BONAVENTURE HIGHWAY RECONFIGURATION PROJECT

EXECUTIVE SUMMARY OF THE TECHNICAL PRE-FEASIBILITY STUDY

The mandate awarded by the Société du Havre de Montreal (SHM) to SNC-LAVALIN INC., consists of validating the Bonaventure Highway reconfiguration proposal put forth by *Vision 2025,* to improve it, if required, to identify the benefits and constraints and to evaluate all realization costs.

An improved version of the layout presented in Vision 2025 has been developed in order to minimize the impact on several existing infrastructures. The improved version and a variation of it have been subjected to detailed analyses. These analyses demonstrate that the project is feasible at a reasonable cost either as a global project, or in phases.

The Bonaventure Highway reconfiguration project consists of two major interventions: the relocalisation of the highway in the Technoparc sector and the demolition of the elevated structure and its replacement by a boulevard between the Victoria bridge and Notre-Dame street.

The relocalisation of the highway in the Technoparc sector is essential for the creation of a park along the length of the riverfront. The development of this park aims to link, by a network of bicycle and pedestrian paths, the recreational networks of the Verdun borough, the Jean-Drapeau park, the Lachine canal and the Old-Port. This reconfiguration also allows a better flow of traffic between the Verdun and Pointe-St-Charles boroughs and downtown Montreal. The necessary investment to realize this large project of the reappropriation of the shores of the St.Lawrence river, amounts to approximately 96 M $.

The demolition of the elevated structure of the existing highway from the Victoria Bridge and its replacement by a boulevard with a tunnel under the Lachine canal or a bridge to cross the Peel basin will allow, on their part, the prolongation of downtown all the way until the Peel basin and, in the long term, up to the St-Lawrence river. The economical, urban and environmental fallouts of such a project are considerable. This reappropriation of the urban area will allow the reconnection of the Faubourg des Récollets and Griffintown and will reattach these areas to downtown. The lands thus liberated will be valuable in the same way as the current developments in the faubourg des Récollets and the Multimedia City, thus transforming the main entrance of Montreal into an alive area. The cost of realization of this section is in the order of 672 M $ for the option of a tunnel underneath the Peel Bassin, and of in the order of 437 M $ for the option of a bridge to cross the Lachine canal.

For the present mandate, only the costs resulting from the displacement and the reconfiguration of the Bonaventure highway have been estimated. The increase in public transportation capacities, the optimization of the municipal road network as well as certain related costs, such as the development of the green areas, the archaeological investigations and the mutual agreed upon acquisitions or expropriations will be subjected to estimations in the next steps.

It is important to note that the s*tatus quo* option versus the actual situation — being the absence of the highway reconfiguration project — will require amounts around 120 M $ in order to prolong the necessary life of the infrastructure built for the 1967 universal exposition. Furthermore, the *status quo* will not increase the value of the neighbouring areas which will not benefit from the multiple effects of this urban requalification operation on the property investments.

The biggest challenge of the Bonaventure Highway reconfiguration project is the traffic circulation, not only because the traffic capacity will be reduced by the transformation of part (i.e. north of Pierre-Dupuy Avenue) of the highway into an urban boulevard, but especially due to the significant increase of demand related to the major real estate developments projects anticipated in the sector.

In order to reduce the impact on the traffic circulation, several strategies must be considered. Amongst those, the increase in the public transportation capacity, the optimization of the municipal road network, the establishment of concrete management measures for the demand and reduction of automobile movements during rush hours. These concrete solutions aim to answer the demand which will increase progressively during the planning period, which demand, anyhow, would not be well served by the existing road network and the configuration of the network of local streets.

This project is in line with the strategic objectives of the Montreal transportation plan and with the Kyoto Protocol, by increasing the public transportation capacity, by reducing the road capacity by between 30% and

50% depending on the section, and also by the development of a park of over 235 000 m^2 that will allow the renaturalization of the riverfront.

After the preliminary revision of the environmental figures and the soil condition with respect to the proposed geometry within the framework of the highway reconfiguration, the scenario retained by the SHM will involve only a relatively small volume of soil to be excavated on all the sections. In fact, the reconfiguration of the road axes should only require the dynamic consolidation of the soil in place, rather than their excavation. Only the sectors near the tunnel and the roads built by excavation will require excavation of soil that could potentially be contaminated, at variable depths but not at the surface of the ground.

The project contributes significantly to the enhancement of the territory and to the quality of life of the Montreal people by creating constructible lands near downtown, by liberating the access of the Peel basin, by allowing access to the riverfront and by disenclaving Pointe-St-Charles and Verdun. The archaeological and patrimonial aspects have been integrated during the planning process of this large urban requalification project. As an example, the vestiges of the hydraulic works still present in the Peel basin sector will be valorized by the creation of esplanades and public places. The creation of a boulevard near the Duke and Nazareth streets will allow the rebuilding of islands actually hidden by the presence of the highway.

Overall, the road and structural engineering do not pose particular technical difficulties, with the exception of the tunnel passage underneath the Canadian National railway tracks near the Victoria bridge, since the railway traffic cannot be interrupted. Nevertheless, an execution method already used by the Canadian National during previous projects has been proposed in order to overcome this constraint. However, the presence of certain underground public infrastructures will have an important impact on the rebuilding costs and on the execution delays.

In parallel to this study, the SHM is performing an analysis on the economical fallouts of the highway reconfiguration project which aims to measure the structuring and the multiple effects of the Bonaventure highway reconfiguration.

EXECUTIVE SUMMARY OF THE ECONOMIC BENEFITS STUDY

Mandate
The Société du Havre de Montréal (SHM), in collaboration with the City of Montreal's Service de la mise en valeur du territoire et du patrimoine along with the Société de développement de Montréal has mandated GENIVAR to carry out a study on the economic benefits of a project for the redevelopment of the Bonaventure Expressway between the Champlain Bridge and Notre-Dame Street.

This study was carried out in parallel with the technical pre-feasibility study administered by Jacques Cartier and Champlain Bridge Inc., in the name of SHM. Its goal was to measure the structuring and multiplier effects that would result from redevelopment of the Bonaventure Expressway. Structuring effects are those that can be attributed to all projects that provide the urban fabric with added value through reappropriation in bordering areas and through the addition of tourist and recreational facilities. Multiplier effects are mainly those that translate into real estate investments, attracted by improvements to the sector and by access to new development spaces.

Study Area
The study undertaken covers the Bonaventure Expressway corridor and the zone influenced by it, extending from the Wellington Interchange to Notre-Dame Street. Included in this zone is the Technoparc sector, part of Cité-du-Harvre, and Point-Saint-Charles, plus the Tate, Wellington, Peel,, Windmill and Bickerdike basins, as well as Cité Multimédia and Faubourg des Récollets.

Study's Four Sections
The four sections comprising this study were described in the third part of the Executive Summary:

Real estate market trends in Montreal and impacts of the harbourfront's potential usages.
Case for reappropriation of bordering and urban areas.
Development potential.
Economic analysis and value creation.

1) Real Estate Market Trends in Montreal
Current and future components of market supply and demand were analysed, for each segment of the real estate market: residential, office, retail, industrial and hotel. This exercise was necessary to determine under which conditions potential real estate projects would be included within the study territory.

The development potential announced in Vision 2025 envisaged significant spin-offs at the urban development level. In the residential function for example, SHM estimated that about 12,500 new residential units could potentially be added to the overall harbourfront area. Areas projected for commercial buildings and also for tourist, recreational and cultural facilities would potentially amount to 900,000 m^2 and 1,060,875 m^2 respectively.

<u>Residential Market</u>
Sales of co-tenancy units in Montreal's downtown core vary from 400 to 600 units per year. Thus, over a 20-year period this could represent between 8,000 and 12,000 units. Once the expressway has been transformed into a boulevard, the construction of new residential projects is expected to represent 37% to 43% of new residential units built within the downtown core, or 3,500 to 4,500 units.

Office Space Market
Currently the supply of available office space being added annually is 28,000 m^2, and over a 20-year period figure will be 560,000 m^2. Once the expressway has been revitalised, development projects are expected to represent 30% to 40% of additional spaces to be constructed within Montreal's central core, out of an overall area varying from 168,000 m^2 to 224,000 m^2.

Retail Trade Market
Residential growth envisaged within the Vision 2025 perspective will result in an increase in demand for nearby business services. To meet the demand from these new residents, at least 19,000 m^2 of commercial retail space is being envisaged,

Hotel Market
This sector will depend on specific analyses being made on a site's development. A 300-room hotel is being contemplated for the complex planned for the entertainment centre, yet it will have only a marginal impact on Montreal's vacancy rate, especially given the sectors eventual trade fair centre.

2) Case for Reappropriation of Bordering and Urban Areas
Eleven cases of bordering and urban reappropriation carried out elsewhere were examined, plus an in-depth analysis of three that were better documented than others: the London Docklands, the Melbourne Docklands and Toronto's Harbourfront. In each of these cities there was reappropriation of urban and bordering areas, depending on the particular economic context in each city. Although a common triggering factor could not be easily determined in all cases, some of those reoccurring fairly often are listed below:
international event
historical anniversary
implementation of a concerted requalification project (implementation of urban master or development plan).

Some of the benefits common to this type of project were: improvements to citizens' quality of life, real estate development, business development and jobs, and improvements to socio-economic conditions and tourism.

There were several similarities observed among Vision 2025 and these urban requalification projects, including:
significant public contributions were needed to carried out the projects;
a large portion of the land targeted comprised public property;
private/public investment ratios were generally between 3 and 10;
a long-term development period of 20 to 30 years was involved.

Finally, the projects were all steered by an independent development organisation. This group was responsible for promoting the project, ensuring respect of the initial vision throughout the process and taking care of liaison between the public authorities and private developers involved.

3) Development Potential
Following in the wake of the Bonaventure Expressway's redevelopment and the revitalisation of the adjacent sectors, will be a need to attract both public and private investment, and to demonstrate the interesting opportunities available. The goal of the study was to identify development potential within the context of urban programming, and to pinpoint the nature and extent of real estate projects that could be achieved from now until 2025 within the context of this vast undertaking.

The methodology used in this part of the study employs the best land use principle. Several elements were analysed, among them being current characteristics of the milieu, its property tenure, zoning and orientations for the development, environmental constraints, short-term public and private investment projects envisaged in the sector and its surroundings, the
boulevard design, etc. Also considered were specifics aspects of its insertion within the area, real estate market trends, the sector's market share and its synergy with respect to other development projects in Montreal's downtown core.

Quantification of development potentials was based on the small urban blocks to be developed or revitalised, or new parcels to be freed up following restructuring of the expressway corridor. Each small block was categorised as follows, depending on location:
Corridor: block restructured within the current expressway corridor, as a direct effect of redevelopment.
Peripheral: revitalised block within the corridor's periphery, indirectly affected by redevelopment.

Facilities envisaged: projects being planned, such as the Saputo Stadium, the Entertainment Centre, and the International Trade Fair Centre. Although these projects do not directly stem from the expressway redevelopment project, they are fully integrated into Montreal's overall harbourfront project.

For the Lachine Canal crossing, the pre-feasibility study completed by SNC-Lavalin examined two scenarios: a tunnel and a bridge.

Each option illustrates different development potential within the Peel Basin periphery, resulting from a configuration of the proposed road network, along with considerations regarding the bridge and its noise potential. Within the context of this current study, best uses were identified as a function of these two options.

Development potential was thus determined for each of the two Lachine Canal crossing options, a tunnel or a bridge, and also according to two scenarios, one optimistic and another conservative. This was achieved by accounting for the real estate projects according to their density and quality, as well as market conditions.

Development potentials 2005-2025

m^2 built

Option	Option Tunnel		Option Bridge	
Scénario	Optimistic	Conservative	Optimistic	Conservative
1. Technoparc / Cité-du-Havre	586 693	521 949	586 693	521 949
Business uses	231 816	167 073	231 816	167 073
Facilities planned[1]	152 794	152 794	152 794	152 794
Parks	202 082	202 082	202 082	202 082
2. Basins	493 207	324 601	493 207	324 601
Résidential	34 499	24 642	34 499	24 642
Commercial / retail	87 569	52 680	87 569	52 680
Business use	139 012	45 146	139 012	45 146
Facilities planned[1]	179 389	179 389	179 389	179 389
Parks	52 738	22 745	52 738	22 745
3. Pôle Peel / Faubourg des Récollets	622 581	445 061	597 598	431 717
Résidential	340 865	251 799	315 883	246 859
Commercial / Office	241 396	162 832	241 396	164 046
Commercial / retail	23 803	4 296	23 803	4 296
Parks	16 517	26 134	16 516	16 516
Total	1 702 480	1 291 611	1 677 498	1 278 267
Residential units added	4 542	3 408	4 379	3 388

1.Soccer Stadium, Entertainment Centre

Source: GENIVAR (2005)

Conclusions were drawn based on an analysis of potential for development and assets by sector:

Technoparc/Cité-du-Havre

Although their vocations remain unchanged (business use), redevelopment would allow for the reintegration of isolated blocks located west of the Technoparc. In the eastern part, most available space is earmarked for the soccer stadium.

Basins
In this sector, the expressway's development will have little impact because most sites to be developed are reserved for the Entertainment Centre. The real development potential lies in the port area located east of the expressway corridor, around the basins, and in extending the Cité-du-Havre residential development.

Peel Pole/Faubourg des Récollets
Significant development potential can be achieved by extending the rapid growth currently taking place in Old Montreal, Cité Multimédia, the International District and the downtown core areas. Over recent decades this sector has been among those areas targeted by on-going public intervention in urban revitalisation and requalification. Moreover, expressway redevelopment in this sector will free up large amounts of real estate for both high-rise and high-end residential development. Finally, it is in this sector that the largest level of infrastructure investments (tunnel or bridge) will take place.

Otherwise, regardless of the option retained (tunnel or bridge), both will allow a great deal of real estate development to take place in areas bordering the Peel Basin, whether the optimistic or conservative scenario is chosen. There is however a gap of nearly $1 billion in real estate investments for the Peel Pole and Faubourg des Récollets sectors, between the optimistic scenario with the tunnel option and the conservative scenario with the bridge option. Redevelopment will also open up the small peripheral blocks in the Faubourg des Récollets sector, introducing better development conditions for them.

4) Economic Analysis and Value Creation
Generally, a project for rebuilding an expressway's obsolete transport infrastructure involves few economic repercussions. The Bonaventure Expressway's redevelopment will however lead to a gigantic urban requalification undertaking with magnificent real estate development potential, including major spin-offs. In addition to the number and variety of economic impacts, the social and environmental impacts will also be effective in improving the quality of life.

Major public investments in infrastructures will result in considerable direct and indirect benefits. Indeed over a 20 years period, the blocks affected (in the expressway corridor or its bordering areas) and also the facilities being planned are to benefit from this redevelopment, attracting several billions of dollars. These investments will of course incur additional municipal expenditures, but they will also bring in recurring property taxes.

Within the context of this mandate, only the costs of relocating and redeveloping the Bonaventure Expressway were considered. Increases in public transport capacity, the optimisation of municipal road networks, plus certain related including green space development, archaeological excavations, private acquisitions or expropriations, will all subjected to estimates during the study's next stages.

The tables below contain the following:
calculation of investments necessary for each block to be redeveloped;
calculation of revenues as well as recurring and nonrecurring costs for the City of Montreal;
calculation of direct and indirect spin-offs from public and private investments (intersectorial model)
employment spin-offs;
benefit-cost analysis.

Results in terms of investments

In the event that all projects stemming from the Bonaventure Expressway redevelopment are carried, they would generate private investments of about $1.5 billion with the most conservative scenario, and $2.3 billion with the most optimistic one, This figure does not take into account those investments of over $1 billion already envisaged for tourist and recreational facilities (Entertainment Centre and Soccer Stadium)

PROJECTED PRIVATE INVESTMENTS 2005-2025 ($ M)

Option	Option Tunnel		Option Bridge	
Scénario	Optimistic	Conservative	Optimistic	Conservative
1. Technoparc / Cité-du-Havre	279,1	201,4	279,1	201,4
Résidential	-	-	-	-
Non-résidential[1]	264,1	186,4	264,1	186,4
Facilities planned[2]	15,0	15,0	15,0	15,0
2. Basins	1 627,4	1 411,0	1 635,3	1 414,1
Résidentiel	92,8	66,3	92,8	66,3
Non-résidential[1]	359,6	169,7	367,5	172,8
Facilities planned[2]	1 175,0	1 175,0	1 175,0	1 175,0
3. Pôle Peel / Faubourg des Récollets	1 607,8	1 092,1	1 454,1	1 054,8
Résidentiel	1 035,0	728,6	881,3	691,3
Non-résidential[1]	572,8	363,5	572,8	363,5
Facilities planned[2]	-	-	-	-
Total	3 514,3	2 704,5	3 368,5	2 670,3

Source: GENIVAR (2005)

1 –Office, retail and business uses included.

2 - Soccer Stadium and Entertainment Centre

The project's private/public ratio is derived from a comparison of total investments and infrastructure costs. Not count projects already announced (over $1 billion), the ratio would be 2 for the conservative scenario with the tunnel option and 2.8 for the conservative scenario with the bridge option.

As for the optimistic scenario with the tunnel option, the ratio obtained is 3.0, while that with the bridge option is 4.1.

Generally speaking, these ratios are similar to those found in comparable projects from Canada and abroad, such as that being planned for Toronto's Harbourfront area (ratio of 3), Old Montreal's revitalisation (ratio of 3) and London's Docklands (ratio of 4). If the ratio were calculated based on the effect of combining the announced projects along with the Bonaventure Expressway redevelopment project, the private/public ratio obtained would be between 3.5 and 6.3, depending on the scenario chosen.

ECONOMIC SYNOPSIS 2005-2025

Option	Option Tunnel		Option Bridge	
Scénario	Optimistic	Conservative	Optimistic	Conservative
INVESTISSEMENTS ($ M)				
Public[1]	768	768	533	533
Private[2]	3 514	2 705	3 369	2 670
Private / public Ratio	4,6	3,5	6,3	5,0
Avoided Costs[3]	120	120	120	120
GOVERNMENTS REVENUES ($ M)	1 117	890,8	1028,1	837,5
Government of Canada[7]	221	178	200	165
Government of Quebec[8]	564	452	512	419
City of Montreal[9]	331,9	260,8	316,1	253,5
Non-Recurring Revenues[10]	30,9	24,8	28,1	23,5
Annual Recurring Revenues[11]	40,4	31,2	37,9	30,2
Annual Recurring Costs[12]	(10,3)	(7,6)	(9,1)	(7,2)
ECONOMIC IMPACT				
Added Value[4] ($ M)	3 003	2 432	2 733	2 140
Labour				
Construction (person years)[5]	52 872	42 376	48 029	39 451
Supported Jobst[6]	41 420	25 657	41 460	25 704
COST-BENEFIT ANALYSIS ($ M)				
Net current value	117	(39)	258	129
Benefits actualized[13]	1 011	845	938	797
Costs actualized[14]	(894)	(884)	(680)	(668)
Cost-Benefit Ratio	1,13	0,96	1,38	1,19

SOURCE : GENIVAR

1- Construction costs estimated by SNC-Lavalin (2005)
2- Residential, non-residential and facilities projects included.
3- In order to maintain the current condition of the structure of Bonaventure Expressway, an investment of $120 million is required on a short-term basis for the whole stilted structure. Source: SNC-Lavalin (2005) from ROCHE (2004).
4- Presents the economic contribution of the project to country's GDP.
5- Presents direct and indirect economic benefits of employment related to construction work.
6- Presents the employees of the various companies which will be located in the area's new buildings.
7- Including income tax, incidental taxation and taxes.
8- Including income tax, incidental taxation and taxes.
9- Total of costs and municipal incomes on a 20-year term.
10- Including land sale, construction licence and transfer taxes.
11- Presents revenues from property taxes and grant in lieu of taxes.
12- Presents municipal maintenance and upkeep costs.
13- Total of the discounted benefits at a rate of 8% for society including increased land value (betterment), municipal revenues, maintenance costs reduction, avoidance of a $120 million major repair cost.
14- Total of the discounted benefits at a rate of 8% including infrastructure costs, municipal recurring costs and driving lost time.

For the various levels of government being asked to contribute to this large-scale project, tax spin-offs resulting from it would mean redevelopment is the preferred choice, rather than rebuilding the present expressway structure.

As for municipal investments, recurring revenues would greatly exceed recurring costs, regardless of the scenarios and options being studied. Depending on federal and provincial contributions to expressway redevelopment costs, within the project's 20-year period the City of Montreal would recover the value of its initial investment. At the outset the City of Montreal would obtain revenues from land sales, construction permits and transfer taxes, totalling approximately $24 million for the conservative scenarios and between $28 and 31 million for the optimistic scenarios. As for recurring revenues, or revenues drawn from property taxes and in-lieu taxes, they would amount to $19.5 million for the conservative scenarios and between $38 and 40 million for the optimistic scenarios. Finally, the City will have to assume recurring costs related to maintenance and management, amounting to just over $7 million for the conservative scenarios and between $9 and 10 million for the optimistic scenarios.

As for revenues expected from the Quebec and federal governments for direct and indirect spin-offs on investments in residential and non-residential construction, they are substantial. For Quebec, for the most conservative scenario (bridge option), spin-offs would amount to $419 million, with more than half this amount from residential and non-residential real estate projects. For the most optimistic scenario (tunnel option), spin-offs at term would amount to $564 million.

As for the federal government, according to the most conservative scenario (bridge option) it would earn $165 million. In the most optimistic scenario (tunnel option) incomes would increase to $221 million. This therefore means that governments would benefit from real estate developments stemming from the area's requalification, mostly those located close to the Peel Basin.

As for employment, infrastructure and real estate project construction would amount to between 39,451 and 52,872 person years, depending on the scenarios studied. Of these figures, nearly 13,000 jobs would be attributed to the construction of projected facilities such as the Entertainment Centre, the International Trade Fair Centre and the Saputo Stadium.

Finally, a cost-benefit analysis confirms that the project would be socially profitable for almost all scenarios. In fact, benefits would exceed costs, except for the conservative scenario with the tunnel option, where costs would slightly exceed benefits. Note however that several advantages could not be quantified and that their value might lead to increases in their net current values. These advantages would mainly benefit the tunnel option, impacting favourably on the visual environment and diminishing noise.

Moreover, should commercial and business areas be developed, about 25,700 jobs would be added for the two conservative scenarios and 41,400 for the optimistic scenarios, thus contributing to the rehabilitation of the overall sector. Note that more than 40% of these jobs would be located in the office buildings envisaged for areas bordering the Faubourg des Récollets.

Conclusion
Rarely do expressway corridor redevelopment projects have such a major impact on both the neighbourhood and the community. The Bonaventure expressway is the main gateway to Montreal's downtown core yet it crosses a totally unstructured neighbourhood, and thus limits any development potential there. This urban planning exercise, carried out within the context of an economic benefits study, has demonstrated that along the current expressway's corridor there is truly great potential for development. Over a 20-year period this would mean between 1.2 and 1.7 million square meters of available construction area. This potential would attract major real estate development, valued at between $2.7 to 3.5 billion. Additionally, given the economic spin-offs, the three levels of government could justify their investments through the revenues generated from construction as well as the recurrent revenues thereafter.

What are winning conditions for this project? First the infrastructure work needs to be implemented in order to open up development. As for which scenario to favour, the tunnel instead of the bridge would undoubtedly be the selection for strategic success. Over and above simply comparing direct costs and economic benefits, its infrastructures constitute a visual impact of that should not be underestimated, nor their consequent power to encourage investors to develop. Choosing a bridge, unless it be an exceptional architectural project with a price tag far beyond reach, would risk diminishing the effects of changes made in this sector. Other impacts such as noise would also have to be taken into account, specifically with respect to their affect on tourist activity and access to the basins.

Finally, regardless of the scenario selected, all hypotheses lead to the conclusion that redeveloping the Bonaventure Expressway provides a unique opportunity to enhance these sites and stimulate real estate and economic development in the area. The result would be a better link between the central core, the Peel Basin and the riverfront. This project, designed to extend over a 20-year period, will be listed among a line of many others that have greatly contributed to Montreal's transformation over the last two decades. It would rival other projects such as the revitalisation of Old Montreal and its neighbourhoods or Montreal's International District, a reference project in urban renewal.

Redevelopment of the Bonaventure Expressway: the very essence of a catalyst project:

- *a project that will create employment and economic spin-offs throughout its history:*
  - *40,000 person-years of employment*
  - *more than $2 billion to be added to Quebec's GDP*
- *a project with incomparable growth potential:*
  - *more than $2.7 billion in private investment accomplished throughout redevelopment;*
- *a project that will provide an excellent return on taxpayers' investment:*
  - *in 20 years, government revenues will exceed the $768 million initially investment*