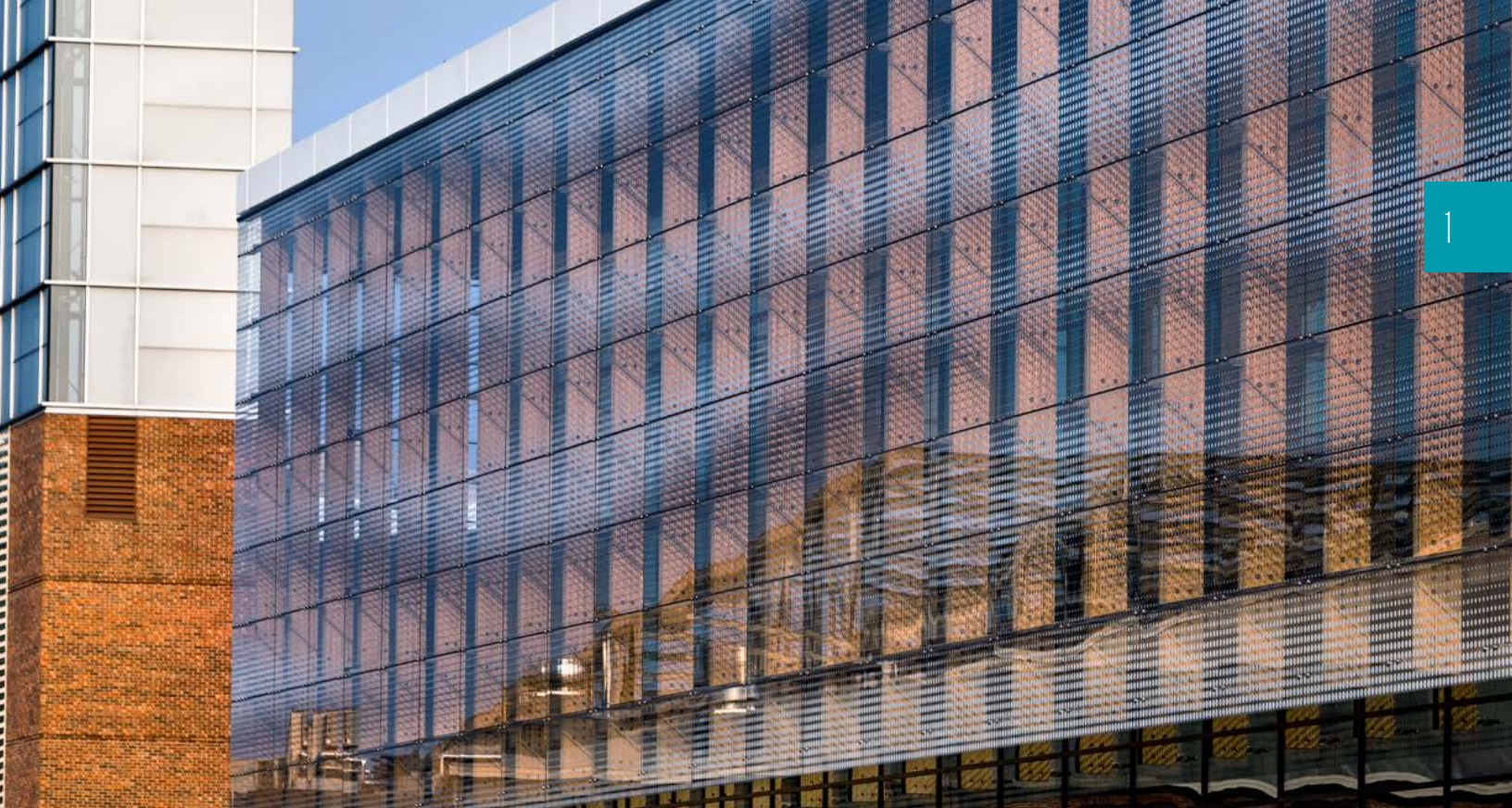


VIDEOTRON CENTRE

CANADIAN CONSULTING ENGINEERING AWARDS 2016



GENERAL PROJECT INTRODUCTION

The Quebec Multifunctional Amphitheatre (AMQ - Amphithéâtre multifonctionnel de Québec) was built to fulfill the public's need for a modern and multifunctional sports facility to make hockey a priority, pave the way for the return of the Quebec Nordiques and hold major international cultural events. The existing facility, the Colisée Pepsi, was no longer able to fulfill these needs and would have required major renovations. And so, WSP was called upon to establish a management plan for carrying out this particularly demanding project.

On February 10, 2011, the project's financial plan was unveiled, following an agreement with the future amphitheatre manager, Quebecor Media (QMI). This agreement marked the beginning of this \$400-million project, which was to be completed by September 15, 2015, in accordance with the budgets and timelines set.

The announced project was to be built on the ExpoCité site, but preliminary budgets quickly surpassed \$570M and therefore had to be revised. A new design was therefore unveiled, showcasing a simple and pared down architectural style that complied with all of the project's parameters. The final design was selected and ground was broken on September 4, 2012, at the J'ai ma pelle inaugural day, during which citizens were invited to take part in a historic event.

The definitive location for the AMQ is on the site of the former Quebec horse racetrack. The new amphitheatre is nearly 65,000 m², with seven levels, including a hall that takes up three levels. Built at around 4 m below ground level, the "event" level includes an ice rink, rooms for players on the Remparts, the local junior hockey team, and could eventually house rooms for the NHL. Two levels above, the main corridor provides open space for circulation, with a view over the ice rink and show floor. It contains several concession stands and various visitor services. Through this corridor, 10,000 spectators can access their seats in the main level of the "bowl." Eighty lounges and two boxes are located on the two levels, between the main corridor and the upper corridor. The upper corridor provides access to 7,000 seats as well as other concession stands and various services.

The AMQ was a dream for the City of Quebec and its government, a dream for the entire Quebec region. It was the province's most highly covered project in the media, and the most closely followed both by its fans and critics, leaving no margin for error!

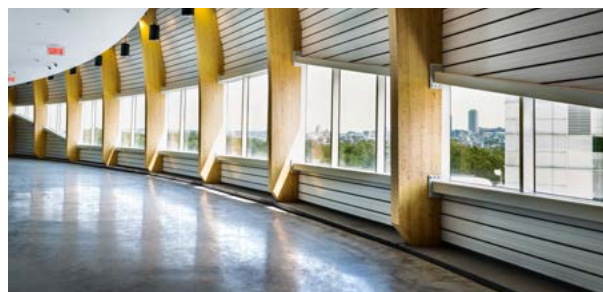
CONSULTANT ENGINEER'S INTERVENTION METHOD

FIRM SELECTION METHOD

At the outset, the City of Quebec issued two turnkey calls for tender. The first covered the building excavation and backfill work, the construction of the new structure and the installation of its external shell. The second covered the interior facilities and the installation of the building's mechanical and electrical systems. The City therefore sent out a call for tender for an integrated engineering and architecture team to cover all the professional design services of and on-site quality monitoring.

At the same time, the City released a call for proposals with fees for project management and support services to its own management team. WSP submitted a proposal presenting the firm, its team of specialists, the main participants, its understanding of the mandate and the management methods it intended to apply to manage the City's team of professionals, as well as the two contractors who would be granted the turnkey mandates.

Following the analysis of the proposals, WSP was selected based on the excellence of its project management resources, as well as the quality of its technical support resources. The project managers all had more than 25 years' experience in construction management and also brought expertise in the construction of large amphitheatres elsewhere in Canada. The technical resources had just as much experience. It's important to point out that the last amphitheatre of this kind in Quebec, the Bell Centre, was built more than 20 years prior.



ADDED VALUE

The municipal authorities appointed a preliminary consortium of professionals to identify the needs the AMQ could meet. The definition of needs assessment, submitted to the City on September 30, 2011, was edited by the City, and with this revised list, the functional and technical planning (FTP) began.

Under the new mandate, the team of professionals from Professionnels Maîtres SAGP (SNC / ABCP / GLCRM / Populous) turned the City's needs into an FTP and a preliminary design. We became involved in the project at the same time, to configure the management plans for all participants to follow throughout the project.

As soon as the first designs were submitted, WSP assessed the design costs and ensured that the FTP was observed. Furthermore, comments from WSP technical specialists were submitted within a relatively short time frame. WSP therefore positively influenced the decisions and suggested a series of very timely adjustments. Following this critical stage, the City chose to follow the recommendations of WSP specialists and relocated the AMQ to the ExpoCité site. The City then resolved to very closely follow the latest version of the FTP in order to avoid last-minute additions.

Several discussions also took place on how the project would be carried out. WSP had expressed reservations as to the proposed two-step management method and the employment of a construction manager by the City. The discussion led to a complete change of approach.

In consultation with the construction manager, Pomerleau and the Professionnels Maîtres SAGP, a complete construction management structure was developed and implemented. The two initially planned turnkey calls for tender were abandoned and replaced by more than 60 calls for tender for specialized contractors. Thanks to our efforts, everything fell into place for the construction of a multifunctional amphitheatre with state-of-the-art technologies and the most recent multimedia equipment, while respecting the City of Quebec's needs, budget and timeline.

HUMAN RESOURCES MANAGEMENT

RESOURCES SELECTION AND TEAM MAKEUP

WSP assembled an elite multi-disciplinary team to meet the client's particularly high requirements. A management team was mobilized, which included four project and construction managers with more than 25 years' experience each. Among them was Principal Manager John Akerley, a seasoned professional with nearly 50 years' experience, notably having taken part in the construction of similar amphitheatres in Canada and the United States including Toronto's Air Canada Centre. The rest of the management team and the entire project office benefited from his experience. He was able to identify certain pitfalls looming on the horizon. Gilles Desrochers, Michel Létourneau and Jean Gariépy, all engineers and PMPs (Project Management Professionals certified by the Project Management Institute), helped him implement the management plans for the entire project.

The City wanted WSP to ensure compliance with the FTP, which was central to the contractual agreement made with Québecor Media for the management of post-construction operations. To this end, several other seasoned professionals provided comments for the professionals' plans and estimates. André Lapointe, Jonathan Garneau, Joël Primeau, Marc Morin and Guy Deschênes, all engineers, Albert Paquette, architect, and Robert Levac, multimedia specialist, also helped bring the project back within the defined parameters. Hervé Couture, professional quantity surveyor with more than 30 years' experience, performed the estimate service in order to validate the sums advanced by the professionals.

It was our responsibility to review the budget, and the initial estimates had brought the project to more than \$570M. The first site's contaminated soil and the excessive initial floor surface area, considering the needs expressed by the City, would lead to the budget being overrun by nearly \$170M. Relocating the building on the site and optimizing space enabled us to bring the estimate to nearly \$400M. The subsequent evaluations led the final calculation to a total cost under \$370M. In financial terms, it was a real success and an example to follow!

MOBILIZATION AND MOTIVATION

The pressure from citizens and the challenge of a project of this scope were highly motivating factors for all involved. In spite of everything, participants needed to be 100% on board, and WSP greatly contributed to the team's synergy. Having selected its own team, these experienced and motivated individuals from all over Canada, from Vancouver, Toronto, Ottawa and Montreal were dispatched to reside permanently in the City of Quebec throughout their mandate.

The project team, working within the same project office, on the building site with the other participants, was able to participate actively and diligently on all stages of project development and construction. Kickoff meetings enabled the different contributors to quickly fit in. Then, twice weekly team meetings enabled them to refocus on immediate objectives. With motivated professionals who want to see a large project completed on time and on budget, nothing is impossible! The hard work of the WSP team and all the project teams, professionals, builders, sub-contractors and workers greatly contributed to the stunning success of the Quebec Multifunctional Amphitheatre.

The City and its project director, engineer Jean Rochette, put all their effort towards encouraging the pursuit of excellence and helping all the stakeholders become fully invested. The establishment of this project office also significantly increased the feeling of belonging for the people involved, in addition to facilitating communication and accelerating decision-making.

On a lighter note, Linda D'Amours, WSP's receptionist on the building site, set up a cafeteria and launched the employee-of-the-month competition. This award was presented at the themed lunches she organized, and though it may seem insignificant, it enabled people to get to know each other better and to talk in a warm and friendly environment. Jean Rochette singled out Linda's contribution during the opening ceremonies, proving that the success of a project depends on many factors - whether big or small.

OCCUPATIONAL HEALTH AND SAFETY

A building site of this size cannot exist without the implementation of a safety plan and the adherence of each contributor to a rigorous health and safety program. The WSP team took full part in the deployment of this program which proved to be a great success.

It is important to note that more than 4,000 workers participated in this project, as there were two, and sometimes three shifts. At peak times, up to 500 people could be working at once, in relatively restricted spaces, often involving work at heights or overlapping operations. All this required out-of-the-ordinary planning. Over the more than 1,300,000 hours worked, only around one hundred days were lost due to minor injuries. From a health and safety perspective, this is a noteworthy feat.

WSP took part in the site safety efforts and endeavoured to support the members of the team at official visits from politicians and other dignitaries, on evenings and weekends, and even at special events such as ExpoQuébec, when thousands of people converged on the site.

Finally, all the members of the project office were informed of news concerning building site health and safety. This was thanks to diligent work by the health and safety officer who was invited to present a summary of the latest developments at the beginning of each construction committee and building site coordination meeting. The contractors also had their representatives there.



PROJECT SPECIFICS

COMPLEXITY

The AMQ, today called the Videotron Centre, is simple in its complexity. The first site selected for its construction was complex due to the significant municipal infrastructure to work around and decontaminate. WSP identified the initial site pitfalls, and greatly simplified the project by suggesting the facilities be relocated.

Built on the ruins of the Quebec horse racetrack, the AMQ is on its way to becoming an icon of the City, visible from everywhere and easily identifiable. The construction of the amphitheatre's structure took more time than its development and completion. The construction stages were adjusted according to the seasons, in particular the four quadrants of the "bowl" were installed in spring instead of in winter, for purposes of operational efficiency.

The prospect of hosting an NHL team also added a considerable level of complexity. All efforts were made to optimize the quality of the ice while maximizing spectator comfort. This goal was reached because the AMQ, as a multi-functional facility, has a capacity of 18,000 seats in "arena" mode, and a capacity of 5,000 to 20,000 visitors in "event" mode, depending on the type of reception or show. This multi-functionality goes hand in hand with the implementation of state-of-the-art voice/data/video communications networks with which surpass North-American standards.

ORIGINAL SOLUTIONS

Compact building

The "bowl" was subject to a few changes following the relocation of the amphitheatre. It was rotated 80° in relation to the entrance hall. These changes required streamlining the spaces to meet cost targets and make the building even more efficient.

Ventilation and air conditioning

A world first was achieved at the AMQ. The lower part of the "bowl" which has 10,000 seats is ventilated through the floor. Openings were made in the bleachers to let air circulate behind spectators' seats. Air is therefore brought to the spectator at a comfortable temperature, at a low speed. This avoids pushing the ceiling air onto the ice rink, which would heat the ice. On the other hand, at the centre of the scoreboard, an immense flexible ventilation sheath directs 10°C air towards the ice rink, to satisfy NHL requirements.

Lighting

The AMQ has 8,000 light fixtures. The vast majority of the fixtures operate with light emitting diodes (LEDs), which enables very low energy consumption and reduces the frequency of replacement.



Construction management

The project timeline required a rapid pace of work even in the winter. The erection of the steel frame and pouring of the first floor slabs, in autumn 2013, enabled the manager to close the first two levels of the amphitheatre during the winter of 2013-2014. It was then possible for us to install the ventilation mechanical rooms, the boiler room, the cooler room, the main electrical sub-station and the ice plant. We also began installing gypsum inside spaces which were only just partitioned, even if this meant replacing a few gypsum boards. Around \$20,000 of this material had to be replaced, which was a reasonable loss given the \$300,000 that a day of overtime could cost. Not to mention that without this work, it would have been impossible to respect the project's timeline.

FUNCTIONALITY

The building's functionality met expectations perfectly. Visitors access the building through a wide-open entrance hall which can hold 2,000 people. This space is ideal for celebrations or cocktail parties. It is open to the outside, and during the summer, a system of stackable doors allow activities to be held with an outdoor terrace feel.

From the main corridor level of the arena, which has 10,000 seats as well as many concessions and services, spectators can access the bowl using escalators or stairs. They can also go to the 86 corporate lounges or one of the two group boxes, one of which holds 64 people and the other 96, as well as the upper corridor, which has 7,000 seats. All the bleachers offer a 360° view of the ice rink. Some observers have said that the Videotron Centre is one of the most beautiful multifunctional amphitheatres in North America.

The technical grid suspended from the AMQ's roof offers great versatility and provides almost infinite possibilities for fastening elements. World-class production teams have a broad spectrum of possibilities for fastening equipment or décor, no matter their size or shape.

In the mechanical rooms, which serve the two corridors, the equipment is unobstructed in order to facilitate its maintenance. They are grouped according to their functions or their sector, all depending on needs. The "event" level has numerous storage rooms. The main kitchen rivals the kitchens of exhibition centres with similar capacities.

Simplicity and efficiency were our watchwords in every way.

BUDGET

As mentioned previously, the AMQ project has been assessed as a whole on several occasions. The City required that four cost reviews be carried out, in particular at the design stage, as preliminary plans were made, when the final plans were 50% complete, and during the final plan stage.

The first design review, when the AMQ still appeared on the original site, revealed a considerable overrun of costs and required the relocation of the amphitheatre. New designs and another design stage assessment were carried out, establishing the soundness of the relocation and demonstrating that it was necessary to streamline the spaces to optimize the building's functionality and reduce costs.

The subsequent budgetary cycles reassured the City about the work performed. The last cycle carried out, which recorded all the costs for almost all the bids submitted, confirmed the accuracy of our proposal, and left a reasonable reserve for construction contingencies.

Risk management is an important element of the budget. WSP was responsible for identifying and assessing risk, and this was reviewed five times, with a reserve was set up for unforeseen risks.

At workshops of about ten managers, around one hundred risks were identified. Then, as the work advanced, these risks were mitigated and brought to zero. The \$45-million contingency reserve planned at the outset was reduced to around \$5M at its last revision. This reserve was of course included in the overall \$400-million budget controlled by WSP.

TIMELINE

As with the budget, the project parameters were set before the project was launched. The mandate of the operations manager, QMI, whose agreement was signed in 2011, planned for operations to be taken over at the latest on September 15, 2015. WSP was appointed in autumn 2011 and had to present a master timeline that met this target.

The first drafts were revised after the budgetary studies revealed a considerable overrun of costs. The new version ensured project feasibility for September 15, while confirming that two work shifts, at least, would be necessary throughout the AMQ project.

WSP imposed a very strict production pace on the design team. Then, in consultation with the designers and the construction manager, WSP divided the building site work into separate contractual components. These were assigned through public calls for tender to specialist contractors whose responsibilities often exceeded the framework of their usual expertise, making them general contractors, in a way.

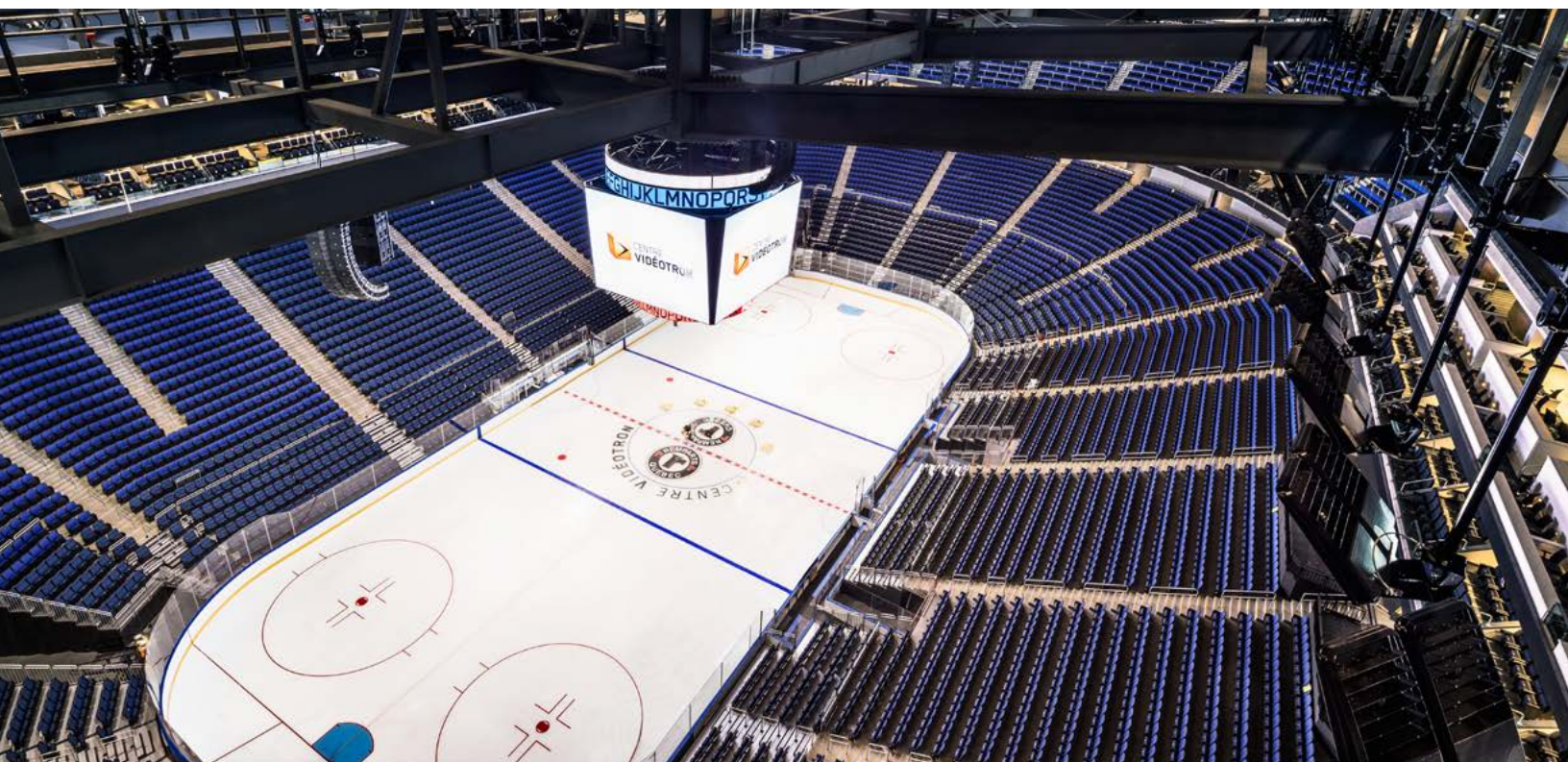
This situation forced the contractors to exchange certain sub-contracts, leading them to depend on one another and facilitating collaboration. This was really apparent at the coordination and building site meetings held either every day, week and every two weeks, depending on the building site needs.

WSP strongly contributed towards meeting this goal by maintaining a reasonable pressure on all the teams, questioning the construction manager and inviting him to increase his involvement with contractors.

SUSTAINABLE DEVELOPMENT

SOCIAL ACCEPTABILITY

The AMQ project, which was highly politicized and publicized even before its announcement, saw the light of day thanks to the citizen consortium Première Place. Première Place had begun to seek financing by selling seats in a new virtual building to private individuals and companies in order to better define the needs expressed by the population for the governmental authorities.



The group also helped to organize the Marche Bleue, for a new coliseum and the return of a NHL team to Quebec. Following this pressure from the population, the \$400-million financing for the construction of the AMQ was shared equally between the City and the provincial government, with no possibility of an overrun.

From this point on, it was essential that the City and project team comply with budgetary parameters and timelines, but also that they make this building a source of pride for the population.

Today, the Quebec Multifunctional Amphitheatre has everyone on its side, due to its great functionality, its undeniable architectural appeal, its ability to meet initial expectations and its final cost. The AMQ brings together citizens of the Capitale-Nationale region, as well as those from all the neighbouring regions. It has become a symbol of the City of Quebec's economic success, its rigour and its know-how.

CERTIFICATION AND ACCREDITATION

The AMQ is aiming for LEED® Silver certification. The WSP team, which has managed the LEED® application since the very beginning, put everything it had into obtaining this certification. Engineer Guy Deschênes is responsible for the application submission to the Canada Green Building Council (CGBC). The management team made sure that all choices, from the beginning of the design, would meet or exceed the necessary scores for Silver accreditation.

Furthermore, WSP and SAGP submitted a design proposal to the City with ventilation beneath the bleachers. This is a revolutionary design in building mechanics for an amphitheatre and a first in the Americas. This design enables great energy efficiency and heightened comfort for visitors, without being detrimental to the ice rink's quality.

WSP also closely monitored the building site development to ensure the environmental requirements during construction, such as control of runoff water and air quality inside, were met at all times and adequately documented.

PROJECT LIFE CYCLE

The AMQ site was previously occupied by the Quebec horse racetrack. The facility housed a racing circuit, outdoor platforms and a mutual betting room which had been converted into covered platforms, and to which had been added a brick façade. Over the years, the location had fallen into disrepair.



The brick façade was initially incorporated in the AMQ design, but the low-quality cladding made this operation too costly. Another plan was to remind visitors of the old façade by projecting it onto that of the new amphitheatre. This option is still entirely feasible, if interest is shown: the necessary projection equipment would just need to be installed. The Quebec Gaming Hall, which was not very profitable, was relocated successfully. This decommissioned building was repurposed into offices and recording studios.

ECONOMIC ASPECT

In the short and medium term, the economic relevance of the project poses no difficulty. The AMQ will pay for itself even without the presence of an NHL team. The current operator, QMI, has become the owner of the region's QMJHL team, the Quebec Remparts, which has made the amphitheatre its permanent residence. Shows by renowned international artists attract visitors to the region, which was not possible with the Colisée. Many artists were no longer stopping in Quebec City, preferring the more modern facilities of Montreal's Bell Centre. This is now a thing of the past, and the local economy is faring very well because of it.

ENVIRONMENTAL ASPECT

The human environment of ExpoCité, where the AMQ was built, greatly benefited from the removal of the horse race track, which had fallen into disrepair and was unoccupied. The municipal authorities are even considering bringing back the annual provincial exhibition Expo-Québec, held at the end of the summer. Redevelopment is planned for Place Jean Béliveau, as well as a rejuvenation of Pavillon du Commerce and Pavillon de la Jeunesse. Space K and the old Colisée are also being considered for demolition. Hotels, food fairs and several other ideas have been launched to revive this lower town sector of the City of Quebec. The AMQ's environment is expected to change a great deal over the next decade, in addition to the changes already made.

In structural terms, the AMQ used steel, but also Nordic engineering wood, thanks to a local resource's participation, to support the entire external wall of the "bowl" and the double façade of the entrance hall. This second silkscreened glass partition forms a second external membrane and enables the air to be kept at comfortable temperatures while leading to substantial energy savings.

Throughout the project, WSP's management team worked hard to minimize nuisance from noise, odour, light and traffic as much as possible. Very few complaints were reported throughout the 36 months of construction work.

SOCIAL ASPECT

The wonderful momentum provided by the success of the 400th anniversary celebrations in 2008 does not seem to be slowing down for the Quebec City. The list of major projects contributing to the City's vitality continues to lengthen. To mention only a few, there is the complete reconstruction of the Quebec Airport and its subsequent extensions; the revitalization of the banks of the St. Charles River and the St. Lawrence River, with the development of the Samuel de Champlain promenade and the cruise terminal; the repair of the highway network starting with the Duplessis and Robert-Borassa highways; the development of many cycle paths on a large section of the land. All these developments have given the city new sparkle and have a very positive effect on the residents. We are proud to think that the success of the new amphitheatre is part of this, and that it will also contribute to the vitality and quality of life of Quebec residents.

Quebec may have once been a provincial capital languishing in the shadow of its metropolis, but it is no longer. The AMQ's addition on the former horse racetrack site is the crown jewel of this period of burgeoning activity, and a new milestone in the economic and social development of the capital. The AMQ will assuredly have a strong impact on the revitalization of this lower town neighbourhood and one will certainly see other inspiring projects over the next decade.

IMPACT ON THE PROFESSION

BEST PRACTICES IN PROJECT MANAGEMENT

The Project Management Institute's best practices were used to manage the entire project. Cost management, timelines, human resources, risks, documentation, communications, content, changes and quality plans were drawn up and implemented by WSP throughout this project.

The results were exceptional. In response, many observers, in particular the Mayor of the City of Quebec, have said that the project team deserves all of the credit for this success, which shines over the City and its entire population.

WSP is proud to have been a part of this success. The AMQ's success reflects positively on the firm, but also on the entire engineer and project management profession, at a time when many projects have faced worrying failures in terms of keeping to budgets and schedules.

BENCHMARK PROJECT

This achievement is a major showcase that we will regularly cite in our service offers and on our website, as well as in our promotional publications in newspapers and magazines. Photos of the AMQ and interviews with resources allocated to the project are also featured in our "World of possibilities" microsite. Team members, in particular natives of the Quebec region, are proud when our directors mention the AMQ project in internal meetings. For all the participants, particularly those from WSP, the AMQ is the project of their career and their badge of honour.

IMPROVING THE STATUS OF THE PROFESSION

Due to its technical quality, the new Quebec Multifunctional Amphitheatre has state-of-the-art technology and is able to incorporate new mechanical principles which will certainly become the benchmark in this field for other facilities. We should also note that in terms of structure, the Las Vegas arena, which is currently under construction, is a carbon copy of the concrete and steel structural frame used in Quebec, so as to eliminate bracing in the steel structure and facilitate interior development by the architects. The AMQ is a jewel of Quebec engineering and greatly contributes towards improving the status of the profession.

Our project management team applied the necessary management processes for good project governance and exceeded all of the client's expectations. Transfer of the building was planned for September 15, 2015 and the opening ceremonies were held on September 11, four days before the initial due date!

Although the Mayor of the Quebec City announced that the project was \$30M under budget, in reality it was \$40M that the project was able to redistribute to the governmental authorities involved, without the project being negatively affected in any way. The quality and sustainability of the work are also guaranteed. The whole call for tender process, including the contracts negotiated, was honoured four months after the building was completed. No claim or "fault" has been reported. In the wake of the Charbonneau Commission, and considering that UPAC representatives were present on the building site as early as the very first coordination meetings, one can say that this was an exemplary achievement.

If one project could shine a positive light on the engineering and project manager professions in Quebec, it's certainly the Quebec Multifunctional Amphitheatre, today known as the Videotron Centre!



