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Canadian Consulting Engineer

Category I:  
**Community Outreach**

# *Effet de terre*—Green Parking at Habitations Jeanne-Mance



**May 2012**





2-PAGE PROJECT HIGHLIGHTS



## *Effet de terre* – Green Parking at Habitations Jeanne-Mance

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### *The project*

Located in the Ville-Marie borough at the heart of downtown Montreal, Habitations Jeanne-Mance (HJM) consists of 788 apartments housing some 1,700 residents in 5 apartment buildings, 14 multiplex row houses and 50 town houses. The high-density downtown area is prone to heat islands, which reduce quality of life for occupants of this low-income housing complex. The intense heat stored and radiated by pavement and concrete surfaces is harmful to inhabitants' health, and such surfaces also prevent water from seeping into the soil. This lowers the water table, dehydrates the ground and damages basement foundations.

With the assistance of Éco-quartier Saint-Jacques (EQSJ), the Corporation d'habitation Jeanne-Mance (CHJM) decided to renovate its downtown properties by performing major upgrades.

The *Effet de terre* project was divided into four components: (1) ecological rehabilitation of a parking lot, including a bioretention basin, (2) redesign of housing frontages around the lot, (3) development of the area surrounding four other HJM parking lots and (4) community support for the project accompanied by environmental education for the community.

### *Benefits to the community*

This project transformed the immediate environment of HJM families. The project's management model focused on the transformation of space to create an environment meeting resident needs. In their work, the designers successfully applied the concept of planning for sustainable development to ensure long-term life quality benefits within the downtown core.

Community outreach and involvement took many forms: discussion sessions to define implementation goals; participation of residents in many aspects of the parking lot rehabilitation and community planting efforts; workshops to raise awareness on the importance of good neighborliness, how humans affect their environment, and to build on community spirit.

A dozen HJM residents were trained and hired to perform the landscaping and to monitor the bioretention basin's hydrology.

### *Degree of effort*

**Exp** had less than two weeks to rethink the parking lot's physical space, reduce its paved area, install a central island of trees and incorporate a new runoff management system. It therefore mobilized a team to successfully achieve this goal.

The design Engineer began researching best runoff management practices with great determination, even investing personal time on the project.

At the work's conclusion, the project manager was aware that the engineering firm had incurred significant overruns on project fees. Because its priority was to provide good service to the client, the project manager decided not to request these additional fees but to write off the lost revenue.

### *Environmental impact*

In addition to significantly improving the life quality of local residents, this project will have lasting effects on the environment as a whole.

*Water Quality* – Instead of being discharged as quickly as possible into the sewer system, runoff is now collected by a bioretention basin to treat the water (retaining various contaminants, including those responsible for the spread of blue-green algae in Quebec) and replenish the water table.

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*Air Quality* – The parking lots were redesigned with the addition of green areas and tree canopies to reduce the site's temperature by 3 to 6° C in hot weather. The trees also enhance air quality by absorbing a portion of air pollution as well as rainwater, helping it seep into the soil rather than letting it be discharged into the sewage system.

*Biodiversity* – Special emphasis was placed on the selection of plant life. Over 100 species were planted, the vast majority of which were indigenous. EQSJ and its partners made significant contributions to preserving the biodiversity of the HJMs and the downtown area. What's more, the new green space has resulted in the return of insects, butterflies and various birds that had long been absent from the site.

### *Complexity*

Delivering an environmental redesign of a parking lot in a very short time is not a simple task. With limited Canadian studies available in 2009 on the topic, the design engineer focused his efforts on the American and European territories. Based on his research and exchanges with colleagues and other experts in the field, he concluded that a bioretention basin would be the most appropriate project technology. However, contemporary practices are not yet well suited to the use of a bioretention basin and the work required close supervision. The technology also had to be adapted to the reality of Quebec's winter conditions.

Other problems also had to be bypassed creatively in formulating plans for the basin. Ideally, the basin would consist of a single unit at the lot's centre. Differences in site elevation, unfortunately, made it necessary to install the basin at the western end of the site and channel as much water as possible to it. Since the lot was located in a high-traffic residential area, it was also necessary to permit residents to move freely throughout the space. The basin was accordingly divided into three sections separated by sidewalks.

Also adding to the project's complexity were the multiple community outreach efforts to obtain resident opinions, support and involvement, as these activities required some hard thinking and considerable logistics.

### *In short*

As Montreal's first green parking lot and one of the earliest projects involving such extraordinary cooperation among its stakeholders, *Effet de terre* was very broad based. This factor enabled the partners to develop unique expertise. The engineering team proposed a pioneering technological solution that met government requirements even before their issuance. EQSJ launched a social and environmental project to bring the community into the decision-making and implementation processes. These considerations were all new challenges for the stakeholders. The project was also unique because it involved an unusual partnership with an engineering consulting firm, an eco-neighborhood organization and a paramunicipal organization managing social housing.

This ecological solution is a solid example of cooperation among different stakeholders and a grassroots approach that gets the entire community involved in decision-making. Ultimately, the project served as a model of sustainable and social development.



FULL PROJECT DESCRIPTION

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## Background

With the assistance of Éco-quartier Saint-Jacques (EQSJ), the Corporation d'habitation Jeanne-Mance (CHJM) decided to renovate its downtown properties by performing major upgrades, including the rehabilitation of four parking lots, throughout its site.

Habitations Jeanne-Mance (HJM) consists of 788 apartments housing some 1,700 residents in 5 apartment buildings, 14 multiplex row houses and 50 town houses. Its tenants come from 70 cultural communities and are of all age groups. Habitations Jeanne-Mance is located in the Ville-Marie borough at the heart of downtown Montreal, bordered by Sainte-Catherine, Ontario, Sanguinet and Saint-Dominique streets. The high-density downtown area is prone to heat islands, which reduce quality of life for occupants of this low-income housing complex.

Ville-Marie's greenery has almost completely yielded to pavement and concrete. The intense heat stored and radiated by these mineral surfaces is harmful to inhabitants' health. Such surfaces prevent water from seeping into the soil. This lowers the water table, dehydrates the ground and increases runoff to the sewer system. This project's main goal was to reduce temperatures by 3 to 6° C during heat events. Doing so would reduce dwelling cooling requirements and improve tenant life quality. Furthermore, this innovative and experimental project has drawn interest from the environmental and urban development sectors and is being closely monitored.



Habitations Jeanne-Mance before rehabilitation

## Introduction

In 2008, **exp**, an engineering consulting firm, submitted a bid and won a contract to rehabilitate parking lots in line with their original design and budget constraints. In the course of this project, **exp's** engineers deployed their expertise and technical versatility, while providing firm leadership. The project consisted of two phases, with two parking lots to be completed annually over a two-year period (2008-2010).

Since the CHJM's primary goal was to incorporate a maximum number of ecological projects into the territory, it received a grant during the work through its partnership with Éco-quartier Saint-Jacques. The grant was provided by Fonds vert under Action 21 of the Government of Québec's 2006-2012 Climate Change Action Plan. What had begun as a simple parking lot rehabilitation project thus became an environmental project involving community mobilization. The project was launched by EQST, which coordinated it, with CHJM as project supervisor. The work was divided into four components: (1) ecological rehabilitation of a parking lot, (2) redesign of housing frontages around the lot, (3) development of the area surrounding four other HJM parking lots and (4) community support for the project accompanied by environmental education for the community. **Exp** designed the rehabilitation plans, EQSJ led the landscaping and community outreach efforts and CTI Construction Inc. performed the implementation. The *Effet de terre* project was thus created.

When the grant was awarded, **exp's** role changed from site supervisor to technical director of project feasibility and of coordination with EQSJ, in accordance with client requirements. This gave **exp** an excellent opportunity to demonstrate that it could manage and complete a project by fostering real teamwork among all stakeholders. Such teamwork proved critical to the project's success.



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The grant awarded in early 2010 arrived at an excellent time for the client, since the rehabilitation project was then nearing the end of its initial phase. To prevent any delays in the second stage and to comply with the grant's spirit, however, the team had to reconsider the total parking area, reduce its paved surface, introduce a central island including trees and a new method for managing runoff—and do so in just two weeks.

To comply with the new considerations imposed by incorporating green spaces and technologies, the final design reduced the number of individual parking spaces from 81 to 62. This change presented an opportunity for **exp** and EQSJ to break new ground by transforming ordinary parking spaces into one of Montreal's first green parking lots.

### The partners

**Exp** was originally selected through a public tender process to rehabilitate four parking lots at Habitations Jeanne-Mance. The initial idea was to rebuild the lots as they were originally. To maintain a minimum number of spaces for tenants, work on the four lots was to proceed in two phases. When the grant was awarded by the *Institut national de santé publique du Québec*, the firm proposed changes to meet new project requirements. It did so by revising its preliminary concept and treating the challenge as a different project. It recommended installing a bioretention basin in the largest lot to collect runoff and to reduce the paved area. **Exp** was also responsible for partial construction monitoring to ensure the quality of the work.

Éco-quartier Saint-Jacques, founded in 1995, is an environmental program funded by the Ville-Marie borough. Based in the very heart of downtown Montreal, EQSJ's territory runs from Sherbrooke Street to the river and from Champlain Street to University Street. It includes a portion of Centre-Sud, the downtown area, Old Montreal, Faubourg Saint-Laurent and Chinatown. EQSJ's mission is to enhance the quality of urban life and to build a greener society by promoting integrated waste management and urban renaturalization.

EQSJ's strategy for applying integrated and sustainable solutions to environmental issues relies on educational awareness efforts, training and the organization of partnership projects and activities.

EQSJ was the partner that applied for the project's grant and developed its broader goals. EQSJ staff focused on the creation of green areas and planting trees in the parking lots. To maximize the impact of this approach, EQSJ also held meetings with residents to assess their needs and refine its own objectives. The organization explained the environmental and social benefits of its green strategy and allowed residents to participate in the landscaping's design.

### Benefits to the community

Surrounded by an environment in which skyscrapers and office buildings reign, the CHJM is well acquainted with the presence of summer heat islands generated by large paved surfaces. During hot weather, the poor air quality around these islands can trigger complications for individuals with respiratory problems. It is difficult for inhabitants to cool down and high centre city temperatures represent a hardship for tenants. The CHJM's desire was to afford tenants a better life quality.

This project transformed the immediate environment of HJM families. Building frontages on one parking lot constituted 2,805 m<sup>2</sup> of pavement before the work.



1,093 plants were installed around the lot and at its centre

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Following ecological redesign of the lots, 785 m<sup>2</sup> of asphalt had been removed and replaced with greenery. A total of 1,093 plants (1,083 indigenous and 10 naturalized, including 53 large trees, 314 bushes, 409 types of grasses and 317 perennials) were installed around the lot and at its centre.

The project's management model focused on the transformation of space to create an environment meeting resident needs. EQSJ launched workshops to make tenants more aware of the importance of good neighborliness and to build on community spirit. In addition to promoting greater fellowship and cooperation, the project provided an excellent means of demonstrating and explaining how humans affect their environment. Several interactive workshops were developed to make residents more aware of ways they could reduce their environmental footprints and become meaningful leaders of change. In their work, the designers successfully applied the concept of planning for sustainable development to ensure long-term life quality benefits within the downtown core.

### Active participation

Citizen support for the project and broad-based environmental education were key factors in this project. EQSJ conducted several public hearings to solicit resident opinions on various possible improvements to their frontages. The organization also went door-to-door, collecting feedback from the large majority of residents. Tenants were ultimately asked to participate in the landscaping by contributing to community planting projects in front of their homes.

Consultation workshops were developed during meetings to gauge popular interest in the project. Discussion sessions served to define implementation goals and get people to think more about the environment and community support for the undertaking. Residents were very much in favor of planting fruit trees and bushes, including apple, cherry and pear trees, for their beauty in bloom and for the fruit they yield. Residents contributed to many aspects of the parking lot rehabilitation effort. This process made them more aware of the positive impact of green parking and they helped landscape home frontages around the lots.

### Maximizing space

In accordance with sustainable development principles, a designer must see things from the residents' perspective and understand how they perceive their living environment, in terms of how they move around within, settle into and define such space. Throughout the project's study and analysis phase, the design team did its homework well by placing special emphasis on social issues. Based on this perspective and other factors, they repositioned the sidewalks and parking spaces.

### Job creation and the development of new knowledge

The project gave residents a chance to take charge of a volunteer effort and through it, reconfigure neighborhood life. As members forged bonds, a positive sense of good neighborliness grew. A dozen HJM residents were trained and hired to perform the landscaping and to monitor the bioretention basin's hydrology.

This project also enabled EQSJ to acquire fresh expertise and hire five new employees to build its knowledge base, set the project in motion and then closely observe it. These new employees include the *Effet de terre* project manager, a greening official and three horticulturalists responsible



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for implementing and maintaining the landscaping. A second greening official helped formulate landscaping plans and conduct certain activities. The expertise gained through these efforts can now be reproduced in other educational awareness and greening projects.

This project also built awareness of the greening approach and of social inclusion among **exp's** employees. It helped them hone new knowledge in technical areas still underdeveloped in Quebec, such as optimal runoff management using a bioretention basin. This experience allowed the firm to subsequently complete two additional projects of the same kind, generated a new expertise in Quebec and introduced an R&D effort that pushed the knowledge envelope.

### Solution optimization

Throughout the design process, decisions were made to optimize the client's desired results of maximum benefits for lowest cost, long-term reduction in facility maintenance costs, improved resident life quality and compliance with schedules and site constraints. By fulfilling these requirements, the partners enabled the HJM to provide continued use of its parking lots and to offer solutions at reasonable cost. The additional funding earmarked for the project was then reinvested in upgrading other aspects of the site and in providing better service to tenants.

### Degree of effort

Candidates often have a short window for filing government grant applications and the partners had to put their ideas on paper quickly. Project initiator EQSJ first had to convince the client of the heat-island reduction project's benefits. EQSJ subsequently held design meetings with **exp's** experts to assess the concept's feasibility.

### Collecting information

Design Engineer David Courchesne began researching best runoff management practices with great determination. As we know, limited studies from Quebec or the rest of Canada were available on this topic in 2009, since few projects had employed such new technologies. David accordingly focused his efforts on the American, Canadian and European literature. Based on his studies and exchanges with colleagues and other experts in the field, he concluded that a bioretention basin would be the most appropriate project technology. Complying with sustainable development principles, this technique is particularly well suited to urban regions, including parking lots.

A bioretention basin collects runoff from a permeable area, delays discharge of water into the underground storm sewer system, locally replenishes the water table and employs plants and soil possessing specific features to treat the water.

**Exp's** engineer designed the bioretention unit while preparing a detailed cost estimate to demonstrate clearly to the client the difference between initial project costs and those of the new concept. Fortunately, the grant covered the additional costs resulting from the new design and the client did not have to make any additional outlays, as this was one of David's concerns.

Bioretention basin



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Although the project had already been completed by the time the *Ministère du Développement durable, de l'environnement et des Parcs' Guide de gestion des eaux pluviales* (Guide to rain runoff management) was published in January 2011, David rechecked his calculations and their underlying assumptions to determine if he had made the right decisions and if they complied with best practices. This validation confirmed that his various design criteria corresponded with the guide's principles. All of David's pre-design research used to select the bioretention technology had paid off by enabling him to propose an innovative and ground-breaking concept in line with government requirements that now appear in the *Guide de gestion des eaux pluviales*. He factored many social criteria into the overall design and the partners had to ensure that each proposal was effective and viable. Their commitment and interest resulted in a design backed by scientific knowledge that would ensure the bioretention basin's durability and proper functioning.

### Crew mobilization

**Exp** had less than two weeks to rethink the parking lot's physical space, reduce its paved area, install a central island of trees and incorporate a new runoff management system. **Exp's** project manager at the time put engineer David Courchesne in full charge of exploring options, defining appropriate technologies, conducting a feasibility study and proposing a solution to the client. David was already well acquainted with the stakeholders and had long been interested in working on a project incorporating sustainable development principles.

Tenant movements had to be taken into account, since the parking lot was surrounded by building entrances. The engineer consequently divided the bioretention basin into three sections and placed pathways between each. This solution prompted tenants to follow these obstacle-free routes. This work was accomplished in a very tight time frame, but everyone's energy and dedication made it possible to deliver the project on time.

### Time investment

Since the client requested partial construction monitoring to save on costs, the engineer decided to visit the site at key construction intervals to optimize such efforts. However, he decided that constant supervision was necessary during basin construction and the client agreed.

At the work's conclusion, **exp** and EQSJ returned to the site to see how the facilities were working. They also made recommendations on maintaining the basin and the planted areas. Upon final acceptance of the work, one year later, the crew convinced the contractor to improve certain technical points that had not been covered in the plans and specifications, as they had been introduced during construction. Our client accordingly received a fully functional project, without excessive restrictions on site use during construction.

Based on the knowledge acquired through his research and acting in full transparency, David presented his design to various officials of Montreal's Water Department (*Service de l'eau*). Although he was not paid by the client for this task, he was pleased to prepare this session, because he felt it was important to make officials aware of how this new technology can benefit Quebec.

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## New coordination process among the crews

Because a new design was introduced in the course of the project, an altered construction schedule was required to ensure coordination of the contractor's activities with those of EQSJ. Engineering, technical and scientific services had to be bundled with the landscaping planned and proposed by EQSJ.

Ensuring that the contractor properly implemented this new and as-yet unknown technology was a challenge. Several additional information meetings were conducted to guarantee the best possible knowledge-sharing process to diminish eventual problems. Documents based on research in the literature were prepared and distributed to help the various construction site parties better understand these new technologies.

At the work's conclusion, the project manager was aware that the firm had incurred overruns on project fees. These overruns were about twice the fees it had been paid. Because its priority was to provide good service to the client, the project manager decided not to request these additional fees but to write off the lost revenue. He also knew that the **exp** engineer had been exceptionally dedicated to the project and did not charge all his time, because he felt that some of his initiatives contributed to his personal growth and achievement.

The excellent cooperation and dedication of all parties served to expand the design limits toward the attainment of optimal results. EQSJ and **exp** were in fact invited to the October 2011 *Rendez-vous international sur la gestion intégrée de l'eau* in Sherbrooke to share this experience with fellow experts. Both organizations were delighted to continue their partnership through this joint presentation.

## Environmental impact

The project benefitted the environment by lowering indoor HJM temperatures during the summer, increasing air quality in downtown Montreal, fighting climate change, improving ground and river water quality, creating a green space and generating greater biodiversity in the central city. At the outset, it was essential to define what is a green parking lot.

A green parking lot enhances the space it occupies by reducing its environmental impact, extending its service life and maximizing its use by the community. The site is redesigned to diminish urban heat islands by minimizing paved areas, maximizing the number of parking spaces and planting trees that offer shade during hot spells. The surfaces are covered with indigenous plants to promote biodiversity, reintroduce animal and insect species that had long been absent from this zone and produce an aesthetic that enhances the site's visual beauty. A complete project must include optimal runoff management by allowing water to seep into the ground or devices that will treat and discharge water over a certain period. Infrastructures need to be planned to facilitate pedestrian and cyclist movements while also optimizing vehicular traffic and utility placement. All technologies employed must reduce the environmental footprint during construction and use.

To ensure this project would be complete, effective and functional, the engineer also included an optimal runoff management system. The infrastructures were redesigned to improve pedestrian and cyclist movements and also optimize vehicular traffic and utility placement. Finally, all of the proposed technologies successfully reduced the environmental footprint during construction and use.

Green parking



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## Improved water quality

All runoff, prior to the project, was collected and discharged as quickly as possible into the sewer system. This practice is obsolete, because we now understand its adverse impact on drainage channels: discharge of water contaminated by overflow structures at the treatment plant, discharges containing high concentrations of phosphorous and groundwater depletion.

A bioretention basin is considered one of the best means of managing runoff in a dense urban environment. The basin collects runoff from a permeable space, delays discharge of the water into the storm sewer system, locally replenishes the groundwater and employs plants and soils with specific characteristics to treat the water. Retention refers to a structure's ability to hold water on a site, as has been traditionally found in cities with runoff flow restrictions.

Bio means creating a habitat that will encourage the proliferation of environmentally beneficial microorganisms. In a parking lot, such a basin retains various contaminants (such as hydrocarbons, suspended matter, phosphorous, nitrates, nitrogen, etc.) conducive to the spread of blue-green algae in Quebec. Microorganisms and plants consume the various nutrients contained in runoff. Plants also create a more attractive site. Water is channeled to the basin, where it is treated vertically by seepage through a filter medium. The selected medium must be adequately permeable for the water to pass through in less than 48 hours to avoid a concentrated proliferation of mosquitoes. This solution proved advantageous to the CHJM and the public storm sewer system.

The designer also took the groundwater, the existing soil and required clearance needed from existing buildings into account. He proposed placing a perforated drain at the bottom of the trench to ensure circulation of the water if the soil became saturated. This solution returns water to the water table and ensures proper functioning during heavy rains, while preventing excessive and unnecessary discharge of runoff to wastewater treatment plants. It presents numerous environmental advantages and boosts water quality.

## Air quality

Trees enhance air quality in several ways. Primary plant production captures carbon, absorbs a certain portion and reduces global warming. Trees provide shade for asphalt surfaces, reducing the heat they generate. Leaves protect the public by absorbing a portion of air pollution. Trees also absorb rainwater and help it seep into the soil rather than letting it be discharged into the sewage system.

## Climate change

Primary production of plants captures some carbon, as noted above, which they then absorb. This helps reduce global warming caused by carbon emissions. The amount of carbon captured at the site remains relatively low because its plant life is still immature. EQSJ will try to forecast the amount captured in coming years once this greenery matures.



Sélection of plants

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### Biodiversity

The partners placed special emphasis during site design on the selection of plant life. They sought to choose plant species that would grow in the HJM's parking lots. Over 100 species were planted, the vast majority of which were indigenous. By adopting an ecosystemic service approach, focusing on how the environment serves society, EQSJ and its partners made significant contributions to preserving the biodiversity of the HJMs and the downtown area.



### Complexity

The engineer delivered his research results as images to make them easy to understand and to win acceptance for bioretention technology, which was then virtually nonexistent in Quebec. This effort constituted a major hurdle, since none of the parties concerned had any experience in urban drainage and in particular, with green technologies. The engineer simplified the idea by comparing it with a mini-treatment centre for contaminated soil. This analogy demonstrated how oxygenation and soil humidification stimulated the proliferation of microorganisms and accelerated treatment at the source. His winning argument was that the technology cuts soil treatment time from 60 years (in a natural environment) to just a few months!

### Winter constraints

Two years ago, it was more difficult to obtain information on the functioning of bioretention basins in winter and Quebec broke new ground in installing such structures. The client was quite concerned about being sued if someone slipped on an ice patch. Because of climate change, winter rainstorms have become much more common over the past few years, magnifying this concern. These issues did not deter the designer who opted for a secure approach by installing two safety sumps outside the basin, should sidewalk inlets be clogged by snow preventing water from entering the basin. Overflow structures and a sand trench were also added to the basin. These features would prevent the basin from malfunctioning in a critical situation. They also diminished the client's fears and boosted his confidence in the project.

### Ecological redesign

Delivering an environmental redesign of a parking lot is no simple task. Contemporary practices are not yet well suited to the use of a bioretention basin and the work required close supervision. The project supervisor spent much time organizing activities to obtain resident opinions on project plans. Public hearings, door-to-door surveys, training sessions and educational awareness workshops required some hard thinking and considerable logistics.

The partners had to bypass certain problems creatively in formulating plans for the bioretention basin. Ideally, the basin would consist of a single unit at the lot's centre. Differences in site elevation, unfortunately, made it necessary to install the basin at the western end of the site and channel as much water as possible to it. Since the lot was located in a high-traffic residential area, it was also necessary to permit residents to move freely throughout the space. The basin was accordingly divided into three sections separated by sidewalks.

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### Meeting client needs

The engineers and EQSJ were very professional throughout the design stage by remaining cautious about the use of new technologies in conditions specific to this site (harsh climate, limited space, legal requirements, nearby residences). The senior designer conducted a comprehensive feasibility study covering all project issues and requirements, as well as the client's needs. The designer accordingly developed a viable and versatile concept that could, if necessary, be fine-tuned.

The client's confidence during design clearly highlighted the designer's support, excellent communication and good judgment. Green parking gave the CHJM an opportunity to revive this space, while enabling its residents to make better use of it. The team's dedication and constant efforts in defining the project resulted in an optimal plan that precisely met client needs.

The project's success extends well beyond its fulfillment of client expectations. The CHJM is very proud of its new lots and extremely pleased with the project's partners. The contributions of all concerned made it possible to exceed initial goals, while enhancing the sustainability of the HJM site.

### New technology and development of original expertise

As Montreal's first green parking lot and one of the earliest projects involving such extraordinary cooperation among its stakeholders, *Effet de terre* was very broad based. This factor enabled the partners to develop unique expertise. The engineering team proposed a pioneering technological solution that met government requirements even before their issuance. EQSJ launched a social and environmental project to bring the community into the decision-making and implementation processes. These considerations were all new challenges for the stakeholders. The project was also unique because it involved an unusual partnership with an engineering consulting firm, an eco-neighborhood organization and a paramunicipal organization, managing social housing.

Other partners in sustainable development, such as NGOs, institutions, businesses and boroughs expressed interest in monitoring the project's results. The partners' initiative and dedication, the bioretention basin's technologies, the selection of plant life and community participation will therefore be transferable to other projects. EQSJ asked Université de Montréal to monitor the bioretention basin's hydrology. A university research group affiliated with the Société québécoise de phytotechnologie expressed interest in the idea and is seeking funding to design and conduct a study project that will include the HJM parking lots.



Aerial photo - During and after rehabilitation

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### Conclusion

Our client's satisfaction, the fact that we were on time and within budget, the solutions we provided for problems, cooperation between the various stakeholders and the value added by the project all attest to its success.

To ensure the project's long-term functionality, the team has returned to the site on several occasions since construction. It observed that residents have taken a vested interest in their new frontages by planting new flower gardens. The team also reconfirmed the appropriateness of its technological decisions after noting that the basin functioned properly under heavy winter rains. The landscaping is filling out and its components are doing excellently. Optimal use of the parking spaces and the addition of green areas will reduce the site's temperature by almost 4° C in hot weather by reducing the heat island effect. Insects, butterflies and various birds that had long been absent from the site have returned. All of the partners have noted that walking through the sector is a pleasant experience of great benefit to all.

This ecological solution is a solid example of cooperation among different stakeholders and a grassroots approach that gets the entire community involved in decision-making. Ultimately, the project served as a model of sustainable and social development.

This project is a gauge of cooperation by numerous partners in change, whose attentive and dedicated work resulted in Montreal's first green parking lot. This partnership pooled their knowledge and renovated existing facilities by supporting and mobilizing the community to get it involved. The team deployed multiple disciplines in developing green technologies that would be reproducible in other social spheres. It overcame major hurdles and won the trust of all partners in demonstrating the benefits of community and ecological contributions to sustainable development.



*Award winner at the Gala de reconnaissance en environnement et développement durable*

*Éco-quartier Saint-Jacques won the 2011 Gala de reconnaissance en environnement et développement durable de Montréal. Because of **exp's** innovative engineering work and other factors, this recognition was extended to the entire project.*