

Adaptive Re-use for Municipal Shelter System, Toronto, ON

COMPLETED 2022

ENTRANT

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Project Summary

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RJC Engineers was retained by the City of Toronto to lead an adaptive re-use program to convert six existing buildings located throughout the city into homeless shelters and supportive housing. To date, three shelters have been brought online, with two more currently in the late stages of design, and one under renovation. RJC lead a twenty-firm design and engineering team as Prime Consultant while also providing structural engineering, building science consulting, and contract administration services.





Complexity

Adaptive Re-use for Municipal Shelter System, Toronto, ON

The program involved the adaptive re-purposing of existing office and multi-residential buildings to increase the capacity of the City's shelter system. Sites ranged in size and age but were typically in or around 20,000 sq.ft. of gross floor area and were built in the 1970's and '80's.

Each project included a combination of some, or all, of the following scopes: total building interior renovation and revised space layout, barrier free accessibility upgrades including new ramps, ADOs, universal washrooms, and elevators, wholesale overcladding and re-roofing, group dining and commercial kitchen, seismic upgrades and structural reinforcing, wholesale heating, cooling, and ventilation upgrades, new plumbing, upgraded power and site services, new energy efficient lighting systems, new security, IT, and data systems, and landscaped outdoor amenity space, garbage disposal areas, and parking lot.

In addition to program design requirements and mandatory building code and zoning by-law compliance, the program at large was required to meet the stringent standards set out in the City of Toronto Shelter Design Guideline, the Toronto Public Health Guideline to Reduce Tuberculosis Transmission in Homeless Shelters, the Toronto Accessibility Design Guidelines, and Tier 2 of the Toronto Green Standard.

Setting aside the urgent need for more shelter capacity and thus a very aggressive project schedule and limited funding, the above design standards in aggregate were a challenging mandate to achieve for a number of reasons, including:

- 1. The challenges of upgrading existing buildings to meet accessibility design standards,
- 2. The increased population of residents that require barrier free building design features,
- 3. The inherent leakiness and limited thermal performance of older buildings, and
- 4. The competing interests of introducing additional fresh air to the building while trying to design energy efficient building heating and cooling systems

At many of these locations, there is also dedicated space for primary care and health care, employment support programs, and community space for programming, events, community partnerships, workshops and volunteer engagement. Many of the sites are also pet-friendly and feature commercial kitchens, dining areas and laundry facilities.

Program coordination, standard compliance, and cost control were significant challenges throughout design, while hidden conditions, existing deficient fire rated assemblies, abatement of hazardous substances, and trade coordination manifested themselves through construction. The key to navigating these complexities involved a high degree of communication across disciplines, trades, and stakeholders (further hindered by the pandemic!), quick turnaround on submittals and a strong multidisciplinary understanding of how systems integrate to form a whole.





Meeting Clients Needs

Adaptive Re-use for Municipal Shelter System, Toronto, ON

The City of Toronto's Shelter Support and Housing Administration (SSHA) in partnership with third party shelter operators had a number of mission critical project goals to support their vulnerable population. A select number of critical project goals are outlined below:

- Develop single resident occupancy (SRO) units and small dorms for people-centred dignified living conditions.
- **Programs for mental health and addiction** the design included a managed alcohol program, safe injection and harm reduction facilities.
- Mitigation of airborne diseases (infection prevention and control) through building design the design included increasing both the fresh air intake to the building and the number of air changes per hour as well as ultraviolet germicidal irradiation systems.
- Access to on site healthcare professionals the design included hospital grade examination rooms, private and confidential therapy and consultation spaces, and safe spaces for the city's black homeless population compliant with the City's Confronting Anti-Black Racism (CABR) action plan.
- Accommodate a vulnerable population with disproportionately higher reliance on barrier free building systems all spaces and systems within the building (for both clients and building staff) were designed to meet accessibility guidelines.
- Active and passive security systems the design included local and remote (networked) security monitoring, multiple exit routes from all rooms, comprehensive security camera coverage, and elimination of concealed spaces
- Durable building design Building compliance with CSA 478 "Guideline on Durability of Buildings" with particular attention to robust interior finishes (eg. resistant to hard impact, non porous surfaces, stain resistant high traffic areas, easy to clean/ wipeable surface finishes, resistant to bed bug infiltration)



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Environmental Benefits

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The adaptive reuse program included ASHRAE energy modeling audits on current and future state conditions and voluntary upgrades to the existing building systems to meet the Toronto Green Standard (Building Energy, Emissions, and Resilience), and in some cases targeting The City of Toronto Net Zero Emissions Strategy.

Compliance strategies included:

- Improving building air tightness and thermal performance through high performance building envelope glazing, roofing, and over-cladding systems,
- The introduction of heat pump and heat/energy recovery strategies,
- Electrification of natural gas boilers, hot water heaters, and roof top units.
- Specifying Energystar rated appliances.
- Preserving and salvaging high embodied carbon base building structural framing







Innovation

Adaptive Re-use for Municipal Shelter System, Toronto, ON

This program demonstrates a number of innovative engineering solutions.

Of particular relevance were the structural upgrades that were required to one of the buildings following the discovery of grossly deficient exterior load bearing masonry walls shortly after the contractor had mobilized on site and undertaken the interior demolition.

Structural steel wind columns were anchored to the interior face of the walls to resist local wind loads acting on what was essentially unreinforced veneer walls (unreinforced 150mm CMU block & a single course of clay brick veneer) that were originally believed to be mass masonry reinforced walls. Seismic upgrades were also implemented which included heavy steel plating on the interior and exterior face of the walls (concealed by interior stud walls and the new exterior overcladding system) and anchored to the buried foundations to improve the in plane shear capacity of the walls.

These structural upgrades also allowed for the enlargement and relocation of exterior openings to accommodate the dorms and increase the degree of natural light to the interior of the building.

This innovative technical engineering solution was complimented by creative contract administration and on-the-fly design coordination solutions. The team was able to react quickly to a significant design change early in the project in concert with the contractor, their subtrades, and multiple disciplines.









Social and/or Economic Benefits

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Canada is currently experiencing an acute housing crisis as a result of social, economic, and political forces, all of which have contributed in their own way to an increase in homelessness, particularly in dense urban centres like Toronto. Many believe that polarizing social topics surrounding culture, religion, race, sexuality, and gender identity are also contributing to a rise in homelessness as families and communities take ideologically driven positions and struggle to empathize across the left and right political spectrums.

The ability of the City's shelter system to accommodate the outfall of this crisis has been severely inhibited by the COVID-19 pandemic and public health mandates limiting shelter occupancy and distancing requirements within dorm rooms. For context, shelter occupancy has been reduced by as much as 60% in some cases with the average reduction being in or around 50% in a system that was already over capacity. The development team for the City's Shelter Support and Housing Administration has done a commendable job in procuring additional temporary and leased sites and City Council has committed meaningful funds to offset these losses.

RJC and our team are proud to have supported The City of Toronto, SSHA, the shelter operators, and their clients by leading this program that has played an fundamental part in not only providing additional beds for this marginalized and underserved population, but also in providing valuable program space and community outreach to offer mental health and addiction support and reintegrate those experiencing homelessness back into society in a dignified, person-focused manner.

Locations

Canada

Vancouver, BC Surrey, BC Victoria, BC Nanaimo, BC Kelowna, BC

Calgary, AB Edmonton, AB

Saskatoon, SK

Toronto, ON Ottawa, ON Kitchener, ON Kingston, ON

Montreal, QC

Stratford, PEI

USA Las Vegas, NV Reno, NV



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- Waterproofing
- Wood Design