

Remai Modern Boiler Replacement Rationale and Guarded Plant Status Request

ISSUE

To meet the requirements of the Technical Safety Authority of Saskatchewan (TSASK) and maintain safe, reliable operations at Remai Modern, the City of Saskatoon (City) must replace the facility's aging steam boilers and upgrade associated control systems. Regular inspections have confirmed that the existing boilers and key components are deteriorating and nearing the point where renewal is necessary to maintain regulatory compliance and safeguard environmental conditions required for art collections.

TSASK requires continuous supervision of high-pressure boilers unless the system meets Guarded Plant standards, which the current equipment does not satisfy. As a Category A regulated cultural facility, Remai Modern must maintain strict environmental controls at all times. The new boilers and control system upgrades will uphold these standards and support uninterrupted programming.

Replacing and upgrading this equipment will restore compliance, reduce monitoring demands, and ensure consistent environmental protection for both programming and the gallery.

BACKGROUND

City Council, at its Regular Business meeting held on January 28, 2026, considered a Notice of Motion from Councillor Dubois and resolved:

“That the Administration be directed to report back on the results of the root cause evaluation related to the boiler replacement and upgrades at the Remai Modern, as well as warranty work, all costs, and all information relating to the boiler from its installation to the present situation.”

Construction of the Remai Modern began in 2014, with the installation and commissioning of major building systems, including the primary heating boilers, which were brought online in 2015, to provide heat and support construction-phase needs. Humidification boilers were activated between late 2015 and 2016 to condition storage and gallery spaces. These systems underwent final commissioning, fluid conditioning, and repeated testing in 2016 to meet certification requirements and operational tolerances.

Remai Modern opened in October 2017, and has required continuous, year-round environmental control since then to protect its collections. The high-pressure boilers have operated continuously to maintain stable temperature and humidity conditions.

In late 2023, TSASK advised that the steam plant requires continuous 24/7 supervision unless the equipment is upgraded to meet Guarded Plant or General Supervision standards, resulting in increased ongoing operating costs.

CURRENT STATUS

In response to TSASK's supervision requirements, the Administration conducted internal reviews and engaged third party HVAC engineering experts to assess compliance needs and replacement options. Technical assessments confirmed significant deterioration in both boilers, including a leaking pressure vessel in one unit and signs of leakage in the other. Since replacement parts for this discontinued model are unavailable, long-term repair is not feasible.

The proposed boiler replacement and controls upgrade will restore the system's reliability, support environmental protection for the art collection, and achieve Guarded Plant certification in alignment with regulatory requirements and industry standards.

DISCUSSION/ANALYSIS

Technical Drivers

There are three technical drivers that need to be considered when operating a regulated cultural facility such as the Remai Modern:

1. *Regulatory Compliance:* Remai Modern is designated as a Category A Cultural Institution under the [Cultural Property Export and Import Act \(R.S.C., 1985, c. C-51\)](#), a status that allows the Remai Modern to borrow, insure, and exhibit high-value cultural property from Canadian and international lenders. This federal designation requires strict environmental controls, including stable humidity and temperature.

To meet these obligations, the facility must operate in accordance with the ASHRAE Class AA Standard, the highest stability category for museum environmental performance. This standard requires extremely tight control bands with minimal fluctuation, even during construction or mechanical replacement activities. Maintaining Class AA conditions demonstrates compliance with expectations for Category A status.

The building's steam and humidification systems are regulated by TSASK, which requires continuous 24/7 supervision of high-pressure boilers unless the system meets modern Guarded Plant criteria. Replacing the obsolete, deteriorated boilers is the only approach that protects the environment, preserves national borrowing status under Category A, resolves the TSASK compliance issue, and avoids ongoing monitoring costs. Plant classification and supervision requirements can be met by adding failsafe controls/alarms for Guarded Plant licensing or by reducing plant capacity below supervision thresholds; however, neither met all necessary criteria.

2. *Asset Condition and Reliability:* Commercial boilers typically operate for more than 20 years, but equipment lifespan varies with load, maintenance, and environmental stability requirements. At Remai Modern, the boilers operate under continuous, high-demand conditions to maintain strict environmental tolerances required to protect art collections. This accelerates wear compared to standard commercial settings.

Inspection findings show that the existing boilers are nearing the end of their reliable service life. They are out of warranty; the model is obsolete; and replacement parts,

specifically tube bundles, are increasingly difficult to source. Without available tube bundles, repairing a tube failure becomes unfeasible or cost prohibitive. A boiler with an unrepaired tube failure cannot operate at its designed output and is typically taken offline entirely. Continued operation in this condition also risks damage to connected systems.

For Remai Modern, this would compromise environmental control and eliminate required heating redundancy, significantly increasing the risk of unplanned failure and operational disruption. Further, replacement of a failed part does not guarantee increased service life, as other parts may fail.

Given these factors, replacing the boilers was determined to be the best path forward. Proactive replacement reduces the likelihood of sudden, complete failure and protects both the facility and the collection.

3. *Collections and Programming Protection:* Humidity excursions (where indoor humidity temporarily falls outside the setpoint range required) have occurred in recent years during required shutdowns for service and during controls interventions. Since Remai Modern is a Category A institution, small deviations from the setpoints pose risks to artworks, can impact loan and insurance terms, strain HVAC and boiler systems, and indicate potential mechanical or control-system problems. Prioritizing the maintenance of stable conditions is essential to protect galleries, vaults, and work areas and to prevent operational disruptions.

Project Scope Options

Several compliance and upgrade options were considered, including enhanced monitoring, partial repairs, and equipment modification to meet TSASK requirements. However, control upgrades alone would not address end-of-life risks or remove continuous supervision requirements. Replacing both boilers with new units and associated code-compliant upgrades provides a reliable, full-capacity solution that supports Guarded Plant certification and avoids approximately \$150,000 in annual 24/7 monitoring costs.

Risk, Access, and Constructability

Replacement of the boilers will be staged to maintain uninterrupted ASHRAE Class AA environmental control throughout the building. The mechanical spaces are constrained, requiring careful sequencing and coordination to safely remove the old boilers and install new units. Work will be planned around Remai Modern's programming to reduce impacts on staff and visitors.

Procurement and Market Feedback

The tender for this project closed with limited vendor participation and higher-than-anticipated construction pricing. These outcomes are consistent with the project's elevated risk profile, including the need to maintain continuous operations, protect the art collection, and work within restricted mechanical areas. Such risks were known prior to tendering and were expected to influence market response.

FINANCIAL IMPLICATIONS

The project budget has reserved \$1.5 million, funded by the Civic Buildings Comprehensive Maintenance (CBCM) reserve, a City-wide fund that supports various programs and assets each year with finite annual resources. Remai Modern has contributed to the CBCM reserve since 2016. The proposed work is fully aligned with the CBCM reserve's core purpose of supporting critical asset stewardship and preventing catastrophic failures in a regulated environment, and accounts for approximately 24% of Remai's total contribution to date. Given the finite nature of the reserve, increases in project pricing are handled through a strict deferral process; other CBCM projects with lower priority that may be affected are not cancelled but postponed, ensuring that the most urgent needs are prioritized.

Automating monitoring requirements will eliminate the \$150,000 in annual monitoring costs, thereby reducing annual operating variance and improving the facility's lifecycle economics. These operational savings directly offset the capital investment while increasing reliability and efficiency.

OTHER IMPLICATIONS

Regulatory approval, including TSASK licensing and required audits, is essential, and the application for Guarded Plant status is already planned. Construction sequencing and temporary measures will maintain required environmental tolerances, minimizing impacts on artwork, staff, and visitors. All construction activities will comply with the Saskatchewan Workplace Safety and Health Act and associated regulations. The Administration will maintain regular communication with Remai Modern operations, TSASK, and other stakeholders, and remain ready for any public interest.

The specified efficiency of the new boilers is the highest commercially available for the required operating pressure. While this efficiency matches that of the existing boilers being replaced, the upgrades will further increase efficiency through improved boiler operation. The replacement boilers will be equipped with fully modulating burners, allowing them to maintain higher efficiency throughout the operating range. Further, implementing corrective measures for boiler combustion air will improve overall fuel efficiency.

NEXT STEPS

The Administration is concluding the tender evaluation and will proceed with the award in accordance with the City's procurement policy. Following the award, construction sequencing and scheduling will be coordinated to protect collections and enable programming. An annual Guarded Plant application to TSASK will be submitted, and Facilities Management will implement the compliance scope (safety, controls, and monitoring) concurrent with the boiler replacement.

Report Approval

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