



CCE Awards Phase 3

Northern College | Integrated Emergency Services Complex





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A. INTRODUCTION

Project: Northern College Integrated
Emergency Services Complex
Client & Owner: Northern College
Prime Consultant: J.L. Richards & Associates Limited

Construction Cost: \$16.6M
Start Date: 2016
Completion Date: 2018

In 2016, Northern College retained J.L. Richards & Associates Limited (JLR) to design a unique facility to serve both students and local emergency response personnel. Completed in 2018, the Integrated Emergency Services Complex is a 45,000 ft² building that houses professional firefighting and EMS services, and functions as an educational facility for students training in these fields. This is the first facility in Ontario to combine emergency services and student spaces into one multifunctional building.

In designing this building, JLR was posed with the unique challenge of ensuring the design would cater to the complex needs of emergency service workers, while also ensuring the environment would be conducive to learning for students training in firefighting, EMS, and police services programs. The JLR design team recognized the potential of this project to meet community needs while simultaneously generating experiential learning opportunities that no other students in Ontario are privy to.





A. INTRODUCTION CON'T



Legend

100 Vestibule	132 Office	172 Vestibule	212 Lounge/Workstations
102 Main Entrance & Lounge	134 Copy Room	174 Tower	214 Storage
104 Simulator Classroom	136 Janitor	176 2 Bay Storage Garage	216 Meeting Hall
106 Simulator Classroom	138 Storage Room	178 Compressor Room	216b Kitchen
108 Office	140 IT Room	180 Storage Area	218 Female W/C
110 Scenario Lab	142 Mechanical Room	182 Laundry	220 Male W/C
110a Nursing Room	144 Electrical Room	184 2 Bay Storage Garage	222 Corridor
110b Apartment Washroom	146 Office	186 Storage Room	224 Office
110c Apartment Kitchen	148 Classroom	188 Male W/C	226 Office
110d Apartment Living Room	150 Classroom	190 Male Showers	228 Vestibule
110e Apartment Bedroom	152 Office	192 Female W/C	230 Fire Department 4 Bays
112 Training Lab	154 Office	194 Female Showers	232 Storage
116 Corridor	156 Classroom	196 Scenario Lab	234 Gear Storage
118 Integration Lounge	158 Classroom	198 Corridor	234b Standard Bay
120 Office	160 Office	200 Universal W/C	
122 Office	162 Office	202 Mock 1	
124 Office	164 Classroom	204 Mock 2	
126 Training	166 Resource Room	206 Mock 3	
128 Conference Room	168 Office	208 Storage Garage	
130 Office	170 Corridor	210 EMS 4 Bay Garage	



B. COMPLEX COMMUNITY CONTEXT

As the northernmost post-secondary institution in Ontario, Northern College is a vital component of the province's higher education system. The College has four campuses, located in Haileybury, Moosonee, Kirkland Lake, and the South Porcupine area of Timmins. The Timmins campus is the home of the College's Centre of Excellence for Trades and Technology and is the largest Northern College campus. Over 950 students attend programs at this campus full-time.

A Novel Idea

By 2016, Northern College had identified the need to expand student programming at its Timmins campus. In particular, the College was interested in developing resources to support its burgeoning fire, police, and emergency medical services (EMS) programs.

With this goal in mind, the college established a partnership with the City of Timmins and developed a novel concept for a facility. The new Integrated Emergency Services Complex that the City and College envisioned would combine an active emergency response station with a dynamic post-secondary educational environment. This complex would be the first facility of its kind in Ontario but, in order for this project to become a success, the College and design team needed to establish an understanding of all stakeholder's needs.

Catering to the Community

The citizens of Timmins and the residents of other surrounding communities had three specific shared interests in how this project took shape. Firstly, it was necessary that the construction of a new, state-of-the-art emergency services facility would allow these communities to upgrade their existing emergency response infrastructure and benefit from advanced services as a result. Secondly, the community was interested in this facility being designed to encourage increased coordination and sharing of resources amongst the local fire, police, and emergency medical service providers. Finally, it was important to area residents that this project provide a valuable means of attracting new students, faculty, and first response professionals to the area.





B. COMPLEX COMMUNITY CONTEXT *CONT.*

Supporting Students

For both current and prospective Northern College students, this facility represented an unprecedented opportunity to expand their understanding of their field. By studying alongside actual first responders at work and observing the reality of their day-to-day operations, these students would be constantly immersed in experiential learning opportunities. An important mandate of this project was that the building should encourage natural integration between students and emergency service personnel, and provide spaces to support their authentic interaction. An additional mandate, however, was to ensure that these students also have adequate separation from the emergency services housed in the facility at times when quiet and concentration were required. The dual nature of students needs added a unique challenge to this project.

Perspective of Emergency Personnel

While updated facilities and access to new emergency response technology were important features for the fire, police, and EMS personnel who would use this facility as a base of operations, these groups each had additional needs that informed the project's key goals. For example, it was necessary that each emergency service faction have distinct vehicle bays, site access, highway access, and equipment storage areas. In addition, specialized work spaces, industrial laundry facilities, showers, decompression areas, and training spaces were all identified as important facility components by emergency service experts in the area.

A Comprehensive Approach

J.L. Richards & Associates Limited (JLR) was the Prime Consultant for this project, providing architectural, project management, and planning services, as well as complete mechanical, electrical, structural, and civil engineering services.

A collaborative firm by nature, JLR understood the value of coordinating with all stakeholders and design disciplines early on in the project. This allowed the firm to develop a holistic design for the complex, which addressed the unique challenges of ensuring the facility would cater to the complex needs of emergency service workers, while also ensuring the environment would be conducive to learning for students training in firefighting, EMS, and police services programs. In addition, the JLR design team recognized the potential of this project to meet community needs while simultaneously generating experiential learning opportunities that no other students in Ontario are privy to.





C. UNPRECEDENTED INNOVATION

As this Integrated Emergency Service Complex is the first of its kind, the JLR team was unable to draw inspiration from similar facilities while developing preliminary designs. Instead, the firm relied on its experience in other related sectors to create a holistic vision for this innovative building. The team consulted past project experience related to hospitals, police stations, emergency medical service stations, fire stations, post-secondary facilities, training facilities, and research facilities. The JLR engineers, architects, planners, and project managers involved in this project used this experience and insight to develop creative and constructible designs that met the diverse needs of the College, community, students, and emergency response personnel.

Suited to Staff Needs

The Northern College Emergency Services Complex is truly unique. It is equipped with a complete suite of state-of-the-art fire, paramedic, and policing facilities, including a designated ambulance bay, fire truck bay, and police bay.

Along with these facilities, the building also houses a training lab where students and professionals can train with mock scenarios and authentic emergency service apparatus. This scenario lab also serves as the municipality's emergency tactical training centre.

Additional features promote wellness amongst the first responders, such as an outdoor picnic area, private showers, industrial laundry facilities, bicycle storage, and a private decompression lounge. This lounge provides first responders with a dedicated area, tucked away from student spaces, where staff can spend time physically and emotionally resting following strenuous and traumatic calls.

Integration Atrium

In addition to professional spaces, the facility is equipped with diverse student spaces. Along with conventional classroom areas, one of the key learning spaces in the facility is the Integration Atrium.

This atrium is a bright and open space at the heart of the building, which includes lounge-style seating, breakout workspaces, a coffee and snack station, and other amenities. It is bordered by the training lab and emergency services vehicle bays, and walled by floor to ceiling windows. This area creates a space where students can unobtrusively observe professional emergency personnel at work, as well as a space where students and professionals can meet and freely interact.

Operational Apartment

An additional innovative feature of this facility is the mock apartment. This is a fully functional one-bedroom apartment with an operational kitchen and bathroom that both students and professionals can make use of to conduct diverse styles of training exercises.

The area is also equipped with a mezzanine above the roofless mock apartment, which is designed to support a large group of students and instructors as they observe exercises conducted in this section of the building.

Training Tower

The facility's training tower is another building component that functions as an innovative, multipurpose space for staff and students alike. This tower includes a teaching staircase that is designed to mimic the stairwell of a high-rise building, as well as several specialized hatches for rescue training exercises. This tower is also equipped with a fire hose drying area and a secure fall protection system.



C. UNPRECEDENTED INNOVATION *CONT.*

Scenario Spaces

There are several unique spaces contained within this facility that have been carefully designed to support scenario-based learning. These spaces include a maze-style scenario lab, where students can conduct rescue exercises in complete darkness, a mock jail cell modelled after an actual holding cell, a mock courtroom, and a disaster simulation lab that includes authentic emergency response equipment and an advanced virtual reality system. Each of these scenario spaces are accompanied by adjacent observation areas where students, faculty, and professionals can observe training exercises.

Outdoor Intersection

One of the most complex innovative features of this facility is the outdoor mock intersection, which takes the form of a highly realistic four-way stop. This road simulation training area includes paved roadways, curbs, traffic signage, and a mock Siamese connection. This area has been specially designed to provide unique training opportunities for students enrolled in fire, EMS, and police



D. COMPLEX CONCERNS

The dual nature of the planned programming for this facility was only one factor that contributed to the complexity of this project. As the project progressed, it became clear that the site itself would be the source of two unique challenges.

Clever Civil Planning

One significant challenge that was identified early on in this project was the diverse set of requirements that needed to be addressed through site planning. The design of the site needed to facilitate the authentic integration of professionals and students, without any detrimental impact on first responders' work, nor on students' learning.

JLR had to address the complexities of providing a road simulation training area, direct highway access for emergency service vehicles, safe fire routes, and separation of fire, ambulance, and police vehicle routes. JLR overcame these challenges by relying on the expertise of the firm's civil engineers and planners, who were able to develop seamless solutions that addressed these complex and diverse spatial needs.

Structural Concerns

An additional constraint that contributed to the complexity of this project was the discovery of an unanticipated geotechnical issue at the project site. An investigation of the site revealed that the soil could not provide the required bearing capacity to support the structure, which was a point of particular concern as this facility was designed as a Post-Disaster building.

Rather than proposing a site change and helical pile foundation system, our team elected to utilize shallow spread footing foundations. This type of foundation is designed to transfer the building load to the supporting soils over a specified area, in accordance with soil's capacity. This ensured the stability of the building, avoided drilling into problematic soils, and eliminated risk of construction delays. The selection of a shallow spread footing foundation reduced the cost of the foundation by 50% and allowed the college to allocate the more funds toward academic programming.



E. SOCIAL AND ECONOMIC ADVANTAGES

The social and economic benefits of this project on South Porcupine and other surrounding communities are both far-reaching and diverse.

Supporting South Porcupine

For Timmins area citizens, this facility has ensured comprehensive access to fire, police, and emergency medical services for many years to come. Furthermore, the relocation of these services to the Northern College complex has allowed Timmins to upgrade its facilities and benefit from state-of-the-art technology and new equipment. Community members can also learn more about their local emergency services by observing the inner workings of the facility through large windows that border the nearby highway.

For the city as a whole, this project has provided a notable means of attracting new students, faculty, and emergency service professionals to the area. This facility has allowed the city and college to enhance its reputation across Ontario, and is already attracting students from across Canada.

Enhancing Student Skills

For Northern College students, this project has created an unparalleled experiential learning environment. Both current and prospective students training at this facility will enhance their learning through diverse practice exercises that closely imitate real life emergency scenarios. They will learn from each other due to specially designed observation spaces, and will have continuous exposure to professionals already employed in their desired fields of work for added career insight.

Streamlining Emergency Response

Perhaps the most significant social impact of this project, however, is the fact that this project exemplifies best practices for addressing a pressing global security issue: lack of communication and sharing of resources amongst different emergency services providers. This education facility is designed to close this gap and foster collaborative efforts amongst local emergency service entities, a feature that was celebrated at the grand opening of the complex.



F ENVIRONMENTAL AWARENESS

It was of utmost importance to Northern College that the Integrated Emergency Services Complex incorporate environmentally conscious and sustainable features wherever possible. This was challenging due to strict budgetary constraints, but the client felt that LEED principles provided several specific pathways to enhance the sustainability of this facility. Northern College ultimately decided not to pursue LEED certification of this building, but did mandate that the design team draw upon LEED principles in developing plans to enhance efficiency.

Sustainable Design

Sustainable design features incorporated into this facility include high-efficiency mechanical systems and a high-performance building envelope, which assist in reducing the facility's carbon footprint and capital operating costs. The complex has also been designed to allow natural sunlight to permeate deeply into the facility, reducing the need to use artificial lighting during daylight hours and promoting wellness amongst staff and students. Extensive secure bicycle parking has also been incorporated into the facility in order to encourage staff and students to make use of non-polluting transportation methods. Finally, extensive green space has been cultivated on facility grounds, offsetting some of the carbon debt of this project and fostering environmental engagement on the part of the Northern College community.

Heating Efficiency

The building systems were designed to ensure a high level of energy efficiency was achieved. The heating system consists of natural gas hot water condensing boilers. These boilers provide water at a temperature to ensure continued operation in the condensing range, maximizing boiler efficiency. The domestic hot water system utilizes natural gas fired condensing hot water tanks. Both the boilers and hot water tank systems intake combustion air and exhaust directly to the exterior of the building. The ventilation systems are equipped with dual core style energy recovery ventilators, which recover both latent and sensible energy at an effectiveness of 88% from the exhausted air and recover the energy into the outside air ventilation before being heated or cooled by the air handling systems. All of these systems were incorporated in an effort to minimize the amount energy being expelled from the building mechanical systems.

Reduced Facility Footprint

Perhaps the greatest environmental impact of this project, however, is the fact that the integrated nature of this facility has resulted in expanded educational and emergency services within one facility and one footprint. This project has eliminated the need for four distinct facilities to serve the same community needs that are now addressed within one space.





G. MEETING MANDATES

Throughout this project, the design team was deeply motivated to develop a facility that completely satisfied the needs identified by Northern College. Equally important, however, were the needs of other stakeholders that provided insight and consultation during the design phase.

Satisfied Stakeholders

Project stakeholders include engaged members of the Timmins community, local fire service professionals, local police service members, local emergency medical service practitioners, student leaders, and college faculty. The perspectives provided by each of these groups guided the JLR team and, as the project progressed, helped them to shape the facility to meet the diverse needs of the entire community. The design process was founded on a partnership between JLR and all these stakeholders.

Now that construction has concluded, the project team can attest with confidence to the fact that the true accomplishment of the Northern College Integrated Emergency Services Complex is that it fulfills the needs of all stakeholders.



A Thorough Success

The Northern College facility is the first of its kind in Ontario, and represents the unprecedented and successful marriage of complex emergency services and post-secondary programming. The project was completed on time, and within the prescribed budget.

The facility has been designed in accordance with sustainable design best practices, and includes several high-performance elements that enhance its sustainability and minimize operational costs.

Finally, and most importantly, this project has already had a significant impact on attracting attention to the community and enabling the City of Timmins and Northern College to make a name for themselves as leaders in emergency services and innovative post-secondary education.



H. CONCLUSION

The Northern College Integrated Emergency Services Complex is a state-of-the-art, post-disaster facility that functions as a work space for professional police, firefighters, and EMS workers, and a learning space for students enrolled in fire, EMS, and police college programs. In many ways, this building has broken new ground and shown the extent to which facility programming can inform innovative educational facility design.





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