

# Canadian Brownfields Case Study

## Parc D'Entreprises Saint-Charles



Source: <https://ocpm.qc.ca/fr/bridge-bonaventure>

Bonaventure Bridge Sector future vision for the area.

### PROJECT SUMMARY

This project is located on the Eastern waterfront of Montreal along the St. Lawrence River, between the Pont Samuel de Champlain Bridge and the Victoria Bridge. Remediation on the site began when the City aimed to improve resident access to the Saint Lawrence by moving the Bonaventure Expressway, a project undertaken by the Société du Havre<sup>1</sup>. In 1990, hydrocarbons began appearing along the Saint Lawrence River<sup>2</sup>. Various temporary solutions and studies were conducted to capture the hydrocarbons until 2014 when definitive remediation plans for the site began<sup>3</sup>. The site was divided into two sectors with different parties involved in its remediation. The west sector encompasses the land facing the Île des Sœurs at the approach of the Champlain Bridge<sup>4</sup>. This portion of the site is owned by the Department of Environment of Quebec and the Jacques Cartier Bridge<sup>5</sup>. The east sector features the Bonaventure Expressway between the Clément Bridge and Victoria Bridge<sup>6</sup>. This portion of the site is owned by the City of Montreal and the Jacques Cartier and Champlain Bridges<sup>7</sup>. Overall, this project won the 2020 Brownie Award under the Sustainable Remediation and Technological Innovation Category as well as the Federation of Canadian Municipalities 2020 Sustainable Communities Award under the Contaminated Soil category<sup>8</sup>.

### Site Characteristics

Over the course of history, the site has been host to a variety of industries. In the 1660s, the area was an agricultural estate, and in the mid 1850s, the Canadian railway industry was established on the site<sup>9</sup>. In 1866 the site became a landfill for industrial and household waste and remained active until 1966<sup>10</sup>. In 1990, contaminants were observed in the St. Lawrence River upstream of the Victoria Bridge<sup>11</sup>. Its toxicity was confirmed in 2007<sup>12</sup>. Until 2007, only 50% of the site was

occupied<sup>13</sup>. The City began selling these spaces under the condition that specific conditions and development obligations would be met. Currently, the site hosts a variety of high technology, re-research, media, and telecommunication companies<sup>14</sup>. Companies such as Tata Communications, Bell Mobilité, and Mel's Cité du Cinéma have established themselves here<sup>15</sup>.

### QUICK FACTS

#### Location

Montreal, Quebec

#### Project type

Phytoremediation, Groundwater Treatment

#### Site size

123 hectares

#### Land uses

Industrial Technology / Business Park

#### Keywords/special features

Remediation Technology, Waterfront, Technoparc


#### Brownfield Awards

2020 Remediate: Sustainable Remediation and Technological Innovation

#### Project address

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Case studies were prepared as a course assignment by students enrolled in PL8312/PLE845: Brownfields & Sustainable Development, School of Urban and Regional Planning, Ryerson University (Winter 2021). Information for the case studies was obtained from online sources, available reports, and, in some cases, site visits and direct communication with stakeholders.

If you are aware of any errors or updates to the case studies, please contact [chris.desousa@ryerson.ca](mailto:chris.desousa@ryerson.ca)

The opinions expressed in this case study are those of the authors only and do not represent the opinions and views of either Ryerson University, the School of Urban and Regional Planning, or the Canadian Brownfields Network.



## Cleanup

Under the Brownfield Roadmap for the Province of Quebec, the brownfield redevelopment process must include the following steps: plan development, site-specific study completion, remediation, and redevelopment<sup>16</sup>. Within these generic steps are requirements specific to the province such as the registration of contamination when contaminants exceed provincial standards, comparison of site contaminants to provincial standards, attaining Ministry approval for the rehabilitation plan, obtaining expert certification of rehabilitation and submitting a notice of decontamination to the Quebec Land Register<sup>17</sup>. Within this site, two different methodologies were tested for the remediation process.

In the spring of 2009, a team of researchers led a project examining the effectiveness of phytoremediation techniques on a portion of the site<sup>18</sup>. The solution proposed was the utilization of a transpiration cap, implementing trees and shrubs that have high transpiration rates to bring and limit the water going towards the Saint Lawrence River<sup>19</sup>. The experiment area totaled approximately 1600m<sup>2</sup> and featured cuttings of woody willow that were spaced at 1.7 x 0.3m intervals, producing a density of 19,600 plants / hectare<sup>20</sup>. This plantation was split into five randomized blocks with varying parameters and treatments<sup>21</sup>. In 2010, a drip irrigation system was installed utilizing water from the groundwater table 9m beneath the plantation site<sup>22</sup>. Researchers evaluated how much water could be treated, how much was taken, what control parameters could be organized, and how much water could actually go back into the soil<sup>23</sup>. This process was conducted for two and a half years<sup>24</sup>. The research demonstrated positive results regarding the efficiency of phytoremediation on the site. It was estimated that the willow beds demonstrated



Phytoremediation studies conducted by Werther Guidi Nissim, Adela Voicu, Michel Labrecque.



Site preparation for slurry wall and collector installation.

an overall efficiency level of 95% in reducing ammonium nitrogen<sup>25</sup>. No symptoms of toxicity were observed on the plants during the experiment, nor were there any effects on plant survival rate<sup>26</sup>. Despite this, administrative plans for the site regarding its land use shifted, and the project was ultimately abandoned to accommodate for the shifting of the Bonaventure Expressway<sup>27</sup>.

The solution the City of Montreal chose was the construction of a 1.9km long cement-bentonite slurry wall as well as a groundwater collector system with an accompanying treatment facility to end the migration of contaminants through the water<sup>28</sup>. When contaminated water meets the screen installed within the slurry wall, the screen prevents the water from entering the river, allowing it to be redirected into the treatment plant<sup>29</sup>. This treatment plant is still under construction and will be fully operational by the end of 2021<sup>30</sup>. In total, there are 23 wells that are redirected to the treatment plant via 18 collectors<sup>31</sup>. This division is deliberate and provides an advantage since the water contamination varied by area<sup>32</sup>. Having 18 collectors allows water to be redirected to three different treatment centers and treated for different parameters<sup>33</sup>. With the injection of products (such as phosphorus and magnesium), the recycled ammonium nitrogen is transformed into a sludge that can be used for fertilizer<sup>34</sup>. This process was designed to limit the use of raw materials and generate less waste<sup>35</sup>.

Overall, many partners were involved in the remediation of the site. Some of the actors involved are as follows: City of Montreal Environment Service Department, City Specialists, Water Treatment Specialists from the City of Montreal, City of Montreal Planning Services, Legal Services,

Construction Services, Surveillance Consultants, Environment Canada, Ministry of Environment of Quebec, Champlain Bridge Societies, and nearby property owners<sup>36</sup>.

## Planning and Regulatory Issues / Framework

Led by the City of Montreal, this project was predominantly collaborative and featured the involvement of a variety of actors. Beyond its multidisciplinary nature, the project featured agreements between the municipal, provincial, and federal governments<sup>37</sup>. This intergovernmental network provided various challenges throughout the project. Both the provincial and municipal governments had to reach agreements regarding the environmental studies completed for the site<sup>38</sup>. This process was often time consuming and delayed the construction process<sup>39</sup>. Although the remediation of the overarching site was a collaborative project, its division into different sections allowed these different bodies to work independently from each other<sup>40</sup>.

The site's proximity to the Saint Lawrence River made it subject to the Canada Fisheries Act (1985). Contaminants on the site would impact the fishery goals within Canada Fisheries Act<sup>41</sup>. Environment Canada became involved and asked the City of Montreal to remove the contaminants from the water, however, an agreement was reached that contaminants would be reduced instead<sup>42</sup>.

There was minimal community involvement during this project. Prior to construction, the site was constantly under criticism in the news for the negative environmental impacts it was producing<sup>43</sup>. These concerns were predominantly raised

by environmental activists who aimed to raise awareness<sup>44</sup>. Once plans for remediation began, there was minimal citizen response<sup>45</sup>. One information session was scheduled during the remediation process, however nobody attended<sup>46</sup>. Information was also released through signage within the area, new articles within papers, and publications on local internet sites<sup>47</sup>.

### Financing

This project was predominantly funded by the City of Montreal<sup>48</sup>. As of 2018, approximately \$53 million dollars were utilized for contracts pertaining to the execution of the rehabilitation plan<sup>49</sup>. Ten million dollars were also provided by the Province of Quebec under the ClimatSol-Plus provincial program for rehabilitation<sup>50</sup>. This program provides support for the achievement of action measures outlined in the Soil Protection and Rehabilitation of Contaminated Sites Policy and aims to support municipalities in revitalizing existing urban environments<sup>51</sup>. Funding under this program is awarded to projects located within an RCM urbanization perimeter and whose level of contamination exceeds usage criteria or the maximum regulatory values outlined in the Land Protection and Rehabilitation Regulation.

### Buildings

No new buildings were developed following the remediation process. According to Benoit Dorais, mayor of the Sud-Ouest Borough, the site is particularly attractive for industrial activities and the city hopes to see business migrate to the sector in the following years<sup>53</sup>. Plans for the future

involve the utilization of the sludge acquired for the fertilization of trees in hopes that the site can revitalize this industrial waterfront<sup>54</sup>, transforming it into a vibrant public space for surrounding businesses in accordance with redevelopment plans for the Bonaventure Bridge Sector<sup>55</sup>.

### Key Benefits, Challenges, and Lessons Learned

A variety of challenges arose during the development of this project. The biggest challenge faced on the site was the remediation of ammoniacal nitrogen that was found within the site<sup>56</sup>. Few treatments exist for this chemical and the common approach is sensitive to changes in temperature, pH, and effluent<sup>57</sup>. The approach of restraining contaminated water using the slurry wall proved to be a big success in capturing contaminants and treating them<sup>58</sup>.

A large constraint during the construction process was the lack of space due to unanticipated obstructions. During the development of the Réseau Express Métropolitain (REM), the province had gained rights to expropriate lands<sup>59</sup>. A part of the remediation construction site was expropriated, effectively reducing the space available to work in<sup>60</sup>. This challenge was unexpected and a reorganization of the construction site was managed.

In a similar vein, the involvement of a wide variety of actors provided management and coordination challenges. Because the project length

spanned multiple years, the remediation process has seen multiple professionals come and go<sup>61</sup>. This constant handoff process often resulted in communication issues and delays during the project<sup>62</sup>. The remediation process also had to be mindful of surrounding occupants and the local infrastructure supporting them<sup>63</sup>.

A significant takeaway noted by key actors involved in the project was the importance of planning with all possible situations in mind<sup>64</sup>. The plan and specifications should anticipate any situation that the project may encounter<sup>65</sup>. Although there were still external unforeseen circumstances that occurred during the project, extensive planning and clear role delineation helped in adjusting to these constraints<sup>66</sup>. The technological and engineering successes demonstrated by the project have provided valuable lessons that may be applied to future projects of a similar nature.



Sludge



Phytoremediation studies conducted by Werther Guidi Nissim, Adela Voicu, Michel Labrecque.

<https://journalmetro.com/actualites/montreal/1790358/mettayer-le-site-probablement-le-plus-contamine-de-montreal/>

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## Endnotes

1. City of Montreal. (n.d.). The Pointe-Saint-Charles Business Park (former Technoparc). Retrieved from Montreal: [https://ville.montreal.qc.ca/portal/page?\\_pageid=7757,98631646&\\_dad=portal&\\_schema=PORTAL](https://ville.montreal.qc.ca/portal/page?_pageid=7757,98631646&_dad=portal&_schema=PORTAL)
2. FCM Channel English. (2020, December 10). SCA Talks – Claire Merckaert, Ville de Montréal, Sites contaminés. 2020 Sustainable Communities Awards Talks. Federation of Canadian Municipalities. Consulté le February 10, 2021, sur [https://www.youtube.com/watch?v=5-pSOC-frL5g&list=PLQR3mseG4jCf\\_e6Vpy1mF6BiC-GV4c5vf9&index=2](https://www.youtube.com/watch?v=5-pSOC-frL5g&list=PLQR3mseG4jCf_e6Vpy1mF6BiC-GV4c5vf9&index=2)
3. Ibid.
4. Ponts Jacques Cartier Champlain Bridges. (n.d.). Solution Bonaventure. Retrieved from Ponts Jacques Cartier Champlain Bridges: <https://jacquescartierchamplain.ca/community-heritage/structures-and-projects/solution-bonaventure/launch-of-an-innovative-project/?lang=en>
5. FCM Channel English. (2020, December 10). SCA Talks – Claire Merckaert, Ville de Montréal, Sites contaminés. 2020 Sustainable Communities Awards Talks. Federation of Canadian Municipalities. Consulté le February 10, 2021, sur [https://www.youtube.com/watch?v=5-pSOC-frL5g&list=PLQR3mseG4jCf\\_e6Vpy1mF6BiC-GV4c5vf9&index=2](https://www.youtube.com/watch?v=5-pSOC-frL5g&list=PLQR3mseG4jCf_e6Vpy1mF6BiC-GV4c5vf9&index=2)
6. Ponts Jacques Cartier Champlain Bridges. (n.d.). Solution Bonaventure. Retrieved from Ponts Jacques Cartier Champlain Bridges: <https://jacquescartierchamplain.ca/community-heritage/structures-and-projects/solution-bonaventure/launch-of-an-innovative-project/?lang=en>
7. FCM Channel English. (2020, December 10). SCA Talks – Claire Merckaert, Ville de Montréal, Sites contaminés. 2020 Sustainable Communities Awards Talks. Federation of Canadian Municipalities. Consulté le February 10, 2021, sur [https://www.youtube.com/watch?v=5-pSOC-frL5g&list=PLQR3mseG4jCf\\_e6Vpy1mF6BiC-GV4c5vf9&index=2](https://www.youtube.com/watch?v=5-pSOC-frL5g&list=PLQR3mseG4jCf_e6Vpy1mF6BiC-GV4c5vf9&index=2)
8. City of Montreal. (2020, September 14). Rehabilitation of the Pointe-Saint-Charles business park | Montreal wins the Sustainable Communities Award in the “contaminated soils” category. Retrieved from Montreal: [http://ville.montreal.qc.ca/portal/page?\\_pageid=5798,42657625&\\_dad=portal&\\_schema=PORTAL&id=32998](http://ville.montreal.qc.ca/portal/page?_pageid=5798,42657625&_dad=portal&_schema=PORTAL&id=32998)
9. GrandQuebec. (n.d.). Pointe-Saint-Charles Business Park. Retrieved from GrandQuebec: [https://grandquebec.com/trouver\\_emploi\\_quebec/parc-entreprise-st-charles/](https://grandquebec.com/trouver_emploi_quebec/parc-entreprise-st-charles/)
10. Ponts Jacques Cartier Champlain Bridges. (n.d.). Solution Bonaventure. Retrieved from Ponts from Ponts Jacques Cartier Champlain Bridges: <https://jacquescartierchamplain.ca/community-heritage/structures-and-projects/solution-bonaventure/launch-of-an-innovative-project/?lang=en>
11. Canadian Brownfields Network. (2020). Parc D'Enterprises de la Pointe Saint. Retrieved from Brownie Awards 2020: <https://brownieawards.ca/parc-denterprises-de-la-pointe-saint/>
12. Ibid.
13. City of Montreal. (n.d.). The Pointe-Saint-Charles Business Park (former Technoparc). Retrieved from Montreal: [https://ville.montreal.qc.ca/portal/page?\\_pageid=7757,98631646&\\_dad=portal&\\_schema=PORTAL](https://ville.montreal.qc.ca/portal/page?_pageid=7757,98631646&_dad=portal&_schema=PORTAL)
14. Ponts Jacques Cartier Champlain Bridges. (n.d.). Solution Bonaventure. Retrieved from Ponts Jacques Cartier Champlain Bridges: <https://jacquescartierchamplain.ca/community-heritage/structures-and-projects/solution-bonaventure/launch-of-an-innovative-project/?lang=en>
15. City of Montreal. (n.d.). The Pointe-Saint-Charles Business Park (former Technoparc). Retrieved from Montreal: [https://ville.montreal.qc.ca/portal/page?\\_pageid=7757,98631646&\\_dad=portal&\\_schema=PORTAL](https://ville.montreal.qc.ca/portal/page?_pageid=7757,98631646&_dad=portal&_schema=PORTAL)
16. Green Municipal Fund. (2021). Brownfield Roadmap: Quebec. Retrieved from Federation of Canadian Municipalities: <https://fcm.ca/en/resources/gmf/tool-roadmap-redeveloping-brownfields-in-quebec>
17. Ibid.
18. Labrecque, M., Nissim, W. G., & Voicu, A. (2013). Willow short-rotation coppice for treatment of polluted groundwater. *Ecological Engineering*, 62, 102-114. doi:<https://doi.org/10.1016/j.ecoleng.2013.10.005>
19. Labrecque, M. (2021, February 16). Parc d'Entreprises Saint-Charles Case Study Inquiry. (K. Rodrigo, Interviewer)
20. Labrecque, M., Nissim, W. G., & Voicu, A. (2013). Willow short-rotation coppice for treatment of polluted groundwater. *Ecological Engineering*, 62, 102-114. doi:<https://doi.org/10.1016/j.ecoleng.2013.10.005>
21. Ibid.
22. Ibid.
23. Labrecque, M. (2021, February 16). Parc d'Entreprises Saint-Charles Case Study Inquiry. (K. Rodrigo, Interviewer)
24. Ibid.
25. Labrecque, M., Nissim, W. G., & Voicu, A. (2013). Willow short-rotation coppice for treatment of polluted groundwater. *Ecological Engineering*, 62, 102-114. doi:<https://doi.org/10.1016/j.ecoleng.2013.10.005>
26. Ibid.
27. Labrecque, M. (2021, February 16). Parc d'Entreprises Saint-Charles Case Study Inquiry. (K. Rodrigo, Interviewer)
28. Canadian Brownfields Network. (2020). Parc D'Enterprises de la Pointe Saint. Retrieved from Brownie Awards 2020: <https://brownieawards.ca/parc-denterprises-de-la-pointe-saint/>
29. FCM Channel English. (2020, December 10). SCA Talks – Claire Merckaert, Ville de Montréal, Sites contaminés. 2020 Sustainable Communities Awards Talks. Federation of Canadian Municipalities. Consulté le February 10, 2021, sur [https://www.youtube.com/watch?v=5-pSOC-frL5g&list=PLQR3mseG4jCf\\_e6Vpy1mF6BiC-GV4c5vf9&index=2](https://www.youtube.com/watch?v=5-pSOC-frL5g&list=PLQR3mseG4jCf_e6Vpy1mF6BiC-GV4c5vf9&index=2)
30. Ibid.
31. Ibid.
32. Ibid.
33. Ibid.
34. Ibid.
35. Federation of Canadian Municipalities. (s.d.). Case study: Remediation of a former landfill protects the Saint Lawrence and improves an urban area in Montreal. Récupéré sur Federation of Canadian Municipalities: <https://fcm.ca/en/resources/gmf/case-study-remediation-former-landfill-protects-the-saint-lawrence-and-improves-urban>
36. Merckaert, C., & Samson, J. (2021, February 17). PEPSC Case Study Inquiry. (K. Rodrigo, Interviewer)
37. Ibid.
38. Ibid.
39. Ibid.
40. Ibid.
41. Ibid.
42. Ibid.

43. Ibid.
44. Ibid.
45. Ibid.
46. Ibid.
47. Ibid.
48. Ibid.
49. Cision. (2018, November 14). Environmental rehabilitation plan for the Pointe-Saint-Charles Business Park - The City of Montreal invests to protect the St. Lawrence River. Retrieved from Cision: <https://www.newswire.ca/fr/news-releases/plan-de-rehabilitation-environnementale-du-parc-dentreprises-de-la-pointe-saint-charles--la-ville-de-montreal-investit-pour-protoger-le-fleuve-saint-laurent-700502392.html>
50. Merckaert, C., & Samson, J. (2021, February 17). PEPSC Case Study Inquiry. (K. Rodrigo, Interviewer).
51. Province of Quebec. (n.d.). ClimatSol-Plus program. Retrieved from Quebec Ministère de l'Environnement et de la Lutte contre les changements climatiques: <https://www.environnement.gouv.qc.ca/programmes/climatsol-plus/index-en.htm>
52. Merckaert, C., & Samson, J. (2021, February 17). PEPSC Case Study Inquiry. (K. Rodrigo, Interviewer).
53. City of Montreal. (2020, September 14). Rehabilitation of the Pointe-Saint-Charles business park | Montreal wins the Sustainable Communities Award in the "contaminated soils" category. Retrieved from Montreal: [http://ville.montreal.qc.ca/portal/page?\\_pageid=5798,42657625&\\_dad=portal&\\_schema=PORTAL&id=32998](http://ville.montreal.qc.ca/portal/page?_pageid=5798,42657625&_dad=portal&_schema=PORTAL&id=32998)
54. Merckaert, C., & Samson, J. (2021, February 17). PEPSC Case Study Inquiry. (K. Rodrigo, Interviewer).
55. Office de Consultation Publique de Montreal. (n.d.). BRIDGE SECTOR - BONAVENTURE. Retrieved from Office de Consultation Publique de Montreal: <https://ocpm.qc.ca/fr/bridge-bonaventure>
56. FCM Channel English. (2020, December 10). SCA Talks – Claire Merckaert, Ville de Montréal, Sites contaminés. 2020 Sustainable Communities Awards Talks. Federation of Canadian Municipalities. Consulté le February 10, 2021, sur [https://www.youtube.com/watch?v=5-pSOC-frL5g&list=PLQR3mseG4jCf\\_e6Vpy1mF6BiC-GV4c5vf9&index=2](https://www.youtube.com/watch?v=5-pSOC-frL5g&list=PLQR3mseG4jCf_e6Vpy1mF6BiC-GV4c5vf9&index=2)
57. Ibid.
58. Merckaert, C., & Samson, J. (2021, February 17). PEPSC Case Study Inquiry. (K. Rodrigo, Interviewer).
59. FCM Channel English. (2020, December 10). SCA Talks – Claire Merckaert, Ville de Montréal, Sites contaminés. 2020 Sustainable Communities Awards Talks. Federation of Canadian Municipalities. Consulté le February 10, 2021, sur [https://www.youtube.com/watch?v=5-pSOC-frL5g&list=PLQR3mseG4jCf\\_e6Vpy1mF6BiC-GV4c5vf9&index=2](https://www.youtube.com/watch?v=5-pSOC-frL5g&list=PLQR3mseG4jCf_e6Vpy1mF6BiC-GV4c5vf9&index=2)
60. Merckaert, C., & Samson, J. (2021, February 17). PEPSC Case Study Inquiry. (K. Rodrigo, Interviewer).
61. Ibid.
62. Ibid.
63. Ibid.
64. Ibid.
65. Ibid.
66. Ibid.