaged, such as Independent Project Managers and the Clerk of Works who provided a valuable contribution to the final outcomes.

Figure 8 compares the average duration time (in days) from contract execution to the completion of major works. The results demonstrate a marked improvement in delivery timeframes across all building height categories.

- **3-4 storeys:** reduced by 44.8 per cent (148 days)
- **5-9 storeys:** reduced by 43.5 per cent (146 days)
- **10+ storeys:** reduced by 37.15% (123 days).

Time savings can be attributed to the reduced project scope which shortens execution and delivery times. Limiting works to only the highest-risk areas can streamline delivery without compromising safety outcomes, enabling faster reduction of cladding risk across Victoria.

3.4 Program efficiency

Over time, and as a result of CSV's accumulated knowledge and understanding on how to reduce risk effectively, CSV's approach to cladding rectification has evolved towards more efficient, risk-informed strategies, with a clear shift from full cladding removal to proportionate solutions such as targeted removal and enhanced fire safety upgrades. To measure this progression, changes in remediation strategy were analysed to examine the relationship between full and partial cladding rectification approaches and emerging cost trends throughout the program.

As outlined in section 2.1 (Methodology), the term 'partial cladding removal' is used as a broad descriptor for alternatives to full cladding removal. This may include targeted partial cladding removal, essential fire safety upgrades, or a combination of both.

Figure 9. Changes in remediation approach across the program

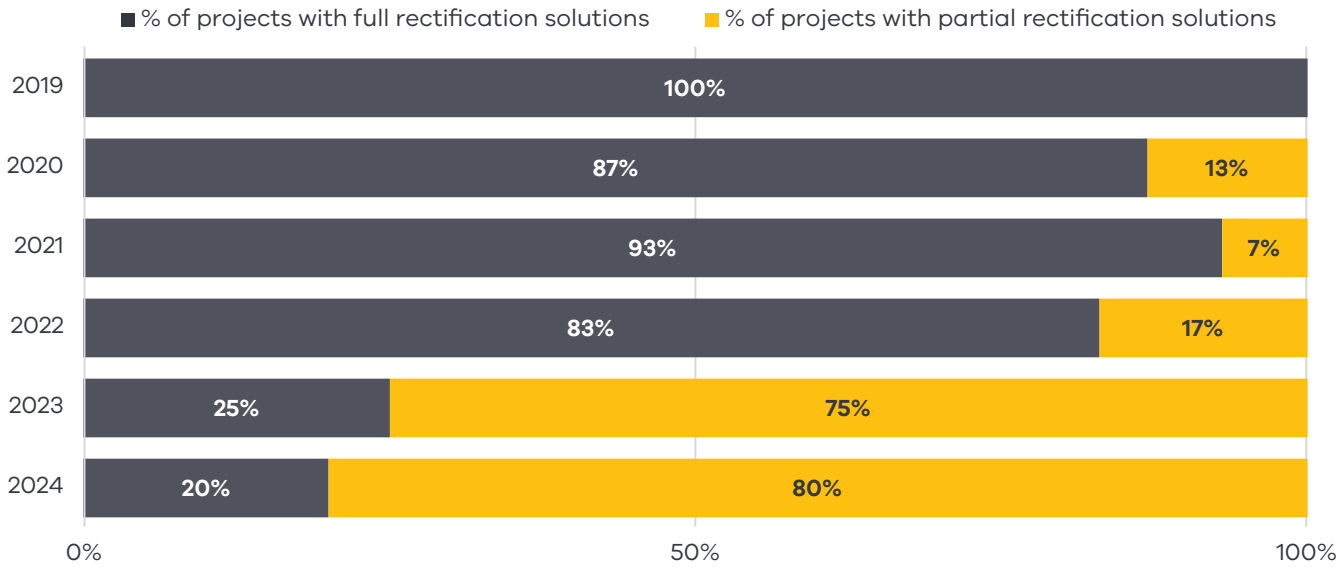


Figure 9 illustrates the distribution of remediation types for high-risk buildings during the period 2019 and 2024.

These trends highlight the program's increasing efficiency, with more proportionate remediation strategies delivering substantial cost reductions while maintaining safety outcomes.

Key finding:

Full cladding removal, being the predominant remediation approach between 2019 and 2022 (83–100 per cent of projects), shifted significantly toward partial cladding removal after 2023 (75 per cent in 2023 and 80 per cent in 2024). This transition reduced rectification costs from $1.24 million in 2022 to $540,000 in 2024, demonstrating the program's overall increasing efficiency.

4. Discussion

4.1 Evolution as a learning organisation

CSV's adaptive approach to program delivery aligns with the principles of a learning organisation, one that continuously evolves by integrating insights from experience, data and innovation into its core operations.

During the initial stage of delivery, CSV was operating in a high-risk, highly uncertain environment, where risk mitigation was central in decision making to safeguard safety and quality. CSV's early investment efficiency was supported by strategic contract management including the engagement of various expert panels such as Independent Project Managers, Quantity Surveyors, Architects and the Clerk of Works. By strengthening control over project outcomes, this approach enabled CSV to minimise risk and associated costs while fostering trusted supplier relationships across the panels. The contract management processes implemented during this period established a standardised approach that strengthened performance management frameworks and supported CSV's shift from a building-by-building approach to a program-based delivery model. The alternative approach (initially canvassed by Government) was to place the onus on OCs to source expert advice and procure consultants directly to undertake rectification works, which would have proven exceedingly complex and beyond most OCs' abilities to manage effectively, with the concomitant risk of being price gouged by consultants.[5]

Overtime, the organisation systematically captured data and experience from each completed project which was integrated into decision making. The deliberate cultivation of a learning culture allowed CSV to build confidence in capability, refine its methods, and transition from predominantly full cladding removal to more proportionate, evidence-driven solutions.

The five pillars of cost control (see Figure 10) illustrate how CSV's learning culture translated into practical reforms at each stage of program delivery and have collectively enabled the organisation to manage the cost of rectification.

Figure 10. CSV's five pillars of cost controls

1	2	3	4	5
Expert panels	**Cost monitoring and oversight**	**Revised due diligence model**	**Linear Regression Model**	**The PMCR**
Safeguarding quality and safety through risk mitigation and defect prevention	Robust financial governance through consistent accountable frameworks	In-house capability delivering more consistent risk-based practice	Leveraging reliable program data to deliver accurate in-house cost planning	Risk-proportionate, cost-effective remediation achieved through program maturity

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- **Expert Panels:** In the early stages, expert panels safeguarded quality, safety, and risk mitigation, preventing costly defects and establishing consistent standards. This was necessary while operating in a new and specialised scope, with delivery processes in the early ages of development.
- **Cost Monitoring & Oversight:** As delivery expanded, CSV identified new opportunities for effective contract management (such as the Construction Deed which enabled CSV to step-in on occasion and ensure that each project progressed) and continued to apply effective financial governance through clear frameworks such as the CAF, TAF, and VBMAC, ensuring consistency, accountability, and responsible use of funds.
- **Due Diligence:** As the program matured, CSV reached a stage where internal capability and systems had developed sufficiently to manage the majority of due diligence in-house assessments, reducing its reliance on external consultants.
- **Linear Regression Model:** The introduction of the Linear Regression Model further strengthened cost controls allowing CSV to forecast with greater precision, marking a significant advancement in the organisation's analytical capability and independence.
- **Protocols for Mitigating Cladding Risk:** Now recognised as a world leader in cladding rectification, CSV developed and introduced the PMCR, providing a risk proportionate and cost-efficient alternative to complete cladding removal, without compromising the risk to safety or life.

Fostering a culture of continuous improvement, supported by data analysis, cross-disciplinary collaboration, and evidence-based decision making can strengthen capability and reduce reliance on external consultants. The evolution in approach from caution and uncertainty to leadership in innovation reflects CSV's drive to be a learning organisation, one that demonstrates a dynamic and adaptable approach that enables the delivery of safe, efficient and cost-effective outcomes without compromising quality or safety.

4.2 Case Studies

The risk-prioritisation approach underpinning CSV's cladding rectification program means that funding is allocated to a solution that achieves a reduction in life safety risk associated with the external wall systems to an 'acceptable level', i.e. achieves a low cladding risk rating or presents an overall level of risk to the life and safety of the occupants which is reasonably similar or less than the risk which would be presented by the same building, if that building had no combustible external cladding. Buildings rated as an Unacceptable Risk are eligible for funding from CSV's program. Those rated in the next category, Elevated, present a high enough risk to warrant intervention but are not considered severe enough to receive government funding. In these cases, CSV provides building owners with a Remediation Works Proposal to help mitigate the combustible cladding risk and to satisfy any enforcement (building notices) that may have been issued by a Municipal Building Surveyor.

Any partial cladding removal needs to apply the adopted risk management process outlined in the PMCR to identify all hazards associated with the external wall system and assess the associated risks. Effective risk mitigations should then be developed using the PMCR's risk controls framework and the in-house customised Linear Regression Model outlined in the previous section.

In determining the best solution to make a building safe under CSV's cost model plan, its investigation and assessment takes into account:

- The most cost-efficient approach to addressing the risk, noting that CSV's cladding program is designed to inform the organisation's decision making to support its ability to direct finite resources with maximum effect with regard to reducing cladding fire risk.
- Materiality of prospective savings that a partial solution can achieve which takes into account the complexity of the building.
- Certainty of outcomes as derived through its due diligence processes.
- CSV's independent assessment and degree of reliance and oversight of any fire engineering approach adopted.
- Ability to control the assessed costs of the partial cladding removal through an objective assessment of the proposed works.
- The degree of process design complexity for the partial cladding removal.
- Contingent design liability for addressing building defects.
- An assessment of the community burden arising from the partial cladding removal, for example, maintenance of Essential Safety Measures (ESMs) or ongoing safety issues for that building.
- The degree of stakeholder acceptance for the partial solution, including owners, residents, fire authorities, insurers and regulators.
- Potential for consequential economic loss that may arise, for example, in mixed-use buildings where there are commercial tenancies.

The following case studies are notable examples of the application of the PMCR in addressing the fire cladding risk on buildings in the program. Furthermore, they demonstrate how tailored Remediation Works Proposals, developed under the PMCR, have enhanced public benefit and owners' satisfaction.

Building 1

A 10-storey building was referred to CSV in 2023 by the then Victorian Building Authority (renamed the Building and Plumbing Commission) as a low to moderate risk, where the presence of Aluminium Composite Panels with a Polyethylene core (ACP-PE) and timber cladding on the building's external façade had been identified.

The owners corporation initially procured a fire engineer who provided a report suggesting the extensive removal of both ACP-PE and timber, which had already been approved by the Building Appeals Board. The scope of works was estimated at $900,000 as advised by the owners corporations project manager.

CSV was notified of the case's progress and undertook an independent assessment of the building using the principles of the PMCR. Specifications such as combustible cladding type, configuration, existing sprinkler system and other Essential Safety Measures were evaluated before a risk-proportionate, low-cost alternative was concluded in the form of a Remediation Works Proposal.

The proposal comprised targeted measures such as the installation of smoke alarms to specific bedrooms and auditing of electrical penetrations through combustible cladding at specific locations. Following the endorsement of the Municipal Building Surveyor, the proposal was presented to the owners corporation who were happy to accept. They were relieved to be offered an alternative, lower cost solution which addressed the combustible cladding risk prior to committing to the works outlined in the original fire engineering report.

Based on CSV cost estimates drawn from similar works in the program, it is likely that the cost for the owners corporation to implement the Remediation Works Proposal would be between $10,000 and $15,000. This represents a substantial saving for the owners at over $800,000 compared to the scope approved at the Building Appeals Board.

Building 2

A 15-storey building was referred to CSV by the municipal building surveyor in 2024 following the identification of ACP-PE on external walls and balconies. The owners corporation engaged a fire engineer to assess the combustible cladding risk and proposed a partial cladding removal solution.

The resulting fire engineering report recommended extensive cladding removal and the extension of the building's sprinkler system to the balconies. The report had also misidentified a portion of solid aluminium panels as combustible ACP-PE. The rectification scope outlined in the report was inconsistent and impractical, with an estimated cost of $5 million.

Following an inspection and risk assessment by CSV, the building was deemed as Unacceptable Risk and therefore deemed eligible for program funding. A Remediation Works Proposal suggesting the removal of Aluminium Composite Panel was prepared by CSV and endorsed by the Municipal Building Surveyor.

The Remediation Works Proposal offered a solution at a cost of $2.8 million, representing a saving of approximately $2.2 million compared to the scope outlined in the fire engineering report. This proposal also offered comparable savings to the full-scale removal option proposed by CSV which was estimated at $5.3 million.

In addition, the proposed scope was less time and resource intensive, offering greater outcome certainty for the owners corporation compared to the initial solution proposed by the Fire Engineer.

5. Reform opportunities for further consideration

The findings in this report clearly demonstrate CSV's success in delivering on the government's commitment to addressing the cladding problem in Victoria through the application of a tailored risk-proportionate methodology. CSV's program has provided a unique opportunity for both government and industry alike to consider the application of a risk-proportionate model to any intervention that requires the development, design, construction, demolition, management or maintenance of buildings. Understanding each building's unique risk profile and applying a rectification strategy based on that risk, means that redress will occur in a more cost effective and efficient manner.

It was self-evident that CSV needed to achieve twin objectives – expedited removal of high-risk cladding and efficient use of public funds. CSV administered a program that provided money to OCs according to the risk posed by the cladding. To retire cladding risk in a way that protected the public interest and public funds, a more directive role for CSV was determined to be appropriate. The alternative approach of providing a "hands-off" pure grants program would have exposed the Government to significant budget problems and a loss of cost management control.

Further, placing the onus on owners corporations to source expert advice and procure consultants directly to undertake rectification works, would have potentially set them up for failure and open them up to being exploited by underqualified consultants. Active management by government with all the appropriate approvals means that government has a stake in getting it right. To this end, a key learning for CSV is in recommending that any grants programs by government have appropriate levels of government management to ensure funds are spent appropriately.

A full-cladding removal approach leads to significantly higher costs, longer delivery timelines, and greater disruption to the public – more importantly, full cladding rectification was not required on every building to make them safer for the people who live there. Embedding risk-management principles provides a foundation for responsive, proportionate action wherever state intervention is required to address building or other construction related risks.

Any such interventions should be qualified by an objective methodology like the PMCR model adopted by CSV, ensuring that obligations are prioritised according to risk, and tailored to the actual circumstances of the problem. The Cladding Risk Prioritisation Model has demonstrated a balanced approach, delivering practical solutions that often avoid unnecessary works for building owners, reducing both cost burden and disruption while maintaining occupant safety.

CSV is strongly advocating for the PMCR to be given the status of an Australian Standard, referenced in the National Construction Code. A risk-proportionate approach provides agencies with a consistent and transparent framework to proactively respond to emerging challenges, while increasing their effectiveness in achieving outcomes that are clear to both consumers and industry.

The CSV Delivery Framework has evolved under CSV's stewardship in a way that best meets the needs of affected OCs and has also given our insurers the confidence to underwrite the program.

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