Building Envelope SOLUTIONS

ENTUITIVE

Contents

BUILDING ENVELOPE SOLUTIONS OVERVIEW

OUR LOCATIONS

CANADA

TORONTO
VANCOUVER
EDMONTON
CALGARY
OTTAWA

UNITED STATES

NEW YORK

290+
TOTAL STAFF

2011
YEAR ESTABLISHED

Purpose-led. Passion-fueled.

ENTUITIVE BRINGS TOGETHER A HIGH CALIBRE, EXPERIENCED GROUP OF ENGINEERS WITH A NEW ATTITUDE.

It's a new way of thinking that's driving our success as we strive to build the first-choice engineering firm for exceptional clients in Canada and around the world.

We are a group of purpose-driven engineers, scientists, designers, technologists, and city-building experts who deliver uncompromising performance through a comprehensive range of services for the built environment. Our culture, commitment, and passion enable us to achieve progressive solutions to the most complex challenges.

Since our inception in 2011, we have been recognized as the firm that does things differently. Our organization is designed for agility and navigated using guiding principles that aid us in achieving uncompromising performance: always asking better questions, tackling every challenge as an opportunity, and a relentless pursuit in being better tomorrow than we were today. We are committed to a sustainable future.

We exist to realize our potential for the fulfillment of our people, our clients, and the communities where our work comes to life. We strive to build a better world by being creative, collaborative, and advanced.

Why Entuitive?

A NEW WAY OF THINKING

Cities are demanding more from the built environment as the way people live, work, and travel changes at an unprecedented pace. Sustainability, once considered an afterthought, is now central to designing buildings suited for future demands.

CREATIVE

We combine our insight, experience and creativity with our technical knowledge to solve the unique challenges presented by every new project. Whether it's a design challenge, a cost challenge or a scheduling challenge, we are committed to being problem solvers.

COLLABORATIVE

At Entuitive, we collaborate with developers, architects, building owners, building managers and construction clients to find the best constructible, cost-effective solutions. We also have an open approach in-house, where we share ideas, knowledge and resources across our multi-disciplinary team and between offices.

ADVANCED

Our in-house innovation process is designed to rapidly bring challenges to the masses, tap our high-caliber talent for solutions, and implement change for the advancement of our firm and the evolving needs of our clients. Ennovation is a discipline in process that removes barriers and empowers our people to discover opportunities that benefit the projects our clients have entrusted us to deliver.

PERSPECTIVE

Founded in 2011, Entuitive is rapidly expanding. We currently have one office in New York and five Canadian offices positioned strategically across the country in Vancouver, Calgary, Edmonton, Ottawa, and Toronto. Our One-Company philosophy and corporate structure allows us to involve the right people at the right time from across the firm to deliver complex and challenging projects. This has worked very effectively on larger complex projects where team members are located across multiple geographies.

RELATIONSHIPS

Entuitive has developed long standing relationships with many of Canada's most established developers, builders, and property managers. We work hard to establish enduring relationships with clients and have built a strong reputation across the country through hard work, innovation and, most importantly, collaboration.

EXPERTISE

Our team has a solid track record of delivering existing building projects across a wide range of sectors, including strata, multi-unit residential, commercial, hospitality, institutional, retail, sports and recreation, industrial, transportation, and healthcare. We invest in the latest information and conference technology to allow for a unified and flexible internal project workflow.

We Engineer For Sustainability

With a triple bottom line focus, we strive to create a built environment that is environmentally, socially, and economically sustainable.

We believe building performance is sustainable performance.

As both legislated and voluntary responses to the environmental crisis continue to become more ambitious, Sustainability Stewardship at Entuitive seeks to reduce our own carbon footprint, coordinate our services to provide a holistic approach to sustainable planning, design, and delivery, and equip our clients with the knowledge they need about how building performance can contribute to a sustainable future.

We have developed four guiding principles to steer our efforts and align with this approach.

1

SUSTAINABLE PROJECT DELIVERY & CARBON REDUCTION

Our diverse and expansive portfolio of projects across multiple sectors has positioned us to work with forward-thinking clients and teams seeking excellence in design. Leading the collaborative process, we integrate early sustainable design considerations, such as net zero, water conservation, waste reduction, circular design, and community health, where they can have the most beneficial impact on the project.

2

SUPPORT INNOVATION THROUGH RESEARCH & DEVELOPMENT

Staying up to date on climate trends and resilient design practices is paramount. Our team of engineers, scientists, designers, and technologists actively research new and improved methods of analyzing embodied carbon, optimizing structural design, modelling whole-building energy efficiency, and enhancing envelope durability.

3

COMMUNITY ENGAGEMENT & EDUCATION

We provide educational resources and outreach to all employees and clients to continuously improve our collective acumen at tackling the challenges of climate change, resource scarcity, urban densification, and social inequity. We commit to community-focused projects that provide more green spaces and help offset both our own carbon footprint and that of the buildings and infrastructure we design.

4

LOW-CARBON OPERATIONS

We have benchmarked our 2018 Operational Carbon Footprint according to the GHG Protocol, ISO 14064-1:2018 Part 1, and the Climate Registry General Reporting Protocol Version 3.0 guidelines and standards. We are also addressing our largest emitter activities to reduce our carbon footprint across our offices and are providing financial support to carbon emissions reductions projects for our excess corporate emissions.

Our Sectors

UNCOVER THE LIMITLESS POTENTIAL OF THE BUILT ENVIRONMENT

We unlock the potential within new and existing sites with solutions that surpass expectations. We collaborate with stakeholders, owners, developers, architects, and contractors to drive maximum return on investment for commercial buildings.

Every cultural venue is an original creation. Iconic civic, cultural, and performing arts centres in our community are designed to inspire awe and inclusivity inside and out. Our commitment to creativity, collaboration, and advanced technology supports bringing these venues to life.

Positive outcomes in healthcare facilities demand high-performing structures. We work with healthcare providers and stakeholders within acute care, long-term care, and rehabilitation services to design buildings that support healing, recovery, and resilience.

From hotels to ballrooms and convention centres, hospitality projects present unique challenges with a need to integrate repetitive framing at suite level with long-span, open areas for amenities, restaurants, and more. Our expertise seamlessly unites these needs to create welcoming, accessible, and inclusive spaces.

We are committed to creating a built environment that unites its residents and fosters community spirit. Publicly funded projects, such as schools, universities, seniors living, community centres, government offices, police stations, fire halls, courthouses, and more, fulfil the noble purpose of community, connectedness, and environmental and social stewardship.

Performance in these facilities means the ability to help medical researchers, businesses, and governments undertake vital work and securely store their data. Our team provides a holistic, all-encompassing approach to building solid, resilient structures designed with post-disaster strategies in mind.

Mixed-use developments support walkable, accessible community hubs that enrich the lives of their residents and workers, creating urban spaces that meet the needs of our growing populations. Our multi-sector expertise allows us to bring these hubs to life.

Residential projects demand an approach that considers return on investment, design aspirations, and quality of life. We collaborate with all stakeholders to design efficient, sustainable, readily constructible homes for multi-unit projects and private residences.

Redefining the brick-and-mortar retail experience requires a combination of technical skills, imagination, and collaboration. We work with architects and developers to create unique customer encounters that maximize return on investment.

Sports and recreation facilities demand some of the fastest delivery schedules in the industry. We work closely with architects and designers to create venues that offer best-in-class facilities for athletes and deliver an enhanced experience for the viewing community.

Our cities, people, and economy all demand modern, efficient, sustainable, and reliable infrastructure to keep them connected as they evolve. Transportation projects are most successful when they are delivered on time and on budget, and, perhaps most importantly, without compromising day-to-day operations.

Our Services

UNCOVER THE LIMITLESS POTENTIAL OF THE BUILT ENVIRONMENT

ADVANCED PERFORMANCE ANALYSIS (APA)

APA allows us to consider all aspects of a project and how its environment will impact performance.

CONSTRUCTION ENGINEERING

The integration of our Construction Engineering services enables our team to tailor designs to the distinct needs of our contractor clients.

BRIDGE ENGINEERING

Our Bridge Engineering group has a keen focus on mitigating construction costs for new bridges, as well as extending the lifespan of existing ones.

EXPERT ADVISORY SERVICES

Corporate teams, such as Investment, Legal, Insurance, and Planning, rely on our experts for consultations on a variety of issues.

BUILDING ENVELOPE

Our Building Envelope team specializes in the complete enclosure of new and existing buildings.

FIRE ENGINEERING

We provide holistic, performance-based fire engineering solutions that meet all stakeholder goals and broaden the range of design possibilities while having the same or better performance than prescriptive building codes deliver.

NATIONAL VETERANS RESOURCE CENTER
SYRACUSE, NY

PEDESTRIAN MODELLING

We are able to quantify how occupants move through a physical space under a range of scenarios to gain insight into the user experience and inform design and renovation decision making.

RESTORATION

Restoration is an alternative to demolition that favours the preservation of sustainability, heritage, and an original architectural vision, allowing us to accommodate the growing density of modern cities.

SPECIAL PROJECTS & RENOVATIONS

From repurposing existing structures to tenant fit outs, public art installations, and updates to private residences, we deliver unique and strategic solutions, often on expedited timelines.

STRUCTURAL ENGINEERING

Structural Engineering is a pillar on which a high-performing, creative vision stands, most successfully if it begins with a holistic view of an asset's impact on its users and community.

SUSTAINABLE BUILDINGS & SITES

We support our clients in building a better world through project engagement, planning, design, construction, renovation, and operation to achieve sustainable certifications and performance standards, including LEED, Envision, Built Green High Density, WELL, Fitwel, Living Building Challenge, BOMA Best, SITES, TRUE, and custom-fit solutions.

WHOLE LIFE CARBON CONSULTING

Our team offers a broad suite of carbon assessment, auditing, and retrofitting services spanning the full asset lifecycle, enabling our clients to achieve their net-zero or near net-zero carbon goals and building certifications.

Building Envelope Solutions

WHY ENTUITIVE?

We maximize the performance of the building envelope, working with design teams, developers, and contractors to develop solutions that achieve the aesthetic, performance, and durability goals of the project.

Entuitive's Building Envelope team specializes in the complete enclosure of new and existing buildings, including cladding, glazing, roofing, and waterproofing.

We collaborate with all stakeholders from the early design concept phase through to commissioning. Our team balances many criteria against issues such as cost, availability, scheduling, and programming requirements so we can advise on the best solutions.

With a view to the full asset lifecycle, we provide envelope restoration and rehabilitation, through forensic analysis and investigations, that optimize performance and extend the lifespan of the structure.

COMCAST INNOVATION & TECHNOLOGY CENTER
PHILADELPHIA, PA

SHANE HOMES YMCA AT ROCKY RIDGE
CALGARY, AB

SERVICES AT A GLANCE

ADVANCED BUILDING ENVELOPE SOLUTIONS

We ensure that sound building science theory and building envelope expertise are applied to every project, large and small. Supporting our holistic solutions, we apply computer simulations to test our ideas during design, and sophisticated field testing to verify performance during and after construction.

Our commitment to engineering Uncompromising Performance means we use the most advanced technology platforms to design and rehabilitate high-performance building envelopes within the project budget and schedule.

MAINTAINING YOUR ASSET FOR LIFE

We perform Building Envelope Condition Assessments for building owners looking to proactively maintain their asset. Our deep understanding of the building envelope as a complete, integrated system allows us to investigate and assess a variety of structures

Starting with an assessment, our team investigates the asset for a range of failures, including leakage of walls, internal damage, condensation, and more. Using the most advanced tools, we provide thoughtful recommendations for rehabilitation and renewal.

THERMAL BRIDGING ANALYSIS

To ensure compliance with various energy requirements, as well as ensure we deliver the best-performing envelopes, Entuitive offers Thermal Bridging Analysis as part of our holistic, integrated suite of building envelope services.

We perform weighted u-value calculations and computer-aided thermal transmission analyses to determine the effective u-value of the exterior building envelope systems, including the effects of thermal bridging, such as window/wall transitions, balcony/slab edges, and exterior cladding attachments.

HYGROTHERMAL MODELLING

Hygrothermal Modelling utilizes a computational finite element method to evaluate the thermal and moisture conditions within exterior walls or roofs. Hygrothermal analysis is key to understanding the performance of an existing wall assembly, allowing for informed decision-making regarding assembly alterations.

Representative wall sections are analyzed to determine the potential for moisture build up within an enclosure system. Should changes need to be made, we study multiple iterations and options for improving and upgrading the system without compromising the longevity of the existing components.

THE ROCKEFELLER UNIVERSITY
RIVER CAMPUS NEW LABORATORY
NEW YORK, NY

Building Envelope Design & Sustainability

AN INTEGRATED APPROACH

Our approach to the building envelope as an integrated whole, with a view to the full asset lifecycle, enables our team to continually deliver high-performing, efficient envelopes that meet all stakeholder and end user needs.

This includes design and specification of high-quality envelope components to optimize building energy performance, as well as commissioning, which involves inspection, testing, and reporting to verify that your building systems are reaching performance expectations.

Moreover, our Building Envelope, Structural, Restoration, and Advanced Performance Analysis teams collaborate and work together as well to deliver uncompromising environmental separators. Our LEED®-accredited and Passive House staff collaborate with all stakeholders to design solutions to meet your sustainability goals for long-term, low-footprint building performance.

ADVANCED PERFORMANCE ANALYSIS

Current performance targets are driving towards goals of net-zero energy while simultaneously demanding improved occupant wellness.

The cornerstone of modern low-energy design is a highly effective building envelope. Many iterative conversations must happen with the architectural team, who must consider how the building envelope is going to integrate into full building performance.

Our Building Envelope and Advanced Performance Analysis (APA) teams seamlessly integrate to consider all aspects of a project and how its environment will impact performance to maximize energy efficiency and reduce project costs throughout the entire asset lifecycle.

By providing feedback on key performance indicators at all stages of design, we enable design teams to push the boundaries of architecture and engineering with confidence that sustainability targets will be achieved.

THE BREARLEY SCHOOL
RENOVATION & EXPANSION
NEW YORK, NY

APA includes climate and site analysis, daylight and glare analysis, energy modelling and building simulation, massing and orientation analysis, natural ventilation analysis, passive survivability analysis, and thermal comfort analysis.

We have also developed ways of using future projected climate data to understand its effects on building envelope energy efficiency, and how to maintain envelope efficiency over a building's lifecycle.

Entuitive develops creative solutions that anticipate future building stress through environmental change to create resilient buildings.

PASSIVE HOUSE

Passive House is a cutting-edge building construction standard that relies on air tightness, high thermal performance, heat-recovery ventilation, and passive heating to drastically reduce energy consumption and improve occupant comfort.

Entuitive's team of Certified Passive House Designers and Building Envelope Specialists can work with design teams to realize vast operational energy savings.

Our team is partnering with clients to achieve this certification on large low-, mid- and high-rise projects. Passive House projects rely heavily on Entuitive's building envelope services to design and develop specialty envelope assemblies with significant building envelope air tightness and thermal performance. We understand the importance of revolutionizing how we develop buildings to ensure that we provide the best solutions for energy performance.

With projects that are pursuing Passive House Standards, the following strategies are implemented in schematic design.

SCHEMATIC DESIGN STRATEGIES

- Developing wall section options and typical envelope details that minimize thermal bridging, meet the thermal resistance target set by our team's Passive House Consultant, and facilitate air barrier continuity at typical details and interfaces with other envelope systems;
- Working with wall and roofing manufacturers, suppliers and trades to understand product and assembly performance, and to develop high performance, constructible envelope systems;
- Working with window manufacturers to develop installation details that meet Passive House requirements;
- Creating THERM models to calculate thermal bridging effects (psi-value), which the Passive House Consultants can use in their PHPP energy model;
- Developing air barrier QA/QC processes for design and construction phases.

KEN SOBLE TOWER -
PASSIVE HOUSE RETROFIT (EnerPHit)
HAMILTON, ON

During the design development and construction documents phase, our Building Envelope team provides extensive psi-value calculations for bridging details at wall and roof corners, penetrations, foundation walls, floor slabs, cladding attachments, etc.

During the construction phase, our team acts as the Passive House Verifier, performing weekly site reviews to verify that the envelope construction meets the design intent, and that air barrier continuity is achieved to meet the Passive House air leakage limit of 0.6 ACH.

Early consideration of the thermal envelope can eliminate critical thermal bridges by design. As well as reducing heat loss, which results in long-term savings in energy bills, and because of higher surface temperatures at junctions, we also eliminate the risk of mould growth and improve the comfort factor of occupants.

DEEP ENERGY RETROFITS

Deep energy retrofits play a significant part in meeting government, institutional, and corporate GHG emissions reductions commitments.

Deep energy retrofits consider the building asset as an integrated whole, upgrading all systems together to minimize on-site energy usage and improve overall performance.

Entuitive's Building Envelope, Structural Restoration, and Energy Modelling teams allow us to lead or support deep energy retrofit projects, from Building Condition Assessments through to final Envelope Commissioning. Our parametric tools enable us to identify optimal performance upgrades.

Our approach is founded on our understanding of the whole building lifecycle as well as our expertise in building performance and sustainability modelling. As a leader in the industry, Entuitive has conducted research studies to understand the key considerations for developing high-performing buildings that will ensure future climate resilience and sustainability.

Ongoing studies address methods of generating future climate data and contrasting statistical manipulation against simulations to better quantify projected temperature increases and their impact on energy use.

Our LEED®-accredited staff are committed to a design process that uses materials and resources wisely, realizing project needs with innovative, low-imprint solutions.

Strategies might include incorporation of regionally located, low-emissions or recycled-content material; structural and building forms that address environmental temperature and building services, such as design of vertical spaces to draw heat and air out of a building, or proper detailing of air and thermal barriers to control air movement and ensure energy efficiency of the building envelope, ultimately reducing loads on HVAC systems.

Our diverse and expansive portfolio of projects across multiple sectors has positioned us well to work with forward thinking design teams seeking to provide high-quality, efficient, deep energy retrofits to our clients.

Our innovative design strategies and value of deep collaboration are underpinned by our commitment to a sustainable future.

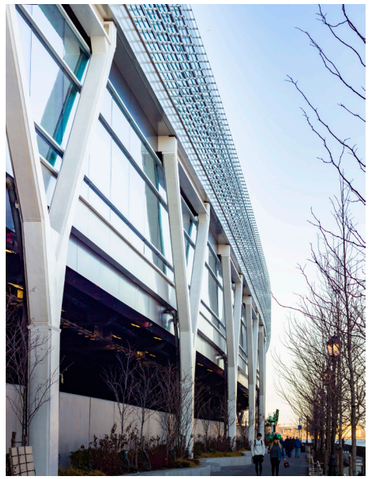
BOSTON UNIVERSITY - CENTER FOR COMPUTING & DATA SCIENCES
BOSTON, MA

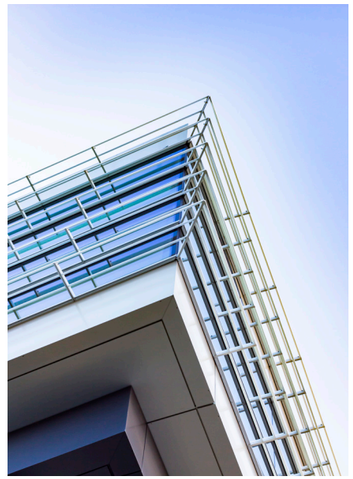
Project Highlights

SELECTED RELEVANT
PROJECT EXPERIENCE

MARIE-JOSÉE AND HENRY R. KRAVIS RESEARCH BUILDING - THE ROCKEFELLER UNIVERSITY RIVER CAMPUS NEW LABORATORY

NEW YORK, NY

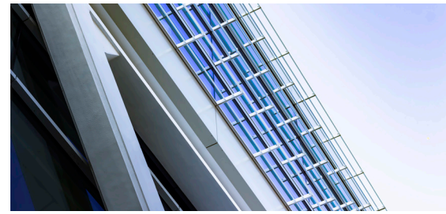




The new laboratory building at Rockefeller University, one of the foremost biomedical research institutions in the world, will project over FDR Drive on the east side of Manhattan and serve as a highly collaborative facility supporting modern research.

The new 160,000 ft^2 laboratory building extending over FDR Drive will maintain a low building profile to protect and enhance the views of the campus from Manhattan and the East River. The facility will provide new connections to existing laboratory buildings and infrastructure. It will also incorporate maximum flexibility for changes in the layouts of the spaces, horizontal connectivity to improve communication between programs, lounges, informal congregation areas, seminar rooms, general food and beverage spaces, and a green roof over the new two-storey laboratory that will be integrated into the landscape.

Challenge
The footprint of the new laboratory building is directly above the bustling FDR expressway. Since this expressway is integral to commuters it could not be closed down to allow for construction.



Solution
Our team developed a building envelope solution that can be assembled on the structural frame of the building and is being constructed off-site, transported by barge to the site, and lifted into place above the FDR expressway. Careful consideration was given to the weight of each module as they will be transported to the site and lifted into place by cranes from barges on the East River. The strategy is to have the modules as staging areas for the remainder of the work to progress without disruption to the expressway below.

Architect
Rafael Viñoly Architects

Client
Rockefeller University

Size
14,864 m^2 (160,000 ft^2)

Role
Building Envelope Consultant

Budget
$500 M

ST. LOUIS HOTEL RESTORATION
CALGARY, AB

The St. Louis Hotel has been a landmark in Calgary since 1914 and was designated a Municipal Historic Resource in 2008. The brick, timber, and steel-framed building sat empty for many years until CMLC undertook the redevelopment of the building into leasable space in 2014. Nyhoff Architecture led the conservation and adaptive re-use of the historic hotel.

To extend the life of the building by another 100+ years, the edifice was fortified with a new steel structure and concrete floors while the heritage floors and ceiling were maintained. The building has been opened up with reconstructed light wells to enhance the leasing opportunities on all above-grade floors of the character building. The St. Louis' front façade mimics the style of the façade installed in 1949. Exposed brick, mechanical, electrical, and structural elements evoke the original building's rustic feel.

The restoration project was completed in July 2016, and opened a new chapter for the historical asset as a key component of the 8th Avenue gateway connecting East Village with the site of the New Central Library. The space further enables the retail vision for the neighbourhood, with mixed-use office space on the second and third floors and a variety of potential retail options on the main floor and basement.

Challenge
The existing building's wood structure was found to be in significant distress after 100 years of renovations and modifications. Areas of the floor were unsafe to walk on and in a state of near collapse.

Solution
To create a high-end, leasable space, it was decided to reconstruct the interior structure of the building using a new steel frame. The frame was designed to integrate with and mimic the existing structural steel in the lower levels of the building. This solution allowed for the installation of new concrete slabs over the old mill floors, which resulted in the appearance of solid wood flooring overhead as a ceiling finish, but solid, flat concrete floors underfoot.

Architect
Nyhoff Architecture

Client
Calgary Municipal Land Corporation (CMLC)

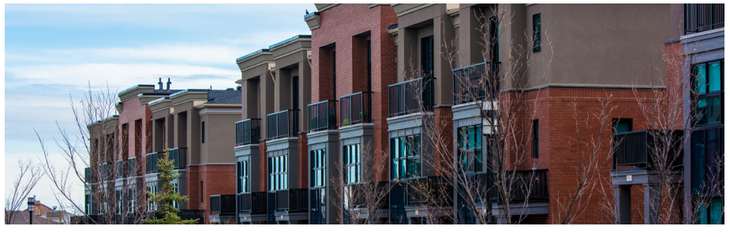
Role
Structural Engineering & Building Envelope Consultant

Size
1,719 m² (18,500 ft²) above grade

Budget
$7.1 M

Awards
2016 Alberta Construction Magazine Top Projects: Finalist

WEST 17TH LOFTS REHABILITATION
CALGARY, AB



In 2014, Entuitive was retained by a previous client, the condominium corporation of West 17th Lofts in Calgary, Alberta, to conduct a full building envelope condition assessment of the entire townhouse complex.

After careful investigation, and worrisome findings that necessitated immediate attention, our team prepared a comprehensive design package for the replacement of all affected structural and building envelope components, including all cladding, windows, and doors. The project was a true test of structural knowledge and ingenuity, requiring a workable solution for the fully occupied townhouse community.

Challenge
The beams above each of the garage doors in the complex, as well as other major structural supports for each unit, were severely undersized, causing the structures to sag. This structural failure caused multiple other failures in the building envelope.

Solution
As multiple undersized beams had to be replaced, the team worked closely with the contractor to ensure that the means and methods were the most economical and feasible, while ensuring that the replacements would not impact the new building envelope components being installed overtop.

Challenge
Because major structural supports were undersized, the building envelope was not sealed properly, allowing moisture ingress. This caused severe decay of internal beams, columns, and timber framing. Certain areas exhibited organic growth hazardous to occupant health.

Solution
As the issues with the building envelope were so extensive, repair had to start at the level of the timber studs, moving outward step by step. Our team developed many details to deal with the various issues. Envelope components were upgraded, poorly secured masonry was replaced, and proper drainage incorporated.

Architect
Nyhoff Architecture

Client
Calgary Municipal Land Corporation (CMLC)

Role
Structural Engineering & Building Envelope Consultant

Size
1,719 m² (18,500 ft²) above grade

Budget
$7.1 M

Awards
2016 Alberta Construction Magazine Top Projects: Finalist

COMCAST INNOVATION & TECHNOLOGY CENTER

PHILADELPHIA, PA

With 59 storeys reaching a height of 1,121 feet, the Comcast Innovation and Technology Center is the eighth-tallest building in the US, and the tallest in Philadelphia. It stands adjacent to the existing Comcast Center headquarters, the largest broadcasting and cable company in the world.

The mixed-use building includes a 220-room Four Seasons Hotel, high-tech research and development spaces, loft-like work spaces, retail spaces, and state-of-the-art television studios for NBC, located at the base of the building.

The central spine culminates at the top of the building as illuminated blades of glass extending 38 metres above the tower, creating a striking marker on the skyline. The building's façades are animated by panoramic glass lifts and a series of 13 three-storey sky gardens that rise through the eastern elevation, infusing a continuous strand of greenery throughout the building.

Challenge
The visual appearance of the tower was of high importance for the anchor tenant, requiring a visually flat and distortion-free glass. Typical glass design produces distortion in the reflected image, leading to a fragmented appearance of the tower.

Solution
The glass makeup of the IGU was improved to allow for increased glass thickness, which was then visually mocked up at full scale in various combinations and installed on-site for key stakeholders to review and comment on.

Architect
Foster+Partners (Design Architect); Kendall/Heaton Associates (Executive Architect)

Size
140,000 m² (1,500,000 ft²)

Role
Building Envelope Consultant

Budget
$933 M

LEED® Certification
Targeting LEED® Platinum

THE BREARLEY SCHOOL RENOVATION & EXPANSION

NEW YORK, NY

Founded in 1884, The Brearley School is a K-12 all-girls private school in New York City, located on the Upper East Side of Manhattan. The School teaches students to think critically and creatively, preparing them for purposeful lives beyond its halls.

As part of its "Opening Doors: A Strategic Vision for The Brearley School" plan, the School aims to modernize its campus and realize the full potential of its program and community. Entuitive was retained by KPMB Architects in a building envelope consulting capacity for work on a new schoolhouse as well as on the renovation of an existing schoolhouse.

The building is designed as a LEED Gold teaching tool, with envelope assemblies that include high performance, operable glazing systems, a highly insulated brick facade and green roof systems.

After completion of the new build expansion, the existing Brearley school is now going through a renovation project, which involves replacement of existing windows with new thermally broken aluminum framed windows with triple glazed fixed and operable units. Extensive thermal analysis was completed taking into consideration existing construction that would remain in place to assess impact on thermal performance and condensation risk from foreseeable thermal bridging at the rough opening.
As part of a larger energy retrofit strategy, it was also proposed to include thermal insulation in the interior side of the existing multi wythe masonry wall.

Hygrothermal analysis was performed to establish the depth of thermal insulation that would balance long term durability with improved thermal performance of the multi wythe masonry wall. To combat schedule challenges and to minimize disruption to students during the school year, design and coordination activities occurred during the school year while onsite construction activities are scheduled to occur during the winter and summer holiday months.

Architect
KPMB Architects

Client
The Brearley School

Size
85,000 ft2 (new schoolhouse)
112,000 ft2 (renovation of existing schoolhouse)

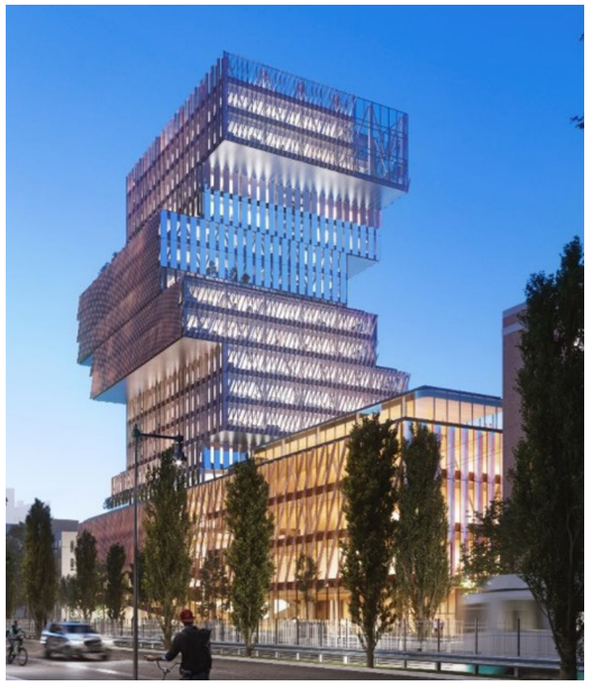
Role
Structural Engineering and Building Envelope Consultant

Budget
$ 107 M

LEED Certification
Targeting LEED® Platinum

BOSTON UNIVERSITY - CENTER FOR COMPUTING & DATA SCIENCES

BOSTON, US



The new Center for Computing & Data Sciences at Boston University will be a hub for the campus, connecting the river and city. Located within walking distance from the Charles River the building will become a natural campus hub, central to on and off campus activities and faculty events. Standing at 305 feet with a 5 story podium, the building will be a center for innovative and technologically advanced teaching and learning for the Math and Statistics Graphics Program, Computer Science Program, and the Hariri Institute Program. The architectural massing of the building features shifting free-floating volumes to create outdoor terraces associated with research neighborhoods that capitalize on spectacular views from all sides of the tower.

Challenge

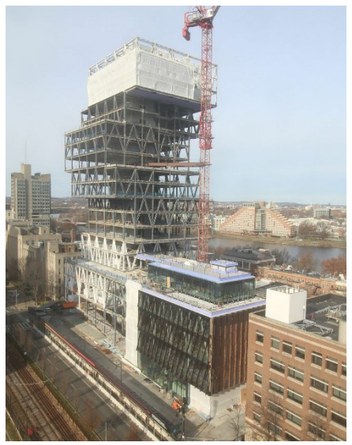
The project posed a number of challenges to achieve the architectural vision of the landmark building. One key challenge was related to the fact that floor plans feature bay modules that align for no more than three consecutive floors resulting in 115ft x 23ft cantilever volumes.

The structural team needed to resolve this cantilevered geometry within a standard 14' floor-to-floor stack and no internal bracing.

Solution

To meet this challenge, the team designed two story deep trusses located along the perimeter of the building to support the cantilevered volumes. These trusses span the full length of the building and are supported by a truss in the perpendicular direction that cantilevers a single bay and is supported by tower columns.

This resulted in a mixture of traditionally supported and hung floors. Another challenge was to erect a steel frame that depended on upper-level structure for stability, without vertical support from below. Working with the design assist steel trade partner, erector, and temporary works engineer, Entuitive developed a solution that used temporary shoring to support a stick-built steel frame that could be erected with a traditional bottom-up approach. Jacking boxes were setup to allow for the removal of temporary shoring when the building was complete.



Architect
KPMB

Client
Boston University

Size
264,000 ft²

Role
Structural Engineering and Building Envelope Consultant

Budget
USD $110M

1601 WEWATTA STREET

DENVER, CO

Completed in 2015, 1601 Wewatta Street played a large part in its neighborhood's enhancement. The 10-storey Class AA office tower is located in Denver's Commons area, just west of the 125-year-old Union Station, which underwent significant redevelopment in 2014. More than 100,000 commuters descend on the Commons each day.

1601 Wewatta is clad in aluminum and glass curtain wall and elegant stone cladding.Projecting glass parapets, horizontal sunshades, and unique cladding segmentation visually tie the tower's cladding to the ground floor streetscape.

Challenge

The building had aggressive goals for energy performance, coupled with a unique, complex, and attractive design. As is often the case, design elements, such canopies, terraces, and unique cladding elements, can create challenging lines, parameters, and shapes that are not conducive to good building envelope performance and complicate continuity of the building envelope in terms of air, vapour, heat, and water.

Solution

Our team worked with the architects to maintain the desired aesthetic appearance while boosting overall performance of the building envelope behind the scenes, in the materials, systems, and assemblies used in the exterior walls and roof areas.

Architect
Hellmuth, Obata + Kassabaum Architects (HOK)

Client
Hines

Size
27,871 m² (300,000 ft²) of rentable commercial and retail area, plus 4 levels of underground parking garage

Role
Building Envelope Consultant

Budget
LEED® Gold

MANHATTAN WEST PLATFORM
NEW YORK CITY, NY

The Manhattan West Platform was the first stage in a commercial development project to reclaim 2.6 acres of land over the busiest commuter rail corridor in North America. Completed in 2015, the platform serves as the foundation for a plaza and public space over previously uncovered railway tracks and serves part of a new 5.4 million ft² office development in west Manhattan.

The project required constant coordination with Amtrak and the Long Island Railway, and with the design and construction of Amtrak's new High-Speed Rail terminal at Moynihan Station, directly east of the site.

The project involved the construction of an innovative 240-foot span platform structure using post-tensioned precast technology, a rarity among commercial construction projects. Brookfield Properties retained Entuitive to design the foundations and platform support beams, and to develop the structural design of the long-span platform.

Challenge
It was essential in the design of the platform to minimize, or completely avoid, disruption of rail service to New York's Penn Station.

Solution
Entuitive developed a design that incorporated deep post-tensioned segmental precast box girders to span 16 tracks, allowing crews to avoid intrusive construction at track level.

Architect
Skidmore Owings and Merrill (SOM) Architects

Client
Brookfield Properties

Size
10,500 m² (115,000 ft²)

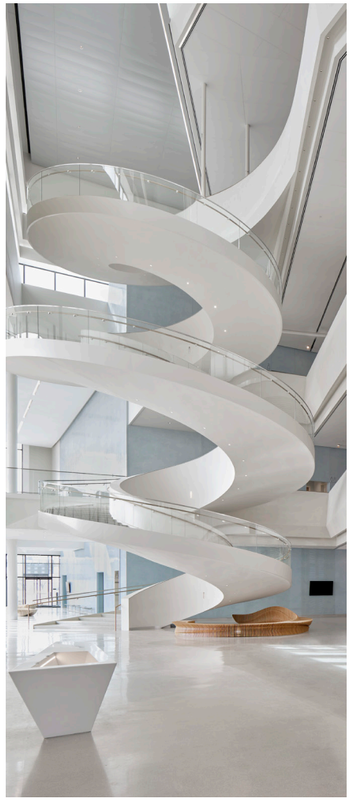
Role
Structural Engineering Consultant

Budget
$200 M

BUDDY HOLLY HALL OF PERFORMING ARTS AND SCIENCES
LUBBOCK, TX

The Buddy Holly Hall of Performing Arts and Sciences is a world-class, multi-purpose cultural venue that will accommodate a diverse range of events ranging from large touring musicals to intimate dance performances.

The venue includes a 2,300-seat main theater, a 425-seat studio theater, a 6,000 square-foot multi-purpose room, and a bistro café. The facility is acoustically flexible to accommodate ballet, opera and other musical performances as well as educational activities, banquets and community events.



Challenge
Deliver a world-class cultural venue to meet the high expectations of the owner, cultural groups and donors while respecting a limited budget.

Solution
Early in the design phase, we undertook multiple parametric modeling studies which explored, tested and optimized many aspects of the structural design to rapidly explore options and find optimal, cost-effective solutions. This included comparing conventional two-sided formwork foundation walls against tilt up wall construction; structural resistance to lateral earth pressures as well as concerns about water retention to protect the substructure program. Other examples included parametrically modeling solutions to a feature stair in the Front of House lobby; selecting alternate material selection for the stage house by comparing various structural steel schemes to a cast-in-place concrete scheme. We also modeled alternate framing schemes for the building's roof considering support for catwalks, acoustic banners, and the coordination with mechanical HVAC.

Architect
Diamond Schmitt Architects

Client
Garfield Project Management

Size
19,881 m² (214,000 ft²)

Role
Structural Engineering Consultant

Budget
$146 M ($118 M USD)

550 WASHINGTON REDEVELOPMENT

NEW YORK, NY

550 Washington was constructed in the 1930s as St. John's Terminus, the depot for the rail tracks that are today's High Line. The building's redevelopment will create a new high-performance, health and wellness commercial office building, described as a "workplace of the future."

The 1.1 million ft² building will include commercial, retail, and ground floor event space. A new nine-storey addition will be constructed on top of a renovated existing three-storey podium structure (12-storey plus penthouse in total). The building's green rooftops and recessed terraces will offer views of the Hudson and New York City skyline. The site/building is located in the AE Flood Zone.

Challenge
550 Washington's initial programming has little connection to its use as an office building. However, retaining the authenticity of this unique building is paramount to creating an honest structure that will attract prestigious tenants.

Solution
Reviewing archived drawings and testing existing materials was a critical first step toward understanding the existing building's capacities. Through close collaboration with the architect, MEP engineer, owner, and contractor, Entuitive proposed solutions that maintain and expose a significant amount of the structure. While this is most evidenced by the exposed north portal entry, it was equally as important to maintain the existing deep foundations that were constructed below the watertable.

Architect
Adamson Associates Architects (Executive Architect); COOKFOX (Design Architect)

Client
Oxford Properties

Size
102,193 m² (1,100,000 ft²)

Role
Structural Engineering Consultant

LEED® Certification
Targeting LEED® Platinum and WELL Certification for Core/Shell

CORTELLUCCI VAUGHAN HOSPITAL

VAUGHAN, ON

The new Cortellucci Vaughan Hospital (formerly the Mackenzie Vaughan Hospital) is the first hospital to be built in the city of Vaughan and the first new hospital to be built in the York Region in the last 30 years. The hospital will be a place for state-of-the-art healthcare.

The new facility will include an emergency department designed for the needs of today's patients, modern surgical services and operating rooms, advanced diagnostic imaging, specialized ambulatory clinics and intensive care beds, and acute-care patient rooms for infection prevention and control. It will also be the first hospital in Canada to feature fully integrated smart technology with systems and medical devices that speak directly to one another to maximize information exchange.

The 1.2 million ft² complex will employ 1,000 construction workers during that phase, 1,800 full-time healthcare workers once it opens its doors, and will have capacity for 75,000 annual emergency visits. The project has a goal of achieving LEED® Silver certification, focusing on sustainable design and construction.

Architect
Stantec Architecture

Client
Mackenzie Health

Size
111,484 m² (1,200,000 ft²)

Role
Structural Engineering Consultant

Budget
$1.3 B

LEED® Certification
Targeting Leed® Silver

SICKKIDS PETER GILGAN CENTRE FOR RESEARCH AND LEARNING

TORONTO, ON

Project led by an Entuitive leader while employed at a previous firm.

Located on a constricted downtown site in Toronto's Discovery District, a medical and biotechnology corridor, the 21-storey building consolidates SickKids Hospital's research programs, bringing together 2,000 staff under one roof.

Located at Bay and Elm Street and representing the largest high-rise research building in Canada, the 850,000 ft² building contains research labs, learning and assembly spaces, meeting rooms, a tele-education room, a 250-seat auditorium, informal gathering areas, and two levels of associated underground parking.

On the ground floor, retail and restaurant spaces serve both building tenants and the public. Structural design included shoring and underpinning on all sides of the building to address the L-shaped site, and structural elements to support the feature, curved glass wall and striking frontage for the centre along its Bay Street side.

Challenge
To incorporate a 250-seat lecture theatre in a multi-storey building, with minimum impact to adjacent building programs.

Solution
The 250-seat auditorium was located in the low-rise podium to reduce transfer structure requirements. The transfer was achieved with a two-storey Vierendeel truss with no cross-bracing to maximize efficiency of the program space.

Architect
Diamond Schmitt Architects

Client
Hospital for Sick Children

Size
78,960 m² (850,000 ft²)

Role
Structural Engineering & Building Envelope Consultant

Budget
$300 M

LEED® Certification
LEED® Gold

SHANE HOMES YMCA AT ROCKY RIDGE

CALGARY, AB

The Shane Homes YMCA at Rocky Ridge is a complex situated in Calgary's northwest. The facility is approximately 300,000 ft² in area and sits on a 64.5 acre site. The project was part of the City of Calgary's "Investing in Communities" initiative.

The facility houses an aquatics centre, including an eight-lane competition pool, two ice rinks, gymnasiums, fitness centre, multi-purpose rooms, a library, daycare facility, physiotherapy/medical clinic, a pro shop, and food services.

Challenge
The roof of the building includes undulating lines that are free flowing and blend with the rolling hills of its surrounding site. The curves of the roof and how the roof connects seamlessly to the exterior wall cladding and glazing systems was a particular challenge in terms of material selection, assembly composition, and the requirement to maintain the continuity of the building envelope sufficient for occupant comfort and the air and water tightness of the building.

Solution
Entuitive worked with the architect to evaluate the various cladding, roofing and glazing options, and details to ensure the building envelope met the aesthetic requirements, while beneath the visible skin it provides the required moisture management and continuity of air barriers, vapour retarders, and thermal barriers required for the internal uses of the building.

Architect
GEC Architecture

Client
City of Calgary

Size
27,000 m² (300,000 ft²)

Role
Building Envelope Consultant

Budget
$100 M

LEED® Certification
Targeting LEED® Gold

FOUR SEASONS CENTRE FOR THE PERFORMING ARTS

TORONTO, ON

Project led by an Entuitive leader while employed at a previous firm.

The Four Seasons Centre for the Performing Arts is home to the Canadian Opera Company and the National Ballet of Canada. In addition to the 2,071-seat theatre, the centre features a street-related City Room along University Avenue. From the City Room's double lift glass stair and through the structural glass façade, audience members can walk up to the theatre's upper-levels of seating while looking out to traffic passing by on University Avenue.

The glass stair is a complete glass structure. The large plate glass balustrade includes two virtually invisible tension splices that allow for three sections of glass to perform as one continuous structural member, spanning from the floor to the intermediate landing and suspended by four stainless steel rods.

The sloping/curving wall of the City Room supports the theatre seating "bowl" structure. Four cantilevered balconies are framed from the back wall using a "warped" plate slab to preserve sightlines.

Challenge
The centre was designed to achieve an N1 acoustic rating, a special challenge given its location atop lower-level parking and adjacent to both the Queen Street streetcar and the University leg of Toronto's Yonge-University-Spadina subway line.

Solution
To achieve the N1 acoustic rating, large rubber isolating pads designed to resist gravity and lateral forces support the entire house area. An acoustic joint separates the parking garage and the building.

Architect
Diamond Schmitt Architects

Client
Canadian Opera Company

Size
15,000 m² (161,459 ft²)

Role
Structural Engineering, Building Envelope & Structural Glass Consultant

Budget
$102 M

Awards
2007, Design in Glass Award - Commercial category, Glass Association of North America;

2007, Project Achievement Award, Large Project category, Best of the Best Design Excellence Awards, Toronto Construction Association;

2007, Ontario Association of Architects OAA Awards

BAY ADELAIDE CENTRE, EAST TOWER

TORONTO, ON

The tower core was built using an ATR self-climbing system – so-called because it climbs on rails up the building by means of hydraulic jacks – so construction can proceed without the use of a tower crane.

To mitigate noise and vibration from an adjacent subway line, crews constructed the ground floor of the podium so that its core floats 100 millimetres above the existing B1 level. It was supported on existing columns and foundation walls using isolation pads.

Adjacent to its sister building, Bay Adelaide West, the east tower was built above an existing four-storey, below-grade parkade. Crews partly demolished existing parking slabs within the tower's footprint to build the tower's core and concrete columns.

At 44 storeys plus an eight-storey podium, Toronto's Bay Adelaide Centre East is a LEED® Platinum project that demanded significant structural innovation to bring to fruition.

Challenge
The existing parkade, tenant space, and adjacent underground pedestrian tunnel all had to remain operational during construction.

Solution
We prevented disruption to tenants, cars, and PATH users by locating tower columns so the structure could clear span the main areas. Where necessary, built-up structural columns were "needled" through small openings in the existing slab so column erection could occur during short off-peak periods of time for parkade and tenant use.

Architect
KPMB; Adamson Associates

Client
Brookfield Properties

Size
Tower is approximately 980,000 ft²
Podium is approximately 100,000 ft²

Role
Structural Engineering and Building Envelope Consultant

LEED® Certification
LEED® Platinum

DANIELS FACULTY OF ARCHITECTURE, LANDSCAPE AND DESIGN

TORONTO, ON

The University of Toronto has transformed one of the city's landmark icons into the home of the John H. Daniels Faculty of Architecture, Landscape and Design.

Located on the southwest edge of the downtown University of Toronto campus, the 1874 historic Knox College building was renovated and expanded to suit the requirements of the faculty while retaining and respecting the building's history and grandeur.

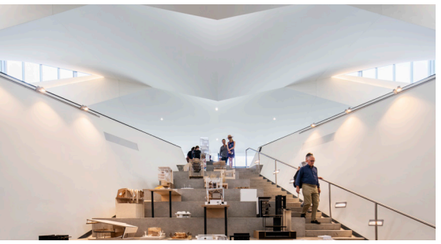
The roof, windows, and walls were restored to their original state while enhancing the performance of the building to provide a comfort level matching today's standard for occupants.

Challenge One

The university's stringent schedule required a portion of the building to remain occupied during the demolition phase and the construction of the new addition.

Solution One

Entuitive helped to orchestrate the work schedule so that the building envelope for the occupied area was not compromised during any phase of the project. The plan kept large portions of the budget from being spent on temporary construction.



Challenge Two

The structural work had to respect the interior and exterior fabric of the building, which is designated as historically significant. In addition, there was a requirement to bring natural light to the centre of the third-floor studio space.

Solution Two

A seamless collaboration with the design architect, heritage architect, and the contractor to develop repair/restoration strategies that were economical, constructible, and minimized the impact on the building fabric. To address the introduction of natural light, a saw-tooth roof profile was designed to allow for the incorporation of skylights in the cantilevered steel trusses above the third-floor studio space. The use of natural daylight will realize energy savings that amount to 54% less emissions than would otherwise be needed.

Architect

NADAAA Inc (Design Architect); Adamson and Associates (Executive Architect); ERA Architects (Heritage Architect)

Client

University of Toronto

Size

10,000 m² (100,000 ft²)

Role

Building Envelope & Structural Engineering Consultant

Budget

$44 M

LEED® Certification

Following LEED® Standards, but not pursuing LEED® certification

NEW CENTRAL LIBRARY
CALGARY, AB

Named one of Architectural Digest's 12 Most Anticipated Buildings of 2018, the New Central Library, located in the vibrant East Village downtown, is one of Calgary's most important and distinctive cultural institutions, with signature design led by renowned international architecture firm Snøhetta.

The New Central Library occupies 278,000 ft², including public space, and 40,000 ft² for future library expansion. The building structure was built over Calgary's busiest LRT line, which bisects the site and occupies approximately 40% of the site area.

The library's design will places a strong emphasis on public accessibility and community-oriented spaces, with 80% of the building, including collections areas, allocated to public space.

Challenge
Build a new landmark civic building with an anticipated high level of community engagement over an existing, busy LRT line that bisects the site on a radius with minimal disruption to its operation

Solution
Entuitive developed a transfer system that creates the opportunity for a contiguous floor plate above the LRT line with a regular grid system that maximizes future flexibility.

This forms the basis for the encapsulation – a new concrete structure that will clear span approximately 12 metres across the existing Calgary Transit South East corridor LRT tracks, just north of the exiting CP Rail tunnel.

Architect
Snøhetta (Design Architect);
DIALOG (Executive Architect)

Client
Calgary Municipal Land Corporation;
Calgary Public Library;
The City of Calgary

Size
25,800 m² (278,000 ft²)

Role
Structural Engineering Consultant

Budget
$245 M

Awards
2019 American Institute of Architects Awards, Calgary;

2015 Canadian Architect Award of Excellence

MIRVISH VILLAGE REDEVELOPMENT
TORONTO, ON

This 900-unit affordable housing development spans five mixed-use towers and includes an outdoor market, park, woonerf, on-site district energy plant, extensive green roofs, end-of-trip bike services, and revitalization of 15 heritage buildings.

As the Sustainability Consultant, our team engaged in collaborative design meetings to align stakeholders around the Owner's sustainable building performance requirements, while managing multiple sustainable building performance certifications for the project.

Challenge One
Mirvish has 30+ team members in 14 disciplines and must comply with two LEED® Rating Systems and the Toronto Green Standard.

Solution One
We applied various collaboration techniques and reporting to support the design and construction teams in proactively meeting the project requirements.

Challenge Two
The project is delivered under both US and Canadian green building rating systems, while facing the restrictions of a zero lot-line, densified urban setting.

Solution Two
Our team devised alternate strategies to ensure the project achieved the highest levels of sustainable performance, hosting calls with USGBC and CaGBC to ensure aspects of each LEED® system are met in the Canadian context.

Architect
DSAI; HPA; Janet Rosen Studio (Landscape Architect)

Client
Westbank Corporation

Size
82,300 m²

Role
Sustainability Consultant

Budget
$146 M ($118 M USD)

LEED® Certification
LEED® Platinum for Neighborhood Development, LEED® Gold for New Construction, Toronto Green Standard Tier II

MIRVISH VILLAGE REDEVELOPMENT
TORONTO, ON

Our Leaders

DELIVERING SUCCESSFUL PROJECTS ACROSS OUR MARKETS

We operate as One Company, driven by a shared purpose. We are defined by our collective intelligence and united by a common mindset. We are the sum of our people and acknowledge that we are better together.

*Project led by David Thompson while employed at a previous firm.

DAVID THOMPSON, DIPL. ARCH. TECH., M.A.A.T.O.
PRINCIPAL

> The best solutions within a structure result from taking a holistic approach. In this industry, that involves understanding how your area of expertise interrelates with the others to create a solution that's highly functional and aesthetically pleasing.

David is co-leader of Entuitive's building envelope services and recognized as an industry expert in cladding design and specialty glass systems.

His career path initially led through architectural engineering and construction consultation, providing insight into how building envelope technology relates to both design and construction. David's expertise has taken him to complex projects across a diverse range of climatic conditions in Canada, the United States, United Kingdom, Caribbean and Middle East.

With over 40 years of experience, David's work has covered virtually every building sector, and he brings his talents to new construction, existing buildings and historical building renovation.

David finds it rewarding to share his knowledge, which he pursues through industry lectures, client presentations and collaboration with team members.

EDUCATION
Building Envelope Specialist, O.L.A., British Columbia
Diploma in Architectural Engineering Technology, Confederation College

MEMBERSHIPS
Association of Architectural Technologists of Ontario (AATO)
Ontario Building Envelope Council

PROJECT EXPERIENCE

NEW CONSTRUCTION & RECLADDING

258 Richards Street Office Building	*New York, USA*
777 North Van Buren Residential Tower	*Milwaukee, USA*
3221 Proctor Lane	*Seattle, USA*
Baltimore State Centre	*Baltimore, USA*
Bay Adelaide Centre - East Tower	*Toronto, Canada*
Bay Adelaide Centre - North Tower	*Toronto, Canada*
BMO Field Expansion	*Toronto, Canada*
Brearley School	*New York, USA*
Centre Hospitalier de l'Universite de Montreal	*Montréal, Canada*
Chesterfield Corporate Headquarters	*St. Louis, USA*
CIBC Square (81 & 141 Bay Street)	*Toronto, Canada*
Comcast Innovation and Technology Center	*Philadelphia, USA*
Deep Ellum Office Building	*Dallas, USA*
Dominion Workplace	*Richmond, USA*
Eaton Corporate Headquarters	*Cleveland, USA*
Eighth Avenue Place	*Calgary, Canada*
Joseph Brant Hospital Administration Building	*Burlington, Canada*
King Faisal Specialist Hospital Mega Housing Development – Peer Review	*Jeddah, Kingdom of Saudi Arabia*
Lethbridge College Trades and Technologies Renewal and Innovation Project (TTRIP)	*Lethbridge, Canada*
Minazayed Mixed-use Development	*Abu Dhabi, UAE*
Northwest Mutual Campus Connection	*Milwaukee, USA*
Pan American Games	
Hamilton Soccer Stadium	*Hamilton, Canada*
Milton Velodrome	*Milton, Canada*
York University Stadium	*Toronto, Canada*
Rockefeller University Marie-Josée and Henry R. Kravis Research Building	*New York, USA*
Rockefeller University New Lab Building	*New York, USA*
St. Lawrence Market North Redevelopment	*Toronto, Canada*
T3 Bayside	*Toronto, Canada*
T3 Sterling Road	*Toronto, Canada*
The Globe and Mail Headquarters Building	*Toronto, Canada*
Toronto Raptors Training Facility	*Toronto, Canada*
University of Toronto, Daniels School of Architecture, Landscape and Design	*Toronto, Canada*
University of Toronto, Mississauga Campus, Arts Culture and Technology Building	*Mississauga, Canada*
Yonge Sheppard Centre Mixed-use Dev.	*Toronto, Canada*
20 Fenchurch Street*	*London, UK*
180 Queen Street*	*Toronto, Canada*
Four Seasons Centre for the Performing Arts*	*Toronto, Canada*
Frederick Horsman Varley Art Gallery*	*Markham, Canada*
Goose Island Residence	*Ketchum, USA*
Harmon Hotel*	*Las Vegas, USA*
MGCS Data Centre*	*Guelph, Canada*
Thunder Bay Consolidated Courthouse*	*Thunder Bay, Canada*
SickKids – Peter Gilgan Centre for Research and Learning*	*Toronto, Canada*
Tysons Corner Center*	*Tysons Corner, USA*
VA Polytrauma Hospital*	*Tampa Bay, USA*
Women's College Hospital*	*Toronto, Canada*
XL House (O'Hara House)*	*Bermuda*

EXISTING BUILDING CONSULTING

1 Memorial Drive	*Boston, USA*
Avoca Apartments	*Toronto, Canada*
Bronx County Hall of Justice	*New York, USA*
City of Hamilton Housing, Building Envelope Retrofit Feasibility Study	*Hamilton, Canada*
Delta Hotel	*Montreal, Canada*
Parkway Place Condominiums	*Mississauga, Canada*
Peel Standard Condominium Corporation 745	*Mississauga, Canada*
Macdonald Block Reconstruction	*Toronto, Canada*
St. Mary's General Hospital – Chapel Building Restoration	*Kitchener, Canada*
Toronto Community Housing Corporation – Mount Olive Townhouses, Building Envelope Restoration	*Toronto, Canada*
Weiser Hall Renovation	*Ann Arbor, USA*
Calgary Eaton Centre*	*Calgary, Canada*
CIBC Oakwood and Rogers*	*Toronto, Canada*
Devonian Gardens*	*Calgary, Canada*
Ryerson Image Arts Building*	*Toronto, Canada*

HISTORICAL BUILDING RESTORATION

Bay Adelaide Heritage Façade	*Toronto, Canada*
University of Toronto, Daniels School of Architecture, Landscape and Design	*Toronto, Canada*
Masonic Temple*	*Thunder Bay, Canada*
Royal Edward Hotel*	*Thunder Bay, Canada*
Royal York Hotel*	*Toronto, Canada*
Union Station*	*Toronto, Canada*
York Club*	*Toronto, Canada*

SPECIAL STRUCTURES GLASS & STEEL

Calgary Eaton Centre*	*Calgary, Canada*
Delegation Building of the Ismaili Imamat*	*Ottawa, Canada*
Four Seasons Centre for the Performing Arts*	*Toronto, Canada*
Ismaili Centre*	*Toronto, Canada*
Ritz Carlton Hotel*	*Toronto, Canada*
Space Needle*	*Seattle, USA*
Willis Tower*	*Chicago, USA*
Sick Kids – Peter Gilgan Centre for Research and Learning*	*Toronto, Canada*

ROOFING

Bank of Montréal Tower	*Toronto, Canada*
Elgin and Winter Garden Theatre Centre - New Roof Membrane	*Toronto, Canada*

*Project led by Michael Lembke while employed at a previous firm.

MICHAEL LEMBKE, B.ARCH.SC., ENG.L., LEED® AP, RRO
PRINCIPAL

> On each of our projects, we apply sound proven building envelope science theory, practical experience, and new technology in order to deliver sustainablem constructible and efficient solutions for our clients. Well-designed building enclosure systems have greater longevity with less maintenance, and higher-energy efficiency brings greater economy.

Michael is co-leader of Entuitive's overall building envelope services team, while providing leadership in our Vancouver office.

His expertise includes the design and construction of building envelope systems for new buildings, and restoration of existing buildings and heritage buildings. Michael has over 20 years' experience in building envelope consulting on projects throughout Canada, the United States and the United Kingdom, including the commercial, residential, mixed-use, healthcare, institutional, sports, cultural and retail sectors.

Michael is recognized by his clients as a dynamic leader who provides sound, progressive insight to help develop and achieve durable, constructible, and energy conscious building envelope solutions. He thrives in a team atmosphere, where close collaboration with clients and the design team results in solutions that equally benefit the project, client and end user.

EDUCATION
Bachelor of Architectural Science (Building Science), Ryerson University

MEMBERSHIPS
Engineers and Geoscientist of British Columbia (EGBC)
Association of Professional Engineers and Geoscientists of Alberta (APEGA)
Association of Professional Engineers & Geoscientists of Saskatchewan (APEGS)
British Columbia Building Envelope Council (BCBEC)
Alberta Building Envelope Council (ABEC)
Registered Roof Observer (RRO) with the Roofing Consultants Institute (RCI)

PROJECT EXPERIENCE

ROOFING

4502 10th Avenue NE – Roof Replacement	*Calgary, Canada*
7060-7070 Farrell Road – Roof Consulting	*Calgary, Canada*
Andrew Davison Building – Main Roof Replacement	*Calgary, Canada*
Manchester Building E – Roof Consulting	*Calgary, Canada*
Mayland Heights Building – Metal Roof Over-cladding	*Calgary, Canada*
Mechanical Roof Replacement	*Calgary, Canada*
NE Sportsplex – Roof Consulting	*Calgary, Canada*
Northland Building – Main and Rocky Mountain Plaza – Roof Replacement	*Calgary, Canada*
Caramoor Condominium – Roof Replacement*	*Calgary, Canada*
City of Calgary Firehalls - Roof Replacement*	*Calgary, Canada*
Peter Lougheed Centre – Roof Replacement*	*Calgary, Canada*
Rockyview General Hospital – Capital Roof Replacement	*Calgary, Canada*
Scotiabank Saddledome – Roof Replacement	*Calgary, Canada*
Wheatland Elementary – Roof Replacement*	*Strathmore, Canada*

PROJECT EXPERIENCE

NEW CONSTRUCTION & RECLADDING

100 Mill Avenue	*Tempe, USA*
1111 Travis Street Commercial Tower	*Houston, USA*
1601 Wewatta Street	*Denver, USA*
2880 Arbutus Street	*Vancouver, Canada*
6103 West Boulevard Mixed-use	*Vancouver, Canada*
Ambrosia Affordable Housing	*Vancouver, Canada*
ATCO Business Centre	*Calgary, Canada*
Brookfield Place Calgary	*Calgary, Canada*
Cineplex Expansion	*Saskatoon, Canada*
Copperfield K-4 School	*Calgary, Canada*
Deep Ellum Office Building	*Dallas, USA*
East Village Hilton	*Calgary, Canada*
Eaton Corporation World Headquarters	*Cleveland, USA*
Eighth Avenue Place West	*Calgary, Canada*
Great Plains Recreation Facility	*Calgary, Canada*
Hinton Training Centre	*Hinton, Canada*
Lethbridge College Trades and Technologies Renewal and Innovation Project (TTRIP)	*Lethbridge, Canada*
Linwood Residential	*Victoria, Canada*
Lloydminster Mall Entrances	*Lloydminster, Canada*
Martin Expo Town Center	*Los Angeles, USA*
Mount Royal University Riddell Library	*Calgary, Canada*
New Brighton K-4 School	*Calgary, Canada*
The Odeon Mixed Use Building	*Calgary, Canada*
Quarry Park Recreation Facility	*Calgary, Canada*
Rocky Ridge Recreation Facility	*Calgary, Canada*
Sarcee Operations Workplace Centre	*Calgary, Canada*
Saskatchewan Public and Catholic Schools (9)	*Saskatchewan, Canada*
UBC Brock Commons Phase 2	*Vancouver, Canada*
Village Church Worship Centre	*Surrey, Canada*
Walter Residence	*Calgary, Canada*
20 Fenchurch Street*	*London, United Kingdom*
Calgary Animal By-law Services Addition*	*Calgary, Canada*
CCIS Building University of Alberta*	*Edmonton, Canada*
CORE Glass Roof*	*Calgary, Canada*
Devonian Gardens Recladding and Skylights*	*Calgary, Canada*
Eighth Avenue Place East Tower and Podium*	*Calgary, Canada*
Harmon Lifestyle Tower*	*Las Vegas, USA*
Quantum Residential Towers*	*Toronto, Canada*

HISTORICAL BUILDING RESTORATION

Calgary City Hall – Condition Assessment	*Calgary, Canada*
Canada Life Building – Historical Stone and Railing Restoration*	*Toronto, Canada*
Corvette School – Brick Restoration*	*Toronto, Canada*
Elmbank School Brick and Window Restoration*	*Toronto, Canada*
Fairglen Junior School – Brick Restoration*	*Toronto, Canada*
Fern Public School – Brick, Stone, Window and Roofing Restoration*	*Toronto, Canada*
Hearn Building – Masonry Investigation*	*Toronto, Canada*
Henderson Hospital – Masonry Condition Assessment*	*Hamilton, Canada*
Jean Tweed Historical Residence – Condition Assessment*	*Toronto, Canada*
Kelowna Train Station Redevelopment*	*Kelowna, Canada*
Lawrence Park High School – Brick and Stone Restoration*	*Toronto, Canada*
McMurrich Junior Public School – Brick, Stone and Window Restoration*	*Toronto, Canada*
Royal Victoria Hospital – Historical Masonry and Window Assessment*	*Montréal, Canada*
St. Mary's General Hospital – Condition Assessment and Repairs*	*Kitchener, Canada*

EXISTING BUILDING CONSULTING

441 5th Avenue – Curtain Wall Consulting	*Calgary, Canada*
Canada Games Aquatic Centre Infrastructure Upgrade	*Kamloops, Canada*
Centre 4800 – Building Envelope Revitalization	*Calgary, Canada*
City of Calgary – Building Envelope and Roofing Condition Assessments (16 buildings)	*Calgary, Canada*
City View Manor – Window and Door Replacement	*Calgary, Canada*
Columbia Ice Fields Visitors Centre – Cladding and Podium Restoration	*Jasper, Canada*
CP Rail Air Brakes Building – Recladding	*Calgary, Canada*
Elbow River Casino – Flood Remediation	*Calgary, Canada*
GP Vanier School (CBE) – Building Envelope Improvements	*Calgary, Canada*
Holy Spirit Academy – Recladding	*High River, Canada*
Huntcliffe Gardens – Window Consulting	*Calgary, Canada*
Lynnmour Village North Podia, Parking Garage Restoration	*Vancouver, Canada*
Martens Residence Recladding & Reroofing	*Calgary, Canada*
Mount Royal University Natatorium – Building Envelope Condition Assessment	*Calgary, Canada*
Municipal Building, Administration Building and Trade Centre – Infrared Thermographic Review	*Calgary, Canada*
Notre Dame Collegiate – Recladding	*High River, Canada*
Rocky Mountain Plaza – Glass Consulting	*Calgary, Canada*
SaskPower Headquarters – Building Envelope Consulting	*Regina, Canada*
Sierra Place and Brittania Place – Infrared Thermographic Review	*Calgary, Canada*
Strathmore Travel Lodge – Expert Witness	*Strathmore, Canada*
Three Hills School – Cladding Assessment	*Three Hills, Canada*
Trolley Square – Flood Remediation and Recladding	*Calgary, Canada*
Vista View Commercial Building – Building Envelope Restoration	*Calgary, Canada*
Village at West Springs – Building Envelope Consulting	*Calgary, Canada*
Water Centre – Infrared Thermographic Review	*Calgary, Canada*
Watermark Tower – Building Envelope Analysis	*Calgary, Canada*
West 17 Lofts – Building Envelope Consulting	*Calgary, Canada*
Wexford Place – Window Replacement	*Calgary, Canada*
Yellow Pages Building – Building Envelope Remediation	*Calgary, Canada*

*Project led by Heather Elliot while employed at a previous firm.

HEATHER ELLIOT, P.ENG., LEED® GREEN ASSOCIATE
ASSOCIATE

Heather has been involved in various aspects of building envelope consulting, including new construction and remediation.

Heather is interested in life-cycle studies, and the effective design of building envelopes for new construction. She believes in finding practical solutions to ensure the lifespan and performance of new infrastructure.

Heather has also been involved with projects that include the investigation and repair of existing building envelope systems. Heather has experience in building envelope remediation, from initial visual reviews, exploratory work, and condition assessments, to the design of repair details, writing of technical specifications, issuing of bid documents, and field review during construction.

Heather holds a Bachelor of Science degree in Civil Engineering from the University of Calgary, with a minor in Structural Engineering. She is a member of the Association of Professional Engineers and Geoscientists of Alberta (APEGA), a member of the Alberta Building Envelope Council (ABEC) and an Alberta Chapter Member of the Canadian Green Building Council (CaGBC).

EDUCATION
Bachelor of Science in Civil Engineering (With Distinction), Minor in Structural Engineering, University of Calgary

MEMBERSHIPS
Association of Professional Engineers and Geoscientists of Alberta (APEGA)
Alberta Building Envelope Council (ABEC)
Canadian Green Building Council (CaGBC), Alberta Chapter

PROJECT EXPERIENCE

NEW CONSTRUCTION & ADDITIONS

1601 Wewatta	*Denver, USA*
Castle Downs Arena Renewal	*Edmonton, Canada*
Cineplex Odeon Addition	*Saskatoon, Canada*
Crossing Leisure Centre	*Lethbridge, Canada*
Eighth Avenue Place West Tower	*Calgary, Canada*
Brookfield Place Calgary East Tower	*Calgary, Canada*
The Odeon Mixed-Use Building	*Calgary, Canada*
Lethbridge College Trades and Technologies Renewal and Innovation Project (TTRIP)	*Lethbridge, Canada*
Lethbridge Police Headquarters Addition	*Lethbridge, Canada*
Quarry Park Recreation Facility	*Calgary, Canada*
Rocky Ridge Recreation Facility	*Calgary, Canada*
Rundle College Administration Building Addition	*Calgary, Canada*
Rundle College K-6 School	*Calgary, Canada*
Sage Hill Residential	*Calgary, Canada*
Upper West Residential	*Calgary, Canada*
YMCA Inglewood Hub and Spoke Facilty	*Calgary, Canada*

EXISTING BUILDING ASSESSMENT

Cliff Bungalow School Restoration	*Calgary, Canada*
City of Calgary – Building Envelope Condition Assessments	*Calgary, Canada*
Eagle Butte High School - Building Envelope Condition Assessment	*Eagle Butte, Canada*
Holy Angels School Restoration	*Calgary, Canada*
Foothills Professional Building – Exterior Sealant Assessment	*Calgary, Canada*
Silvera Westview – Building Envelope Condition Assessment	*Calgary, Canada*
Sunridge Professional Centre – Exterior Sealant Assessment	*Calgary, Canada*
Village at West Springs – Building Envelope Condition Assessment	*Calgary, Canada*

EXISTING BUILDING REPAIR/ REPLACEMENT/RECLADDING

17th Avenue NW – Envelope Restoration	*Calgary, Canada*
Carbon School – EIFS Recladding	*Carbon, Canada*
Eagle Butte High School – Addition and Renovation	*Eagle Butte, Canada*
Rocky Mountain Plaza – Glazing Replacement	*Calgary, Canada*
Three Hills School – EIFS Recladding	*Three Hills, Canada*
Watermark Tower – Leakage Investigation	*Calgary, Canada*
West 17 Lofts – Leakage Investigation	*Calgary, Canada*

ROOF CONSULTING

4502-4516 10th Street NE – Roof Assembly Replacement	*Calgary, Canada*
Andrew Davison Building – Main Roof Assembly Replacement	*Calgary, Canada*
Capital Regional Housing Corporation Balcony Condition Assessments	*Edmonton, Canada*
Northland Building – Roof Assembly Replacement	*Calgary, Canada*
Rockyview General Hospital – Fisher Building Roof Assembly Replacement	*Calgary, Canada*
Oliver Village Brighton - Flashing, Sealant and Masonry Restoration	*Edmonton, Canada*
Scona Gardens Roof Replacement	*Edmonton, Canada*
Scotiabank Saddledome – Roof Assembly Replacement (200,000 f²)	*Calgary, Canada*

INFRARED THERMOGRAPHIC REVIEW

Bay Adelaide Heritage Façade	*Toronto, Canada*
University of Toronto, Daniels School of Architecture, Landscape and Design	*Toronto, Canada*
Masonic Temple*	*Thunder Bay, Canada*
Royal Edward Hotel*	*Thunder Bay, Canada*
Royal York Hotel*	*Toronto, Canada*
Union Station*	*Toronto, Canada*
York Club*	*Toronto, Canada*

*Project led by Chris van Dongen while employed at a previous firm.

CHRIS VAN DONGEN, B.ARCH.SC., LEED® AP
ASSOCIATE

Chris is a LEED-accredited professional with a specialty in Building Science. He brings over 13 years of sustainable design expertise to a wide range of work in the institutional, residential and commercial sectors, with a focus on building envelope and roofing renewal.

He has participated in all phases of project delivery, from initial assessment of existing building components and conditions to design development and construction specification and contract administration.

Chris has extensive experience in the design, specification, inspection and testing of complex glazing and cladding systems for new construction projects. Through his keen understanding of cladding systems, curtain wall and structural glass systems, and experience in advanced thermal and hygrothermal modeling, Chris provides valuable insight to inform the design of façade systems to achieve both performance and constructability.

Throughout his career, Chris has also gained considerable experience in contributing to high-profile sustainable design projects through analysis and design for building envelope upgrades. His recent work includes the City of Hamilton's 500 MacNab Street Passive House retrofit of an existing 20 storey tower, a deep energy retrofit project at the University of Michigan's Weiser Hall Building, and overcladding of two commercial office towers at Yonge & Sheppard Centre. He also leads the building envelope consulting team for TCHC's SHARP/ReSet program, implementing energy efficient upgrades at several high-rise properties.

Chris is also involved in the design of ultra high-performance building envelopes, with recent work including feasibility analysis and design guidance for projects seeking to seeking to achieve Net-Zero energy and Passive House level performance. He also contributes to Entuitive's research and on climate change mitigation and advanced modeling for building performance optimization.

EDUCATION
Bachelor of Architectural Science (Building Science), Ryerson University

MEMBERSHIPS
Canada Green Building Council
Construction Specifications Canada
Construction Safety Association of Ontario
LEED (Leadership in Energy and Environmental Design) Accredited Professional

CERTIFICATIONS
Certified Level I Infrared Thermographer
Construction Contract Administration - Level II (CSC)
Suspended Access Systems Certification
Working at Heights Certification
Workplace Hazardous Materials and Safety Control Program Certification

PROJECT EXPERIENCE

HISTORICAL BUILDING RESTORATION

Hamilton GO Centre – Stone Cladding Restoration	*Hamilton, Canada*
McMaster University – Burke Science Building	*Hamilton, Canada*
South Station Historic Train Station Restoration	*Boston, USA*
University of Toronto, Daniels School of Architecture, Landscape and Design	*Toronto, Canada*

PROJECT EXPERIENCE

NEW CONSTRUCTION & RECLADDING

Brearley School	*New York, USA*
Goose Island Residence	*Ketchum, USA*
Hamilton Family Health Clinic – Joseph Brant Memorial Hospital – Phase 1 Redevelopment	*Burlington, Ontario*
Milton Sherwood Community Centre and Library	*Milton, Canada*
Pan Am Games – Hamilton Soccer Stadium	*Hamilton, Canada*
Pan Am Games – Milton Velodrome	*Milton, Canada*
Pan Am Games – York University Stadium	*Toronto, Canada*
Proctor Lane Mercer Island Residence	*Seattle, USA*
St. Lawrence Market North Redevelopment	*Toronto, Canada*
University of Toronto, Daniels School of Architecture, Landscape and Design	*Toronto, Canada*
University of Toronto, Mississauga Campus, Arts Culture and Technology Building	*Mississauga, Canada*
West Park Healthcare Centre	*Toronto, Canada*
10 Bay Street Exterior Sealant Replacement*	*Toronto, Canada*
200 Bay Street Exterior Sealant Replacement*	*Toronto, Canada*
225 King Street West Architectural Framework Repairs*	*Toronto, Canada*
Bremner Office Tower, Southcore Financial Centre*	*Toronto, Canada*
Delta Hotel, Southcore Financial Centre*	*Toronto, Canada*
Elementary Teachers Federation of Ontario Headquarters*	*Toronto, Canada*
MTO Travel Centres*	*Ontario, Canada*
Ontario Science Centre, Omnimax Dome Rehabilitation*	*Toronto, Canada*
Ryerson Image Arts Building*	*Toronto, Canada*
Sick Kids – Peter Gilgan Centre for Research and Learning*	*Toronto, Canada*
Thunder Bay Consolidated Courthouse*	*Thunder Bay, Canada*

EXISTING BUILDING RESTORATION

191 & 201 Sherbourne Street, Multi-Unit Residential Building Envelope Renewal	*Toronto, Canada*
East Hants Aquatic Centre, East Hants	*Nova Scotia, Canada*
London South-West Community Centre	*London, Canada*
Milton SCCL Recreation Centre	*Milton, Canada*
Raptors Training Centre	*Toronto, Canada*
St. Hilda's Towers	*Toronto, Canada*
Toronto Community Housing Corporation – Mount Olive Townhouses, Building Envelope Restoration	*Toronto, Canada*
Weiser Hall Renovation, University of Michigan	*Ann Arbor, USA*
Ellen Fairclough Building Exterior Masonry Rehabilitation*	*Hamilton, Canada*
Region of Peel Masonry Rehabilitation for Various Buildings*	*Ontario, Canada*

BUILDING CONDITION ASSESSMENTS & RETROFIT FEASIBILITY STUDIES

33 Bloor Street West – Cladding Investigation	*Toronto, Canada*
City of Hamilton Housing, Building Envelope Retrofit Feasibility Study	*Hamilton, Canada*
Hamilton GO Centre – Facility Audit	*Hamilton, Canada*
McMaster University - Bates Student Residence, Building Envelope Retrofit Feasibility Study	*Hamilton, Canada*
Northam Realty Portfolio – Property Condition Assessments	*Toronto, Canada*
Oxford County Housing and Public Works Portfolio, Property Condition Assessments	*Oxford County, Canada*
Toronto Community Housing Corporation ReSet, Building Envelope Retrofit Feasibility Study – Lawrence-Orton	*Toronto, Canada*
155 Wellington Street – RBC Centre – Property Condition Assessment*	*Toronto, Canada*
City of Toronto EMS Stations – Building Condition Assessments*	*Toronto, Canada*
Queens Quay Terminal – Property Condition Assessment*	*Toronto, Canada*
Sun Life Financial – Various Multi-Unit Residential Buildings – Property Condition Assessments*	*Ontario & Quebec, Canada*
Sutton Place Hotel – Property Condition Assessment*	*Chicago, USA*
Toronto District School Board –Property Condition Assessments*	*Toronto, Canada*

ROOFING

Avoca Apartments – Roof Replacement	*Toronto, Canada*
McMaster University – Degroote School of Business Building Roof Replacement	*Hamilton, Canada*
Toronto Transit Commission – Glenayr Substation Roof Replacement	*Toronto, Canada*
Toronto Transit Commission – Lawrence West Subway Station Skylight Repairs	*Toronto, Canada*
Toronto Transit Commission – McBrien Building Roof Replacement	*Toronto, Canada*
1 University Avenue Roof Replacement*	*Toronto, Canada*
75 Eglinton Ave – Toronto Police 53 Division Roof Replacement*	*Toronto, Canada*
120 Adelaide Street West Roof Replacement*	*Toronto, Canada*
Bruce Power OBD Building Roof Replacement*	*Kincardine, Canada*
Ontario Shores Centre for Mental Health Sciences Zinc Roofing Replacement*	*Whitby, Canada*
Region of Peel Roof Rehabilitation for Various Buildings*	*Ontario, Canada*
Square One Shopping Mall Roof Rehabilitation*	*Mississauga, Canada*
Toronto Transit Commission – Davisville Station Roof Replacement*	*Toronto, Canada*
University of Toronto Residences 89 Chestnut St.*	*Toronto, Canada*

*Project led by Paul Carter while employed at a previous firm.

PAUL CARTER, B.ARCH.SC., C.E.T., CPHD
ASSOCIATE, *BUILDING ENVELOPE SPECIALIST*

> Climate change will bring massive challenges. Thoughtful building envelope design can drastically reduce GHG emissions and prepare us for what lies ahead.

With 15 years of broad experience as a building envelope consultant,

Paul has worked throughout North America and abroad on projects ranging from the restoration of heritage building enclosures to enclosure design for complex new construction projects in the healthcare and institutional sectors.

In recent work, Paul has developed a focus on optimized building envelope performance to achieve ultra-low energy use buildings, including meeting the Passive House standard. As one of the leading project managers at Entuitive, Paul is sought after for his expert knowledge of building enclosure and sustainable design principles, as well as technical direction in all types of building envelope work.

Paul has co-authored research papers on climate change and the effects on building envelope performance, and plays a key role in the development and advancement of Entuitive's Advanced Performance Modelling service.

Paul believes strongly that effective collaboration is a key factor in delivering successful projects. He has experience managing design consultant teams and coordinating construction contractors.

EDUCATION
Bachelor of Architectural Science (Building Science), Ryerson University
Passive House Designer Course, Canadian Passive House Institute

MEMBERSHIPS
The Ontario Association of Certified Engineering Technicians and Technologists (OACETT)
Passive House Institute (Certified Passive House Designer)

PROJECT EXPERIENCE

NEW CONSTRUCTION & RECLADDING

120 & 130 Adelaide St. W.	*Toronto, ON*
481 University Avenue	*Toronto, ON*
500 MacNab - Passive House Retrofit	*Hamilton, ON*
CIBC Square	*Toronto, ON*
Dominion Workplace	*Richmond, VA*
Le Centre Hospitalier de l'Université de Montréal (CHUM)	*Montreal, QC*

PROJECT EXPERIENCE

NEW CONSTRUCTION & RECLADDING

Massey Hall Revitalization	*Toronto, ON*
Peel Memorial Centre for Integrated Health and Wellness	*Brampton, ON*
Renew Mount Sinai, Phase 3A	*Toronto, ON*
Rockefeller University Marie-Josée and Henry R. Kravis Research Building	*New York, NY*
SickKids Project Horizon - Patient Support Centre	*Toronto, ON*
St. Lawrence Market North Redevelopment	*Toronto, ON*
St. Mary's General Hospital, North Building Recladding	*Kitchener, ON*
T3 Bayside	*Toronto, ON*
University of Toronto	
Centre for Civilizations and Cultures	*Toronto, ON*
Daniels Faculty of Architecture, Landscape and Design	*Toronto, ON*
Spadina-Sussex Student Residence	*Toronto, ON*
Women's College Hospital - Capital Redevelopment Project	*Toronto, ON*
Canon Canada Headquarters	*Mississauga, ON*
David Braley Health Sciences Centre*, McMaster University Hamilton	*Hamilton, ON*
Delta Hotel, Southcore Financial Centre*	*Toronto, ON*
MTO Travel Centres*	*Ontario*
Parkwood Institute, St. Joseph's Healthcare*	*London, ON*
Penetanguishene Mental Health Centre - Toanche Building*	*Penetanguishene, ON*
Sinnovate Technology Hub*	*KAEC, KSA*
Thunder Bay Consolidated Courthouse*	*Thunder Bay, ON*
Women's College Hospital - Capital Redevelopment Project*	*Toronto, ON*

HISTORICAL BUILDING CONSULTING

481 University Avenue	*Toronto, ON*
696 Yonge Street	*Toronto, ON*
Elgin and Winter Garden Theatres	*Toronto, ON*
Massey Hall Revitalization	*Toronto, ON*
St. Leo's Catholic School	*Toronto, ON*
University of Toronto	
Emmanuel College Heritage Masonry Restoration	*Toronto, ON*
Fitzgerald Building Revitalization	*Toronto, ON*
Hart House Skylight Replacement	*Toronto, ON*
Physical Geography Building - Net-Zero Feasibility Study	*Toronto, ON*
Cayuga Courthouse*	*Cayuga, ON*
Hamilton (John Sopinka) Courthouse*	*Hamilton, ON*
Hamilton Unified Family Court - Building Envelope Investigation*	*Hamilton, ON*
Red House Restoration and Adaptive Reuse*	*Port-of-Spain, TT*

EXISTING BUILDING CONSULTING

90 Shuter Street - Master Planning Exercise	*Toronto, ON*
888 Birchmount Road	*Toronto, ON*
Avoca Apartments	*Toronto, ON*
Parkway Place Condominiums	*Mississauga, ON*
Peel Condominium Corporation 180	*Mississauga, ON*
Peel Standard Condominium Corporation 745	*Mississauga, ON*
St. Helier Hospital Refurbishment	*Carshalton, UK*
St. Mary's General Hospital - Chapel Building Restoration	*Kitchener, ON*
Toronto Western Hospital - Gamma Knife Centre	*Toronto, ON*
TTC Lawrence West Station	*Toronto, ON*
Ellen Fairclough Building Exterior Masonry Rehabilitation*	*Hamilton, ON*
Gore Bay Courthouse*	*Gore Bay, ON*
Mono Township Summer Home*	*Mono, ON*
Ontario Provincial Police - Port Credit Detachment*	*Mississauga, ON*
Toronto Fire Station 434*	*Toronto, ON*
Village by the Grange*	*Toronto, ON*
York Condominium Corporation 104*	*Toronto, ON*
York Region Condominium Corporation 570*	*Vaughan, ON*

ROOFING

Ellen Fairclough Building	*Hamilton, ON*
Ontario Shores Centre for Mental Health Science - Zinc Roofing Replacement*	*Whitby, ON*
St. Mary's General Hospital	*Kitchener, ON*
TTC Glenayr Substation Roof Replacement	*Toronto, ON*
TTC Lawrence West Subway Station Skylight Repairs	*Toronto, ON*
TTC McBrien Building Roof Replacement	*Toronto, ON*
75 Eglington Ave - Toronto Police 53 Division Roofing Replacement*	*Toronto, ON*
Hamilton Unified Family Court*	*Hamilton, ON*
Ontario Provincial Police - Port Credit Detachment*	*Mississauga, ON*
Ontario Science Centre - Omnimax Dome Roof Repairs*	*Toronto, ON*
Ontario Shores Centre for Mental Health Sciences - Zinc Roofing Replacement*	*Whitby, ON*
TTC Triennial Masonry Rehabilitation and Roofing Replacement*	
Donlands Station	*Toronto, ON*
Kipling Station	*Toronto, ON*
Lawrence West Station	*Toronto, ON*
Pape Station	*Toronto, ON*
Rosedale Station	*Toronto, ON*
Russell Traffic Office	*Toronto, ON*
Sunnyside Terminal and Roncesvalles Traffic Office	*Toronto, ON*

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