Milton Courthouse Remediation Program

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Ministry of the Attorney General

Infrastructure Ontario

The Ministry of the Attorney General (MAG), through Infrastructure Ontario (IO) is wrapping up the Milton Courthouse Remediation Program. The building is nearly ready for reoccupancy. This bulletin describes:

- Details of the completed Indoor Air Quality (IAQ) and mould investigation
- Findings and results
- Additional work to augment mould remediation efforts
- Implementation of mould prevention measures
- Other work completed at the same time
- What you can expect when you move back

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Background

In November 2020, mould was confirmed in the duct system of Air Handling Unit 1 (AHU1), which serves the north half of the Milton Courthouse. To address this, the Milton Courthouse Remediation Program was launched to coordinate several concurrent projects. Together, these projects will resolve and remediate mould-related matters, investigate and discover any other mould sources, and assess the need for any additional work to maintain the Indoor Air Quality (IAQ) within currently established and acceptable limits.

The building was vacated to remediate the mould. While the building was unoccupied, to reduce later disruption, Infrastructure Ontario (IO) advanced work scheduled for the next few years to replace equipment that was nearing end of life.

The objectives of the Milton Courthouse Remediation Program were to:

- Provide appropriate air quality and thermal comfort for the operations of the courts
- Minimize the impact to facility operations
- Provide consolidated governance and reporting to Ministry of the Attorney General (MAG) staff, judiciary and justice participants

This bulletin describes the work undertaken to investigate sources of mould and remediate them to provide good indoor air quality and comfort for all occupants.

Program Team

Program Director:	John Alley, Claire Vial – Colliers Project Leaders
Project Managers:	Leah Rossini, Lise Genest, Ahmed Kareem – Colliers Project Leaders
IO Project Service Manager:	Nelson Francisco Rodriguez – Infrastructure Ontario (IO)
Environmental Consultant:	Stephen Booth, Cheryl Hunt, Ali Alskeif – Pinchin Ltd.
HVAC Consultant:	Heath Chrystall, Kevin O'Neill – H. H. Angus & Associates Limited
Design Consultant:	Heman Shih – Heman Shih Architect Inc.
Contractor (Remediation, Windows, HVAC)	Bird Mechanical
Contractor (Courtrooms)	GenPro Construction

Milton Courthouse Temporary Locations

It was decided to move occupants out of the building because the impacts of the work on the building were extensive. To accommodate the relocation of staff, spaces were fit up at the Burlington Convention Centre, the Marriott Hotel and the Burlington Courthouse, and all occupants were moved out of the building. Any furniture that was left in the Milton Courthouse was isolated from the remediation work areas. Files were removed from the vaults – some were moved to the temporary locations and others were moved to storage spaces available within the courthouse, offering additional protection and coverage.

Additional temporary courtrooms were later configured at the Oakville Conference Centre and the Burlington Provincial Offences Act (POA) Courthouse to provide additional capacity for in-person hearings.

With the work wrapping up, the planning for the move back to Milton Courthouse is in full swing.

Indoor Air Quality (IAQ) and Mould Study

This was the driving study to identify locations of mould growth and document the necessary remediation work. The study followed every lead in the search for the root cause of the mould and included:

- Weekly mould air monitoring while the temporary spaces were being prepared to record any changes.
- Investigation of the root causes of mould in the AHU1 system.
- Research into historical repair records and interviews with occupants to identify areas of previous flooding and leak events, review of the weekly monitoring results to identify trends, and non-intrusive testing throughout the building to identify potential problem areas.
- Assessment of the indoor air quality before corrective work was undertaken, including measurements of:
    - Carbon dioxide (CO_2)
    - Carbon monoxide (CO)
    - Relative humidity
    - Temperature
    - Particulate Matter (PM_{10})
    - Total Volatile Organic Compounds (TVOC)
- Intrusive testing of areas that had experienced floods or leaks and a review of repair records to identify past plumbing leaks – this included cutting out sections of drywall to confirm the conditions behind the walls.
- When intrusive testing revealed mould behind the perimeter walls, the study was expanded to assess the building envelope and identify areas at risk for water leakage. This additional analysis defined corrective actions including initiating the Window Replacement Project and work to repair the exterior walls.
- Additional testing in the Air Handling Unit 2 (AHU2) system found mould growth on some diffusers. This led to expanding the scope of the Mould Remediation Project to remove the diffusers and deep clean the ductwork.
- Finally, all perimeter offices with floating vinyl flooring were investigated for trapped moisture and mould.

The results of the IAQ and Mould Study were used to define the work to be included in the Mould Remediation Project and the Window Replacement Project.

Heating, Ventilation and Air Conditioning (HVAC) Study

This was a companion study to the IAQ and Mould Study. It used the IAQ data and assessed the overall capability of the building heating, cooling and ventilation systems including:

- The performance of the HVAC systems for zones and identified rooms, looking at fresh air requirements as well as thermal comfort,
- The performance and condition of the air handling systems including:
    - Air handling units
    - Rooftop units
    - Return air fans
    - Modulating variable air volume boxes
    - Air dampers
    - Chiller
    - Cooling tower
    - Boilers
- Requirements for additional humidification,
- Requirements for additional air filtration,
- Localized heating and cooling deficiencies,
- Overall efficiency of heating and cooling along with heating and cooling load calculations to support system sizing,
- Requirements for local monitoring and control of temperature, relative humidity and air flow to control carbon dioxide (CO_2) levels,
- Design of new Dedicated Outdoor Air Systems to provide additional fresh air,
- Potential for future leaks in existing plumbing and drainage pipes.

This study culminated in the Mechanical Systems Upgrade Project to improve the HVAC systems throughout the building.

Mould Remediation Project

The Mould Remediation Project remediated areas where mould was identified through the IAQ and Mould Study. In the course of this project, the team:

- Relocated existing humidifiers to upstream of the cooling coil to reduce the potential for water droplets to be carried through the ductwork,
- Removed and replaced all ductwork with interior sound insulation,
- Installed new Dedicated Outdoor Air Systems attached to AHU1 and AHU2 that will allow greater volumes of fresh outdoor air to be brought into the building,
- Replaced rooftop mechanical units that were leaking, impacted or close to end of life,
- Installed upgraded air filters to achieve the recommended Minimum Efficiency Reporting Value (MERV) 14A standard which trap 90% of particles of 1 to 3 microns and 95% of particles of 3 to 10 microns,
- Installed Ultraviolet disinfection lamps in AHU1 and AHU2,
- Installed fan-powered boxes to improve air circulation and ventilation effectiveness,
- Replaced Variable Air Volume boxes to reduce the risk of failure in the future. Some were replaced with fan-powered units that provide enhanced airflow,
- Added ventilation to the evidence vaults to control humidity,
- Cleaned all air-handling units and ducts using advanced cleaning methods (mould can only grow in the ducts if there is dirt and debris in the duct),
- Removed all drywall and insulation on the perimeter face of the building,
- Replaced affected drywall and other finishes in washrooms that had been subject to flooding and leaks,
- Made good interior walls and finishes where they had been disrupted.

In every location where mould was found, materials were removed under mould containment procedures. All abatement areas were inspected and tested to confirm the cleanup was completed properly.

Window Replacement Project

The Window Replacement Project also addressed identified issues with the building envelope. These improvements will reduce the potential for leaks and moisture migration into the building. Under this project the construction team:

- Replaced all windows and curtain walls in the building with higher reflectivity glass (to reduce solar heat gain), using more advanced frames and glazing units, with installation details to give a tighter air and moisture barrier,
- Installed new spray-foam insulation to replace existing fibre-glass insulation where it had been removed, providing higher insulation levels and a tighter air sea,
- Installed new mould-resistant drywall on perimeter walls that previously had a drywall finish to make good the finishes and reduce the risk of future mould growth,
- Provided new window trim, blinds and baseboards.

In addition to the work above, other building envelope repairs identified in the IAQ and Mould Study were completed, including repairs to mortar joints, broken bricks and precast panels that had the potential for failure.

Mechanical Systems Upgrade Project

The Mechanical Systems Upgrade Project replaced and upgraded parts of the mechanical system that were not performing as required. Equipment near end of life was also replaced at this time to avoid causing disruption in the next few years. Through this project:

- All perimeter heating units in the South Building were replaced.
- Perimeter fan-coil units in the North Building that were not replaced in 2019 were replaced as part of this project.
- Perimeter mechanical units with greater capacity were installed to improve thermal comfort in areas where low temperatures had been a problem,
- New thermostats, sensors and data logging systems were installed and connected to the Building Automation System. These allow local control while preserving the ability to control the building for energy efficiency and monitor temperature, humidity and CO_2 levels.

How Do We Know All the Mould Was Removed?

The program was exhaustive. The work was led by highly regarded environmental experts and medical professionals. The studies were designed to find sources of mould growth where it might exist in the building. The IAQ and Mould Study was an iterative examination, using all available information to identify any areas of potential mould growth. Any suspect area was thoroughly investigated, even to the point of removing walls and floors to check areas that were not visible.

The weekly pre-move-out IAQ monitoring captured 16 weeks of mould sampling and provided a wealth of data. Every room that showed even a single abnormal mould spore sample in the 16-week period was analyzed in more detail.

All perimeter drywall walls were stripped to the concrete block or steel studs to remove any possible mould.

In every condition where mould-contaminated materials were removed, further post-remediation samples were taken to verify that the required level of cleanliness had been achieved.

Finally, mould monitoring will re-start on February 28, 2022, as part of the post-construction assessment. Test results will be analyzed, and a summary of results will be made available before the move-back date.

Is the Work All Finished?

Almost, but not quite. The remaining work is to be completed by the end of March

Outstanding work to be completed after-hours following the move includes:

- New blinds, sunshades and window films for judicial offices, jury assembly areas and courtrooms will be installed by mid-March. The balance of the blinds will be installed by the end of March.
- Some perimeter fan-coil units may not be connected to the building automation system until mid-March – they will be fully functional and will respond to the local thermostats.
- Some air-balancing will need to be completed after the move to fine-tune thermal comfort.
- Some glazing was delayed by the manufacturer. Temporary clear glass will be in place for most of the north building on the ground floor. The proper reflective glazing is to be installed by the end of March.
- The card access controls for the North-East and North-West entries may not be operating on move-in day but will be by the middle of March.
- Some rooms may not have complete baseboards and some corridors may not have been patched and painted by the move-in date. This work will be completed by the end of March.

What To Expect upon Moving Back

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When Will Moving Information Be Communicated?

A detailed move plan will be provided to those who will be moving.

The primary move will be as follows:

Location	Move Starts	Operations Start at Milton
Burlington Convention Centre:	March 4 – 5:00 pm or after court is finished	March 7 – 8:00 am
Marriott Hotel:	March 4 – 5:00 pm or after court is finished	March 7 – 8:00 am
Burlington Courthouse:	March 4 – 5:00 pm or after court is finished	March 7 – 8:00 am
Oakville Conference Centre:	March 12	**
Burlington POA Courthouse:	March 12	**

** Staff can occupy their normal spaces in the Milton Courthouse any time after March 7.

Some materials will be moved before or after the primary move as defined in the detailed move plan.

On-going building communications, operational and project close out updates will be issued through the IO Property Services Tenant Memo.

What is the Mould Prevention Strategy Going Forward?

All possible steps have been taken to address all mould in the Milton Courthouse and to reduce the risk of mould growth in the future.

- The IAQ and Mould Study will continue to monitor for mould and conditions that could contribute to mould, and this will continue for the first year after the building is re-occupied.
- A comprehensive mould and moisture mitigation and prevention program has been implemented.
    - The primary focus of this program is to respond quickly to any incidents of flooding or leaks. Mould can only grow on materials that remain wet for 48 to 72 hours. If moist areas are dried within two days, there would be no opportunity for mould to grow.
    - The mould prevention strategy program will provide a clear path for mould management activities with a clear outline of preventive measures, response measures, and a communication plan with assignment of roles and responsibilities

What Should We Expect from Mould Sampling?

The first phase of the IAQ and Mould Study included mould spore sampling before the work started, to identify locations that may have mould growth. The second phase of the IAQ and Mould Study includes more spore sampling periodically over the first year after re-opening the building.

From time to time, you may notice mould spore sampling devices and other monitoring devices installed in various locations in the building. A small number of monitors will be used, and these will be moved from room to room to give a comprehensive assessment of the whole building.

Mould spores are naturally found everywhere in our natural and built environments – the Milton Courthouse is no exception. The environmental consultants will undertake mould spore sampling in the courthouse multiple times over the next year. Every time samples are taken indoors the consultants will also take outdoor samples to assess differences between indoor and outdoor mould spore concentrations. The consultants will be considering the following:

1. The count of mould spores over time should be no higher inside the building than mould spore counts outdoors. The mould spore counts will be higher in the spring, summer and fall, and lower in the winter. Typically mould spore counts will be lower indoors because the air filtration in the HVAC systems will trap some spores.
2. The species of mould spores should be similar inside and outside, and there should be no spores of mould species that are indicators of mould growth inside the building.
3. The relative humidity should be less than 80%, a level below which mould growth is unlikely.

Conclusion

Thank you for your continued support and patience over the past nine months as this important work was undertaken. It has been challenging for building occupants to serve the needs of the justice system from temporary locations and through the COVID-19 restrictions. Your commitment is evident in how smoothly you made the justice system work in these temporary conditions.

Infrastructure Ontario and the entire project team of consultants and contractors are pleased to welcome you back to the Milton Courthouse. While the building will not look substantially different from when you left, the clean-up and improvements behind the walls and the renewed mechanical systems will provide appropriate air quality and thermal comfort for the operations of the courts.

Appendix 1 – List of Projects in the Program

The Milton Courthouse Remediation Program included the following projects:

Project Number and Name	Scope	Status
1079932 Replace Manually Operated FC	• Upgrading perimeter heating • Add humidifier for RTU3, 4 and 5. • Add airflow measuring stations for RTU1 and RTU3 • Replace RTU1 • Install UVGI lighting in AHU-1 and AHU -2 • Add differential pressure monitoring sensors at AHU-1 filter rack • Revise RTU4 and RTU5 outdoor air control sequence • Reconfigure Chilled Water Piping (addressed issues with AHU 2 stealing chilled water from AHU 1)	Forecasted substantial completion: February 28, 2022
1079933 Site Drainage Study	• Investigate site drainage • Review potential for water leaks at foundation • Recommend work to be completed as Small Works	Completed June 30, 2021
1080763 Milton Mould and IAQ Testing (Ministry)	• Comprehensive mould study, weekly air monitoring preconstruction • Post construction monitoring for first year after occupancy	Planned Completion January 2023
1082550 Milton Refresh (Ministry - bundled with 1083890)	• Refresh of the Cafeteria, including new flooring, ceiling, paint, millwork and furniture	Forecasted substantial completion: February 28, 2022
1083054 MCH Repair Limestone Panels 1086724 MCH Repair Limestone Panels	• Replacement of the anchoring system to 16 limestones panels • Wholesale removal and disposal of limestone panel mortar joints and installation of new joint sealant and backer rod • Localized replacement of deteriorated brick masonry units and masonry mortar joints • Replacement of exterior cladding joint sealant at all building elevations, including masonry, precast concrete, limestone, granite and metal cladding. Excludes window and window perimeter joint sealant • Cleaning of existing brick masonry, limestone panels, and precast concrete cladding elements, including but not limited to the window heads, sills, and intermediate granite panels, at all building elevations • Removal and replacement of deteriorated brick masonry units at foundation walls, below limestone panels along the east • Removal and disposal of existing chimney cap flashing • Removal and replacement of Roof Area 'A' cap flashing, including supply and installation of new self-adhered membrane	Completed January 31, 2022
1082772 HVAC Study	• Review HVAC systems and heating/cooling loads and recommend design improvement to enhance the indoor air quality and thermal comfort.	Completed October 15, 2021
1083890 Milton Technology (Ministry - bundled with 1082550)	• Facilities scope of work to support new JVN installations in 11 Courtrooms, 2 remote testimony rooms, and 2 jury rooms	Forecasted substantial completion: February 28, 2022
1083946 AHU 1 Ductwork Mould Remediation	• Ductwork mould remediation in the North Building • Supply and install of DOAS 1 DOAS -2 • Cleaning AHU 2 and RTU 1-5 including associated ductwork and equipment as recommended in Pinchin's comprehensive mould study • Perimeter mould remediation identified in Pinchin's comprehensive mould study.	Forecasted substantial completion: February 28, 2022
1084515 Milton IAQ Testing	• Provide air testing before move-out	Completed June 30, 2021

Appendices

Project Number and Name	Scope	Status
1085473 Milton Move Out	• Prepare temporary spaces at Burlington Convention Centre and Marriott Hotel • Manage move into temporary spaces	Move completed June 20, 2021. Project remains open for return of rental furniture by March 31, 2022
1085743 Milton Courthouse Program	• Provide oversight and governance for program of projects listed here	Forecasted substantial completion: March 31, 2022
1086921 Milton Move Back	• Moving MAG back to Milton Courthouse (move costs will be paid under a small works project) • Make good at BCC/Marriot.	Forecasted substantial completion: March 31, 2022
1087484 Milton Windows Renewal	• Supply and install new double glazed low-e energy efficient glazing units • Approx. 152 exterior windows that cover 6,675 sq.ft. and curtain wall that covers 382 sq.ft. • Reinstatement of perimeter finishes removed for the mould remediation (project 1083946)	Forecasted substantial completion: February 28, 2022
1087485 Milton Windows Renewal	• Supply and install new double glazed low-e energy efficient glazing units • Approx. 24 exterior windows that cover 1,800 sq.ft. and curtain wall that covers 224 sq.ft. • Reinstatement of perimeter finishes removed for the mould remediation (project 1083946)	Forecasted substantial completion: February 28, 2022
1089614 Retaining Wall Concrete Renewal	• Replace retaining wall west of the Milton Land Registry as recommended by the retaining wall assessment (PMIS ID: 1079933). Study found retaining wall was in poor condition & can't be repaired and recommended immediate renewal of the retaining wall inclusive of the fence. GC to remove & install new retaining wall • Project Charter approved October 8th, 2021. Utilizing the IO Procurement Policy guidelines, prime consultant will be Single Sourced to RJC, the consultant for the study report. GC will be procured through invitational procurement • to RJC, the consultant for the study report. GC will be procured through invitational procurement	Forecasted substantial completion: July 29, 2022

If you have any questions about any of these projects, please consult with your manager who will direct questions to the Facilities Management Branch.