



MARCH 2025

**Mass
Timber**
SOLUTIONS

ENTUITIVE

Contents

MASS TIMBER SOLUTIONS OVERVIEW

- 1 FIRM OVERVIEW
- 5 OUR SERVICES
- 7 WOOD DESIGN SOLUTIONS
- 15 BUILDING ENVELOPE SOLUTIONS
- 19 PROJECT HIGHLIGHTS



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.



OUR LOCATIONS

CANADA

CALGARY
EDMONTON
VANCOUVER
TORONTO
OTTAWA



UNITED STATES

NEW YORK



300+

TOTAL
STAFF

2011

YEAR
ESTABLISHED

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, climate resilience, and sustainable master planning, 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.

We are B Corp Certified

Entuitive is a B Corp Certified organization and is proudly part of a global network of businesses meeting the highest standards for positive social and environmental performance, accountability, and transparency.



Successful B Corps create positive impact for all of their stakeholders and take strides to minimize the negative impact of doing business.

Through an assessment of Entuitive's overall social and environmental impact, the engineering and sustainable performance leader received an overall score of 97.5, leading across most categories. Entuitive scored higher than average B Corp organizations for its sector, size, and country in the following categories: Governance, Workers, Community, and Environment.

With its greatest score in the Workers section, some highlights include Entuitive's focus on employee Health, Wellness, and Safety, its Worker Owned-Impact Business Model, and its commitment to regular Engagement & Satisfaction Surveys for employees.



Our Services

UNCOVER THE LIMITLESS POTENTIAL OF THE BUILT ENVIRONMENT

Our services span the asset lifecycle, from planning and design through construction, renovation, and end of life renewal, with sustainability as the foundation throughout.

We offer integrated structural engineering, building envelope, sustainable building consulting and planning, special projects and renovations, energy and carbon performance, fire and pedestrian modelling, restoration, bridge design and rehabilitation, construction engineering, and transportation solutions for new and existing structures and communities.

The solutions we provide and continue to develop are designed to address climate change and to secure a future that is economically, socially, and environmentally sustainable.



SUSTAINABLE PERFORMANCE

We support our clients in building a better world through project engagement, planning, design, construction, renovation, and operation to achieve projects' sustainable design goals. We are well versed in the management of third party sustainable design certifications such as LEED, Zero Carbon Building Standard, Envision, Built Green, WELL, Fitwel, Living Building Challenge, and custom-fit solutions. Our analysis services allow us to quantify projects' operational energy, embodied carbon, and occupant comfort conditions to ensure a high-performance design is achieved.



NATIONAL VETERANS RESOURCE CENTER SYRACUSE, NY



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.



BUILDING ENVELOPE

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



CONSTRUCTION ENGINEERING

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



EXPERT ADVISORY SERVICES

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



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.



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.



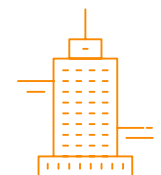
RESTORATION

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.

Mass Timber Solutions

By returning to the one of the original building materials, timber, Entuitive offers clients elegant design and engineering solutions that are efficient, cost-effective, architecturally expressive, and environmentally sustainable.

Innovations in wood products and design have made wood an increasingly viable choice in building design and construction, bringing versatility, affordability, and sustainability together.

Advanced construction technologies and modern mass timber products, such as glue-laminated timber (glulam) and cross-laminated timber (CLT), are pushing the industry forward, enabling us to serve our clients in ways that successfully meet modern challenges head-on.

As a building material, wood has become increasingly more cost-effective and versatile, and contributes to higher sustainability due to carbon sequestration. It can be used in long span applications and can allow for faster construction through prefabrication and modularization.

At the same time, mass timber is still a developing market, which means the design and construction processes have many idiosyncrasies that we don't see in more mature industries like steel and concrete. The "same old" approaches are not always applicable; you can't take a traditional design and simply swap in timber for the other materials.

At Entuitive, we devote resources internally to keeping track of the latest developments in mass timber supplier capabilities across the globe, allowing us to best advise our clients on how to optimize for timber. Our ability to integrate our structural, building envelope, and performance-based fire engineering services is another factor that helps us deliver holistic solutions in an efficient, streamlined way.

From wood frame construction to tall wood buildings and architecturally exposed wood elements, our team has deep experience in timber engineering. We provide solutions that incorporate wood to allow for architectural expression while maintaining structural integrity and respecting project budgets and schedules. The use of wood in Canada and the world is increasing at an unprecedented rate. Entuitive is at the forefront of this innovation.



NATIONAL VETERANS
RESOURCE CENTER
SYRACUSE, NY

SUSTAINABILITY

LOWER CARBON FOOTPRINT

Compared to other building materials, timber-based structures have a lower carbon footprint. Trees sequester carbon dioxide from the atmosphere as they grow; This carbon remains stored in the wood when trees are harvested, meaning timber begins its construction life as a carbon-negative material. Effective end-of-life strategies for timber buildings help maximize the sustainable benefits of wood by further delaying the release of carbon.

LOWER ENERGY PRODUCTION COST

Manufacturing wood products requires significantly less energy than producing other building materials. The production of concrete and structural steel (even when recycled) emits up to **seven times** more carbon than the production of engineered wood products, such as glulam and CLT.

RENEWABLE PROCUREMENT

When managed responsibly, logging and regrowth in forests are balanced to provide a steady supply of lumber, while maintaining forest health and biodiversity. Selective harvesting and replanting allow the same parcel of land to continue sequestering carbon indefinitely. A study has estimated that approximately 25% to 30% of Europe's forests would be required to house the entire population of Europe in perpetuity.

CONSTRUCTION

**FASTER
CONSTRUCTION TIME**

Wood offers the advantage of speed when it comes to building construction. Panelized and modular timber elements are manufactured off-site and erected faster, lowering site time and on-site labour costs. A mass timber building can be constructed up to 20% to 30% faster than a steel or traditional cast-in-place concrete building. Mass timber has a further schedule advantage over concrete because there is no need for shores and re-shores, allowing the follow-on trades to begin their work sooner.

**IMPROVED QUALITY
& GREATER PRECISION**

Mass timber products are manufactured under controlled conditions, meaning each piece achieves the highest quality in building performance. Modern fabrication equipment, using computer numerical control (CNC) technology, allows timber components to be manufactured to precise tolerances, allowing for a better and faster fit-up on site.

**REDUCED
WASTE**

The amount of waste generated in timber construction is significantly less than building with traditional materials, both in the manufacturing process and on-site. The modern forest products industry generates nearly zero waste, using fibre harvested from forests to create everything from engineered wood products to biofuels. Construction waste is also minimal due to mass timber's high level of prefabrication, reducing or even eliminating the need to cut elements on-site.

**LIGHTER
CONSTRUCTION**

A timber building can be 2-3 times lighter than traditionally constructed buildings, leading to savings on foundations and seismic lateral systems. For overbuild and deck-over projects where additional storeys are added to an existing building, timber's light weight can reduce or eliminate the need to reinforce the structure and foundations.

**QUIET,
SAFE SITES**

With fewer truck deliveries and improved health and safety conditions for construction personnel, mass timber construction sites are generally quieter.

ARCHITECTURAL EXPRESSION

Building with visually-exposed timber allows for the creation of beautiful, unique interior and exterior design that truly make a statement.

Timber offers a built-in richness and elegance that can elevate any building project, creating a pleasing and attractive environment for occupants.

CHALLENGES



COST OF CONSTRUCTION

Construction costs depend greatly on specific project requirements.

For any given project, cost comparisons should be carried out by an experienced cost consultant who is familiar with mass timber construction. Mass timber buildings are often cost-competitive when all factors, including construction time, are considered.



ACOUSTICS

Timber structures are lighter and more prone to the transmission of airborne and impact sounds.

As such, appropriate acoustic isolation measures are required for timber projects where acoustic control is important.



APPROVALS

Current North American codes generally allow a height of up to six storeys for timber buildings.

Approvals for taller structures can be obtained through an alternative approvals process, and the 2021 International Building Code (IBC) will allow certain mass timber buildings up to 18 storeys.



INSURANCE COSTS

The cost of insurance during timber construction is generally higher than construction with traditional materials.

Engaging insurers early in the process to help accurately assess risks, particularly for mass timber structures that are less prone to construction fires than light wood frame buildings, can help control insurance costs.



FIRE

When exposed to fire, mass timber behaves very differently than light wood frame buildings.

Large timber elements develop a char layer that insulates the wood beneath. Mass timber elements can therefore be engineered to achieve fire-resistance ratings by accounting for this char layer during design, allowing the timber to be left exposed. Mass timber elements can also be encapsulated in drywall or a similar material to achieve the required fire-resistance rating if the exposed timber aesthetic is not critical to the project.

Entuitive offers specialized, performance-based fire engineering services (fire modelling, egress design, timber buildings, structural fire engineering, and investigations and forensics) that explore advanced engineering solutions for our clients.



MOISTURE

Wood is a natural material that absorbs and releases moisture with changes in the environment.

Effective weather protection during construction, when the variation in moisture content is most severe, ensures that dimensional changes do not exceed allowable tolerances, and that finishes, such as roofing and membranes, can be properly installed. Detailing for permanent durability is also critical as trapped moisture can lead to decay or mold. Leaks, either in the building envelope or internal services, must be identified and repaired quickly.



SUPPLY CHAIN & COMPETITIVE PRICING

Products are not yet standardized in the mass timber industry.

Because of the specific products and capabilities of each timber supplier, early engagement of the timber trade in the design process is preferred. As such, alternative methods of procurement to the traditional lump sum bid become attractive. Entuitive can assist in the assessment and selection of the timber supplier,



EARLY COORDINATION

Maximizing the benefits of the mass timber construction phase requires proper scheduling for fabrication time and early coordination of building services.

Locations and sizes of openings for mechanical and electrical services should be fully detailed in advance to leverage the precision of CNC machining and to avoid delays on-site. This detailed coordination during the design stage can be facilitated by the preparation of BIM models by all disciplines involved. All Entuitive projects are prepared on a BIM platform, allowing close coordination with other disciplines before releasing construction documents.

BUILDING CODE COMPLIANCE & PERFORMANCE-BASED FIRE DESIGN

Mass Timber is seeing increased allowances in building codes, but there are still opportunities to innovate with alternative solutions.

Entuitive offers full building code consulting services to navigate these provisions and ensure any approvals risks are mitigated.

Our approach to building code compliance is to help all stakeholders understand what the code allows, and how this relates to design goals for the project. We identify opportunities for alternative solutions that would better meet architectural, programmatic, or cost goals. We have a track record of successfully negotiating these alternatives with AHJs to help the project succeed.

We do this by using advanced technology to anticipate realistic fire events and demonstrate how a building's performance goals can be met. In close consultation with the client, developers, and architects, we develop specific performance criteria tailored to the end user's need, whether that is to simply meet the performance of the building code, or to go above and beyond the basic criteria for businesses whose livelihood is dependent on fire protection.

Our fire safety engineers stay on top of the latest developments in fire engineering design through our collaboration with academic institutions and industry organizations. We ensure these latest developments make their way into practice through involvement on code committees in both the United States and Canada.

ADVANTAGES TO THIS APPROACH

✓ INNOVATIVE ARCHITECTURAL SYSTEMS

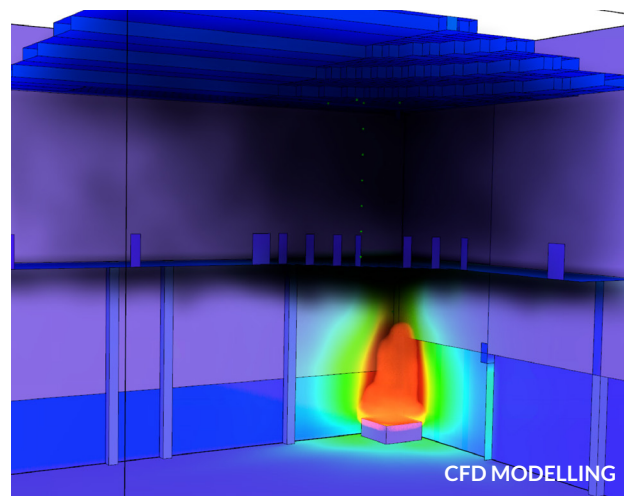
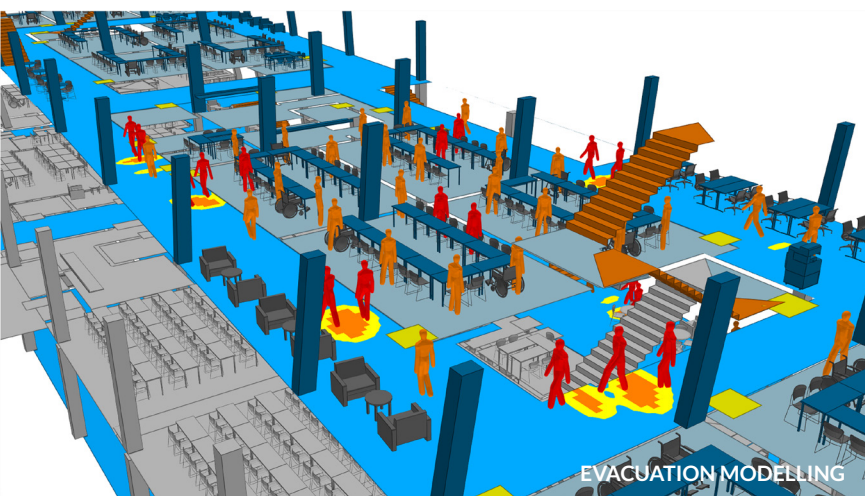
Not bound by conventional prescriptive clauses.

✓ OPTIMIZATION OF FIRE PROTECTION

Reduced cost and shortened schedule without compromising performance.

✓ INCREASED BUILDING RESILIENCE

An engineered, first-principles approach to fire safety.



MASS TIMBER IN HIGH RISE RESIDENTIAL

Mass timber is gaining popularity as a material for use in high rise residential applications.

Structural systems may consist of CLT slabs supported on load bearing CLT walls. Acoustic and fire issues may lead to encapsulation of some or all of the CLT.

Entuitive can provide guidance on the amount of CLT that can be exposed to view from a fire perspective. Structurally, issues such as shrinkage and connections require special consideration in a mass timber building with special details at slab wall intersections required to limit stresses perpendicular to the grain of the slab panels.



INSTITUTIONAL & COMMERCIAL USES

Mass timber can provide comfortable workplace environments for building occupants.

Mass timber is more suited to smaller grid spacing than traditional materials, but can be an efficient system with grids of the order of 9m x 6m.

Beam and slab systems are common with structural depths typically deeper than traditional alternatives. The ceiling may be fully or partially eliminated, and the routing of services requires special consideration. Shallower "flat slab" type systems are also possible. These create a flatter, less articulated soffit and require careful consideration of floor vibrations due to use and occupancy. Hybrid steel and timber systems are also possible, with the steel providing the capability to achieve larger spans.

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.

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.

HYGTROTHERMAL 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.

COMCAST INNOVATION
& TECHNOLOGY CENTER
PHILADELPHIA, PA



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.

INTEGRATED BUILDING ENVELOPE & SUSTAINABILITY

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.



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.

Project Highlights

SELECTED RELEVANT
PROJECT EXPERIENCE

T3 BAYSIDE TORONTO, ON



Challenge

A highly glazed facade was used to maximize views of the wood structure and create a bright interior environment. Meeting project energy performance goals required careful attention to curtain wall thermal performance and detailing.

Solution

Curtain wall details, including feature ribbon and shadow box panels, were designed to create a continuous thermal barrier. Thermally broken connections and custom insulation detailing were implemented and thermal simulations showed that performance requirements were met. It was important to maintain the existing deep foundations that were constructed below the watertable.

T3 Bayside is a ten-storey timber office building that will provide best-in-class, creative-use office space. The building will incorporate as many sustainability objectives as possible, including obtaining LEED® Gold (and possibly Platinum), meeting Waterfront Toronto's mandatory Green Building requirements, and reaching IWBI WELL Certification. The project is part of Phase 1 of the overall Bayside Development, a 13-acre master planned community along the waterfront in the emerging East Bayfront community. The Bayside Development aims to transform an underutilized, industrial area into an active and diverse mixed-use community.

Architect

Design Architect: 3XN
Executive Architect: WZMH

Client

Hines

Size

254,000 ft²

Role

Building Envelope Consultant

LEED® Certification

Targeting LEED® Gold and IWBI WELL Certification

**HUMBER COLLEGE LAKESHORE
CAMPUS CULTURAL HUB**
TORONTO, ON



This 375,000 ft² facility will house the School of Creative Arts and includes a four-story mass timber student residence above a four-story concrete podium.

The project includes glulam columns and beams, CLT floor and roof panels, and CLT shear walls.

Through an Integrated Project Delivery (IPD) process, Entuitive has worked with the contractors from the earliest stages of the design. The complete structural design of the mass timber, including connections, remained in Entuitive's scope as the structural engineer of record for the project.

By collaborating closely with the mass timber fabricator and installer, the design was optimized for both material efficiency and speed and ease of erection on site. Connections were designed to accommodate fasteners from multiple manufacturers to avoid delays associated with pandemic-related supply chain problems.

Architect
Diamond Schmitt Architects

IPD Mass Timber Partners
Kalesnikoff Mass Timber
Bryte Designs

Client
Humber College

Size
375,000 ft²

Role
Structural Engineering Consultant

Status
In Construction



**LETHBRIDGE COLLEGE TRADES & TECHNOLOGIES
RENEWAL & INNOVATION PROJECT (TTRIP)**
LETHBRIDGE, AB



The Trades and Technologies Renewal and Innovation Project dramatically updated Lethbridge College's Trade and Technologies program facilities.

Showcasing the school's current and emerging programs and technologies, the school has been designed with flexibility in mind to accommodate future functional space requirements.

TTRIP brings all trades programs under the same roof, including the Crooks School of Transportation, Agricultural and Heavy Equipment Technology, Wind Turbine Technology, engineering technology disciplines, and various apprenticeship training programs.

CHALLENGE

To create a flexible space that could be adapted to meet the ever-changing needs of technology programs – in terms of enrolment numbers, industry needs, and emerging technologies – and to provide structural elements complementing the architectural features.

SOLUTION

Entuitive's engineers chose structural systems that achieve open concept spaces through economy of material. Of note is the two-storey hub of classrooms and offices, which employs the first-known use of spherical-voided slab – or "bubbledeck" – in Alberta. It allows for floor spans greater than 13 metres long with minimal slab depth, in comparison to conventional cast-in-place concrete or steel systems. Finally, the desired wave-form roof was achieved using glued laminated timber – glulam – a low-cost and sustainable wood product suitable for curvilinear forms.

Architect
Diamond Schmitt Architects;
Sahuri + Partners Architects

Client
Lethbridge College

Size
15,500 m² (166,840 ft²)

Role
Structural Engineering Consultant;
Building Envelope Consultant

Budget
\$65 M

310 MARLBORO STREET KEENE, NH



310 Marlboro Street is a multi-family residential project.

This mixed-use project consists of a vertical mass timber addition of 57 apartments distributed across three stories. The apartments are being built on top of an existing industrial building characterized by its brick and steel mill-style design. The pre-existing structure currently houses a diverse range of businesses, including small-scale manufacturing, maker spaces, education and entertainment & fitness.

The apartments in the development encompass a variety of layouts, featuring one-bedroom, two-bedroom, and studio options. Many of the units are equipped with external balconies. Notably, the building employs innovative construction techniques, incorporating a structural system that utilizes mass timber components including glulam beams and columns with CLT (cross-laminated timber) floors. The choice of wood for this project was motivated by its lighter weight, which minimizes the impact on the existing foundation.

Architect
Banwell Architects; Lignin Group

Role
Structural Engineering Consultant

T3 STERLING ROAD TORONTO, ON



T3 Sterling Road is a landmark development in Toronto's Junction Triangle, bringing sustainable, timber-based construction to the heart of this vibrant neighborhood. Designed as a creative office campus, the project offers three buildings with 415,000 square feet of flexible workspaces, curated amenities, and robust transit connectivity. Emphasizing timber, talent, and technology, the development highlights Toronto's emerging role in sustainable and forward-looking office design.

Consisting of one 6-storey and one 8-storey building, the mass timber portion of the campus reaches heights of 130 ft (40m) across 310,000 sf. of timber office and amenity spaces. The structure uses Dowel Laminated Timber (DLT) floors, supported by glulam post and beam framing. Steel brace frames act as the lateral system. To meet the design requirements for the 8-storey building, both the DLT and glulam achieved a 2hr FRR. Although the design's 8 storeys rose above the local code limit at the time of construction, our engineers submitted an Alternate Solutions Report to the City of Toronto to allow exposed timber nearly everywhere in the development.

T3 Sterling Road's design is tailored to the modern workforce, offering rooftop terraces, a club-quality fitness center, and collaborative workspaces that enhance tenant experience. Floor-to-ceiling windows maximize natural light, while dedicated bike storage, end-of-trip facilities, and high-speed transit access further support an eco-conscious lifestyle. With LEED and WELL certifications, the development is optimized for sustainability and wellness, setting a new standard for office spaces in Toronto.

Architect
DLR Group; WZMH Architects

Client
Hines

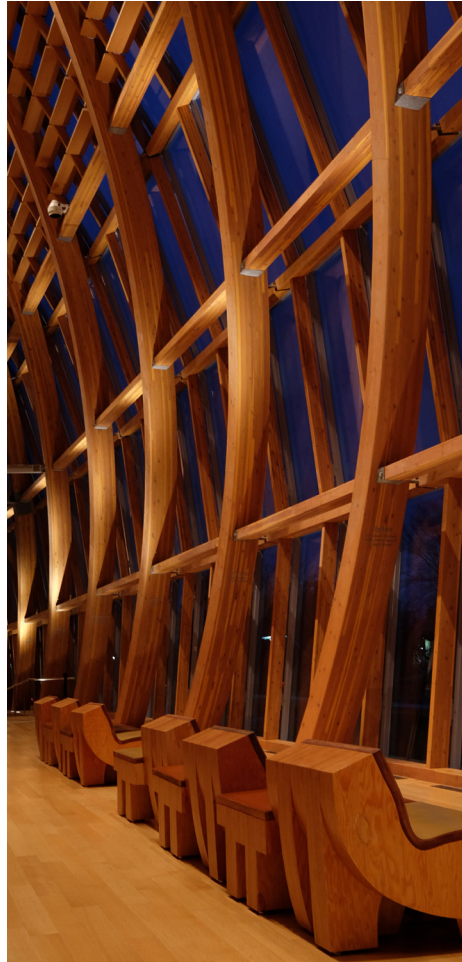
Size
28,800 m² (310,000 ft²)

Role
Structural Engineering Consultant;
Building Envelope Consultant

LEED® Certification
Targeting LEED® Gold

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

AGO TRANSFORMATION TORONTO, ON



Transformation AGO, an innovative architectural expansion by world-renowned architect Frank Gehry, establishes the Art Gallery of Ontario (AGO) as a prime cultural hub in step with leading worldwide destinations. Transparency, city views and a relationship to the historic Grange Park characterise the project, establishing the institution as a centre for art display, programming, conservation, storage, creation and research. The project includes the addition and renovation of almost 100,000 sf2 and 200,000 sf2 respectively, for an increase of close to 50% in dedicated art-viewing space. Notable features include the striking Galleria Italia atrium along the AGO's north façade, and a spiral staircase on the south side, linking the gallery's first two levels to the three new floors above.

The former space features a custom hinge connection developed by the team, allowing multidirectional movement to separate the glulam mullion façade from the sloped main backup glulam framing.

Architect
Gehry International Architects Inc.

Client
Art Gallery of Ontario

Size
97,000 ft² Addition
200,000 ft² Renovation

Role
Structural Engineering Consultant

Budget
\$276 M

HIGH LINE MASS TIMBER PEDESTRIAN BRIDGE NEW YORK, NY



The conversion of an abandoned set of elevated rail tracks into the High Line created one of New York's most celebrated public spaces. A new connector will allow pedestrians to access Moynihan Train Hall from the existing park, with an iconic timber truss pedestrian bridge connecting 30th Street to the Manhattan West platform.

Entuitive was retained by Brookfield, one of the developers in cooperation with the Empire State Development Corporation and Friends of the High Line, to provide specialty mass timber consulting throughout the project.

Our services include procurement assistance, advice on durability and connection detailing strategies for a structure permanently exposed to the weather, building code interpretation, shop drawing review, and field review during construction.

Architect
SOM Architects

Client
Brookfield Properties
Empire State Development Corporation
Friends of the High Line

Mass Timber Supplier
Structurlam

Size
Two 80 ft spans with 80 ft cantilever

Role
Specialty Mass Timber Consultant

Status
In Design

837 BEATTY STREET
VANCOUVER, BC

RENDERING COURTESY OFFICE OF MCFARLANE
BIGGAR ARCHITECTS + DESIGNERS.



837 Beatty Street is an existing two-storey warehouse, originally constructed in 1911. This project involves the rehabilitation of the warehouse plus the addition of a new, four-storey building, consisting of three full floors and an amenity level with rooftop terrace.

The addition will be mass timber with a steel lateral force resistance system that will seismically upgrade the existing building and will be flush faced with the existing building. The new envelope will consist of brick cladding, precast bands, and punched glazed openings.

CHALLENGE

The heritage load-bearing masonry wall presented a unique challenge as we were tying in with new glazing assemblies, revitalized cladding measures, and new envelope tie-ins at the interface between the heritage and modern addition.

SOLUTION

We worked closely with the architect and the general contractor to develop processes for delicately retrofitting assemblies while also pursuing high-performance interventions to ensure both a resilient approach is taken as well as a focus on thermal comfort is achieved.

Architect
Office of McFarlane Biggar
Architects + Designers

Client
Reliance Properties

Size
4,134 m² / 44,500 ft²

Role
Building Envelope Consultant

Budget
\$17 M

**FIRST NATIONS TECHNICAL INSTITUTE
NEW ACADEMIC & ADMINISTRATIVE FACILITY IPD**
BELLEVILLE, ON



This 54,000 ft² academic and administrative building in the Tyendinaga Mohawk Territory will allow FNTI to advance First Nations-specific research in Indigenous food sovereignty, community development, environmental sustainability, and social entrepreneurship.

The project has high sustainability goals and is aiming for net-zero carbon emissions. A mass timber structure has been an integral part of the school's vision from the onset of the project.

Using Integrated Project Delivery (IPD), the full design and construction team has been assembled to work on the project collaboratively.

As the structural designer, Entuitive was an integral part of the selection process of the timber contractor partner. The structural design, including connections, will remain in Entuitive's scope.

As in all IPD projects, we will collaborate closely with the timber fabricator and installer to optimize the design for efficiency and ease of erection.

Architect
Montgomery Sisam Architects

IPD Mass Timber Partner
Timber Systems

Client
First Nations Technical Institute

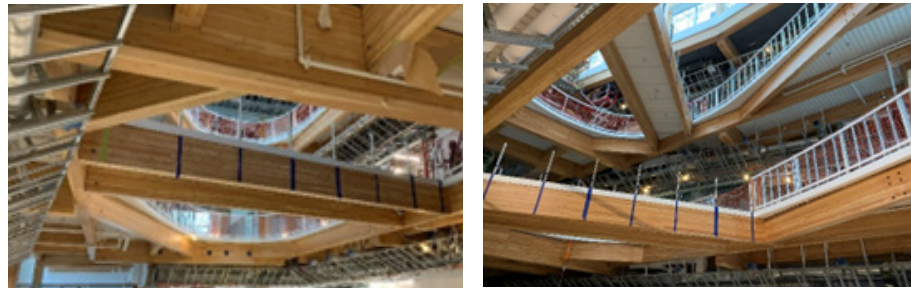
Size
54,000 ft²

Role
Structural Engineering Consultant

Budget
\$21.5 M

Status
In Design

**ROBERT G. KUHN CENTRE AT
TRINITY WESTERN UNIVERSITY**
LANGLEY, BC



Trinity Western University is developing a landmark building that marks the entry to campus as well as creating an attractive student and faculty space. The new building will house the School of Business, international education (Trinity Western University Global), leadership, adult, and online education.

The four-storey mass timber building includes a full-height atrium with a glazed penthouse that brings daylight into the communal spaces and connects the academic community. This atrium is crossed with a timber bridge at each level. The lower two floors consist of a variety of classrooms and student spaces while the top two floors are mainly faculty office spaces. The building site is in the northeast corner of the campus between 76A Avenue and Highway #1.

Challenge

The building is located along the edge of a former gully. Soil conditions vary significantly across the structure with a potential for differential settlements.

Solution

Working closely with the geotechnical engineer, Entutive developed a series of grade beams to distribute the building loads. The slab on grade at the ground floor will be poured after the structure above is completely erected. This will help control the cracking in the final polished concrete surface.

Architect

ThinkSpace

Client

Trinity Western University

Size

54,000 ft²

Role

Structural Engineering Consultant

Budget

\$35 M

**SLOCAN SITE REDEVELOPMENT:
COMPLIANCE CONSULTANT SERVICES**
VANCOUVER, BC



Provincial Health Services Authority is redeveloping its Slocan Site as a Centre for children and youth living with health complexity. The facility will have a gross floor area of approximately 11,210 m² (excluding parking), with lower levels constructed with a reinforced concrete frame, and upper floors using encapsulated mass timber. There will also be a standalone 74-space childcare facility approximately 1,100 m² designed to Passive House requirements. The facility is also required to be certified LEED® Gold.

The project construction budget is estimated at an order of magnitude of \$150M+ and is being procured using a hybrid Design-Build project delivery model, with the Compliance Consultant progress the design far enough to secure a Development Permit.

Architect

IBI Group

Client

Provincial Health Services Authority

Size

11,210 m² Complex Care
1,100 m² Daycare

Role

Structural Engineering (Compliance Consultant)

Budget

\$150 M+

ATLANTIC SCIENCE ENTERPRISE CENTRE MONCTON, NB



This project involves the new federal government Science Research facility in Moncton, New Brunswick. The six-storey administration area is framed in mass timber, consisting of CLT floors on glulam beams and columns.

The framing supports a retained heritage façade and features a central atrium with roof skylight requiring 15m timber spans.

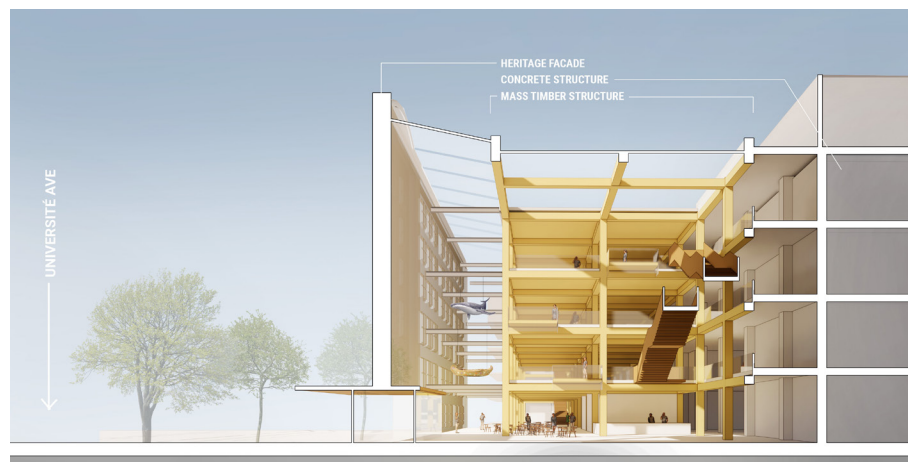
Architect
Diamond Schmitt Architects

Client
Government of Canada

Size
22,300 m² / 240,000 ft²

Role
Structural Engineering Consultant

Budget
\$300 M+ (estimated)



QUEEN ELIZABETH OLYMPIC PARK TIMBER LODGE & TUMBLING BAY PLAYGROUND LONDON, UK



This was the first new building completed in the Olympic Park as part of the legacy phase of the 2012 London Olympic Games, housing a community space and park café adjacent to a natural adventure playground.

The building is constructed from cross-laminated timber (CLT) panels, which allows for a large open internal area and a 3-metre-wide cantilevered canopy providing shade and shelter on three sides of the building. The roof panels are arranged so that the grain radiates from a single point in order to achieve the canopy's minimal depth of just 215 millimetres. The structural design is reflected in the radial arrangement of the roof lights set into the exposed CLT panels.

This clever design also allowed floor-to-ceiling windows to be inserted underneath the wide canopy and a full-height glazed corner in the café space, where the corner of the canopy hangs over 4 metres from the nearest supporting wall.

In addition to our team providing structural design for the main building, the engineering also included the playground's more formal structures and the supervision of the load testing for its less-traditional elements, which included spliced tree trunk supports and protective barriers woven from natural branches.

Architect
Erect Architecture & LUC

Client
London Legacy Development Corporation and BAM Nuttall

Role
Structural Engineering Consultant

Awards
MIPIM Awards, Special Jury Award, 2015; Civic Trust National Award, 2014; Selwyn Goldsmith Award for Universal Design, 2014
New London Award, Public Spaces, 2014; Landscape Institute Awards, Design Small Scale Public, 2014

**NATIONAL VETERANS RESOURCE CENTER,
SYRACUSE UNIVERSITY**
SYRACUSE, NY



The National Veterans Resource Center (NVRC) is a facility dedicated to serving veterans and military families.

Designed by SHoP Architects, the project includes a sculptural timber feature wall that wraps around the central 750-seat auditorium and curves upward to form the ceiling.

Working for the timber fabricator as the delegated designer, we developed and designed the connections of the exposed timber slats to an integrated timber support structure as well as the connections of the entire system to the base building structure.

Detailed coordination was required with mechanical systems and other elements hidden behind the feature wall.

Architect
SHoP Architects

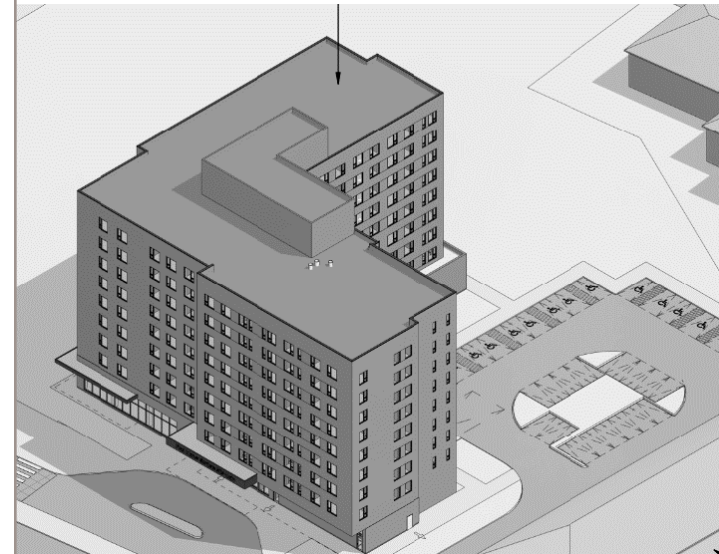
Client
Structure Fusion

Size
126,000 ft²

Role
Specialty Engineering Services

Status
Complete

**PEEL MANOR
SENIORS' HOUSING**
BRAMPTON, ON



The Peel Manor Seniors Housing development is a 9-storey, 198 bed seniors-focused residence. It includes a main floor amenity space and library, while care spaces are provided elsewhere on the site.

Entuitive is providing structural engineering, building envelope, and building code compliance services. A key focus of the project is the use of mass timber throughout for sustainability and aesthetic benefits. The approach to building code compliance required the occupancy to be well defined and discussed with all stakeholders to reduce the number of Alternative Solutions required for a B-2 or Group C, Retirement Home occupancy.

Challenge
Efficient use of mass timber

Solution
During the concept design phase, Entuitive developed a range of mass timber structural schemes. These ranged from pure timber schemes with varying grids and mass timber products, as well as hybrid options. Each mass timber scheme had a clear approach to building code compliance and fire-resistance ratings developed to ensure it was feasible. Working with the project team, the schemes were refined to arrive at the most efficient and economical scheme.

Challenge
Exposed mass timber throughout

Solution
As building code consultant, Entuitive outlined a path to building code compliance that allowed for all timber to be exposed through the use of an Alternative Solution. Discussions are currently ongoing with the AHJ to mitigate approvals risks and ensure project goals are achieved.

Architect
Kasian

Client
Region of Peel

Size
14,400 m² (155,000 ft²)

Role
Building Code Consultant,
Structural Engineering, and
Building Envelope Consultant

Budget
Confidential

ENTUITIVE

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